SECTION 2

SITE

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SECTION 2

SITE

This chapter primarily describes the site characteristics for the Beaver Valley Power Station as they existed when the facility was licensed. As such, current site characteristics may not agree with these descriptions. The site characteristics described here include description and demography, meteorology and climatology, hydrology, geology, seismology, soil mechanics, site structure design data, and environmental radiological monitoring program. This information was gathered to support or develop the original plant design bases. Chapter 2 also contains evaluations of these site characteristics demonstrating how applicable siting criteria were met at the time of original licensing of the facility. This information was accurate at the time the plant was originally licensed, but is considered historical and is not intended or expected to be updated for the life of the plant.

In the past, minor changes to site characteristics have been incorporated into Chapter 2. While updates were not required, these changes have not been removed. Therefore, some parts of this chapter reflect more recent information.

2.1 DESCRIPTION AND DEMOGRAPHY

2.1.1 Location and Description[1]

The Beaver Valley Power Station Unit No. 1 (BVPS-1) is located in Shippingport Borough, Beaver County, Pennsylvania, on the south bank of the Ohio River. The site is approximately one mile from Midland, Pennsylvania, five miles from East Liverpool, Ohio, and approximately 25 miles from Pittsburgh, Pennsylvania. The coordinates are 40°37' 18" north and 80°26' 2" west. The Universal Transverse Mercator coordinates are 547,900 meters east and 4,496,680 meters north. Figure 2.1-1 shows the general site location out to a radius of 200 miles.

The site comprises approximately 453 acres including 26 acres of right of way. Also on the site and immediately to the west of the reactor location is the former site of Shippingport Atomic Power Station (SAPS) which was managed by Duquesne Light Company for the Department of Energy (DOE). The SAPS terminated operations October 1, 1982, and was dismantled by the USDOE. Immediately to the east of the BVPS-1 reactor location, and also onsite is the Beaver Valley Power Station Unit 2 (BVPS-2). Figure 2.1-2 is an aerial photograph of the Beaver Valley Power Station site. Local site topography, site boundary and exclusion radii are shown in Figure 2.1-3.

The Pennsylvania Department of Transportation has a right-of-way across the easterly end of the property on which is constructed a portion of Route 168 including the southerly approach to the Shippingport Bridge.

The site area and adjacent Ohio River provide a minimum exclusion radius of 2,000 ft. The property boundaries also define the nearest approach to the reactor upon which the Offsite Dose Calculation Manual limits on gaseous effluents are based. Gaseous releases will occur at the BVPS-1 primary auxiliary building, containment building, and at the BVPS-1 cooling tower. The shortest distance to the site boundary from the containment building is 2,000 ft to the northeast and from the cooling tower is 1,380 ft to the east-northeast. The nearest occupied residence is approximately 2,100 ft from the reactor location.

Phillis Island lies approximately 400 ft off the shoreline of the site. The previous owner of the island, Dravo Corporation, agreed in 1955 not to use or permit the use of the land for any structure, place or area where the public at large can assemble. This agreement was binding on Dravo Corporation and any future purchaser or lessee until March, 1994. A new agreement, extending the expiration date to 2010 and further delineating the uses which can be made of the island, has been negotiated. Phillis Island was sold to the United States of America in 1990 and through the purchase agreement is bound by the uses which can be made of the island as described in the previous agreement.

The Freeport Development Corporation purchased approximately 46 acres from DLC in 1995. This land, located along the southern site boundary, includes 7.4 acres which are within the 2000-foot exclusion area boundary. A legal agreement binding on Freeport Development Corporation as on any future purchaser or lessee delineates and restricts the uses which can be made of the land.

The site boundary is shown in Figure 2.1-3. Within the site boundary are restricted areas which are areas to which access is limited for the purpose of controlling exposure to radiation and radioactive material. A description of restricted area locations can be found in radiation protection procedures.

Periodic monitoring of external dose rate levels and environmental sampling in the area adjacent to the river's edge and around the perimeter of the restricted area are included as part of the surveillance program (see Section 2.8).

Gaseous releases from BVPS-1 will occur at the containment building, cooling tower, and auxiliary building. With the exception of the northeast corner of the site, near the center of which the station is located, the site area is very hilly. It rises from the river, which has a normal pool El. 664.5 ft above mean sea level (MSL), to a maximum El. 1160 ft above MSL. Prior to grading, the station location consisted primarily of three terraces: a high level terrace at El. 735 ft on which the reactor containment is located, an intermediate terrace at approximately El. 690 ft, and a low level terrace at El. 675 ft. Site filling has been done to provide a bench at El. 707 ft riverward of the station on which the transformers are placed. Site drainage is primarily to the river, but with some drainage in the northeast portion of the site to Peggs Run, a small stream which enters the river at a point just west of Route 168.

2.1.2 Population

The distance and direction to population centers that have more than approximately 20,000 inhabitants and are located within 50 miles of the site are listed in Table 2.1-1. The nearest such population center is East Liverpool, Ohio, with a population in 1970 of 20,020. The population of East Liverpool, and the majority of the other population centers in this area, decreased between the 1960 census and 1970 census primarily because the lack of industrial diversification resulted in a decrease in employment opportunities as the number of employees required in the basic iron and steel industry declined. This decreasing trend is expected to level off in the near future and then employment is projected to gradually increase as more emphasis is placed on nonmanufacturing activities such as trade and services[(2)]. It is therefore possible that the population of East Liverpool might, before the end of the plant life, increase to more than 25,000 and, thereby, meet the criterion for population center as defined in 10 CFR 100.3; hence, East Liverpool is conservatively taken to be the population center.

The nearest boundary of East Liverpool is approximately 4.7 miles west northwest of the reactor location. 10CFR100.11 requires that the population center distance be at least 1 1/3 times the distance from the reactor to the outer boundary of the low population zone (LPZ). From this develops the requirement that the outer boundary of the low population zone must be no greater than approximately 3.6 miles, which is the distance taken for the LPZ.

It should be noted, however, that 10CFR100 defines an LPZ on the basis of a minimum distance at which certain dose level would be obtained under postulated accident conditions. Rigorous interpretation of 10CFR100 gives an LPZ less than the 2,000 ft exclusion boundary.

The approximate distribution of the 1970 population based on census reports, topographic maps, aerial photographs, and field observation is shown in Figure 2.1-4, for 16 directional sectors and radial distances of 1, 2, 3, 4, and 5 miles from the station. Incremental and cumulative populations at these distances are listed in Table 2.1-2. Seasonal fluctuations in population are negligible, since there are no parks or recreation areas within five miles of the station. Daily fluctuations in population are also insignificant in this area since the large industries are on three shifts per day and a majority of the employees live close to their jobs.

Of the approximately 18,000 persons included within the 5 mile radius, 5,270 live within the Borough of Midland centered approximately 1 1/2 miles to the northwest of the site. The population of this Borough remained virtually constant at about 6,400 from 1940 to 1960. Since 1960, the population has decreased. Although there have been some local increases in population within the 5 mile radius, primarily in the rural areas above the Ohio River Valley, the overall growth rate is estimated to be less than 1 percent per year.

Table 2.1-13 provides the population distribution within 50 miles of BVPS-1 for 16 compass directions. The 1970 population is given along with projected population for each decade ending with an estimate for the year 2020.

The 1970 population data within 5 miles, as stated previously, is based on census reports, topographic maps, aerial photographs, and field observation.

Beyond the 5 mile radius, population estimates were based on 1970 census data(12) and the corresponding State maps, account being taken of the population estimated to be within 5 miles of the site. From the census map, it was determined which census units were within a given area and their corresponding fractions within that area. It was assumed that the population within each such unit was uniformly distributed.

Population projections for the years 1980, 1990, 2000, 2010, and 2020 are based on corresponding projections for the counties of three States concerned. It was assumed that each component or fraction of a county had the same decennial rate of growth as that for the county as a whole.

The projections for Pennsylvania counties were obtained from the Department of Development, Harrisburg, Pennsylvania. Those for Ohio counties were obtained from the State of Ohio, Department of Development. The West Virginia counties were obtained from the Department of Sociology, West Virginia University. In all three states, only projections from 1970 to 1985 were

available. Five year growth rates were determined from 1970 to 1975, 1975 to 1980, and 1980 to 1985. A decennial rate of growth was determined from this and applied to the actual 1970 population and each succeeding decade for that County.

The total population of Beaver County was approximately 207,000 in 1960 and 208,400 in 1970. A study prepared in 1970 by the Pennsylvania State Planning Board(6), before the 1970 census data was available, projected a slight decrease in the population of Beaver County between 1960 and 1970 and then an increase to a population of 220,000 in 1990. The final 1970 count indicates that the State Planning Board was conservative in its estimates. The comprehensive economic studies carried out by the Southwestern Pennsylvania Regional Planning Commission (SPRPC)(5) forecasts a continuing increase in the regional population through the year 2000 with a growth rate of approximately 1.0 percent per year. The population growth in Beaver County is expected to be in the suburban areas in the eastern and central part of the county, largely as a result of new highway development; the growth in the vicinity of the site is expected to be very slight.

Figure 2.1-5 shows the 1960 and 1970 censuses and the projected 1990 population in 8 directional sectors out to a 50-mile radial distance from the station. The 1990 projections are based on population trends observed in the 1940 to 1970 period and on State and regional population forecast studies(6)(7)(8) for the counties within the area of interest. The City of Pittsburgh and the other major population centers showed a decrease in population between 1960 and 1970. Increases were registered in the suburban areas surrounding the cities, but the overall trend was for a slight decrease in the regional population.

Major public facilities in the vicinity of the site are presented in Table 2.1-3. The only large public facilities within five miles of the site are schools. The effect of the public facilities on population distribution is negligible. These facilities are utilized by the local population. The effect of these facilities, such as schools, is to temporarily concentrate the distributed population. Parks near the site are listed in Table 2.1-3. The largest park is Raccoon State Park, eight miles south of BVPS-1. In 1970, total attendance at the park was 480,000 people.(9)

2.1.3 Land and Water Use

BVPS-1 is situated in an area characterized by the sharp contrast in land use between the river valley area transversing the region, and the inland countryside. The Ohio River Valley can be described as being a highly industrialized area in comparison to the inland areas which can be best described as being rural in character.

2.1.3.1 Industry

The general area in which BVPS-1 is located is part of the large Pittsburgh industrial complex, which is centered about the City of Pittsburgh. The combination of available raw materials, product markets and transportation facilities led to the development of the region as a major industrial center with the manufacturing of iron and steel being the most important factor in the region's economy. The heavy industries have settled, for the most part, on the flat shelves of land adjacent to the rivers. The steep slopes of the river valley have, for the most part, contained industry close to the banks of the river. This led to the development of the river mill town. The railroads also located next to the river and the commercial and residential areas, restricted by the topography of the river valley, stretched out in a linear pattern along the river.

In Beaver County, 67 percent of the total industrial labor force is employed in the primary metals group - blast furnaces, steelworks and rolling mills. The second largest industry, with 11 percent of the labor force, is the fabricated metal products group, especially fabricated structural steel. The electrical equipment industry employs eight percent of the labor force, while the stone, clay, glass, and concrete industries employ four percent. The other major industrial activity is the chemical group which employ three percent of the labor force.

The industrial giant in the region, and by far the largest employer with close to 12,000 employees, is the Jones & Laughlin Steel Corporation in Aliquippa, about ten miles east of the Beaver Valley site. The world's largest electrically controlled railroad classification yard is located at Conway, across the river from Monaca. The Shippingport Atomic Power Station (now decommissioned), operated by the Duquesne Light Company, adjacent to the Beaver Valley Power Station, was the United States' first commercial nuclear power station. The nearest industrial activity to the site is the steel mill complex located in Midland, between one and two miles northwest of the site, where over 6,000 persons are employed. There is one industrial operation located in Shippingport Borough. It is a coal mining company, employing 60 people, which operates a deep mine and coal washing facilities located about one mile southwest of the entrance of the site.

The urban complex of East Liverpool, Ohio, including Chester and Newell, West Virginia, begins about five miles west of the site and stretches for several miles down the Ohio River. The East Liverpool area industrial base is dependent on pottery and steel for most of its employment. At one time, East Liverpool was known as the pottery center of the world, but foreign competition and the use of plastic materials for tableware has resulted in a decline in the pottery industry.

Table 2.1-4 lists the major employers in the area surrounding the site, while Table 2.1-5 shows statistical data for manufacturing industries in Beaver County.

Mineral resources including coal, clay, gas, oil, sand, and gravel are found in the region surrounding the site. Bituminous coal is the most important mineral being extracted and coal reserves are considered to be extensive. However, relatively few workers are engaged in mining operations and the employment forecast is for a decline in mining employment as the use of automated mining techniques increases. In Beaver County, deep mining is the predominant method for getting the coal out of the ground, although extensive areas of strip mining are found within the region especially in northern Beaver County and in northern Washington County.

The total number of persons employed in southwestern Pennsylvania is projected to increase 42 percent by the year 2000 according to a study prepared by the Southwestern Pennsylvania Regional Planning Commission (SPRPC). However, not all industry groups will experience this growth. Historically, the southwestern Pennsylvania region has been a heavy industry center dominated by the manufacture of iron and steel. The employment forecast for the region, shown in Table 2.1-6 indicates that in the manufacturing category employment gains in fabricated metals, machinery and transportation equipment will be offset by declines in basic steel production and in the stone, clay, and glass industries. The net result will be a stabilization or even a slight decrease in the number of persons employed in manufacturing production jobs. Employment statistics for the southwestern Pennsylvania region show that this trend has been in effect for the past several years. Factors contributing to this trend have been the increased use of automation, foreign competition, dispersion of markets and the development of steel making capacity in other areas of the country. While employment has decreased in the basic

steel industry, the productivity per worker has increased as well as wages and salaries and the value of production.

Employment in the non-manufacturing jobs is projected to grow by almost 70 percent in the next three decades. As shown in Table 2.1-6, the largest growth will occur in services and government.

Storage tank facilities for gasoline and oil are mostly located along the river. The closest oil tanks are in Midland, Pa. directly across the river from the site.

Industrial plants near the site store relatively small quantities of toxic gases such as chlorine. The Midland Water Treatment Plant utilizes chlorine. No significant quantities of propane or LPG are stored within five miles of the site.

Up to 1 ton of explosives may be stored by the Peggs Run Coal Company. This supply is replenished about every three weeks. The coal mine is an active project. Dynamite is shipped by a 3/4 ton pickup truck or a small van from the Austin Powder Company in Evans City, Pa., via Route 168. The Peggs Run Coal Company is about one mile southwest of the site and is shielded by the large hill to the south of the site.

2.1.3.2 Transportation

The region is served by five transportation systems: waterways, railroads, highways, air and pipelines.

The first major transportation system was the rivers. The early economic growth and pattern of development of the region was inextricably tied to the rivers. After 1860, the rivers gradually diminished in importance as a transportation system and the railroads became the primary carriers of industrial materials. However, advances in technology such as, first, steam, and then, diesel power plus a program of building locks and dams to improve navigation led to a revival in river traffic. In 1910 the volume of goods hauled on the rivers was only 7 percent of the combined river and railroad traffic but by 1969 had risen to close to 40 percent. In 1960 the tonnage of freight handled on the upper Ohio River was 22 million tons. By 1969 the tonnage had risen to 33 million tons. The locks at Montgomery Dam, located three miles upriver from the site, recorded 6,574 commercial lockages for 1970. The commodities shipped on the waterways include coal, coke, petroleum, sand and gravel, steel products and chemicals. A map showing the normal river channel used for barge traffic is shown on the U.S. Army Engineer District Charts, Figures 2.1-8, 2.1-9, 2.1-10, and 2.1-11.

The bulk of industrial materials are transported by the railroads. The placement of the rail lines was governed by the topography. Because the railroads needed level and continuous corridors, they followed essentially the same courses as the rivers and streams. One of the first rail lines in the region ran from Pittsburgh up the eastern bank of the Beaver River to the Great Lakes region. That line is one of the main Penn Central lines. The world's largest electrically controlled railroad switching yards, capable of handling 10,000 cars per day, is located on this line at Conway about ten miles east of the site. Another heavily traveled Penn Central line follows the north bank of the Ohio across the river from the station site. There is also a Penn Central right-of-way on the site. This line is of minor importance since the line is controlled by the licensee and its use is limited to the servicing of the Beaver Valley Power Station. The railroad west of the site has been abandoned by the Penn Central Railroad. There are no

through shipments. The railroad siding is leased by the licensee and serves only the site. The railroad on the north side of the Ohio River is approximately 1,200 ft from the site.

The type of quantity of toxic gases that may be transported within one mile of the plant site was not determined at the time of the pre-operational phase investigation because of data availability limitations. Sources consulted in an attempt to secure this information include:

1. U.S. Environmental Protection Agency - Boston Office
2. U.S. Environmental Protection Agency - Philadelphia Office
3. Interstate Commerce Commission - Philadelphia Office
4. Interstate Commerce Commission - Washington, D.C. Office
5. U.S. Department of Transportation, Office of Hazardous Materials
6. U.S. Department of Transportation, Harrisburg, Pa. - Motor Transportation Dept.
7. U.S. Coast Guard - Louisiana
8. Union Barge Lines - Pittsburgh, Pa.

All nongovernment information available prior to the operations phase is included in the Attachment to Section 2.1.

In the event of transportation accident involving toxic gas, emergency air breathing apparatus is available to control room occupants. These precautions will help minimize the effects of the accident.

State Highway 68 provides the main access from the residential areas east of the site to the industrial complexes along the north bank of the Ohio River. State Highway 168 from the south follows roughly along the northeast and east corner of the site and, crossing the Shippingport Bridge, joins Highway 68 immediately across the river from the site. State Highway 18 provides additional access to the east of the site while U.S. Route 30 passes by three miles southwest of the site.

The nearest Interstate highway to the site is the Pennsylvania Turnpike (I-76) which runs through the northeastern section of Beaver County about 15 miles northeast of the site. Interstate 79 is located about 18 miles east of the site while Interstate 70 which goes through Wheeling, West Virginia, is about 30 miles to the south. Figure 2.1-6 shows the local area highway map.

The modern development of the local area as well as the region as a whole has been hampered by an outmoded highway system. The topography of the area and the location of the communities dictated that the early roads would be located in the river valleys. The intense industrial development and the high population density in the valleys resulted in increasingly congested conditions with the rapid growth in auto and truck traffic. The Beaver Valley Expressway (Route 60) which is presently open from Greater Pittsburgh Airport to 2.5 miles past Vanport, Pennsylvania, will help to alleviate this situation as it will provide the first four-lane, limited access highway between the industrial centers of Beaver County and Pittsburgh. The Expressway traverses north to south about six miles east of the site.

The most important airport in the region for passenger and freight service is the Greater Pittsburgh International Airport, located about 15 miles southeast of the site. Local airports in the vicinity of the station are given in Table 2.1-7. The airspace above BVPS-1 is in the direct path of the Victor 103 airway used by aircraft flying between 1,200 and 14,000 ft between Cleveland and Pittsburgh.

The area is also served by pipelines carrying natural gas and petroleum products. There are six pipelines crossing the site: One natural gas pipeline and five petroleum product pipelines.

The pipelines were completely relocated prior to the initial startup of BVPS-1 in 1976. Figure 2.1-12 indicates the current routing of the various oil and natural gas pipelines in the vicinity of BVPS-1.

All of the aforementioned pipelines are provided with a minimum earth cover of two feet of soil.

2.1.3.3 Farming

The countryside inland from the river valley in the vicinity of BVPS-1 can be considered rural in character. Of the total land area of Beaver County (282,000 acres), 48 percent is forest and 29 percent is crop and pasture land.

Beaver County was never a major agricultural area even when compared to other counties in the region. Before the Industrial Revolution, farming provided sustenance for the early settlers leaving little surplus for sale or export. Most of the farms are located in the rolling hill country where the soil is thin and not as fertile as the bottomlands, but little farming is done in these fertile areas as the floodplains have been usurped for industrial, commercial and residential purposes. Beaver County is considered a semiagricultural area and farming is not of great economic importance. Less than one percent of the labor force is employed on farms and the wages and salaries received there from are about 0.08 percent of the total personal income in the county. Still, as shown in Table 2.1-8, Beaver County farms produced cash receipts in 1969 in excess of 4.5 million dollars. Dairy products ranked first and other livestock and poultry products ranked second in value. The number of farms is declining and in 1969, there were an estimated 750 farms in the county. Although there has been a modest gain in the value of farm production, the number of farms is expected to decline even further in the future as small, marginal farm operations are eliminated and the amount of farm land is reduced by urban expansion. The principal agricultural products grown or produced in Beaver County is presented in Table 2.1-9a and 2.1-9b.

The Ohio River is a major natural resource in this region. In addition to supplying water to industry and towns in the valley and transportation for bulk freight in and out of the region, it serves as a source of recreation for fisherman and boaters alike.

Pleasure boating takes place during the warm months of the year although access areas and marine facilities are limited along the stretch on the Ohio between Beaver, Pennsylvania and East Liverpool, Ohio. Montgomery Dam locks, 3 miles up river from the site, recorded 2,035 pleasure boat lockages in 1969; however there were undoubtedly a greater number of boats using the river during the year which did not use the locks. Although there is no extensive commercial fishing activity on the Ohio River, there is some sport fishing activity taking place on the Ohio River and other lakes and creeks in the area. This is indicated by the 14,059 fishing licenses sold in Beaver County during 1969. Studies of the fish population have shown that there are 19 species present in the river near the site[(10)]. Most of these, by weight or by number, are among the coarser varieties such as carp and catfish. Table 2.1-10 lists the FWQA unpublished data on a fish survey at the Montgomery Dam[(10)].

Inspection of this table shows that carp make up over 67 percent of the sample with bullheads, channel catfish and gizzard shad representing approximately 25 percent. Gamefish species make up slightly more than five percent of the sample.

Other fishing areas within five miles of the site are listed in Table 2.1-11 including the species of fish found in these areas.

2.1.3.4 Military Installations

The nearest military installation is adjacent to the Greater Pittsburgh International Airport, about 15 miles southeast of the station.

2.1.4 Potable Water Sources

The nearest user of the Ohio River as a potable water source is Midland Borough Municipal Water Authority. The intake of the water treatment plants is approximately 1.3 miles downstream and on the opposite side of the river from BVPS-1.

East Liverpool, Ohio and Chester, West Virginia are the next downstream users of the Ohio River as a potable water source. Table 2.1-12 presents the communities and the population served by municipal water treatment plants which use the Ohio River as their source of potable water. The heavy industries in Midland as well as others further downstream use river water for cooling purposes. Some of these plants also have private treatment facilities of plant sanitary water. Normal operation of BVPS-1 will have no adverse effect on these river water users.

There are also some 42 wells (principally drilled wells) within five miles of the plant[(11)]. The nearest wells are to the east in Shippingport Borough. Transport of radioactivity to ground water supplies is prevented by the site drainage to the Ohio River and by the general ground water flow which is also in the direction of the river.

2.1.5 Toxic Substances

Based on the 1972 edition of "Toxic Substances" issued by the U.S. Department of Health, Education and Welfare, the following toxic substances will be stored at the Beaver Valley plant site: hydrazine, morpholine, phosphate, boric acid, etc. If the toxic substances are released in an uncontrolled manner, neither the capacity nor location of any toxic substances would prevent or compromise the ability of the facility to shutdown in a safe manner and maintain a safe shutdown condition. Storage areas are located so that they do not compromise any safety-related equipment or the operator's environment in a safety-related area (i.e., the control room).

2.1.6 Stored Gases

Table 2.1-14 lists the vessels used for storage of pressurized gas at BVPS-1. The service operating, design and maximum pressure, location of vessel, and total energy stored are shown in the table.

All storage vessels, except for propane gas storage and air storage tanks for the diesel generator, are not located adjacent to equipment essential for maintaining a safe reactor shutdown.

Nitrogen makeup is provided by a tank truck supply located adjacent to the South Coolant Recovery Tank Cubicle (BR-TK-4B).

Missiles generated by the propane storage tanks and the air storage tanks in the diesel generator structure are discussed in Section 5.2.6.

All storage vessels have provisions for relief protection. This protection precludes any missiles generated from accidental rupture of tanks caused by overpressurization.

The vessels are protected from truck lanes or heavy vehicle traffic. No heavy loads are transported over vessel storage areas.

There are no exceptions or deviations taken to Occupational Health Administration OSHA 29 CFR 1910 Subpart H-Hazardous Material Sections 1910.101 Compressed Gases, 1910.103 Hydrogen and 1910.104 Oxygen, Subpart M-Compressed Gas and Compressed Air Equipment Section, 1910.166 Inspection of Compressed Gas Cylinder, 1910.167 Safety Relief Devices for Compressed Gas Cylinders, 1910.168 Safety Relief Devices for Cargo and Portable Tanks Storing Compressed Gases, 1910.169 Air Receivers.

2.1.7 Evaluation of Potential Accidents

The safety evaluations presented in Sections 2.1.7.1 through 2.1.7.11 are intended to show that the plant may be operated safely under the postulated occurrences. The safety evaluation will show that the source of water will withstand loss of safety function:

1. Any one of the most severe phenomena expected, taken individually
2. The site related events (e.g., transportation accident, river diversion) that historically have occurred or that may occur during the plant lifetime
3. A single failure of man-made structural features.

2.1.7.1 Potential Impact of Barges or Ice on the Intake Structure

The intake structure is not expected to be subjected to the type of collision damage that might occur as a result of a loose barge floating downstream during normal river flow at or near normal pool level. A barge floating downstream must avoid the state highway bridge abutment and supporting pier and the projection formed by an abandoned barge slip in order to impact on the intake structure when the pool level is within a range of El. 664.5 ft to an approximate flood level of El. 680 ft.

For higher flood levels when the south bank is flooded, together with accompanying storm conditions, barges may be postulated to break loose from tows and upstream moorings. Under such conditions, the impact of a single runaway barge may be assumed. The largest possible barge considered for maximum potential impact is the 55 ft by 300 ft jumbo cargo barge with a displacement of 3900 tons. This type is the largest transient barge passing the station at the present time. It is also the largest barge expected to be in this area during the lifetime of the station because of size limitations imposed by the dams and locks of the flood control system for the Ohio River[13].

The characteristics of the postulated impact barges, velocity, elevation, and type of impact producing maximum damage to the structure, as well as other pertinent information and impact criteria, are given in Figure 2.1-14.

For the Probable Maximum Flood (PMF) with coincident wave action, the air ducts, (both the concrete air intake and portable metal exhaust duct) are designed to withstand the dynamic effects of the postulated dynamic wave loading given in Section 2.3.8. This loading is identified under Section 2.3.8.3 entitled "Computation of Wave Forces on a Vertical Wall."

Safety-related facilities at the intake structure such as the ventilation exhaust ducts will be protected against waterborne missiles in addition to the static and dynamic effects of wave action as further discussed in Section 2.3.8.

Portions of structures which are tornado missile protected were not considered in this analysis since the tornado missile is more limiting. Larger waterborne missiles are not considered since it is expected that they will not be carried by wave action above El. 730 ft.

The roof of the intake structure, two ft thick, is adequately reinforced to carry any surcharge added by the waves.

The impact of ice on the intake structure does not present a hazard to the safe operation of the plant. The size of ice blocks that have historically been observed is discussed in Section 2.3.9.

2.1.7.2 Accidental Release of Corrosive Liquids or Oil

The Department of Transportation computer printout of hazardous materials incidents in Pennsylvania, from January 1971 through August 1972, is included in the Attachment to Section 2.1. While no incidents are reported as happening at Shippingport, nor in the immediate area of Shippingport, some of the types of corrosive liquids that might be found in the river are: sulfuric acid, benzene, cleaning compound, xylene, hydrochloric acid, hydrogen peroxide, toluol, ammonium nitrate, and caustic soda. These corrosive liquids could come from a postulated barge, rail, or highway accident near the intake structure of the BVPS-1. The plant materials which would be exposed to transient concentrations of these liquids are: 90-10 copper nickel, stainless steel, carbon steel, bronze, and neoprene.

For calculation purposes, it is assumed that a slug of spilled soluble chemicals is formed in the river and that this slug does not contain significant concentration gradients. Plant components are assumed to be subjected to a transient homogeneous slug of corrosive liquid diluted by the intake water flow for one unit in operation.

It is postulated that, under worst conditions, the entire event will be limited to an exposure of plant components to any single corrosive which has a concentration equivalent to 50 gpm of the concentrated liquid mentioned above in 27,950 gpm of water. Furthermore, it is postulated that the maximum duration of exposure will be 200 minutes (3 hr 20 minutes). Under these postulated conditions, 10,000 gallons of the concentrated corrosive liquid will pass into the plant. The fluid temperature will vary between ambient and 130 F with an average temperature of 106 F.

Under these conditions, the concentrations of the specific corrosive chemicals will be:

1.	Hydrochloric Acid	0.088 weight percent chloride ion 748 ppm 0.024N
2.	Sulfuric Acid	0.326 weight percent 0.066N
3.	Sodium Hydroxide	0.066 weight percent 0.016M
4.	Ammonium Nitrate	0.059 weight percent 0.00737M
5.	Hydrogen Peroxide	0.059 weight percent 0.0173M

Xylene is less dense than water and insoluble. It will not enter the intake structure which is located 5 ft below the normal pool elevation.

Benzene and toluol are also less dense than water, but it is assumed that the intake structure might capture either substance to the limit of their solubilities which are:

1. Benzene 0.082 weight percent

2. Toluol 0.047 weight percent

Due to the low concentrations, temperature, and limited time of exposure, no measurable corrosion would be encountered by any of the components which would be exposed.

The accidental upstream release of oil does not present a hazard to the safe operation of the plant. Oil released from a postulated pipeline break, storage tank rupture, or barge spill will float on the surface of the water rather than enter the intake structure through the intakes which are 5 ft below the normal water surface. In addition, the river water pumps are submerged by 24 ft; the fire pumps are submerged by 21 ft; and the service water pumps are submerged by 23.5 ft. The depth of submergence alone makes it extremely improbable that oil would be drawn into the intake structure. In addition, the approach velocity is a maximum of about 0.2 fps as water passes under the curtain wall. The detection and isolation of the pipelines shown in Figure 2.1-12 is summarized in Table 2.1-15.

Thermal Hydraulic Considerations of Oil Ingestion

Oil ingestion is extremely unlikely from a subsurface oil line break. The closest subsurface oil line is the 10 inch Buckeye pipeline which has since been abandoned and replaced with a newly routed pipe line; however, the provided evaluation continues to bound all other subsurface oil lines near the site. This line is approximately 300 ft upstream of the intake structure. The oil pipeline will be isolated in one hour or less as described in Table 2.1-15. To evaluate the effects of pipeline failures, it was considered that 100 percent of the normal flow of the Buckeye pipeline, upstream 300 ft, is ingested for 1 hour.

The theoretical considerations are those of possibly increased component cooling heat exchanger tubeside fouling and reduced tubeside film heat transfer coefficient, and possibly reduced pumping flowrate. The normal flowrate of the Buckeye pipeline is 1,150 bbl per hr. If 100 percent of the flow from this postulated pipeline break went directly into the intake structure with zero dispersion, it would comprise 2.94 percent of the normal flow.

Fouling is a function of time, temperature, and velocity relationship. Since the water flow in the heat exchanger tubes has a sufficiently high design velocity and is being heated slightly while in the tubes, and since the incident under consideration is of such short duration, there will be no measurable change in the fouling resistance.

The small percentage of oil in the water (1 to 3 percent) will have no measurable effect on the physical properties of the cooling water. There would be no measurable change in the tubeside film heat transfer coefficient, or the pumping capacity of the service water pumps.

Material Consequences of Oil Ingestion Into River and Raw Water Systems

The materials selected for the river and raw water systems are: AL-6XN, 304 stainless steel, carbon steel, 90-10 copper nickel, bronze, and neoprene. With respect to corrosion, the material shown in Table 2.1-16 utilize crude oil as the design fluid.

The data presented in Table 2.1-16 represents corrosion rates experienced under conditions much more severe than is projected for the postulated accidents. Even under the more severe conditions, the reported corrosion rates demonstrate that plant safety would not be jeopardized since ingestion time is limited to one hour.

2.1.7.3 Explosion of Chemicals, Flammable Gases, or Munitions

Explosions due to chemicals, flammable gases, or munitions may be assumed to occur in the normal river channel, along railroad rights-of-way, or along the State Highway. While the plant operating personnel have no control over the transportation of hazardous materials near the site, there are general rules and regulations governing the "Acceptance and Transportation of Hazardous Materials" and "Specifications for Shipping Containers", as discussed in the Attachment to Section 2.1. While these accidents could occur, the normal methods of handling and the normal distances from the plant mitigate the unlikely event of an explosion near the site. It is difficult to postulate an unlikely accident that generates a missile with greater kinetic energy than the design basis missile (a 35-foot utility pole traveling at 150 mph) near enough to any safety-related equipment to cause any significant damage as can be seen below:

Safety-Related Structure	Separation
Control Room	2,065 ft to Penn Central Rail- road Right-of-Way, 710 ft to Intake Structure
Intake Structure	800 ft to Ohio River channel, 1,355 ft to Penn Central Rail- road Right-of-Way, 1,170 ft to State Highway, Rt. 168
Auxiliary Building	1,250 ft to State Highway, Rt. 168.

Explosives Used in Coal Mines

The use of safety explosives[14] is almost universal in coal mining. High explosives are used only when great shattering effect is desired[14]. To be ultraconservative, it is assumed that the postulated one ton of explosives are high explosives. Examples of high explosives are TNT and dynamite. From the text and graphs of Reference 15, it appears that peak dynamic pressure will be much less than 0.1 psig. Therefore, no analysis of these negligible forces on plant structures is presented. Only very new, so-called "camper special" trucks in the 3/4 ton rating have a 9,000 lb gross vehicle weight (GVW) rating. Nearly all are 7,500 lb GVW. A recent 7,500 lb GVW rated 3/4 ton truck, stripped to as light a weight as possible (1 gallon of gas, no spare tire, and no bumpers) weighed 4,312 lb. In road trim, the truck weighed 4,570 lb. A 9,000 lb GVW rated truck will weigh more. However, the referenced 3/4 ton truck is hypothesized to carry 4,500 lb of high explosives such as TNT or dynamite.

TNT and dynamite are too insensitive to be detonated by means of impact, friction, or the brief application of heat[16]. Despite the existence of administrative procedures and regulations prohibiting simultaneous shipment in the same vehicle of initiators (e.g., blasting caps) and high explosives, the hypothesized accident involves the high order detonation of 4,500 lb of TNT on a plane, perfectly reflecting surface with a target 1,000 ft away. In accordance with Reference 20, a peak dynamic pressure of less than 0.1 psi, a peak overpressure of 1.0 psi under inversion conditions, and 0.4 psi under neutral conditions have been calculated. However, it is considered that the terrain effects are such that the peak overpressure will be, at most, 0.1 psi.

Barge and Cargo Tank Combustion

The attachment to Section 2.1 gives the capacity of the largest liquid cargo tank barge as 907,000 gallons with a width of 50 ft and a length of 290 ft. Barges of this size have their holds divided into 12 to 24 compartments to reduce sloshing and cargo shifting[17]. For purposes of this evaluation, the number of subcompartments will be taken to be 12 instead of 24 so as to yield a final answer which will indicate a higher damage than will actually be the case. Thus, the volume containing a gas and air mixture used as basis for calculation for this evaluation will be taken as:

$$(907{,}000 \text{ gal}) \left(\frac{1\,\text{ft}^3}{7.48\,\text{gallon}}\right)\left(\frac{1\,\text{barge}}{12\,\text{subcompartments}}\right) = 10^4\,\text{ft}^3 \qquad (2.1\text{-}1)$$

U.S. motor gasolines have average values of Reid vapor pressure ranging from 8.9 to 11.9 psi[16], which results in their Coast Guard classification as Grade B[18]. Cargo tank barges, in which Grades A, B, and C liquids are to be transported, are required by the Coast Guard to be fitted with either an approved system of pressure vacuum relief valves, an approved venting system, or an approved inert gas system "for maintaining all cargo tank vapor spaces nonflammable"[18]. Documented unequivocal assurance that all empty gasoline barges on the Ohio River will be inerted has not yet been obtained from the Coast Guard; however, it does appear that as the older tank barges are taken out of service and replaced by newer barges that the probability of finding a noninerted empty gasoline barge decreased from already low values. However, it is assumed that the hypothetical empty gasoline barge is not filled with inert gas.

Tank vessels construction prior to July 1, 1951, vented at 4 psig or less, are to be constructed and tested as per Reference 18. Cargo tanks vented at over 4 psig are considered to be "pressure vessels" and are subject to extremely rigid requirements. Tank vessels constructed on, or after July 1, 1951, may be vented at over 4 psig but less than 10 psig only under "special consideration by the Commandant"[18]. Over 10 psig vented cargo tanks in post July 1, 1951, cargo tanks are "pressure vessels" and subject to the special restrictions noted in Reference 18, Part 32. Considering the age of most of the cargo barges, 4 psig venting is a reasonable value. To be conservative, venting at 10 Psig was assumed.

Composition of the Gas in the Cargo Tank

The vapor-liquid ratio of gasoline extrapolates to zero at approximately 130 F[16]. As shown in Table 2.2-2, the maximum temperature at Pittsburgh Airport was 103 F in July 1936. Hence, there should be zero volatilization of the gasoline in a barge on the Ohio River. However, the C4-, C5-, and C6-compounds, dissolved in the gasoline to some degree, will come out of solution and form vapors. This mix of hydrocarbon gases and air may be closely approximated in combustion properties by assuming a butane/air mix, since the addition of small amounts of "promoters" (e.g., diethylperoxide, ethyl nitrate, nitrogen peroxide, nitromethane, ether, acetaldehyde, methyl iodide, and ethyl borate), has negligible effect on the physical properties of the mix[19]. Tetraethyl lead narrows the range of flammability[19].

Burning Rate

The maximum intensity of combustion for any gas occurs for a mixture having a composition lying between the theoretical mixture and the mixture having the maximum flame velocity[20]. The theoretical mixture is calculated to be 6.15 percent[20]. The mixture for maximum flame velocity appears to be near, but lower than the theoretical mixture[20]. For light hydrocarbons, the mixture for maximum flame velocity is very near the arithmetic mean of the two limits for downward propagation. These limits are 1.92 vol percent and 5.50 vol percent[21], and their arithmetic mean is 3.71 vol percent. Thus the mixture for maximum velocity will have a gas concentration ranging from 3.7 percent to about 4 percent, and the mixture for maximum intensity ranging from a lower value of 3.7 to 4 percent to an upper value of 6 percent. The mixture is assumed to be five percent. Reference 20 provides basis for estimating the flame velocity for this mixture to be 1 to 1-1/2 fps at atmospheric pressure, while the preferred Reference[22] gives a maximum flame velocity for a butane/air mixture as 1 fps. Thus it appears reasonable to assume a burning rate of 1 to 1-1/2 fps.

The burning rate of the hypothetical barge gas tank mixture will not increase beyond the 1 to 1-1/2 fps rate assumed. The lower flammability limits for downward flame propagation for pentane, butane, propane, and ethane show negligible variation as the pressure rises from 750 mm Hg to 4,500 mm Hg[21]. The lower flammability limit for butane for horizontal propagation, which should show more variation than for downward propagation, does not vary even when the pressure is increased to 10 atm[21]. Since these lower limits of flammability show no variation over a 10 atm pressure range, no change in burning rate should be observed for the 0.3 to 0.7 atm maximum pressure increase possible in the barge tank.

Energy Released

It has been determined in the previous section that the gas concentration for maximum intensity is about 5 vol percent. The 10^4 cu ft cargo tank thus would contain the equivalent of 500 cu ft of butane. Assuming stoichiometric composition of 500 cu ft of butane, and 3,200 Btu per cu ft of butane gives an energy release of 1.6×10^6 Btu[22]. Pressure vs energy release parameters are readily obtained by means of the graphs in Reference 15 and by proper usage of Reference 23. The energy release from the explosion of one kiloton of TNT is accepted as 3.97×10^9 Btu[15]. On an energy release basis the 1.6×10^6 Btu corresponds to $1.6 \times 10^6/3.97 \times 10^9$ = 0.0004 kiloton of TNT, which is 800 lb of TNT.

Geometry of the Situation

The largest barge are 290 ft long (Attachment to Section 2.1). Tank barges carrying Grades A, B, C, and D liquids must have their cargo tanks segregated and separated from other parts of the barge according to Coast Guard regulations covered in part in Reference 18. U.S. Coast Guard Drawing No. 1, Page 134, in Reference 18, indicates considerable separation between either bow or stern of the barge and any cargo space for Grades A, B, C, or D liquids. There may not be such considerable separation between the cargo tanks and the sides of the barge, although there may be considerable structural protection. Inspection of the various drawings illustrating Coast Guard requirements reveals that the cargo tanks (for Grades A, B, C, and D liquids) are low in the ship, the geometric centers of the tanks being below the waterline. Hull requirements are given throughout Reference 18. Thus, any energy release in a cargo tank reaching the intake structure will be attenuated by the intervening water, as well as the barge structures, hull, subcompartments, bulkheads, etc. However, the energy release is assumed to

occur at distances of 150 ft (corresponding to a center tank ignition with bow against the intake structure), 100 ft (forward tank with bow against the structure), and 50 ft (outside tank with side of barge against the structure).

Pressures Developed

Assuming the distances given in the last paragraph, together with the assumption of zero attenuation by steel, concrete, and water, with the explosive and target on an ideal plane surface, the formula on page 134 of Reference 15 can be used as follows:

$$d = d_1 \times W^{1/3}; \qquad (2.1\text{-}2)$$

where: $d = 150$ ft

$W = 0.4 \times 10^{-3}$

then: $$d_1 = \frac{150 \text{ ft}}{(0.4 \times 10^{-3})^{1/3}} = 2{,}040 \text{ ft} = 0.39 \text{ mi}$$

From Reference 23, the maximum dynamic pressure would be 0.16 psig. Similarly, for the 100 ft distance, a maximum pressure of 0.65 psig is obtained. For 50 ft a maximum pressure of 9 psig is obtained. However, these pressures were obtained on the assumption of the 1.6×10^6 Btu energy released in the combustion of one cargo tank volume to be equivalent to the energy released in 0.0004 kilotons of TNT, an assumption which is correct on the ratio of energy released, but not on the basis of energy release rate.

As previously discussed, the burning rate of the cargo tank gas and air mixture is assumed to be approximately 1 to 1-1/2 fps. TNT has a burning rate of 3,280 fps to 27,900 fps. Since the pressure developed is a function of the energy release rate, as well as total energy release, the pressures approximated by considering energy release only need to be refined by consideration of the energy release rate. Since the burning rate of the gas and air mix several orders of magnitude less than that of the TNT, the pressures of 0.16 psig, 0.65 psig, and 9 psig need to be reduced by several orders of magnitude. The resulting pressures would be further attenuated by interaction with the river surface, structural steel of the barge, etc.

Due to the geometry of the real situation, there should be a negligible increase in pressure from reflection. The overpressures corresponding to the previously given dynamic pressures are 2.6 psi, 5.4 psi, and 22 psi, according to Reference 18; however, these pressures should also be reduced by several orders of magnitude.

It is concluded that ignition of an empty gasoline compartment on a liquid cargo tank barge cannot develop pressures on the intake structure on the order of magnitude required for damage. In addition, the Corps of Engineers has advised that loose barges will naturally be carried by the river on the opposite side from the intake structure. Of the two incidents involving gasoline barges reported by the Coast Guard in their letter appearing in the Attachment to Section 2.1, no damage or spillage resulted.

2.1.7.4 Hazard From Natural Gas Pipeline

The gas line nearest the Primary Auxiliary Building is at a minimum horizontal distance of about 1,000 ft. This line is a 12 inch diameter, 300 psig natural gas line owned at the time of BVPS-1 license by the Peoples Natural Gas Company of Midland, Pennsylvania. The Chief Maintenance Engineer of the Peoples Natural Gas Company advised that it would be overconservative to assume a design basis release to be that quantity of natural gas contained in a 7,200 ft length of pipe.

The exact quantity of gas released is a relatively unimportant parameter since the specific gravity of natural gas ranges from 0.57 to 0.71[22]. Natural gas will, therefore, disperse upward very rapidly due to the 300 psi differential pressure and the specific gravity of the one atmosphere gas, thereby posing no threat to the BVPS-1.

In the unlikely event that a jet of escaping gas should form, ignition of the gas poses a considerable problem. The ignition temperature is 1,200 F to 1,300 F[22]. Ignition of the gas will require a heat source having both a temperature sufficiently high to heat the gas to or above the ignition temperature and a heat capacity adequate to maintain the ignition temperature despite the cooling of the heat source by the high velocity jet of natural gas.

In the exceedingly unlikely combination of events involving the break itself and the creation of an ignition source capable of igniting the gas-air mixture despite the upward jetting of the gas, the next problem is that of obtaining a gas-air mixture capable of propagating a flame, i.e., a flammable mixture. The Peoples Natural Gas Company advises that the line carries "natural gas". Natural gas varies considerably in composition. Reference 22 gives the composition of the one natural gas as 96 percent CH_4, 0.8 percent CO_2, and 3.2 percent N_2, with a specific gravity of 0.57 and a Btu per cu ft, at 60 F, of 967; another natural gas is given as 80.5 percent CH_4, 18.2 percent C_2H_6, 1.3 percent N_2, specific gravity of 0.65, and a Btu per cu ft of 1,131; a third natural gas has a composition of 67.6 percent CH_4, 31.3 percent C_2H_6, 1.1 percent N_2, specific gravity of 0.71, and a Btu per cu ft of 1,232.

With such variations in composition, one logically expects variations in combustion properties. Table 45 of Reference 21 gives a lower limit of flammability for upward flame propagation for Pittsburgh natural gas of 4.8 volume percent and an upper limit of 13.5 percent.

Other natural gases have a lower limit of 3.8 to 6.5 volume percent and an upper limit range of 13 to 17 volume percent. The general observation here is that there is but a 10 percent composition range of flammable mixtures of natural gas and air as contrasted to a more familiar range of 70 percent for hydrogen and air.

For methane, the range for horizontal propagation of flame is 4.5 percent to 14 percent[21]. For downward propagation, the range is about 6 percent to 13 percent[21].

For ethane, the range for horizontal propagation is 3.2 percent to 13 percent[21]. (The same number as reported for horizontal propagation appears to be due to the experimental conditions using narrow tubes.)

Thus, the basic components of natural gases, methane and ethane, show decreasing ranges of flammable mixtures as the direction of propagation goes from upward to horizontal, and the range decreases further as the propagation goes to downward.

There is only a narrow band of natural gas-air mixtures which are flammable and this band reduces as the flame propagation direction ranges from upward through horizontal to downward. In addition, flammable mixtures of methane are very sensitive to extinction by shock or mild turbulence(21), probably due in no small measure to a very low velocity of propagation of flame front(22). (A stoichiometric mixture has an ignition velocity of less than 2-1/2 fps(22).) This low flame velocity is a contributing factor to difficulties encountered in experimentally achieving the flammability limits for downward flame propagation in other than small closed tubes for methane/ethane mixtures.

The physical model of the pipe rupture is considered to be that of a gas leak jetting out of the ground with an initial pressure differential of 300 psi. The gas at one atmosphere pressure has a specific gravity of about 0.6, and forms a gas-air mixture having a concentration gradient ranging from 100 percent gas to 100 percent air in which only the mixture having the range of about 3 to 13 volume percent gas will propagate a flame having a propagation velocity less than that of a vertical rising gas. The resulting picture is that of a rather large Bunsen burner with a flame from only the outer portion of the gas-air mix some distance from the ground. This flame will be easily extinguished by shock or mild turbulence since it could hardly be compared to a properly designed, engineered, and operated proportional gas-air mixer with a fuel air mix in a narrow range to permit flame propagation. This theoretically derived picture is in accordance with the advice of the Maintenance Department, Peoples Natural Gas Company, who anticipate the consequences of a postulated ignition of a postulated pipe break to be a brief torching some distance above the ground, but with no effect at ground level(24).

Consideration of Natural Gas Being Ingested Into the BVPS-1 Complex from Peoples Natural Gas Company Pipeline Rupture

In order to evaluate this postulated natural gas accident, it is assumed that the 300 psig gas line ruptures and the escaping natural gas has a zero velocity component in the upward direction, is at the same temperature and pressure as the ambient air, and is subject to an upward buoyant force due to the density difference in accordance with the Archimedes Principle. This buoyancy results in an acceleration assumed constant for the short vertical distance under consideration. An element of gas is assumed to be moving at a constant horizontal velocity from the nearest point on the gas line in the direction of the diesel generator building at a value corresponding to the highest wind speed ever recorded for that direction in the site area, and subject to constant vertical acceleration. In this model, all dilution and dispersion by the wind is ignored.

Natural gas has a specific gravity ranging from 0.57 to 0.76. A value of 0.64 is assumed for this postulated accident. The density of dry air at 32 F and 760 mm Hg is 0.0807 lb/ft^3. Thus, the vertical acceleration is 0.56 ft/sec^2. The maximum wind from due east, the direction from the gas line to the diesel-generator building is 17 mph according to the onsite meteorological program. (The maximum winds onsite are from the NW quadrant. The Pittsburgh Airport, far more exposed than the Beaver Valley Site, has its highest winds from due west.)

The horizontal distance from the gas line to the auxiliary building air intake is about 1040 ft. The auxiliary building is about 45 ft in elevation above the pipeline. At 17 mph, the gas will cover the required 1040 ft in 41.7 seconds. During this time, the vertical distance traveled is 487 ft. This is calculated by the use of the formula:

$$S = \frac{1}{2}at^2 \qquad (2.1\text{-}3)$$

where: S = distance

a = acceleration

t = time

Since the vertical distance traveled by the gas is greater than the difference in elevation of the pipeline and control room, by a factor of 10.8, it is concluded that natural gas cannot be ingested and is, therefore, not a problem.

2.1.7.5 Various Site Hazards

Consideration of Highway Explosive Cargoes

According to Reference 27, Type A explosives (i.e., TNT or dynamite) may be shipped in carload or truckload lots only in individual gross weight packages not exceeding 125 lb. The description of the required packaging is such that the estimated packaging weight is at least 50 lb. For purposes of conservatism, a packaging weight of only 25 lb will be assumed, leaving 100 lb for the Type A explosive. The Commonwealth of Pennsylvania restricts the gross weight of trucks, and the Department of Transportation advises that a payload of 36,000 lb is an upper limit reduced grossly for Type A explosives. However, a full 36,000 lb cargo has been assumed, resulting in 28,800 lb of TNT. A distance of 1,250 ft lies between the Primary Auxiliary Building and Rt. 168. Other vital structures are at a greater distance. The high-order detonation of 14.4 tons of TNT should give a maximum dynamic pressure of 0.011 psi(15). The maximum theoretically possible overpressure would be 0.67 psi according to Reference 23. Therefore, the high-order detonation of the Type A explosives in a quantity equal to the maximum cargo of a truck in Pennsylvania from the nearest point on the secondary transportation route will not create a maximum dynamic pressure or a maximum overpressure which would adversely affect any vital structure.

Smokeless powder used for propellant in small arms ammunition has a lower burning rate (the effective burning rate in a cartridge and the pressure developed are interrelated, depending on case free volume, bullet mass, power charge, etc.). However, Reference 16 gives a burning rate of 7 to 12 inches per second for smokeless powder and 4 inches per second for black powder, (both at 25,000 psi) since it is used for propellant, rather than the detonating explosives of Type A. The lower burning rate results in lower pressures, assuming a highway accident could cause smokeless powder combustion to proceed at explosive burning rates. The weight of projectile and case will reduce the percentage of total weight represented by smokeless powder. For the limiting case of entirely high-explosive warheads, the case previously discussed gave 0.011 psi. The Department of Transportation classifies "munitions" as Type C cargo, of less hazard than the Type A such as TNT. Other truck cargoes will have lower energy releases, and longer energy release times, than the postulated incident involving the high-order detonation of a full truckload of TNT.

Consideration of Barge Explosive Cargoes

There are no primary manufacturers or primary consumers of high explosives in the site area. There are no known consumers of high explosives that could use the economic scale of shipping by barge. Barge transportation is not geared to handle high explosives. Barges are designed to carry large quantities of bulk cargoes. The Ohio River Commodity Charts do not show high explosives as being transported by barge, and it should be noted that Lockmasters on the Ohio River keep accurate records of all cargo passing through their locks. Records do not indicate barge shipments of explosives, ordinance, liquefied petroleum gas, or liquefied natural gas on the Ohio River. Two of the largest producers of liquefied gas advise that they do not ship liquefied gas via river traffic.

The intake structure is designed to withstand tornado loading. The equivalent pressure for the tornado model of 360 mph is 330 psf. The intake structure is capable of withstanding equivalent pressure of 2.3 psi. A maximum overpressure of 2.3 psi will occur from the detonation of 1 kiloton of high explosives at 0.43 miles[(25)]. The distance from the intake structure to the center of the river channel is 800 ft, or 0.152 miles. At this distance, 0.71 kiloton[(25)] or 1,420,000 lb of TNT would have to detonate in order to create 2.3 psi overpressure.

Consideration of Railway Explosive Cargoes

The Stone & Webster Traffic Department has extensively reviewed Reference 27.

The maximum weight of explosives transported by rail could be 80,000 lb gross, unless state or local regulations require a lower limit. There are no primary manufacturers or primary consumers of high explosives near the site. Even though it would be technically inadvisable and economically unjustifiable to ship such large quantities in one shipment, the hypothetical rail shipment of high explosives is assumed to be 80,000 lb gross. Although the packaging weight of a 125 lb gross weight box probably exceeds 50 lb, a 25 lb packaging weight has been assumed, as was done for the truck shipment case. Thus, the 80,000 lb gross weight becomes 64,000 lb net.

The railway of concern across the Ohio River is approximately 1355 ft from the intake structure. From References 15 and 23, the calculated hypothetical detonation of 32 tons of high explosives at a distance of 1355 ft gives a maximum dynamic pressure of 0.018 psi and a maximum overpressure of 0.86 psi.

Other potentially hazardous cargoes (carried at the maximum permissible cargo weight) undergoing a hypothetical accident release less energy at lower rates than the postulated detonation of the 32 tons of high explosive. For example, consider a railroad tank car containing LNG at the maximum quantity of 30,000 gallons. The Bureau of Mines' report (References 25 and 26) on fire and explosion hazards associated with LNG, offer background material on the subject. Assume the cryogenic liquid to instantaneously flash to 60 F gas and then form a homogenous stoichiometric mixture with atmospheric air. This mixture is then uniformly and perfectly ignited. If the resulting combustion occurred perfectly, the energy release would be 2.21×10^9 Btu from a burning rate of 40 cm/second[(25)]. The 2.21×10^9 Btu corresponds to the energy release from 0.554 kiloton of high explosive[(15)] which has a burning rate of 1000 to 8500 meters/sec[(16)] some 10^5 times faster. Thus the 4 psi maximum overpressure and 0.35 maximum dynamic pressure resulting from detonation of 0.554 kiloton of high explosive at a distance of 1355 ft[(15)] need to be reduced by a factor of some 10^5 to correct for the lower burning rate.

As has been previously indicated, the worst postulated explosion hazard from railroad cargo is the detonation of 80,000 lb gross TNT cargo. This hazard produced acceptable overpressures and dynamic pressures at the intake structure.

Missiles

None of the postulated accidents are capable of generating a missile with greater target-impacting kinetic energy and momentum than the design basis missile, a 35 ft utility pole impacting at 150 mph.

2.1.7.6 Fire in Oil and Gasoline Plants or Storage Facilities, Adjacent Industries, Brush and Forest Fires, and Transportation Accidents

If rupture of an oil line or tank is postulated, the seepage through soil might migrate to the river, but would remain on the river surface rather than enter the intake structure through the intakes which are 5 feet below the water surface. The intake structure is heavy reinforced concrete extending approximately 67 ft above water level. The structure provides adequate fire protection to equipment from an oil or gas line fire on the surface of the ground or on the river water outside. Electrical supply to the intake structure is buried for tornado protection and enters the structure below grade and hence, would be unaffected by fire. Because the intake structure is in essence a concrete box with no openings at grade, below grade, or at the river surface, except the subsurface intake, and with all piping sealed to the structure, seepage of oil or other products into the structure is improbable. In any case, the motors and controls are located in the upper portion of the structure above a concrete floor, and hence, protected from fire in the pump compartment below. The tornado protected ventilation system would prevent formation of an explosive mixture.

The plant is physically separated from adjacent land fire hazards to the east by Pegg's Run and State Highway Rt. 168, and to the south and west by the access road and switchyard. Fire from transportation accidents is not expected to have an effect on any safety-related structures because of the physical separation of the railroads and highways mentioned above.

2.1.7.7 Accidental Release of Toxic Gas from Onsite Storage Facilities, Nearby Industries, and Transportation Accidents

The only major source of relatively large quantities of toxic gases is a transportation accident. It should be noted that in the calendar year 1971, there were no poison gas or liquid, Class A hazardous material reports in Pennsylvania (See the Attachment to Section 2.1). In the event of a large accidental release of toxic gas, self-contained respiratory equipment will be used, and personnel not necessary for the safe operation of the plant will be evacuated.

2.1.7.8 Airborne Pollutant Effects on Important Plant Components

The available data indicates that low emissions of sulfur, nitrogen oxides, and particulates occur near the site. Ambient concentrations of these pollutants will be relatively low, thus precluding any significant degree of reaction resulting from cooling tower plumes in the atmosphere.

Problems such as acid rainout and increased ground level concentrations of pollutant due to cooling tower and stack plumes mixing should not occur in this area. The expected levels will have negligible effects on important plant components.

2.1.7.9 Potential Cooling Tower Collapse

The mode of failure of the cooling tower is expected to be inward during a postulated collapse. It is expected that no missiles with greater kinetic energy than the design basis missile could reach safety-related structures or equipment. The only known collapse due to wind loading has been inward. Missiles generated by a tornado are expected only to penetrate the cooling tower locally without causing failure. The design basis missiles impacting on the cooling tower could not generate a missile with greater kinetic energy.

2.1.7.10 Bruce Mansfield Power Station - Slurry Discharge Pipeline

The Slurry Discharge Pipeline (see Figure 2.3-25) is intended to transport sludge, in the form of a water slurry, from the Sulphur Dioxide Scrubbers at Bruce Mansfield Power Station to the Little Blue Run Disposal Area. The Disposal Area is located approximately five miles down river from the BVPS-1.

The system characteristics of the pipeline are:

1. PIPELINE ROUTING: The pipeline will circumnavigate BVPS-1. The routing was purposely chosen to preclude any possible damage to safety-related structures or equipment in the event of a leak. The closest point of approach to any safety-related structure is approximately 1200 ft. The entire length of pipeline will be laid below grade, and a minimum earth cover of 30 inches will be provided.

2. PUMPING STATION: The pumping station is located at Bruce Mansfield Power Station. The pumping station is continuously manned and is equipped with audible and visual indicators as well as recording equipment to provide continuous control of pumping operations. The operator has visual indication of system valve position, which lines are in use and which pumps are running, as well as pump discharge pressure and temperature. Magnetic flow meters compare total flow at the discharge of the pumping station to the flow at the discharge to the impoundment area and provide visual and audible alarms at the pumping station should a significant mismatch occur. This allows the operator to identify a ruptured pipeline and switch flow to the standby pipeline. The entire pipeline is visually inspected by daily roving patrols. The roving patrol is radio equipped to ensure rapid transfer of information should damage or leakage be discovered.

3. PIPELINE: The pipeline will consist of four pipes, two 12 inch and two 8 inch and four pumps. Each pump has a discharge relief valve, and discharges to a valved manifold which allows various pump combinations to be utilized. The pipeline is constructed of ASTM-A106-B steel pipe and has a design pressure of 1310 psig. System pressure will vary between 600 psi and 1100 psi for flow rates of 400 to 3600 gpm. Wear is estimated to be 0.008 inch per year. The expected life of the pipe sections is 30-35 years. Manual isolation valves are installed in each of the four pipelines on the east and west sides of the site property as well as between BVPS-1 and the discharge impoundment.

4. SLURRY: The slurry is non-toxic, non-flammable and essentially non-corrosive. Its composition will vary somewhat, depending on power plant operation. Normally, the slurry will be 32.3 percent solids by weight and the composition of the solids will be approximately:

   a. fly ash, 30 percent

   b. inerts, 3 percent

   c. limp grits, 1.2 percent

   d. CALCILOX, 9.7 percent

   e. calcium carbonate, 0.6 percent

   f. calcium sulphate, 20.6 percent

   g. calcium sulphite, 32.6 percent

   h. unreacted lime, 0.6 percent

   i. magnesium hydroxide, 1.3 percent

   j. calcium hydroxide, 0.8 percent

The sludge is treated with 1.0 percent lime to increase the pH to 11.0. CALCILOX is added as a solidification aid.

In summary, this pipeline is not considered to be a safety hazard to the plant due to:

1. The routing of the pipeline which was purposely laid out to circumvent the plant structures

2. The leakage detection measures employed in the design

3. Installed capability to isolate any leaking or ruptured slurry line.

2.1.7.11 Potential Peak Pressures on Critical Components

As discussed above, it is not considered probable that any missiles generated by site hazards would be more severe than the tornado generated missiles for which these safety-related structures are designed. All critical plant components are located within structures which are tornado protected. As discussed in Section 2.7.2, these safety-related buildings are designed as a minimum to withstand tornado wind pressures of 330 psf, which is equivalent to a pressure of 2.3 psi. The site hazards discussed in Section 2.1.7 includes a gasoline barge explosion at the intake structure, a rail car explosion across the Ohio River, and a truck explosion on State Highway Rt. 168. The gasoline barge explosion pressures for this analysis are based on one of the 12 barge compartments detonating with the equivalent energy release and resultant pressures of the detonation of 0.004 kilotons of TNT (Refer to Section 2.1.7.3 for energy release equivalency). The peak "side-on" overpressures and dynamic pressures resulting from these postulated site explosions are well below the 2.3 psi for which the safety-related structures are know to be adequate, as summarized in Table 2.1-17.

References to Section 2.1

1. "Description of the Shippingport Atomic Power Station Site and Surrounding Area", WAPD-SC-547, Westinghouse Electric Corporation Bettis Atomic Power Laboratory (June, 1957).

2. "1970 Census of Population, Pennsylvania", U.S. Department of Commerce, Bureau of Census, Advance Report PC(VI)-40 (January, 1971).

3. "1970 Census of Population, Ohio" U. S. Department of Commerce, Bureau of Census, Advance Report PC(VI)-37 (January, 1971).

4. "1970 Census of Population, West Virginia", U. S. Department of Commerce, Bureau of Census, Advance Report PC(VI)-50 (December, 1970).

5. "Provisional Employment and Population Forecasts", Southwestern Pennsylvania Regional Planning Commission (revised June, 1968).

6. "Preliminary Projection of Employment and Population", State Planning Board, Governor's Office, Commonwealth of Pennsylvania (January, 1971).

7. "Ohio Population", Ohio Department of Development, Economic Research Division (1968).

8. "Guidelines for Regional Growth, Brooke-Hancock Counties, W. Va. and Jefferson County, Ohio", prepared by the West Virginia Department of Commerce and the Jefferson County, Ohio Regional Planning Commission (December, 1969).

9. Bureau of State Parks, Department of Forest and Water, Commonwealth of Pennsylvania.

10. Unpublished Data Upper Ohio Basin Office, Water Quality Office, Environmental Protection Agency.

11. "Pre-operational Radiation Survey of the Shippingport Atomic Power Station Site and Surrounding Area", WAPD-CTA(IH)-208, Westinghouse Electric Corporation Bettis Atomic Power Laboratory (January, 1958).

12. Bureau of the Census, U. S. Department of Commerce, 1970 Census of Population: Number of Inhabitants, Reports PC(1) - A40, Pennsylvania (August, 1971), PC(1) - A37, Ohio (August, 1971), and PC(1) - A50, West Virginia (May, 1971).

13. "Planning and Design of Navigation Locks, Walls, and Appurtenances," EM1110-2-2602, U.S. Army Corps of Engineers.

14. Van Nostrand's Scientific Encyclopedia, D. Van Nostrand Co., fourth edition, p. 657, (1968).

15. The Effects of Nuclear Weapons, by U.S. Department of Defense and U.S. Atomic Energy Commission, Revised Edition, (February, 1964).

16. Kirk and Othmer, Encyclopedia of Chemical Technology, Interscience Publishers, New York, second edition, Vol. 8 and Vol. 10, p. 583.

References to Section 2.1 (CONT'D)

17. Telephone communication, J. Weaver of Gateway Marine Survey, Carnegie, Pennsylvania, to J. McCaleb, Stone & Webster, (May 24, 1973).

18. "Rules and Regulations for Tank Vessels," CG-123, U.S. Coast Guard, taken from Subchapter D, of Chapter I, Title 46 CFR, (May, 1969).

19. A. Egerton and J. Powling, "The Limits of Flame Propagation at Atmospheric Pressure," The Influence of "Promoters", Proceedings of the Royal Society, Vol 193A (1948).

20. J. H. Perry, "Chemical Engineers' Handbook," McGraw-Hill Book Co., third edition (1950).

21. H. F. Coward, and G. W. Jones, "Limits of Flammability of Gases and Vapors," Bulletin 503, U.S. Department of the Interior, Bureau of Mines (1952).

22. "Hauck Industrial Combustion Data," Hauck Manufacturing Co., Brooklyn, New York, third edition (1953).

23. Nuclear Bomb Effects Computer, revised 1962, designed by the Lovelace Foundation for Civil Effects Test Operations, U.S. Atomic Energy Commission, Division of Biology and Medicine, Contract AT(29-1) 242.

24. Senior technical personnel from both Air Products and Chemicals, Inc., Allentown, Pa., and Airco/BOC, Murray Hill, N.J., essentially suggest that there should be no significant force at ground level resulting from the postulated ignition of the postulated break of the pipeline.

25. D. Burges and M. Zabetakis, "Fire and Explosion Hazards Associated with Liquefied Natural Gas," Report of Investigations 6099, U.S. Department of Interior Bureau of Mines (1961).

26. "Hazards of LNG Spillage in Marine Transportation," Prepared by U.S. Department of Interior Bureau of Mines, for U.S. Department of Transportation, U.S. Coast Guard SRC Report No. S-4105 (February, 1970).

27. "Hazardous Materials Regulations" Section 173.63, Subparagraph 3, U.S. Department of Transportation, Tariff 25, (April 24, 1972).

Attachment to Section 2.1

REPORT

HAZARDOUS MATERIALS TRANSPORTATION
BEAVER VALLEY POWER STATION

A2.1 GENERAL

Hazardous materials, transported in interstate commerce, are subject to regulation by the Department of Transportation under various statutes including: Title 18, Chapter 39, U.S.C. entitled "Explosives and Combustibles," Title 18, Chapter 49, U.S.C. entitled "Department of Transportation Act of 1970," and those laws governing the Federal Aviation Authority, Coast Guard, and miscellaneous carriers. The individual states have adopted the federal statutory regulations for application to intrastate and private transportation within their jurisdiction.

The general rules and regulations governing the "Acceptance and Transportation of Hazardous Materials" and "Specifications for Shipping Containers" are published in R. M. Graziano's Tariff No. 25, I.C.C. No. 25, effective April 24, 1972, entitled "Hazardous Materials Regulations of the Department of Transportation." The publishing officer is R. M. Graziano, 1920 "L" Street N.W., Washington D.C. 20036.

These rules and regulations apply to all modes of transportation and to all common carriers, contract carriers, and private carriers by rail, motor, air, and water. Additional rules and regulations may be imposed by state and local statutes or by the carriers themselves.

The Department of Transportation's (D.O.T.'s) Second Annual Report on Hazardous Materials, (page 21) 1971, states:

> "The incident reports received are believed to be only a portion of those that should be reported. However, since a census of carriers who transport hazardous materials is not known, nor the total quantity of hazardous materials being transported available, the degree of compliance cannot be truly determined at this time."

Despite the broad application of the laws and promulgated rules and regulations, there exists a segment of non-regulated shippers and carriers that transport hazardous materials, via motor and water modes of transportation without the approval or knowledge of the reporting agencies. This segment of the industry has not been included in the study since their estimated incident ratio is quite low or nonexistent.

A2.2 HAZARDOUS MATERIALS COMMODITY LISTS

The items classified as "hazardous materials" are listed in Section 172.5 of Graziano's Tariff and cover all types of explosives, poisons, flammables, oxidizers, corrosives, gases, radioactive materials, etiologic agents, or similar commodities. The tariff is designed to accommodate all possible types of dangerous cargo that may be specified by the Department of Transportation's Hazardous Materials Board.

The D.O.T.'s 1971 Annual Report (page 10) states:

> "The incident reports involved approximately 250 different commodities with the most frequent ones, in descending order, being: paint and paint related compounds; gasoline; electrolyte, (acid) battery fluid (including sulfuric acid and wet electric storage batteries); and various liquid cleaning compounds (corrosive and/or flammable). These are merely reported figures, and do not take into consideration the relative amounts of these commodities being shipped."

A2.3 VOLUME OF TRAFFIC AND ACCIDENT REPORTS

The Federal Aviation Administration, Federal Highway Administration, Federal Railroad Administration, and the United States Coast Guard maintain statistical data on reported incidents of "unintentional release of hazardous materials during the course of transportation." The actual volume of this traffic is impossible to establish since commodity reporting is not required or monitored by a central reporting agency.

The Army Corps of Engineers maintains the most detailed data on commodities and transportation equipment passing through its projects and navigation districts. This type of information would be economically unobtainable for the vast network of highways, railroads, and air corridors serving the United States and North America.

The D.O.T. has not attempted to establish the volume of hazardous traffic that is handled for each calendar year, but hopes to develop some forecasting ability within the near future.

The Corps of Engineers lists the following commodities as "hazardous materials" and are part of the 41 commodity groups included in their reports:

1. Crude Petroleum
2. Ordinance and Accessories
3. Chemicals and Allied Products
4. Petroleum and Coal Products.

The primary commodity group is further segregated into the individual items composing the group, and each item is assigned a control number. The Corps of Engineers publish summary information; however, detailed reports may be obtained on a "Government Priority Basis" from the District Engineer, U.S. Army District, New Orleans, P.O. Box 60267, New Orleans, LA 70160. (See also, Part II, Waterborned Commerce of the United States, Calendar Year 1971, U.S. Army Corps of Engineers.)

A2.4 LEVEL OF ACCIDENTS FOR 1971

The D.O.T. states that during the calendar year 1971, 328 carriers submitted a total of 2,255 hazardous materials incidents as follows:

MODE	NUMBER OF REPORTS
3 Air Carriers	5
233 For-Hire Highway Carriers	1,633
54 Private Highway Carriers	258
28 Rail	346
10 Water	13

The following table shows the "classification" breakdown of those reports:

CLASSIFICATION	NUMBER OF REPORTS
Class A explosives	17
Class B explosives	8
Class C explosives	8
Corrosive liquid	634
Flammable compressed gas	76
Flammable liquid	1,090
Flammable solid	21
Nonflammable compressed gas	56
Oxidizing material	88
Poisonous gas or liquid, Class A	0
Poisonous liquid or solid, Class B	203
Radioactive materials	9
Tear gas, Class C	1
None shown (unknown or non-hazardous)	44

These figures are believed to be only a fraction of the actual number of incidents and carriers involved in this type of accident. Additional water carrier data is available from the Coast Guard covering several specific areas of responsibility (i.e., coastwise, intercoastal, lakes, etc.), however, the reporting criteria are quite different from the D.O.T's.

A2.5 BEAVER VALLEY POWER STATION

The Beaver Valley Power Station is exposed to water, highway, and limited rail transportation services. The site is located on the Ohio River at milepost 34.81, left bank descending from Pittsburgh, Pennsylvania in the Montgomery Pool. Highway Route 168 bounds the site on the eastern and southern property line. The Penn Central's Pittsburgh - Columbus, Ohio right-of-way is located north of the site on the right bank of the Ohio River. The site is served on a private side track by the Pittsburgh & Lake Erie Railroad.

Water Transportation

The Corps of Engineers reports that tonnage through the Montgomery Pool approximated 18 million tons of cargo for the year 1970. This tonnage included 3 million tons of oil and gas products, 2 million tons of chemicals, and 1 million tons of unclassified commodities.

Barge and towboat equipment are used to handle this type of cargo on the Ohio River or its tributaries. The barges are customarily open hopper barges, covered dry cargo barges, or liquid cargo (tank) barges. The capacities of each class of equipment approximate the following "standard" parameters:

BARGE CLASS	LENGTH, (ft)	WIDTH, (ft)	DRAFT, (ft)	CAPACITY (tons)	(gallons)
Open Hopper	175	26	9	1000	n.a.
	196	35	9	1500	n.a.
	290	50	9	3000	n.a.
Covered Hopper	175	26	9	1000	n.a.
	190	35	9	1500	n.a.
	290	50	9	3000	n.a.
Liquid cargo (tank) barge	175	26	9	1000	302,000
	190	35	9	1500	454,000
	290	50	9	3000	907,000

Based on 7.2 barrels per ton and 42 gallons per barrel

The great majority of the barge equipment meets the construction requirements of the American Bureau of Shipping and the United States Coast Guard. The barges are certified for the type of service for which they were constructed (i.e., dry or liquid cargo, inland river service, ocean, limited ocean, lakes, etc.). The towboats (pushboats) used in the Upper Ohio River Navigation District can vary from a length of 117 feet, width of 30 feet, draft of 7.6 feet and 1000 horsepower to a length of 160 feet, width of 40 feet, draft of 8.6 feet and 6000 horsepower.

The United States Coast Guard reports that only four "non-serious incidents occurred within the Montgomery Pool during the five year period ending December 1972. A summary of each accident can be found in Commander R. E. Anderson's letter of January 4, 1973, which is included as an attachment to this report.

The Beaver Valley Power Station is located in a protected area of the Montgomery Pool and would not be subjected to the type of collision damage that might occur as a result of a "loose" barge floating downstream or pilot error. The power station is located on the "upstream" side of a large pool formed by the movement of the river's current away from the site's intake structure. The natural course of a floating object would be to the right bank of the river, opposite the site.

Highway Transportation

The tonnage or volume of hazardous materials passing near the site over Pennsylvania Route 168 cannot be determined with any degree of reliable accuracy. However, there are chemical facilities and industrial installations that would utilize this type of product in the immediate area of the power station. Reports on this type of traffic are not kept unless the cargo is involved in an accident.

The movement of hazardous materials over public highways near the site does not alter the fact that the probability of a "major accident" involving this classification of cargo is significantly low and the possible effects of such an incident are nominal. The plant is sufficiently isolated from public highway facilities so that explosions, fires, and related incidents would not damage the generating station or interfere with the distribution of power.

The D.O.T's data file on incidents involving hazardous materials for the Commonwealth of Pennsylvania, for the current period January 1, 1971 to August, 1972, clearly shows that no accidents were reported for the Shippingport area. Mr. H. J. Sonnenberg, Accident Analysis Officer, Office of Hazardous Materials, D.O.T. made this observation:

> "You will note [that] none are reported as happening at Shippingport (Midland, Hookstown, Smith's Ferry or Industry). The Pittsburgh and Lake Erie Railroad reported one incident at Aliquippa and Hall's Motor Transit reported three incidents at Mechanicsburg....You will note that all three involved leaks of corrosive liquids at the carrier's dock."

Mr. Sonnenberg's letter is included as an attachment to this report along with the print out for Pennsylvania.

The motor carrier industry utilizes all types of mobile transportation equipment to handle hazardous materials. This equipment includes closed vans, bulk trailers, tank type trailers, and open top trailers which are constructed or adapted to meet the requirements of the D.O.T. for handling hazardous materials. Selection of the proper equipment is a factor of the materials to be shipped and the regulations of the D.O.T.

Rail Transportation

The Penn Central's right-of-way is located on the northern bank of the Ohio River and will not impose any significant effect on the power station if an accident would occur. The D.O.T. ADP file indicates a low incident rate for rail transportation within Pennsylvania; however, these accidents usually involve leaking containers which would result in a very isolated "danger" area.

Equipment specifications for tank car construction are promulgated by the D.O.T. and reflect the requirements of each material and shipping condition. Individual items are packaged and handled in accordance with federal regulations and determination of the exact type of rail car used is not possible.

The volume of hazardous materials traffic moving over this segment of the Penn Central, or any line of the railroad system, cannot be established due to the fact that the individual railroads do not maintain this type of commodity information. Reporting is only required where an accident occurs.

A2.6 CONCLUSION

Hazardous materials transportation within the proximity of the Beaver Valley Power Station does not seem to be a historically high risk function of the transportation industry. Water transportation evidences the greatest possibility for exposure to this type of traffic since it reflects the inherent advantages of bulk distribution and vehicle capacity. Water transportation is also subject to the greatest concentration of federal regulation and enforcement of all the available modes of hazardous materials transportation.

It is impossible to state that a significant or destructive accident, involving hazardous materials, will not occur at the Beaver Valley Power Station area within the life of the plant. It is possible to postulate that in the event of such an incident the summary effect upon the safe operation of the generating station would be nonexistent.

A2.7 ENCLOSURES

The following are enclosures to the Attachment to Section 2.1:

1. Ohio River 1970 commodity flow charts - 3 sheets
2. United States Coast Guard letter dated January 4, 1973
3. Department of Transportation letter dated January 4, 1973
4. ADP print out for Pennsylvania: January 1971 to August 1972
5. Three D.O.T. accident reports

References for Attachment to Section 2.1

1. Waterborne Commerce of the United States - Calendar Year 1971, U.S. Army Corps of Engineers, New Orleans, LA 70160

2. Second Annual Report of the Secretary of Transportation on Hazardous Materials Control - Calendar Year 1971, Washington, D.C. 20402

3. Hazardous Material Regulation of the Department of Transportation, R. M. Graziano's Tariff No. 25, I.C.C. No. 25, Washington, D.C. 20036

DEPARTMENT OF THE ARMY
OHIO RIVER DIVISION, CORPS OF ENGINEERS
P. O. BOX 1159
CINCINNATI, OHIO 45201

ORDPD-F

8 December 1972

Mr. B. C. Joiner
Traffic Manager
Stone & Webster Engineering
Corporation
225 Franklin Street
Boston, Massachusetts 02107

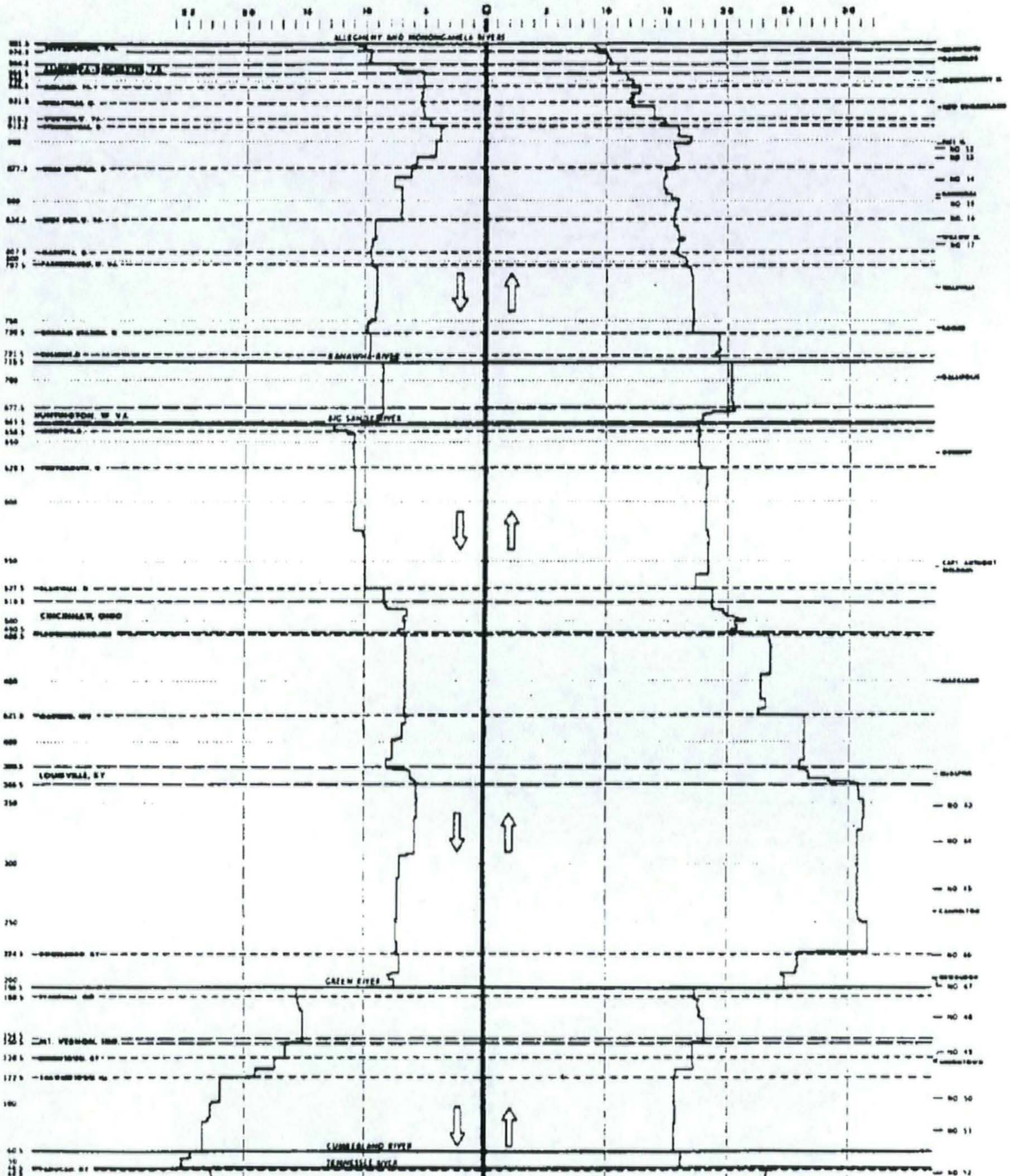
Dear Mr. Joiner:

The inclosed Ohio River 1970 Commodity Flow Charts are forwarded in response to your request of November 29, 1972 (JO 12241).

Sincerely yours,

DONALD T. WILLIAMS
Chief, Planning Division

Incl
As stated

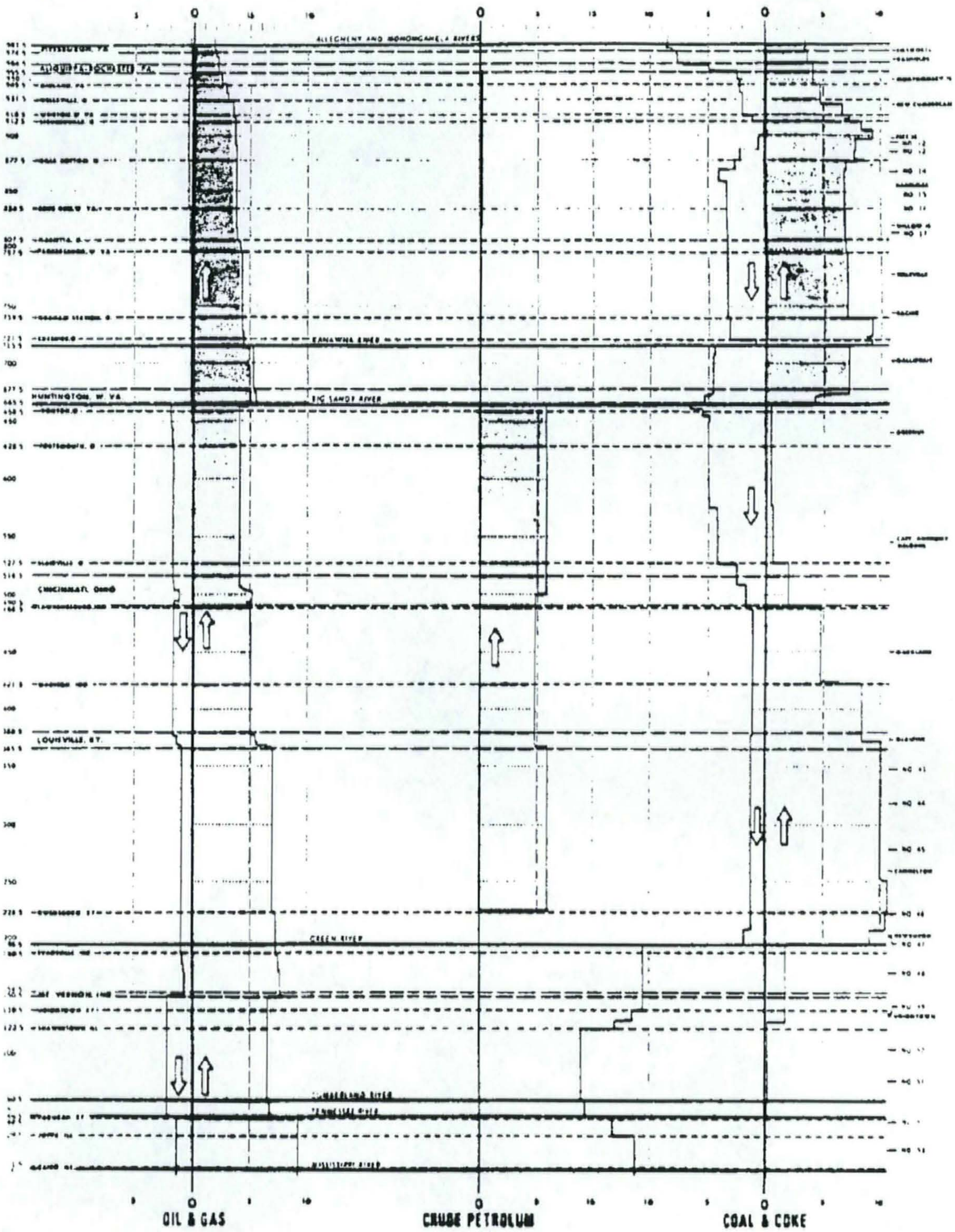


OHIO RIVER

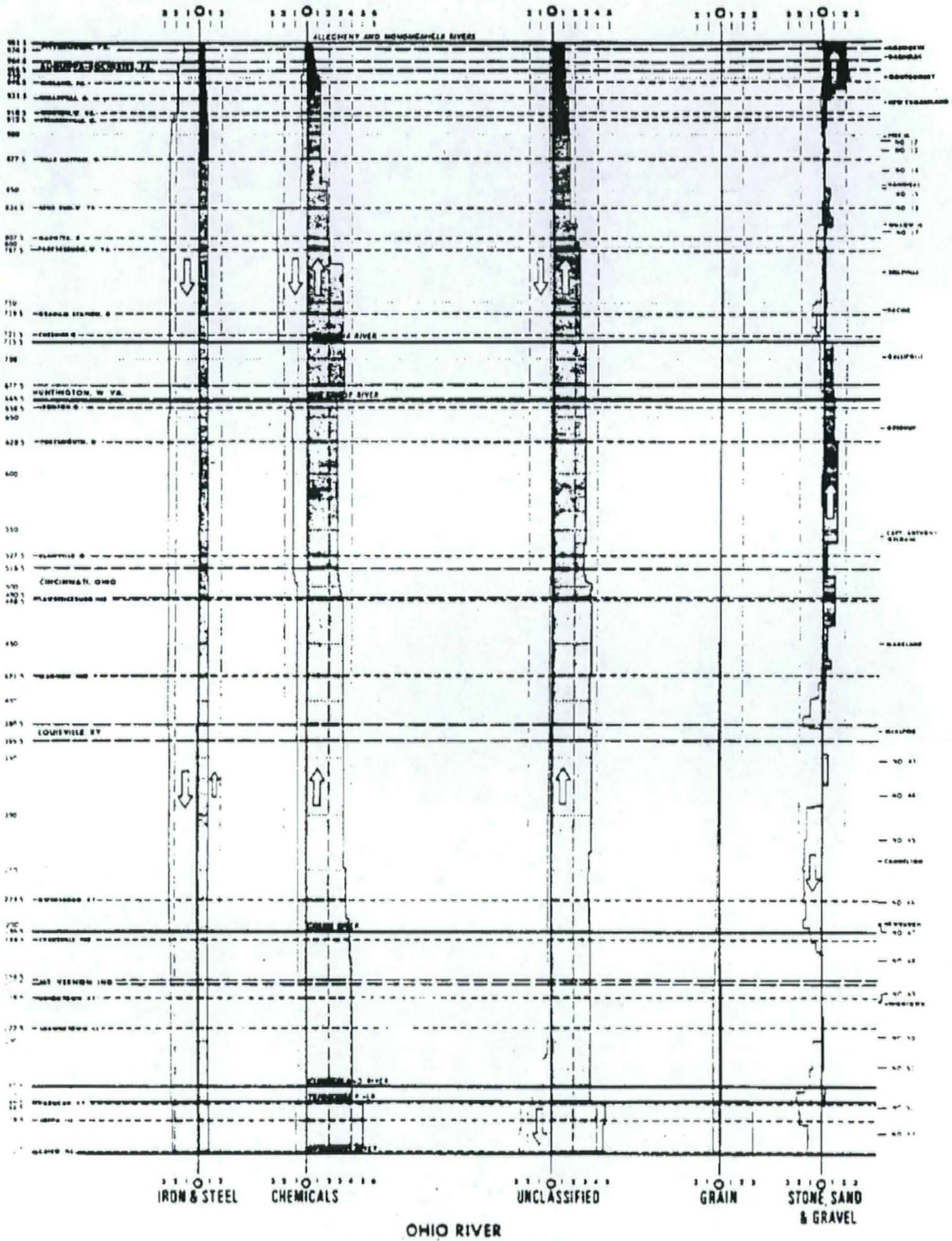
1970 COMMODITY FLOW

IN MILLION TONS

U.S. ARMY ENGINEER DIVISION
CINCINNATI, OHIO



OHIO RIVER
1970 COMMODITY FLOW
IN MILLION TONS



OHIO RIVER
1970 COMMODITY FLOW
IN MILLION TONS
U.S. ARMY ENGINEER DIVISION
CINCINNATI, OHIO
SHEET 3 OF 3

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
Officer in Charge
Marine Inspection
312 Stanwix Street
Pittsburgh, Pa. 15222
(412) 644-5808

5923
4 January 1973

Stone & Webster Engineering Corporation
P. O. Box 2325
Boston, Massachusetts 02107

Gentlemen:

Receipt of your letter dated 6 December 1972 is acknowledged with the following information forwarded for your survey:

During the five year period ending December 1972 there were four accidents involving hazardous materials occurring within the specified area which this office investigated. However, none were considered serious.

1. On 4 August 1967 a discharge hose parted at the Humble Oil Terminal, mile 34.8 on the Ohio River during barge transfer operation as a result of wake created by a passing vessel. Very small spillage resulted.

2. On 13 December 1970 a drifting barge of heavy fuel oil became loose from its moorings and lodged against the dam wall at mile 54 Ohio River resulting in barge damage, no spill.

3. On 14 April 1971 drifting barge of gasoline was recovered at mile 34.8 Ohio River. No damage or spillage resulted.

4. On 19 October 1971 a barge with gasoline cargo struck lock wall at mile 32 Ohio River fracturing one cargo tank. No spillage resulted.

A bill for research is included herein.

Sincerely,

R. E. Anderson
Commander, U. S. Coast Guard
Officer in Charge

Encl: (1) CG-3621 (2)

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

January 4, 1973

Mr. R. N. Roy
Stone & Webster Engineering Corp.
P. O. Box 2325
Boston Massachusetts 02107

Dear Mr. Roy:

In response to your December 6, 1972 letter, enclosed is a copy of the Pennsylvania portion of an ADP print-out showing the location of those hazardous materials incidents reported to us covering the period from January 1971 through August 1972. You will note none are reported as happening at Shippingport, nor the immediate area of Shippingport (Midland, Hookstown, Smith's Ferry or Industry). The Pittsburg and Lake Erie Railroad reported one incident at Aliquippa and Hall's Motor Transit reported three incidents at Mechanicsburg. A copy of each of these three reports is enclosed and you will note that all three involved leaks of corrosive liquids at the carrier's dock.

This office has made no analysis of the incident reports which would relate to a particular locale. Of course when we note a disproportionate number of incidents at a particular location, we do attempt to determine the reason. On the Pennsylvania print-out enclosed, "Camp Hill" appears too often to ignore. We soon determined that a major carrier has a large terminal at "Camp Hill" and most of the leaking containers are discovered during the unloading operation at that location.

While a few of the reports may include a highway route number as a part of the incident location, no attempt is made to include this degree of detail into our ADP system.

We have published very little statistical information based on the hazardous materials incident reporting system. Enclosed are copies of two issues of the OHM Newsletter and a copy of our Second Annual Report which does contain some data. I hope these enclosures and the others noted above will be of some assistance to you.

Sincerely,

H. J. Sonnenberg
Accident Analysis Officer
Office of Hazardous Materials

Enclosures

ADP
PRINT OUT FOR
PENNSYLVANIA

ST	LOCATION CITY	INC DATE	CARRIER	SHIPPER	ORIGIN CITY	ST	IN	CO	DE	CO	COMMODITY	RPT NO.
OR	PORTLAND	71-11-10	CONSOLIDATED FRTWY	AMERON CORROSION C	BREA	CA	0	4	0	4	PAINT, ENAMEL, LAC	1112113A
OR	PORTLAND	71-11-22	T I M E -DC INC	GARLOCK INC	DOWNEY	CA	0	4	0	4	PAINT, ENAMEL, LAC	1120010A
OR	PORTLAND	72-01-21	CONSOLIDATED FRTWY	FREIGHTLINER CORP	INDIANAPOLIS	IN	0	4	0	4	BATTERIES, ELECTRI	2020016A
OR	PORTLAND	72-01-21	CONSOLIDATED FRTWY	EASTERDAY PAINT +	MILWAUKEE	WI	0	4	0	4	INK	2020017A
OR	PORTLAND	72-03-22	UNITED PARCEL SERV	SPEED-DE-WAY PRODS	PORTLAND	OR	0	4	0	4	HYDROGEN PEROXIDE	2040008A
OR	PORTLAND	72-03-26	TIME -DC INC	GLIDDEN DURKEE	SAN FRANCISCO	CA	0	4	0	4	COMPOUNDS,LACQUER,	2040012A
OR	PORTLAND	72-04-13	GARRETT FRTLINES	SHARE CORP	MILWAUKEE	WI	0	4	0	4	BOILER COMPOUND LI	2040226A
OR	PORTLAND	72-05-15	CONSOLIDATED FRTWY	CHEVRON CH CO	RICHMOND	CA	0	4	0	4	SODIUM ARSENITE(SO	2050244A
OR	PORTLAND	72-05-04	GARRETT FRTLINES	SOIL AND CROP SERV	OTHELLO	WA	0	4	0	4	44	2050300A
OR	PORTLAND	72-05-15	T I M E -DC INC	BORDEN CH CO	FREMONT	CA	0	4	0	4	INK	2050301A
OR	PORTLAND	72-05-31	RINGSBY UNITED	DOW CH CO	PITTSBURG	CA	0	4	0	4	INSECTICIDE, LIQUI	2063047A
OR	PORTLAND	72-06-23	G N C MOTOR FREIGH	VAN WATERS + ROGER	PORTLAND	OR	0	4	0	4	HYPOCHLORITE SOLUT	2070084A
OR	PORTLAND	72-06-29	T I M E -DC INC	SIMPSON D J	SAN FRANCISCO	CA	0	4	0	4	PAINT, ENAMEL, LAC	2070896A
OR	PORTLAND	72-07-05	T I M E -DC INC	GLIDDEN DURKEE	SAN FRANCISCO	CA	0	4	0	4	COMPOUNDS,LACQUER,	2370141A
OR	PORTLAND	72-07-20	TRANSCON LINES	LUCIDOL DIV	GENESEE	NY		4		4	OXIDIZING MATERIAL	2080126A
OR	PORTLAND	72-08-04	T I M E -DC INC	SIMPSON D J	SAN FRANCISCO	CA	0	4	0	4	PAINT, ENAMEL, LAC	2380151A
OR	PORTLAND	72-09-02	T I M E -DC	BORDEN CO	FREMONT	CA	0	4	0	4	INK	2380204A
OR	PORTLAND	72-08-16	CONSOLIDATED FRTWY	EASTMAN KODAK CO	ROCHESTER	NY		4		4	ANILINE OIL, LIQUI	2083263A
OR	PORTLAND	72-06-07	T I M E -DC INC	TURCO PRODS CO	WILMINGTON	CA	0	4	0	4	COMPOUNDS,CLEANING	2082338A
[illegible]	[illegible]	71-09-26	CONSOLIDATED FRTWY	TRANSWORLD ADHESIV	ROCKLAND	MA	0	4	0	4	CEMENT, RUBBER	1090019A
[illegible]	[illegible]	71-09-17	[illegible] INC	ESSEX CH CORP	LA MIRADA	CA	0	4	0	4	CEMENT, LIQUID, N.	1100012A
OR	SALEM	71-02-15	SOUTHERN PACIFIC	CAN AM LIQUIDS LTD	ALDERIA	CN	0	4	0	4	LIQUEFIED PETROLEU	1030137A
OR	SPRINGFIELD	71-04-1[illegible]	CONSOLIDATED FRTWY	PENNWALT CORP	PORTLAND	OR	0	4	0	4	UNKN	1040110A
OR	SPRINGFIELD	72-11-19	CONSOLIDATED FRTWY	SOLVOX MFG CO	MILWAUKEE	WI	0	4	0	4	COMPOUNDS,CLEANING	2010164A
OR	SPRINGFIELD	72-03-15	SOUTHERN PACIFIC	COAST CARLOADING	LOS ANGELES	CA	0	4	0	4	SULFURIC ACID,FUMI	2040156A
OR	SPRINGFIELD	72-03-15	SOUTHERN PACIFIC	COAST CARLOADING	LOS ANGELES	CA	0	4	0	4	ELECTROLYTE (ACID)	2340222A
OR	SPRINGFIELD	72-02-23	SOUTHERN PACIFIC	KINGSFORD CO	LOUISVILLE	KY	0	4	0	4	NAPHTHA DISTILLATE	2053041A
OR	SPRINGFIELD	7[illegible]-04	CONSOLIDATED FRTWY	SOLVER MFG CO	MILWAUKEE	WI	0	4	0	4	ACIDS, LIQUID, N.O	2360241A
[illegible]	[illegible]	[illegible]	SOUTHERN PACIFIC	BORDEN CH CO	GEISMAR	LA	0	4	0	4	FLAMMABLE LIQUIDS,	1020102A
[illegible]	[illegible]	71-12-2[illegible]	SOUTHERN PACIFIC	BORDEN CH CO	GEISMAR	LA	0	4	0	4	FLAMMABLE LIQUIDS,	1020103A
[illegible]	[illegible]	[illegible]	SOUTHERN PACIFIC	BORDEN CH CO	GEISMAR	LA	0	4	0	4	FLAMMABLE LIQUIDS,	1020104A
[illegible]	[illegible]	[illegible]	SOUTHERN PACIFIC	BORDEN CH CO	GEISMAR	LA	0	4	0	4	FLAMMABLE LIQUIDS,	1020105A
OR	[illegible]	71-06-[illegible]	BURLINGTON NORTHER	SHELL CH CO	ST. HELENS	OR	3	2	0	4	ANHYDROUS AMMONIA	1060095A
PA	[illegible]	71-12-09	READING CO	ROHM + HAAS CO	PHILADELPHIA	PA		4		4	SULFURIC ACID,FUMI	1120154A
PA	[illegible]	71-08-04	READING CO	UNION CARBIDE CO	TEXAS CITY	TX	0	4	0	4	UNKN	1080102A
PA	[illegible]	71-12-12	READING CO	TENNESSEE EASTMAN	KINGSPORT	TN	0	4	0	4	ACETALDEHYDE (ETHY	1120126A
PA	[illegible]	71-07-1[illegible]	[illegible] + LER	REPUBLIC STEEL COK	YOUNGSTOWN	OH	0	4	0	4	BENZOL(BENZENE)	1070103A
PA	[illegible]	72-02-21	[illegible] REFINING	OIL TRANSIT INC	STEUBENVILLE	OH	1	3	0	4	GASOLINE	2020093A
PA	ALLE[illegible]	71-08-12	[illegible] CO	ECONOMICS LABS	ST. PAUL	MN	0	4	0	4	COMPOUNDS,CLEANING	1080199A
PA	ATLANTIC	72-01-29	[illegible]	DUPONT E I DE NEM	DEEP WATER	NJ	0	4	0	4	MOTOR FUEL ANTIKNO	2020101A
PA	BALTIMORE	71-10-29	CONSOLIDATED FRTWY	M + T CH INC	BALTIMORE	MD	0	4	0	4	CHROMIC ACID	1100029A
PA	BERKS CITY	72-01-26	ATLANTIC RICHFIELD	ATLANTIC RICHFIELD	SINKING SPRING	PA	2	3	0	4	GASOLINE	2023204A
PA	BERLIN	71-12-13	AGWAY INC	AGWAY PETROLEUM CO	SOMERSET	PA	0	4	0	4	GASOLINE	1120207A
PA	BRIDGEVILLE	72-08-01	MATLACK INC	J + L STEEL	ALIQUIPPA	PA	0	4	0	4	XYLOL(XYLENE)	2080084A
PA	BIRDSVILLE	72-04-22	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2050103A
PA	CAMP HILL	71-10-23	ROADWAY EXP INC	NYCO PRODUCTS INC	CHICAGO	IL	0	4	0	4	CLEANING FLUID OR	1110156A
PA	CAMP HILL	71-04-18	ROADWAY EXPRESS	DEL CH CORP	MENOMEE FALLS	WI	0	4	0	4	CORROSIVE LIQUID,N	1050005A
PA	CAMP HILL	71-04-28	ROADWAY EXPRESS	CAROLINE XENIA	XENIA	OH	0	4	0	4	PAINT, ENAMEL, LAC	1050007A
PA	CAMP HILL	71-04-21	ROADWAY EXPRESS	DELL CH	MENOMEE FALLS	WI	0	4	0	4	PAINT, ENAMEL, LAC	1050008A
PA	CAMP HILL	71-06-02	ROADWAY EXPRESS	PPG INDUSTRIES	BLOOMFIELD	NJ	0	4	0	4	CEMENT, LIQUID, N.	1060008A
PA	CAMP HILL	71-06-07	ROADWAY EXPRESS	MIDLAND DIV	WAUKEGON	IN	0	4	0	4	PAINT, ENAMEL, LAC	1060122A
PA	CAMP HILL	71-06-30	ROADWAY EXPRESS	INMOUNT CORP	BOUND BROOK	NJ	0	4	0	4	PAINT, ENAMEL, LAC	1070121A
PA	CAMP HILL	71-07-14	ROADWAY EXPRESS	ALLIED RESEARCH	DETROIT	MI	0	4	0	4	CORROSIVE LIQUID,N	1070140A
PA	CAMP HILL	71-07-15	ROADWAY EXPRESS	NATIONAL CHEMSEARG	IRVING	TX	0	4	0	4	COMPOUNDS,CLEANING	1070142A
PA	CAMP HILL	71-07-14	ROADWAY EXPRESS	FERGUSON FUMIGANTS	HAZELWOOD	MO	0	4	0	4	METHYL BROMIDE + E	1070143A

- Location of Incident
- Date of Incident
- Reporting Carrier
- Shipper
- Origin Point of Shipment
- Injuries
- Deaths
- Commodity
- D.O.T Report No.

PA CAMP HILL	71-07-21	ROADWAY EXPRESS	UNION CARBIDE CORP	INDIANAPOLIS	IN	0	4	0	4	ACETYLENE	1070144A
PA CAMP HILL	71-08-01	ROADWAY EXPRESS	BEE CH CO	LANSING	IL	0	4	0	4	PAINT, ENAMEL, LAC	1080058A
PA CAMP HILL	71-08-19	ROADWAY EXPRESS	MIDLAND DIV	ROCKY HILL	CT	0	4	0	4	PAINT, ENAMEL, LAC	1080207A
PA CAMP HILL	71-08-11	MERCURY MOTOR EXPR	KEM MFG CORP	TUCKER	GA	0	4	0	4	CORROSIVE LIQUID,N	1090165A
PA CAMP HILL	71-09-24	ROADWAY EXPRESS	HYCEL INC	HOUSTON	TX	0	1	0	4	DRUGS, CHEMICALS,	1100050A
PA CAMP HILL	71-11-04	ROADWAY EXPRESS	MAAS & WALDSTEIN	NEWARK	NJ	0	4	0	4	PAINT, ENAMEL, LAC	1110108A
PA CAMP HILL	71-10-22	ROADWAY EXPRESS	AMCHEM	AMBLER	PA	0	4	0	4	UNKN	1110109A
PA CAMP HILL	71-12-11	ROADWAY EXPRESS	MARKEM CORP	KEENE	NH	0	4	0	4	COMPOUNDS,CLEANING	1120130A
PA CAMP HILL	71-12-10	ROADWAY EXPRESS	INMONT CORP	GRAND RAPIDS	MI	0	4	0	4	PAINT, ENAMEL, LAC	1120131A
PA CAMP HILL	71-12-16	ROADWAY EXPRESS	DUPONT E I CO	TULSA	OK	0	4	0	4	GASOLINE	1120132A
PA CAMP HILL	71-12-28	ROADWAY EXPRESS	INMONT CORP	BOUND BROOK	OH	0	4	0	4	PAINT, ENAMEL, LAC	2010020A
PA CAMP HILL	71-12-22	ROADWAY EXPRESS	DEXTER CORP	ROCKY HILL	CT	0	4	0	4	PAINT, ENAMEL, LAC	2010050A
PA CAMP HILL	72-01-05	ROADWAY EXPRESS	PENNALT CORP	CORNWELLS	PA	0	4	0	4	COMPOUNDS,CLEANING	2010061A
PA CAMP HILL	72-01-07	ROADWAY EXPRESS	METAFLAKE INC	HAVER HILL	MA	0	4	0	4	PAINT, ENAMEL, LAC	2010062A
PA CAMP HILL	72-01-07	ROADWAY EXPRESS	STERLING LACQUER	ST LOUIS	MO	0	4	0	4	PAINT, ENAMEL, LAC	2010063A
PA CAMP HILL	72-01-27	ROADWAY EXPRESS	G S A	KANSAS CITY	MO	0	4	0	4	PAINT, ENAMEL, LAC	2020031A
PA CAMP HILL	72-01-30	ROADWAY EXPRESS	BEE CHEMICAL CO	LANSING	MI	0	4	0	4	PAINT, ENAMEL, LAC	2020059A
PA CAMP HILL	72-01-30	ROADWAY EXPRESS	SEIDERT OXIDERMO	DETROIT	MI	0	4	0	4	PAINT, ENAMEL, LAC	2020063A
PA CAMP HILL	72-02-12	ROADWAY EXPRESS	M + T CHEMICAL IN	CARROLLTON	KY	0	4	0	4	PAINT, ENAMEL, LAC	2020105A
PA CAMP HILL	72-02-02	ROADWAY EXPRESS	BEE CHEMICAL CORP	LANSING	IL	1	3	0	4	COMPOUNDS,LACQUER,	2020107A
PA CAMP HILL	72-02-10	ROADWAY EXPRESS CO	RADIATOR SPECIALTY	CHARLOTTE	NC	0	4	0	4	COMPOUNDS,CLEANING	2030004A
PA CAMP HILL	72-02-25	ROADWAY EXPRESS	BEE CHEMICAL CO	LANSING	IL	0	4	0	4	COMPOUNDS,LACQUER,	2030013A
PA CAMP HILL	72-03-08	ROADWAY EXPRESS	SHELL CHEMICAL CO	COLUMBUS	OH	0	4	0	4	INSECTICIDE, LIQUI	2030192A
PA CAMP HILL	72-04-05	ROADWAY EXPRESS	UNIROYAL INC	MISHAWAKA	IN	0	4	0	4	CEMENT, LIQUID, N.	2040071A
PA CAMP HILL	72-05-03	ROADWAY EXPRESS	KERR MFG CO	ROMULUS	MI	0	4	0	4	METHYL METHACRYLAT	2050089A
PA CAMP HILL	72-05-11	ROADWAY EXPRESS	BEE CH CO	LANSING	IL	0	4	0	4	PAINT, ENAMEL, LAC	2050218A
PA CAMP HILL	72-05-11	ROADWAY EXPRESS	OLYMPIC MFG	SMYRNA	GA	0	4	0	4	COMPOUNDS,CLEANING	2050219A
PA CAMP HILL	72-05-13	ROADWAY EXPRESS	MACDERMID INC	WATERBURY	CT	0	4	0	4	POISONOUS LIQUIDS,	2050343A
PA CAMP HILL	72-05-23	ROADWAY EXPRESS	SHARE	BROOKFIELD	WI	0	4	0	4	INSECTICIDE, LIQUI	2050373A
PA CAMP HILL	72-05-25	ROADWAY EXPRESS	SUNNYSIDE PRODUCTS	CHICAGO	IL	0	4	0	4	PAINT, ENAMEL, LAC	2060013A
PA CAMP HILL	72-05-25	ROADWAY EXPRESS	E SHORE CH	MUSKEGON	MI	0	4	0	4	CEMENT, LIQUID, N.	2060014A
PA CAMP HILL	72-06-02	ROADWAY EXPRESS	NALCO CH CO	CHICAGO	IL	0	4	0	4	SODIUM ALUMINATE,	2060107A
PA CAMP HILL	72-06-02	ROADWAY EXPRESS	UNIROYAL CO INC	PROVIDENCE	RI	0	4	0	4	CEMENT, RUBBER	2060168A
PA CAMP HILL	72-06-06	ROADWAY EXPRESS	AIR PRODUCTS AND C	ALLENTOWN	PA	0	4	0	4	CORROSIVE LIQUID,N	2060245A
PA CAMP HILL	72-06-02	ROADWAY EXPRESS	NALCO CHEM CO	CHICAGO	IL	0	4	0	4	SODIUM ALUMINATE,	2060246A
PA CAMP HILL	72-06-08	ROADWAY EXPRESS	GLIDDEN DURKEE	WILMINGTON	DE	0	4	0	4	PAINT, ENAMEL, LAC	2060250A
PA CAMP HILL	72-06-26	ROADWAY EXPRESS	M T CHEMICALS INC	MENASHA	WI	0	4	0	4	PAINT, ENAMEL, LAC	2070083A
PA CAMP HILL	72-07-07	ROADWAY EXPRESS	CORCO CH CORP	FAIRLESS HILLS	PA	0	4	0	4	ACIDS, LIQUID, N.O	2070291A
PA CAMP HILL	72-07-23	ROADWAY EXPRESS	INMONT CORP	CINCINNATI	OH	0	4	0	4	PAINT, ENAMEL, LAC	2080115A
PA CAMP HILL	72-07-28	ROADWAY EXPRESS	BAKER J T CH CO	PHILLIPSBURG	NJ	0	4	0	4	HEPTANE	2080176A
PA CAMP HILL	72-08-01	ROADWAY EXPRESS	PROCESS SOLVENT	KANSAS CITY	KS	0	4	0	4	COMPOUNDS,CLEANING	2080177A
PA CAMP HILL	72-07-26	ROADWAY EXPRESS	BAYCHEM CORP	SOUTH BEND	IN	0	4	0	4	ORGANIC PHOSPHATE	2080178A
PA CAMP HILL	72-08-01	ROADWAY EXPRESS	BADSON BROS CO	OAK BROOK	IL	0	4	0	4	CORROSIVE LIQUID,N	2080179A
PA CAMP HILL	72-08-06	ROADWAY EXPRESS	G S A	KANSAS CITY	MO	0	4	0	4	PAINT, ENAMEL, LAC	2080180A
PA CAMP HILL	72-06-28	EASTERN EXP INC	ENTHONE INC	NEW HAVEN	CT	0	4	0	4	DRUGS, CHEMICALS,	2080322A
PA CAMP HILL	72-08-21	ROADWAY EXPRESS	SHERWIN WILLIAMS	DETROIT	MI	0	4	0	4	COMPOUNDS,LACQUER,	2080383A
PA CARBON COUNTY	72-05-16	ONEIDA MTR FRT INC	GOULD INDUSTRIAL B	TRENTON	NJ	0	4		4	BATTERIES, ELECTRI	2050354A
PA CARLISLE	71-03-04	ALLEGHANY CORP	MONSANTO CH CO	SAUGET	IL	1	1	0	4	UNKN	1030192A
PA CARLISLE	71-05-21	MASON AND DIXON LN	MATHESON GAS PRODU	RUTHERFORD	NJ	0	4	0	4	*	1060059A
PA CARNEGIE	72-02-24	B + P MTR EXP INC	CHEVRON CH CO	CLEVELAND	OH	0	4	0	4	AMMONIUM NITRATE-P	2030159A
PA CHESTER	71-02-17	PENN CENTRAL TRANS	KERR MCGEE CH	HAMILTON	MS	0	4	0	4	SODIUM CHLORATE(SO	1030093A
PA CHESTER	71-11-24	B + P MTR EXP	CHEMPLY INC	ELIZABETH	PA	0	4	0	4	SODIUM CHLORATE(SO	2040203A
PA CHESTER	72-04-30	MATLACK INC	HESS OIL CO	PHILADELPHIA	PA	0	4	0	4	GASOLINE	2050185A
PA CLIFTON HEIGHTS	72-06-05	PILOT FRT CARRIERS	HESTER BATTERY CO	NASHVILLE	TN	0	4	0	4	BATTERIES, ELECTRI	2070047A
PA CONWAY	72-07-13	PENN CENTRAL TRANS	ALLIED CH CO	CLAYMONT	DE	0	4	0	4	FLUOSULFONIC ACID	2080009A

[illegible] CITY	INC DATE	CARRIER	SHIPPER	ORIGIN CITY	ST	IN	CO	DE	CO	COMMODITY	RPT NO.
PA CORAOPOLIS	72-02-10	MATLACK INC •	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2020156A
PA CORAOPOLIS	72-04-22	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2050187A
PA CORAOPOLIS	72-05-22	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2050374A
PA CORAOPOLIS	72-05-27	MATLACK INC	UNITED REFINING CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2060097A
PA CORAOPOLIS	72-07-25	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080024A
PA CORAOPOLIS	72-07-25	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080025A
PA CORAOPOLIS	72-05-02	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080331A
PA CORAOPOLIS	72-05-08	CHEMICAL LEAMAN TA	UNION CARBIDE CORP	CARTERET	NJ	0	4	0	4	ACETONE	2050154A
PA CORNWELL HEIGHT	72-04-26	JOHNSON MTR LINES	ELECTRIC STOR BATT	SUMTER	SC	0	4	0	4	CAUSTIC POTASH, LI	2050110A
PA DEVON	71-06-19	CITIES SERVICE OIL	CITIES OIL CO	PHILADELPHIA	PA	0	4	0	4	GASOLINE	1060172A
PA DUBOIS	71-03-16	QUAKER STATE	QUAKER STATE OIL R	FARMERS VALLEY	PA	0	4	0	4	CRUDE OIL, PETROLE	1040041A
PA DUBOIS	72-03-12	PRESTON TRUCKING	DUPONT E I DENEMOU	PITTSBURG	PA	0	4	0	4	COMPOUNDS,LACQUER,	2040151A
PA DUNMORE	72-03-14	ASSOCIATED TRANSPT	STEVENS MACHINE CO	WELLSVILLE	NY	0	4	0	4	COMPOUNDS,CLEANING	2040173A
PA DUPONT	71-10-07	UNITED PARCEL SERV	GAF CORP	BINGHAMTON	NY	4	1	0	4	ACIDS, LIQUID, N.O	1100097A
PA ENOLA	71-01-03	PENN CENTRAL TRANS	MOBIL CH CO	BEAUMONT	TX	0	4	0	4	ETHYLENE	1020042A
PA ENOLA	71-07-03	PENN CENTRAL TRANS	EL PASO PRODUCTS	ODESSA	TX	0	4	0	4	ETHYLENE	1070116A
PA ENOLA	72-05-10	PENN CENTRAL TRANS	AMERICAN CYANAMIDE	GRASSELL	NJ	1	1	0	4	SULFURIC ACID,FUMI	2050134A
PA ENOLA	72-08-11	PENN CENTRAL TRANS	EL PASO PRODS CO	ODESSA	TX	0	4	0	4	ETHYLENE	2060333A
PA ETNA	71-02-16	INTERSTATE MTR FRT	ELI LILLY	LAFAYETTE	IN	2	3	0	4	PHOSPHORUS OXYCHLO	1020044A
PA ETNA	71-01-23	MATLACK INC	BORON OILS	CORAOPOLIS	PA	1	3	0	4	GASOLINE	1000038A
PA FAIRLESS HILLS	72-05-16	MATLACK INC	MONSANTO CH	BRIDGEPORT	CT	0	4	0	4	HYDROCHLORIC (MURI	2050181A
PA FLEETWOOD	72-01-18	SUBURBAN PROPANE	Q	Q	Q	0	4	0	4	LIQUEFIED PETROLEU	2020270A
[illegible]	71-04-04	PENN CENTRAL TRANS	ROHM & HAAS	HOUSTON	TX	0	4	0	4	FLAMMABLE LIQUIDS,	1040065A
[illegible]	72-07-[illegible]	COASTAL TANK LINES	PPG INDUSTRIES	NATRIUM	WV	0	4	0	4	CAUSTIC POTASH, LI	2080055A
[illegible]	72-07-23	LEONARD EXPRESS	ALLIED CH CORP	MARCUS HOOK	PA	0	4	0	4	PETROLEUM ETHER	2030087A
[illegible]	72-02-17	MORTHANS INC	PAULE CHEMICAL	CHARLESTOWN	MA	0	4	0	4	FLAMMABLE LIQUIDS,	2020221A
[illegible]	71-07-31	GRADY MIRFRATE INC	TROY CH CO	NEWARK	NJ	1	3	0	4	UNKN	1690053A
[illegible]	71-12-23	GRADY MIRFRATE INC	PIONEER SALT & CH	MAPLE SHADE	NJ	0	4	0	4	UNKN	1120208A
PA GILLSBURG	72-06-10	PENN CENTRAL TRANS	NORTHERN PETROCHEM	DES PLAINES	IL	0	4	0	4	ETHYLENE	2060280A
[illegible]	71-10-[illegible]	[illegible] TANK LINES	ENJAY CH CO	FLORHAM PARK	NJ		4	1	4	*	1110018A
[illegible]	72-05-[illegible]	PENN CENTRAL TRANS	ALLIED CHEMICAL CO	SOLVAY	NY	0	4	0	4	COMPRESSED GASES,N	2030247A
[illegible]	[illegible]	ROADWAY EXPRESS	HILTON DAVIS CH CO	CINCINNATTI	OH	0	4	0	4	UNKN	1020062A
[illegible]	[illegible]	ROADWAY EXPRESS	CAMBRIDGE CH	CAMBRIDGE	MA	0	4	0	4	POLISHES, METAL, S	1030048A
[illegible]	[illegible]	ROADWAY EXPRESS	RAFFI SWANSON	WILMINGTON	MA	0	4	0	4	PAINT, ENAMEL, LAC	1030049A
[illegible]	71-[illegible]	ROADWAY EXPRESS	INTERNATIONAL PAIN	UNION	NJ	0	4	0	4	PAINT, ENAMEL, LAC	1030053A
PA HARRISBURG	71-02-11	ROADWAY EXPRESS	BAKER J T CH CO	PHILLIPSBURG	NJ	0	4	0	4	XYLOL(XYLENE)	1030052A
PA HARRISBURG	71-02-13	ROADWAY EXPRESS	EGYPTIAN LACQUER	KEARNY	NJ	0	4	0	4	PAINT, ENAMEL, LAC	1030053A
PA HARRISBURG	71-02-15	ROADWAY EXPRESS	CONSOLIDATED ELECT	SAN ANTONIO	TX	0	4	0	4	ALKALINE CAUSTIC L	1030054A
PA HARRISBURG	71-03-02	ROADWAY EXPRESS	MINNESOTA MINING C	ST. PAUL	MN	0	4	0	4	PAINT, ENAMEL, LAC	1030114A
[illegible]	71-[illegible]	ROADWAY EXPRESS	DEXTER CORP	ROCKHILL	CT	0	4	0	4	PAINT, ENAMEL, LAC	1040021A
[illegible]	71-03-17	ROADWAY EXPRESS	SHELL CH CO	NORCO	LA	0	4	0	4	HYDROGEN PEROXIDE	1040022A
PA HARRISBURG	71-03-30	ROADWAY EXPRESS	INMONT CORP	BOUNDBROOK	NJ	0	4	0	4	LACQUER BASE, OR L	1340058A
PA HARRISBURG	71-04-07	ROADWAY EXPRESS	SHARE	BROOKFIELD	WI	0	4	0	4	COMPOUNDS,CLEANING	1040062A
PA HARRISBURG	71-03-31	ROADWAY EXPRESS	DEXTER CORP	WAUKEGAN	IL	0	4	0	4	PAINT, ENAMEL, LAC	1040063A
PA HARRISBURG	71-04-09	ROADWAY EXPRESS	SUPERIOR VARNISH A	MERCHANTVILLE	NJ	0	4	0	4	PAINT, ENAMEL, LAC	1050001A
PA HARRISBURG	71-04-18	ROADWAY EXPRESS	SHERWIN WILLIAM CO	CHICAGO	IL	0	4	0	4	PAINT, ENAMEL, LAC	1050002A
PA HARRISBURG	71-04-13	ROADWAY EXPRESS	PLAS CH CORP	ST. LOUIS	MO	0	4	0	4	PAINT, ENAMEL, LAC	1050003A
PA HARRISBURG	71-04-15	ROADWAY EXPRESS	MARTIN SENOUR CO	CHICAGO	IL	0	4	0	4	PAINT, ENAMEL, LAC	1050004A
PA HARRISBURG	71-05-10	ROADWAY EXPRESS	RELIANCE UNIVERSAL	LOUISVILLE	KY	0	4	0	4	PAINT, ENAMEL, LAC	1050083A
PA HARRISBURG	71-05-07	ROADWAY EXPRESS	CHEMCOAT INC	WILLIAMSPORT	PA	0	4	0	4	PAINT, ENAMEL, LAC	1050084A
PA HARRISBURG	71-05-16	ROADWAY EXPRESS	AMERICAN SOLDERS F	PAOLI	PA	0	4	0	4	UNKN	1060006A
PA HARRISBURG	71-05-24	ROADWAY EXPRESS	VERONA	CHARLESTON	SC	0	4	0	4	DINITROPHENOL SOLU	1060009A
PA HARRISBURG	71-06-10	IML FREIGHT INC	AREIAL CH CO	SEAT PLEASANT	MD	0	4	0	4	COMPOUNDS,CLEANING	1070075A
PA HARRISBURG	71-09-04	CAROLINA FREIGHT C	KIASER AGRICULTURE	TAMPA	FL	0	4	0	4	NITRIC ACID	1090068A
PA HARRISBURG	71-12-20	PENN CENTRAL TRANS	LINDELMAN CORP	INDIANAPOLIS	IN	0	4	0	4	FLAMMABLE LIQUIDS,	2010136A

ST	LOCATION CITY	INC DATE	CARRIER	SHIPPER	ORIGIN CITY	ST	IN	CO	DE	CO	COMMODITY	RPT NO.
PA	HARRISBURG	72-03-17	ROADWAY EXPRESS	STAUFFER WACKER	ADRIAN	MI	0	4	0	4	FLAMMABLE LIQUIDS,	2030246A
PA	HARRISBURG	72-04-03	ROADWAY EXPRESS	REILLY TAR + CH	INDIANAPOLIS	IN	0	4	0	4	PYRIDINE	2040053A
PA	HARRISBURG	72-04-17	ROADWAY EXPRESS	SHERWIN WILLIAMS	CHICAGO	IL	0	4	0	4	COMPOUNDS, IRON OR	2040235A
PA	HARRISBURG	72-04-21	ROADWAY EXPRESS	INMONT	LODI	NJ	0	4	0	4	INK	2040236A
PA	HARRISBURG	72-04-05	ROADWAY EXPRESS	WISC PROTECTIVE CT	GREEN BAY	WI	0	4	0	4	PAINT, ENAMEL, LAC	2040239A
PA	HARRISBURG	72-04-11	ROADWAY EXPRESS	C D BATTERIES	CONYERS	GA	0	4	0	4	BATTERIES, ELECTRI	2040240A
PA	HARRISBURG	72-04-24	ROADWAY EXPRESS	OLYMPIC MFG CO	SMYRNA	GA	0	4	0	4	COMPOUNDS,CLEANING	2050007A
PA	HARRISBURG	72-04-23	ROADWAY EXPRESS	CARREL CH	WESTFIELD	IN	0	4	0	4	INSECTICIDE, LIQUI	2050021A
PA	HARRISBURG	72-04-28	ROADWAY EXPRESS	C + D BATTERIES	ATTICA	IN	0	4	0	4	BATTERIES, ELECTRI	2050085A
PA	HARRISBURG	72-04-29	ROADWAY EXPRESS	BEE CH	LANSING	IL	0	4	0	4	GASOLINE	2050093A
PA	HARRISBURG	72-05-04	ROADWAY EXPRESS	CARBOLINE CO	XENIA	OH	0	4	0	4	<<	2050121A
PA	HARRISBURG	72-05-13	ROADWAY EXPRESS	BEE CH CO	LANSING	IL	0	4	0	4	COMPOUNDS,LACQUER,	2050260A
PA	HARRISBURG	72-06-17	ROADWAY EXPRESS	FRECER G CK SMITH	COLUMBUS	OH	0	4	0	4	NITRIC ACID	2060307A
PA	HAYS	72-05-30	MATLACK INC	AMERICAN OIL CO	HAYS	PA	0	4	0	4	GASOLINE	2063096A
PA	HEREFORD	71-10-12	CONSOLIDATED FRTWY	S O S PRODUCTS	EAST GREENVILLE	PA	0	4	0	4	SULFURIC ACID,FUMI	1110069A
PA	HOME	72-05-23	KRAJACK TANK LINES	INLAND CH CO	CARTERET	NJ	1	2	0	4	METHYL ETHYL KETON	2053203A
PA	HUNTINGDON	72-07-14	ROADWAY EXPRESS	PROCESSED CH + COA	CARLSTADT	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2080382A
PA	IRWIN	72-02-04	B + P MTR EXP INC	STANDARD T CH CO	LINDEN	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2020219A
PA	IRWIN	71-09-20	B + P MTR EXP INC	ELECTRIC PAINT + V	CLEVELAND	OH	0	4	0	4	CEMENT, ROOFING, L	2040212A
PA	LANCASTER	72-07-14	SUBURBAN PROPANE	SUN OIL CO	MARCUS HOOK	PA	0	4	0	4	LIQUEFIED PETROLEU	2070232A
PA	LANCASTER	72-03-13	SHELL OIL CO	SHELL OIL CO	VAN NUYS	CA		4	1	1	GASOLINE	2080285A
PA	LEECHBURG	71-09-10	GUTHN FREIGHT LNS	BAXTER L E LIMITEN	MONTREAL	CN	0	4	0	4	RADIOACTIVE DEVICE	1103076A
PA	[illegible]	72-05-12	EASTERN EXP INC	FORMICA CORP	DAYTON	OH	0	4	0	4	CEMENT, LIQUID, N.	2050242A
PA	[illegible]	72-05-16	EASTERN EXP INC	ROGERS HARRY M CO	CHICAGO	IL	0	4	0	4	COMPOUNDS,CLEANING	2060036A
PA	[illegible]	71-07-14	[illegible] INC	ROCKY MOUNTAIN RES	GOLDEN	CO	0	4	0	4	ARSENIC CHLORIDE(A	1070186A
PA	LITITZ	72-05-31	AGWAY INC	AGWAY INC	LANCASTER	PA	0	4	0	4	LIQUEFIED PETROLEU	2060158A
PA	LYNCH	72-06-05	CROSSETT INC	UNITED REFG CO	WARREN	PA	0	4	0	4	GASOLINE	2060218A
PA	MCKEES ROCKS	72-02-17	PITTSBURGH CH	ARCO CHEMICAL CO	CHANNELVIEW	TX	0	4	0	4	BUTADIENE, INHIBIT	2030019A
PA	MECHANICSBURG	71-03-13	HALLS MTR TRANSIT	VA CH INC			0	4	0	4	DRUGS, CHEMICALS,	1030173A
PA	[illegible]	72-05-24	HALLS MTR TRANSIT	SOS PRODUCTS CO	EAST GREENVILLE	PA	0	4	0	4	COMPOUNDS,CLEANING	2060013A
PA	[illegible]	72-05-30	HALLS MTR TRANSIT	TECHNICAL MAINTENA	PHILADELPHIA	PA	0	4	0	4	COMPOUNDS,CLEANING	2060216A
PA	[illegible]	[illegible]	MATLACK INC	HESS OIL CO	PHILADELPHIA	PA	0	4	0	4	GASOLINE	2050184A
PA	[illegible]	[illegible]	[illegible]	AGWAY PETROLEUM CO	MERCER	PA	0	4	0	4	GASOLINE	1060040A
PA	[illegible]	[illegible]	[illegible] TRUCKING CO	GENERAL ELECTRIC	CHELSEA	MA	0	4	0	4	PAINT, ENAMEL, LAC	2010185A
PA	[illegible]	[illegible]	[illegible] INC	STAUFFER CH CO	NIAGARA FALLS	NY	0	4	0	4	SULFUR CHLORIDE(MO	2050126A
PA	MIDDLESEX	72-05-19	[illegible] EXPRESS INC	ARMITAGE J L CO	NEWARK	NJ	0	4	0	4	COATING SOLUTION	2050293A
PA	MIDDLESEX	72-06-06	MCELAN TRUCKING CO	DOLPH JOHN C CO	MONMOUTH JUNCT	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2060304A
PA	MILTON	72-04-04	[illegible] MTR EXP CO	UOYLITE CORP	WARREN	MI	1	1	0	4	ACIDS, LIQUID, N.O	2040093A
PA	[illegible]	71-05-25	NORFOLK + WEST RWY	EPG INDUSTRIES	PASADENA	TX	0	4	0	4	VINYL CHLORIDE	1060062A
PA	MONTGOMERYVILLE	72-06-01	MATLACK INC	HESS OIL CO	PENNSAUKEN	NJ	0	4	0	4	GASOLINE	2080287A
PA	MORRISVILLE	71-06-19	PENN CENTRAL TRANS	AMERICAN CYANAMID	LINDEN	NJ	2	1	0	4	SULFURIC ACID,FUMI	1070082A
PA	NATRONA HEIGHTS	72-06-20	MATLACK INC	UNITED REFINING CO	PITTSBURGH	PA	0	4	0	4	GASOLINE	2080083A
PA	NEVILLE ISLAND	72-05-31	CHEMICAL LEAMAN TA	DUPONT E I DENEMOU	JOSEPHTOWN	PA	0	4	0	4	SULFURIC ACID,FUMI	2060152A
PA	NEW HAVEN	71-09-23	EAZOR EXPRESS INC	MCKESSON CH CO	CARNEGIE	PA	0	4	0	4	CUMENE HYDROPEROXI	1100027A
PA	NEW KENSINGTON	71-02-10	PENN CENTRAL TRANS	IPS CH INC	CARTERET	NJ	0	4	0	4	FLAMMABLE LIQUIDS,	1020117A
PA	NEW SMITH	71-06-08	ROADWAY EXPRESS	DUPONT E I	PARLIN	NJ	0	4	0	4	PAINT, ENAMEL, LAC	1060123A
PA	NEWARK	72-07-17	B + P MTR EXP INC	AMERICAN LACQUER S	OAKRIDGE	PA	0	4	0	4	PAINT, ENAMEL, LAC	2080021A
PA	NORRISTOWN	72-04-25	CHEMICAL LEAMAN TA	GULF OIL CO	PHILADELPHIA	PA	0	4	0	4	TOLUOL(TOLUENE)	2050153A
PA	NORRISTOWN	72-04-05	MATLACK INC	HESS OIL CO	PHILADELPHIA	PA	0	4	0	4	GASOLINE	2050186A
PA	ORANGE	71-06-22	BRANCH MTR EXP CO	BAKER J T CH CORP	PHILLIPSBURG	NJ	0	4	0	4	PERCHLORIC ACID IN	1060207A
PA	PARKER	71-06-20	KRAJACK TANK LINES	SHELL CH CO	SEWAREN	NJ	0	4	0	4	ISOPROPANOL	1070004A
PA	PERKASIE	72-02-21	TEXACO INC	TEXACO INC	WESTVILLE	NJ	0	4	0	4	GASOLINE	2050255A
PA	PHILADELPHIA	71-01-18	KRAJACK TANK LINES	ATLANTIC RICHFIELD	BAYWAY	NJ	0	4	0	4	METHYL ETHYL KETON	1010042A
PA	PHILADELPHIA	71-02-14	READING CO	COMMONWEALTH PROPA	REYBOLD	DE	0	4	0	4	LIQUEFIED PETROLEU	1020064A
PA	PHILADELPHIA	71-03-18	COWAN W T INC	CHEVRON CH ORTHO D	RED BANK	NJ	0	4	0	4	AMMONIUM NITRATE M	1030197A

ST	LOCATION CITY	INC DATE	CARRIER	SHIPPER	ORIGIN CITY	ST	IN	CO	DE	CD	COMMODITY	RPT NO.
PA	PHILADELPHIA	71-08-05	NAVAJO FREIGHT LNS	TRAIL CH CO	EL MONTE	CA	0	4	0	4	PAINT, ENAMEL, LAC	1080074A
PA	PHILADELPHIA	71-07-20	MCLEAN TRUCKING CO	STARR NATIONAL MFG	MEMPHIS	TN	0	4	0	4	SULFURIC ACID,FUMI	1080168A
PA	PHILADELPHIA	71-08-06	COOPER-JARRETT INC	STATE CH MFG CO	CLEVELAND	OH	0	4	0	4	SODIUM ARSENITE(SO	1090159A
PA	PHILADELPHIA	71-09-20	READING CO	CHEVRON ASPHALT CO	FAIRFIELD	MD	0	4	0	4	PETROLEUM NAPHTHA	1090225A
PA	PHILADELPHIA	71-04-08	TRANSAMERICAN FRT	RICHARDSON CH CO	DETROIT	MI	0	4	0	4	ACIDS, LIQUID, N.O	1100064A
PA	PHILADELPHIA	71-04-26	KPAJACK TANK LINES	STEVENSON W N CO	CARTERET	NJ	0	4	0	4	ISOPROPANOL	1100086A
PA	PHILADELPHIA	71-10-11	MATLACK INC	ALLIED CH	MARCUS HOOK	PA	0	4	0	4	SULFURIC ACID,FUMI	1100139A
PA	PHILADELPHIA	71-10-18	A-P-A TRANSPORT CO	BRUDER M A CO	Q	Q		4		4	TURPENTINE SUBSTIT	1110060A
PA	PHILADELPHIA	71-10-29	COOPER-JARRETT INC	PORTER PAINT CO	LOUISVILLE	KY	0	4	0	4	PAINT, ENAMEL, LAC	1110074A
PA	PHILADELPHIA	71-09-28	COOPER-JARRETT INC	DUPLI COLOR	ELK GROVE	IL	0	4	0	4	PAINT, ENAMEL, LAC	1110076A
PA	PHILADELPHIA	71-11-18	A-P-A TRANSPORT CO	ALTER HARRY CO	MASPETH	NY	0	4	0	4	UNKN	1110235A
PA	PHILADELPHIA	71-11-04	A-P-A TRANSPORT CO	REDI-CAR	SAYVILLE	NY	0	4	0	4	PAINT, ENAMEL, LAC	1120073A
PA	PHILADELPHIA	72-01-11	COOPER-JARRETT IN	B F GOODRICH CH C	CALVERT CITY	KY	0	4	0	4	ACRYLONITRILE	2020041A
PA	PHILADELPHIA	72-01-25	COOPER-JARRETT IN	VISTRON CORP	LIMA	OH	0	4	0	4	ACETONITRILE	2020235A
PA	PHILADELPHIA	72-03-30	B + P MTR EXP	TECHNICAL COATINGS	OAKMONT	PA	0	4	0	4	QUES	2040127A
PA	PHILADELPHIA	72-04-04	ASSOCIATED TRANSPT	FERGUSSON ALEX C	FRAZER	PA	0	4	0	4	COMPOUNDS,CLEANING	2040173A
PA	PHILADELPHIA	72-05-03	MATLACK INC	HESS OIL CO	PHILADELPHIA	PA	0	4	0	4	GASOLINE	2050188A
PA	PHILADELPHIA	72-05-17	ASSOCIATED TRANSPT	CHRYSLER CORP	TRENTON	MI	0	4	0	4	CEMENT, LIQUID, N.	2050266A
PA	PHILADELPHIA	72-05-25	PRESTON TRUCKING	RESIDEX CORP	CLARK	NJ	0	4	0	4	HYDROCHLORIC (MURI	2050362A
PA	PHILADELPHIA	72-05-35	CHEMICAL LEAMAN TA	DUPONT E I DENEMOU	GIBBSTOWN	NJ	0	4	0	4	HYDROGEN PEROXIDE	2060020A
PA	PHILADELPHIA	72-05-21	MATLACK INC	HESS OIL CO	PHILADELPHIA	PA	0	4	0	4	GASOLINE	2060095A
PA	PHILADELPHIA	72-06-05	PRESTON TRUCKING C	FIRESTONE TIRE + R	PHILADELPHIA	PA	0	4	0	4	ELECTROLYTE (ACID)	2060189A
PA	PHILADELPHIA	72-05-31	ATLANTIC RICHFIELD	ATLANTIC RICHFIELD	PHILADELPHIA	PA	0	4	0	4	GASOLINE	2060271A
PA	PHILADELPHIA	72-06-27	TIDEWATER INLAND E	KEY CH	PHILADELPHIA	PA	0	4	0	4	COMPOUNDS,CLEANING	2070034A
PA	PHILADELPHIA	72-07-17	COOPER-JARRETT INC	STAUFFER CH CO	WESTON	MI	0	4	0	4	DRUGS, CHEMICALS.	2030047A
PA	PHILADELPHIA	72-06-16	WERNER CONTINENTAL	WATER TREATMENT CO	PITTSBURGH	PA	0	4	0	4	CAUSTIC SODA, LIQU	2030073A
PA	PHILADELPHIA	72-07-24	CHEMICAL LEAMAN TA	ATLANTIC RICHFIELD	PHILADELPHIA	PA	1	1	0	4	SULFURIC ACID,FUMI	2050205A
PA	PHILADELPHIA	72-09-10	A-P-A TRANSPORT CO	SHELL CH CO	KEARNY	NJ	1	1	0	4	INSECTICIDE, LIQUI	2180429A
PA	[illegible]	71-04-26	PENN CENTRAL TRANS	REILLY TAR + CH CO	INDIANAPOLIS	IN	9	4	0	4	PYRIDINE	1050053A
PA	PITTS	71-06-22	PRESTON TRUCKING	ELLBEE CH CO	EAS M	NJ	1	1	0	4	PAINT, ENAMEL, LAC	2060269A
PA	PITTSBURG	71-04-20	DELTA LINES INC	TROJAN INC	SAN FRANCISCO	CA	0	4	0	4	ELECTROLYTE (ACID)	1050019A
PA	PITTSBURG	71-05-31	MCLEAN TRUCKING CO	CITIES SERVICE CO	COPPERHILL	TN	0	4	0	4	SODIUM HYDROSULFIT	1070053A
PA	PITTSBURG	71-10-13	EAZOR EXPRESS INC	PPG INDUSTRIES INC	NATRIUM	WV	0	4	0	4	TITANIUM TETRACHLO	1100119A
PA	PITTSBURG	72-02-09	EAZOR EXPRESS INC	UNION CARBIDE COR	CHARLESTON	WV	0	4	0	4	WOOD ALCOHOL(METHA	2020163A
PA	PITTSBURG	72-03-29	MOTOR FREIGHT EXPR	BERKLEY PRODUCTS	AKRON	PA	0	4	0	4	PAINT, ENAMEL, LAC	2040073A
PA	PITTSBURGH	71-01-31	PENN CENTRAL TRANS	UNION CARBIDE CORP	SO. CHARLESTON	WV	0	4	0	4	WOOD ALCOHOL(METHA	1020077A
PA	PITTSBURGH	71-02-25	CONSOLIDATED FRTWY	ARKON CH CO	DALLAS	TX	1	1		4	COMPOUNDS,CLEANING	1030163A
PA	PITTSBURGH	71-05-21	MCLEAN TRUCKING CO	IRM INC	HIBBING	MN	0	4	0	4	PAINT, ENAMEL, LAC	1060043A
PA	PITTSBURGH	71-11-09	EAZOR EXPRESS INC	WITCO CH	PATERSON	NJ	0	4	0	4	ACIDS, LIQUID, N.O	1110145A
PA	PITTSBURGH	72-03-17	B + P MOTOR EXPRES	CHEVRON CH CO	CLEVELAND	OH	0	4	0	4	OXIDIZING MATERIAL	2030232A
PA	PITTSBURGH	71-04-11	B + P MTR EXP INC	DUPONT E I DENEMOU	BRADDOCK	PA	0	4	0	4	CYANIDE OF POTASSI	2030233A
PA	PITTSBURGH	72-05-12	MERCURY MOTOR EXPR	MINE SAFETY APPL	EVANS CITY	PA	0	4	0	4	PYROFORIC LIQUIDS,	2050211A
PA	PITTSBURGH	72-05-24	MATLACK INC	UNITED REFINING CO	PITTSBURGH	PA	0	4	0	4	GASOLINE	2060095A
PA	PITTSBURGH	72-05-29	MATLACK INC	BORON OIL CO	EAST HANOVER	PA	0	4	0	4	GASOLINE	2060267A
PA	PITTSBURGH	72-06-03	GRANT MIRFRATE INC	PETIT PAINT CO	BELLEVUE	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2060354A
PA	PITTSBURGH	72-07-21	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080026A
PA	PITTSBURGH	72-08-01	MASON AND DIXON LN	OLYMPIC MFG CO	SMYRNA	GA	0	4	0	4	COMPOUNDS,CLEANING	2080294A
PA	PITTSBURGH	72-08-23	MATLACK INC	BORON OIL	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080373A
PA	PITTSBURGH	72-08-22	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080441A
PA	PLEASANTVILLE	72-05-31	REFINERS TRANSPORT	WOLFS HEAD OIL + R	RENO	PA	0	4	0	4	GASOLINE	2060176A
PA	PORT RICHMOND	72-02-27	READING CO	MOBIL OIL CORP	EAST CHICAGO	IN	0	4	0	4	ALKALINE CORROSIVE	2030020A
PA	POTTSTOWN	72-04-08	ROADWAY EXPRESS	WYANDOTTE CH CO	WYANDOTTE	MI	0	4	0	4	PLASTIC SOLVENT, N	2040242A
PA	POTTSVILLE	71-08-03	ROADWAY EXPRESS	ANKEM OF TEXAS	DALLAS	TX	0	4	0	4	COMPOUNDS,CLEANING	1080087A
PA	POTTSVILLE	73-08-33	ROADWAY EXP INC	ANKEM OF TEXAS INC	DALLAS	TX	0	4	0	4	CLEANING FLUID OR	1080187A
PA	Q	71-05-17	READING CO	INORGANIC CH	S. CHARLESTON	WV	0	4	0	4	CAUSTIC SODA, LIQU	1060006A

ST	LOCATION CITY	INC DATE	CARRIER	SHIPPER	ORIGIN CITY	ST	IN	CD	DE	CD	COMMODITY	RPT NO.
PA	Q	71-08-07	ATLANTIC RICHFIELD	ATLANTIC RICHFIELD	ROCHESTER	NY	1	2	0	4	GASOLINE	1080166A
PA	Q	71-09-03	MCCAHIC WILLIAM B	HALBY CH CO	WYANDOTTE	MI		4		4	CAUSTIC SODA, LIQU	1090187A
PA	READING	71-01-24	BRANCH MTR EXP CO	PPG INDUSTRIES	CLEVELAND	OH	0	4	0	4	PAINT, ENAMEL, LAC	1020017A
PA	READING	71-06-04	BRANCH MTR EXP CO	ATLAS SYNTHETICS	LONG ISLAND	NY	0	4	0	4	PAINT, ENAMEL, LAC	1060083A
PA	READING	71-07-23	CONSOLIDATED FRTWY	FREEMAN CH CORP	SAUKVILLE	WI	0	4	0	4	FLAMMABLE LIQUIDS,	1080161A
PA	READING	71-10-18	READING CO	DUPONT E I NEMOURS	GRASSELL	NJ	0	4	0	4	SULFURIC ACID,FUMI	1100095A
PA	READING	72-06-16	M + M TRANSPORTATN	STAUFFER CH CO	DAYTON	NJ	0	4	0	4	PARATHION MIXTURE,	2060344A
PA	READING	72-07-17	M + M TRANSPORTATN	STANCHEM INC	EAST BERLIN	CT	0	4	0	4	CEMENT, LIQUID, N.	2070264A
PA	RICHMOND	71-03-06	SUBURBAN PROPANE G	SUBURBAN ATLANTIC	HORSEHEADS	NY	0	4	0	4	LIQUEFIED PETROLEU	1030111A
PA	RIDGWAY	70-12-29	B + O RR	CYANAMID OF CANADA	ONTARIO	CN	0	4	0	4	CYANIDE OF CALCIUM	1010016A
PA	RIDGWAY	70-12-29	B + O RR	CYANAMID OF CANADA	ONTARIO	CN	0	4	0	4	CYANIDE OF CALCIUM	1010017A
PA	RIDGWAY	71-01-31	B + O RR	HOOKER CH	NIAGARA FALLS	NY	0	4	0	4	CAUSTIC SODA, LIQU	1020038A
PA	ROARING SPRINGS	71-11-26	PENN CENTRAL TRANS	PPG INDUSTRIES INC	BARBERTON	OH	12	1	0	4	CHLORINE	1120030A
PA	RUTHERFORD	71-05-03	READING CO	SPECIALITY CH CORP	PERKINS	WV	0	4	0	4	HYDROCHLORIC (MURI	1050093A
PA	SANTA CLARA	71-09-03	DELTA LINES INC	GORDON DUFF INC	LOS ANGELES	CA	0	4	0	4	ACIDS, LIQUID, N.O	1090185A
PA	SCRANTON	71-10-13	A-P-A TRANSPORT CO	MOBIL CH CO	EDISON	NJ		4		4	PAINT, ENAMEL, LAC	1100166A
PA	SCRANTON	71-10-13	A-P-A TRANSPORT CO	MOBIL CH CO	EDISON	NJ		4		4	PAINT, ENAMEL, LAC	1100168A
PA	SCRANTON	71-10-11	A-P-A TRANSPORT CO	PARKS CORP	SOMERSET	MA		4		4	SHELLAC, LIQUID	1100173A
PA	SCRANTON	71-10-21	A-P-A TRANSPORT CO	U S RUBBER CO	NORTH BERGEN	NJ		4		4	BATTERIES, ELECTRI	1110058A
PA	SCRANTON	72-05-04	A-P-A TRANSPORT CO	MAAS + WALDERSTEIN	NEWARK	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2050129A
PA	SCRANTON	72-08-23	A-P-A TRANSPORT CO	PROCESSED CH + COA	CARLSTADT	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2080422A
PA	SCRANTON	72-08-20	A-P-A TRANSPORT CO	DAMAN EDUCATION OI	WESTWOOD	MA	0	4	0	4	ALCOHOL, N.O.S.	2080449A
PA	SHARON	71-01-11	EAZOR EXPRESS INC	PRATT + LAMBERT IN	BUFFALO	NY	0	4	0	4	PAINT, ENAMEL, LAC	1010019A
PA	SHARON	71-08-04	COOPER-JARRETT INC	FRANKLIN GLUE CO	COLUMBUS	OH	0	4	0	4	UNKN	1090163A
PA	SHARON	71-09-27	COOPER-JARRETT INC	BRUNNING PAINT CO	BALTIMORE	MD	0	4	0	4	PAINT, ENAMEL, LAC	1090162A
PA	SHARON	71-10-27	COOPER-JARRETT INC	AMERICAN-LINCOLN	BOWLING GREEN	OH	0	4	0	4	ELECTROLYTE (ACID)	1110073A
PA	SHARON	71-09-30	COOPER-JARRETT INC	WITINE INC	CLIFTON	NJ	0	4	0	4	ACIDS, LIQUID, N.O	1110077A
PA	SHARON	71-11-24	COOPER-JARRETT INC	VAREUM CH	NIAGARA FALLS	NY	0	4	0	4	UNKN	1120020A
PA	SHARON	71-02-23	EAZOR EXPRESS INC	PRATT + LAMBERT	BUFFALO	NY	0	4	0	4	PAINT, ENAMEL, LAC	2020260A
PA	SLATINGTON	71-10-22	MATLACK INC	ALLIED CH	PALMERTON	PA	1	1	0	4	SULFURIC ACID,FUMI	1110164A
PA	SPRING CITY	71-12-08	JONES MOTOR CO	PFD PENN COLOR INC	DOYLESTOWN	PA	0	4	0	4	PAINT, ENAMEL, LAC	1120065A
PA	SPRING CITY	71-11-30	JONES MOTOR CO	TURNER EXP	NORFOLK	VA	0	4	0	4	SULFURIC ACID,FUMI	1120066A
PA	TREVOSE	71-06-19	HERRMANN FORWARDING	UNION CARBIDE CORP	DUNELLEN	NJ	0	4	0	4	UNKN	1060184A
PA	UNITY	72-06-23	MATLACK INC	BORON OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2080443A
PA	WEST MIDDLESEX	71-08-11	MCLEAN TRUCKING CO	PERFECTION PAINT	INDIANAPOLIS	IN	0	4	0	4	PAINT, ENAMEL, LAC	1080151A
PA	WEST MIDDLESEX	71-08-07	MCLEAN TRUCKING CO	PRINTING INK DIV	INDIANAPOLIS	IN	0	4	0	4	INK	1080152A
PA	WEST MIDDLESEX	71-09-24	MCLEAN TRUCKING CO	TENNANT CO	MINNEAPOLIS	MN	0	4	0	4	PAINT, ENAMEL, LAC	1100112A
PA	WEST MIDDLESEX	71-09-29	MCLEAN TRUCKING CO	FORD MARKETING COR	LIVONIA	MI	0	4	0	4	COMPOUNDS,CLEANING	1100114A
PA	WEST MIDDLESEX	71-09-29	MCLEAN TRUCKING CO	STATE CH MFG CO	CLEVELAND	OH	0	4	0	4	COMPOUNDS,CLEANING	1100144A
PA	WEST MIDDLESEX	71-09-07	MCLEAN TRUCKING CO	MINNESOTA MINING +	ST.PAUL	MN	0	4	0	4	RESIN SOLUTION(RES	1100145A
PA	WEST MIDDLESEX	71-11-05	MCLEAN TRUCKING CO	MICHIGAN CHROME +	DETROIT	MI	0	4	0	4	UNKN	1110166A
PA	WEST MIDDLESEX	71-11-11	DANIELS MTR FRT IN	UNION CARBIDE	CHICAGO	IL	0	4	0	4	UNKN	1110206A
PA	WEST MIDDLESEX	71-12	MCLEAN TRUCKING CO	I-SIS CH INC	SPRINGDALE	CT	0	4	0	4	COMPOUNDS,LACQUER,	2010081A
PA	WEST MIDDLESEX	72-02-02	MCLEAN TRUCKING C	FISHER SCIENTIFIC	WARRENSVILLE	OH	0	4	0	4	BUTYL ACETATE	2020202A
PA	WEST MIDDLESEX	72-04-04	EAZOR EXPRESS INC	LANDAU J AND CO	CARLSTADT	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2040051A
PA	WEST MIDDLESEX	72-04-24	EAZOR EXPRESS INC	SHERWIN WILLIAMS	CHICAGO	IL	0	4	0	4	PAINT, ENAMEL, LAC	2040229A
PA	WEST MIDDLESEX	72-05-06	MCLEAN TRUCKING CO	PERFECTION PAINT +	GARDNER	MA	0	4	0	4	PAINT, ENAMEL, LAC	2070004A
PA	WEST MIDDLESEX	72-05-01	MCLEAN TRUCKING CO	STATE CH CO	CLEVELAND	OH	0	4	0	4	SODIUM ARSENITE(SO	2070044A
PA	WEST MIDDLESEX	72-06-02	MCLEAN TRUCKING CO	MYSAN CORP	CHICAGO	IL	0	4	0	4	COMPRESSED GASES,N	2070168A
PA	WEST MIDDLESEX	72-06-18	MCLEAN TRUCKING CO	DAVIS WEIL MFG CO	MEMPHIS	TN	0	4	0	4	COMPOUNDS,CLEANING	2070189A
PA	WEST MIDDLESEX	72-06-03	MCLEAN TRUCKING CO	DYNA TECH INC	SIOUX CITY	IA	0	4	0	4	ELECTROLYTE (ACID)	2070194A
PA	WEST MIDDLESEX	72-05-17	MCLEAN TRUCKING CO	FULLER H B CO	PALATINE	IL	0	4	0	4	CEMENT, LIQUID, N.	2070195A
PA	WEST MIDDLESEX	72-07-14	EAZOR EXPRESS INC	UNION CARBIDE CORP	CHARLESTON	WV	0	4	0	4	COMPOUNDS,LACQUER,	2070199A
PA	WEST MIDDLESEX	72-05-18	MCLEAN TRUCKING CO	LUCIDOL DIVISION	GENESCO	NY	0	4	0	4	DRUGS, CHEMICALS,	2070223A
PA	WEST MIDDLESEX	72-06-27	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	ACIDS, LIQUID, N.O	2070224A

ST	[illegible] CITY	INC DATE	CARRIER	SHIPPER	ORIGIN CITY	ST	IN	CO	DE	CD	COMMODITY	RPT NO.
PA	WEST MIDDLESEX	72-06-25	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	<<	2070247A
PA	WEST MIDDLESEX	72-06-30	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	HYDROCHLORIC (MURI	2070243A
PA	WEST MIDDLESEX	72-07-12	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	HYDROCHLORIC (MURI	2070249A
PA	WEST MIDDLESEX	72-06-08	MCLEAN TRUCKING CO	PRESS-SEAL GASKET	FT WAYNE	IN	0	4	0	4	CEMENT, LIQUID, N.	2070253A
PA	WEST MIDDLESEX	72-05-26	MCLEAN TRUCKING CO	RAYBESTOS MANHATTA	STATFORD	CT	0	4	0	4	CEMENT, LIQUID, N.	2070256A
PA	WEST MIDDLESEX	72-05-25	MCLEAN TRUCKING CO	RUST-O-LEUM CORP	EVANSTON	IL	0	4	0	4	PAINT, ENAMEL, LAC	2070258A
PA	WEST MIDDLESEX	72-06-18	MCLEAN TRUCKING CO	PARKS CORP	SOMERSET	MA	0	4	0	4	PAINT, ENAMEL, LAC	2070285A
PA	WEST MIDDLESEX	72-05-10	MCLEAN TRUCKING CO	SCHENECTADY CH INC	SCHENECTADY	NY	0	4	0	4	PAINT, ENAMEL, LAC	2070314A
PA	WEST MIDDLESEX	72-07-12	MCLEAN TRUCKING CO	RIVERDALE CH	CHICAGO HEIGHTS	IL	0	4	0	4	SOLVENTS, N.O.S.	2080031A
PA	WEST MIDDLESEX	72-07-24	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	*	2080169A
PA	WEST MIDDLESEX	72-07-24	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	*	2080173A
PA	WEST MIDDLESEX	72-08-01	MCLEAN TRUCKING CO	DAMON EDUCATIONAL	WESTWOOD	MA	0	4	0	4	HYDROCHLORIC (MURI	2080171A
PA	WEST MIDDLESEX	72-07-27	MCLEAN TRUCKING CO	MISCO INTERNATL CH	WHEELING	IL	0	4	0	4	COMPOUNDS,CLEANING	2080198A
PA	WEST MIDDLESEX	72-07-20	MCLEAN TRUCKING CO	FIRESTONE TIRE + R	AKRON	OH	0	4	0	4	CEMENT, LIQUID, N.	2080400A
PA	WEST VIEW	72-06-20	HATLACK INC	BORGN OIL CO	CORAOPOLIS	PA	0	4	0	4	GASOLINE	2070811A
PA	WILLIAMSPORT	72-05-07	CONSOLIDATED FRTWY	MARTIN SENOUR CO	CHICAGO	IL	0	4	0	4	PAINT, ENAMEL, LAC	2060238A
PA	WILLIAMSPORT	72-08-09	EASTERN EXP INC	BAKER J T CH CO	CHICAGO	IL	0	4	0	4	HYDROCHLORIC (MURI	2080317A
PA	[illegible]LEYSBURG	71-03-10	PENN CENTRAL TRANS	ROHM + HASS	BRISTOL	PA	0	4	0	4	ETHYL ACETATE	1063189A
PA	YORK	71-04-23	CONSOLIDATED FRTWY	C+D BATTERIES	CONSHOHOCKEN	PA		4		4	BATTERIES, ELECTRI	1050039A
PA	YORK	71-05-21	CONSOLIDATED FRTWY	DOW CH	MIDLAND	MI	0	4	0	4	COMPOUNDS,TREE OR	1050149A
PA	YORK	71-05-27	CONSOLIDATED FRTWY	ARCAL CH INC	SEAT PLEASANT	MD	0	4	0	4	COMPOUNDS,CLEANING	1063037A
PA	YORK	71-05-14	MER FREIGHT EXP	GAMBLER CH CO	PATTERSON	NJ	0	4	0	4	COMPOUNDS,CLEANING	1060183A
PA	YORK	71-07-23	SPANCH MTR EXP CO	ALBATROSS CH CO	LONG ISLAND CIT	NY	0	4	0	4	PAINT, ENAMEL, LAC	1080053A
PA	YORK	71-07-29	CONSOLIDATED FRTWY	BEE CH CO	LANSING	IL	0	4	0	4	PAINT, ENAMEL, LAC	1080057A
PA	YORK	71-07-17	CONSOLIDATED FRTWY	MILLER CH	HANOVER	PA	0	4	0	4	TETRAETHYL PYROPHO	1080162A
PA	YORK	71-[illegible]-25	CONSOLIDATED FRTWY	GILLETTE CH CO	NORTH CHICAGO	IL	0	4	0	4	DRUGS, CHEMICALS,	1090007A
PA	YORK	72-03-20	MOTOR FREIGHT EXPR	U S INDUSTRIAL CH	NEWARK	NJ	0	4	0	4	ALCOHOL, N.O.S.	2040175A
PA	YORK	72-04-21	CONSOLIDATED FRTWY	WHITAKER CORP	BERWICK	PA	0	4	0	4	PAINT, ENAMEL, LAC	2040262A
PA	YORK	72-05-30	CONSOLIDATED FRTWY	RUSTOLEUM CORP	EVANSTON	IL	0	4	0	4	PAINT, ENAMEL, LAC	2050155A
PA	YORK	72-05-37	CONSOLIDATED FRTWY	DOLPH WARREN C CO	MONMOUTH JUNCTI	NJ	0	4	0	4	PAINT, ENAMEL, LAC	2050159A
NY	[illegible]A	71-[illegible]-14	STATES STEAMSHIP	MSG - U S MILITARY	OKINAWA	RU	0	4	0	4	MATCHES, BOOK, CAR	2050132A
[illegible]	[illegible]	[illegible]-28	[illegible] SERVICE	ZEP MFG CO	ATLANTA	GA	1	1	0	4	COMPOUNDS,CLEANING	1080006A
[illegible]	SAN JUAN	[illegible]	[illegible] SERVICE	UNION CARBIDE CORP	PONCE	PR	0	4	0	4	QUES	1080032A
[illegible]	[illegible]	[illegible]	[illegible]	TEXACO INC	ANACORTES	Q	0	4	0	4	GASOLINE	2040085A
[illegible]	[illegible]	[illegible]	[illegible] FREIGHT LNS	SARGORAN CO	NORWOOD	MA	0	4	0	4	COMPOUNDS,LACQUER,	1030158A
[illegible]	[illegible]	71-[illegible]-30	[illegible] JAN C CO	RUBICON CHEMICAL	Q	Q	0	4	0	4	QUES	1080172A
[illegible]	[illegible]	71-[illegible]-02	BURLINGTON NORTHER	VUCCON MATERIALS	WICHITA	KS	0	4	0	4	FISH SCRAP OR FISH	1090150A
[illegible]	[illegible]	71-12-29	CROUCH BROS INC	EBS INC	OMAHA	NB	0	4	0	4	BATTERIES, ELECTRI	2010046A
[illegible]	[illegible]	72-01-04	A-P-A TRANSPORT CO	C + D BATTERY	PLYMOUTH MEETIN	PA	0	4	0	4	BATTERIES, ELECTRI	2010090A
[illegible]	[illegible]	72-01-04	A-P-A TRANSPORT CO	SIMON PHONOGRAPHS	NEW YORK	NY	0	4	0	4	<<	2010091A
[illegible]	[illegible]	72-0[illegible]-04	HOLLAND MOTOR EXP	MULLER INDUSTRIES	CINCINATTI	OH	0	4	0	4	PAINT, ENAMEL, LAC	2040093A
[illegible]	[illegible]	72-07-12	JOHNSTONES FUEL LI	TESORO PETROLEUM C	NEWCASTLE	WY	0	4	0	4	GASOLINE	2070277A
RI	CRANSTON	72-05-06	TEXACO INC	TEXACO INC	PROVIDENCE	RI	0	4	0	4	GASOLINE	2060118A
RI	PROVIDENCE	71-06-03	MCLEAN TRUCKING CO	LEMAN SALES CO	CHARLOTTE	NC	0	4	0	4	UNKN	1070076A
RI	PROVIDENCE	71-07-08	OLD COLONY TRANS	CAL CH CORP	COVENTRY	RI	0	4	0	4	UNKN	1070185A
RI	PROVIDENCE	71-12-21	FORT EDWARD EXP CO	PETROLANE	SELKIRK	NY	0	4	0	4	LIQUEFIED PETROLEU	1120175A
RI	PROVIDENCE	72-01-23	PENN CENTRAL TRAN	WARREN PETROLEUM	GENESCO	NJ	0	4	0	4	LIQUEFIED PETROLEU	2020058A
RI	PROVIDENCE	72-06-15	TEXACO INC	TEXACO INC	PROVIDCE	RI	0	4	0	4	GASOLINE	2060330A
RI	PROVIDENCE	72-06-21	PACIFIC INTERMTN E	C + D BATTERIES	ATTICA	IN	0	4	0	4	ELECTROLYTE (ACID)	2070150A
SC	BENNETTSVILLE	72-04-14	LANEY TANK LINES	UNION OIL CO OF CA	WILMINGTON	NC	0	4	0	4	GASOLINE	2050099A
SC	BOWATERS	72-02-26	SOUTHERN RAILWY SY	OLIN MATHIESON CH	CHARLESTON	TN	0	4	0	4	CAUSTIC SODA, LIQU	2030102A
SC	BOWATERS	72-02-27	SOUTHERN RAILWY SY	OLIN MATHIESON CH	CHARLESTON	SC	[illegible]	[illegible]	0	4	CAUSTIC SODA, LIQU	2030105A
SC	BUSHY PARK	72-04-07	SCHMERMAN TRUCKING	GRACE W R CO	CHARLESTON	SC	1	1	0	4	SULFURIC ACID,FUMI	2040181A
SC	CAMDEN	71-07-29	MCLEAN TRUCKING CO	ONAN CO	MINNEAPOLIS	MN	0	4	0	4	SULFURIC ACID,FUMI	1080128A
SC	CAMP CROFT	71-07-15	GULF OIL CO	GULF OIL CO U S	GREENSVILLE	SC	0	[illegible]	1	3	GASOLINE	1070160A

DEPARTMENT OF TRANSPORTATION

Form Approved OMB No. 04-5613

HAZARDOUS MATERIALS INCIDENT REPORT

INSTRUCTIONS: Submit this report in duplicate to the Secretary, Hazardous Materials Regulations Board, Department of Transportation, Washington, D.C. 20590, (ATTN: Op. Div.). If space provided for any item is inadequate, complete that item under Section H, "Remarks", keying to the entry number being completed. Copies of this form, in limited quantities, may be obtained from the Secretary, Hazardous Materials Regulations Board. Additional copies in this prescribed format may be reproduced and used, if of the same size and kind of paper.

A INCIDENT

1. TYPE OF OPERATION: 1 ☐ AIR 2 ☐ HIGHWAY 3 ☐ RAIL 4 ☐ WATER 5 ☒ FREIGHT FORWARDER 5 ☐ OTHER (Identify)

2. DATE AND TIME OF INCIDENT (Month - Day - Year): May 24, 1972 9:05 a.m./p.m.

3. LOCATION OF INCIDENT: Mechanicsburg Terminal (Mechanicsburg, Pennsylvania)

B REPORTING CARRIER, COMPANY OR INDIVIDUAL

4. FULL NAME: Hall's Motor Transit Company

5. ADDRESS (Number, Street, City, State and Zip Code): 6060 Carlisle Pike, Mechanicsburg, Pa 17055

6. TYPE OF VEHICLE OR FACILITY: 40 foot van trailer

C SHIPMENT INFORMATION

7. NAME AND ADDRESS OF SHIPPER (Origin address): 505 Prods. Co., Inc. East Greenville, Pa 215-679-6262.

8. NAME AND ADDRESS OF CONSIGNEE (Destination address): Atlantic Plumbing Supply Co. 807 V Street and W Street Washington, D.C.

9. SHIPPING PAPER IDENTIFICATION NO.: Hall's Pro. Number 1841387

10. SHIPPING PAPERS ISSUED BY: ☐ CARRIER ☒ SHIPPER ☐ OTHER (Identify)

D DEATHS, INJURIES, LOSS AND DAMAGE

DUE TO HAZARDOUS MATERIALS INVOLVED

11. NUMBER PERSONS INJURED: none

12. NUMBER PERSONS KILLED: none

13. ESTIMATED AMOUNT OF LOSS AND/OR PROPERTY DAMAGE INCLUDING COST OF DECONTAMINATION (Round off in dollars): $ 44.00

14. ESTIMATED TOTAL QUANTITY OF HAZARDOUS MATERIALS RELEASED: ½ gallon

E HAZARDOUS MATERIALS INVOLVED

15. CLASSIFICATION (Sec. 172.4)	16. SHIPPING NAME (Sec. 172.5)	17. TRADE NAME
corrosive liquid	~~505 Prods. Co., Inc.~~ [illegible]	Blast out

F NATURE OF PACKAGING FAILURE

18. (Check all applicable boxes)

(1) DROPPED IN HANDLING	(2) EXTERNAL PUNCTURE	(3) DAMAGE BY OTHER FREIGHT
(4) WATER DAMAGE	(5) DAMAGE FROM OTHER LIQUID	(6) FREEZING
(7) EXTERNAL HEAT	(8) INTERNAL PRESSURE	(9) CORROSION OR RUST
(10) DEFECTIVE FITTINGS, VALVES, OR CLOSURES	(11) LOOSE FITTINGS, VALVES OR CLOSURES	(12) FAILURE OF INNER RECEPTACLE
(13) BOTTOM FAILURE	x (14) [illegible] FAILURE	(15) WELD FAILURE
(16) [illegible]	(17) OTHER [illegible]	[illegible]

[illegible]

G PACKAGING INFORMATION - *(If more than one size or type packaging is involved in loss of material show packaging information separately for each. If more space is needed, use Section H "Remarks" below keying to the item number.*

	ITEM		#1	#2	#3
20	TYPE OF PACKAGING INCLUDING INNER RECEPTACLES *(Steel drums, wooden box, cylinder, etc.)*		plastic 5 gal. container		
21	CAPACITY OR WEIGHT PER UNIT *(55 gallons, 65 lbs., etc.)*		½ gallon		
22	NUMBER OF PACKAGES FROM WHICH MATERIAL ESCAPED		one		
23	NUMBER OF PACKAGES OF SAME TYPE IN SHIPMENT		44		
24	DOT SPECIFICATION NUMBER(S) ON PACKAGES *(21P, 17E, 3AA, etc., or none)*		none visible		
25	SHOW ALL OTHER DOT PACKAGING MARKINGS *(Part 178)*		none visible		
26	NAME, SYMBOL, OR REGISTRATION NUMBER OF PACKAGING MANUFACTURER		none shown		
27	SHOW SERIAL NUMBER OF CYLINDERS, CARGO TANKS, TANK CARS, PORTABLE TANKS		none shown		
28	TYPE DOT LABEL(S) APPLIED		corrosive liquid		
29	IF RECONDITIONED OR REQUALIFIED, SHOW	A REGISTRATION NO. OR SYMBOL	none		
		B DATE OF LAST TEST OF INSPECTION	none		
30	IF SHIPMENT IS UNDER DOT OR USCG SPECIAL PERMIT, ENTER PERMIT NO.		none visible		

H REMARKS - Describe essential facts of incident including but not limited to defects, damage, probable cause, stowage, action taken at the time discovered, and action taken to prevent future incidents. Include any recommendations to improve packaging, handling, or transportation of hazardous materials. Photographs and diagrams should be submitted when necessary for clarification.

This container leaked out while in transit from Kutztown terminal. The three cartons that were damaged by this acid were unpacked and held at Mechanicsburg Terminal.

The good portion of the shipments were forwarded to destination.

RECEIVED 1972 JUN 2 [illegible]

31. NAME OF PERSON PREPARING REPORT *(Type or print)* [illegible] F. McDonald	32. SIGNATURE [illegible]
33. TELEPHONE NO. *(Include Area Code)* 717-766-2571	34. DATE REPORT PREPARED 5-30-72

DEPARTMENT OF TRANSPORTATION

Form Approved OMB No. 04-S61

HAZARDOUS MATERIALS INCIDENT REPORT

INSTRUCTIONS: Submit this report in duplicate to the Secretary, Hazardous Materials Regulations Board, Department of Transportation, Washington, D.C. 20590, (ATTN: Op. Div.). If space provided for any item is inadequate, complete that item under Section H, "Remarks", keying to the entry number being completed. Copies of this form, in limited quantities, may be obtained from the Secretary, Hazardous Materials Regulations Board. Additional copies in this prescribed format may be reproduced and used, if on the same size and kind of paper.

A INCIDENT

1. TYPE OF OPERATION: 1 [ ] AIR 2 [X] HIGHWAY 3 [ ] RAIL 4 [ ] WATER 5 [X] FREIGHT FORWARDER 6 [ ] OTHER (Identify)

2. DATE AND TIME OF INCIDENT (Month - Day - Year)	3. LOCATION OF INCIDENT
3/13/71 4:00 p.m.	Dock 6060 Carlisle Pike Mechanicsburg, Pa.

B REPORTING CARRIER, COMPANY OR INDIVIDUAL

4. FULL NAME	5. ADDRESS (Number, Street, City, State and Zip Code)
Hall's Motor Transit Company	6060 Carlisle Pike, Mechanicsburg, Pa. 17055

6. TYPE OF VEHICLE OR FACILITY: 28003 Tandem Trailer

C SHIPMENT INFORMATION

7. NAME AND ADDRESS OF SHIPPER (Origin address)	8. NAME AND ADDRESS OF CONSIGNEE (Destination address)
Va. Chemical Inc.	Grimes Pountry Proc. Corp. Fredericksburg, Penna.
9. SHIPPING PAPER IDENTIFICATION NO.	10. SHIPPING PAPERS ISSUED BY
71261	[ ] CARRIER [X] SHIPPER [ ] OTHER (Identify)

D DEATHS, INJURIES, LOSS AND DAMAGE DUE TO HAZARDOUS MATERIALS INVOLVED

11. NUMBER PERSONS INJURED	12. NUMBER PERSONS KILLED	13. ESTIMATED AMOUNT OF LOSS AND/OR PROPERTY DAMAGE INCLUDING COST OF DECONTAMINATION (Round off in dollars)
none	none	$ 563.68

14. ESTIMATED TOTAL QUANTITY OF HAZARDOUS MATERIALS RELEASED: 30 containers 1560 lbs.

E HAZARDOUS MATERIALS INVOLVED

15. CLASSIFICATION (Sec. 172.4)	16. SHIPPING NAME (Sec. 172.5)	17. TRADE NAME
Corrosive liquid	Va. Chemical	Va. Chemical

F NATURE OF PACKAGING FAILURE

18. (Check all applicable boxes)

(1) DROPPED IN HANDLING	(2) EXTERNAL PUNCTURE	X (3) DAMAGE BY OTHER FREIGHT
(4) WATER DAMAGE	(5) DAMAGE FROM OTHER LIQUID	(6) FREEZING
(7) EXTERNAL HEAT	(8) INTERNAL PRESSURE	(9) CORROSION OR RUST
(10) DEFECTIVE FITTINGS, VALVES, OR CLOSURES	(11) LOOSE FITTINGS, VALVES OR CLOSURES	(12) FAILURE OF INNER RECEPTACLES
(13) BOTTOM FAILURE	(14) BODY OR SIDE FAILURE	(15) WELD FAILURE
(16) CHIME FAILURE	(17) OTHER CONDITIONS (Identify)	(18) SPACE FOR DOT USE ONLY: 1039179

Form DOT F 5800.1 (10-70)

G PACKAGING INFORMATION - If more than one size or type packaging is involved in loss of material show packaging information separately for each. If more space is needed, use Section H "Remarks" below keying to the item number.

	ITEM			#1	#2	#3
20	TYPE OF PACKAGING INCLUDING INNER RECEPTACLES (Steel drums, wooden box, cylinder, etc.)			Plastic 5 gal. containers		
21	CAPACITY OR WEIGHT PER UNIT (55 gallons, 65 lbs., etc.)			52 lbs.		
22	NUMBER OF PACKAGES FROM WHICH MATERIAL ESCAPED			One		
23	NUMBER OF PACKAGES OF SAME TYPE IN SHIPMENT			30		
24	DOT SPECIFICATION NUMBER(S) ON PACKAGES (21P, 17E, 3AA, etc., or none)			None		
25	SHOW ALL OTHER DOT PACKAGING MARKINGS (Part 178)			None		
26	NAME, SYMBOL, OR REGISTRATION NUMBER OF PACKAGING MANUFACTURER			None shown		
27	SHOW SERIAL NUMBER OF CYLINDERS, CARGO TANKS, TANK CARS, PORTABLE TANKS			None		
28	TYPE DOT LABEL(S) APPLIED			Corrosive liquid		
29	IF RECONDITIONED OR REQUALIFIED, SHOW	A	REGISTRATION NO. OR SYMBOL	None		
		B	DATE OF LAST TEST OF INSPECTION	None		
30	IF SHIPMENT IS UNDER DOT OR USCG SPECIAL PERMIT, ENTER PERMIT NO.			4543		

H REMARKS - Describe essential facts of incident including but not limited to defects, damage, probable cause, stowage, action taken at the time discovered, and action taken to prevent future incidents. Include any recommendations to improve packaging, handling, or transportation of hazardous materials. Photographs and diagrams should be submitted when necessary for clarification.

Container damaged when coming in contact with other freight, causing corrosive liquid to escape damaging adjacent freight.

31. NAME OF PERSON PREPARING REPORT (Type or print)	32. SIGNATURE
Richard McDonald	[signature]
33. TELEPHONE NO. (Include Area Code)	34. DATE REPORT PREPARED
717-[illegible]-6571	[illegible]

DEPARTMENT OF TRANSPORTATION Form Approved OMB No. 04-5613

HAZARDOUS MATERIALS INCIDENT REPORT

INSTRUCTIONS: Submit this report in duplicate to the Secretary, Hazardous Materials Regulations Board, Department of Transportation, Washington, D.C. 20590, (ATTN: Op. Div.). If space provided for any item is inadequate, complete that item under Section II, "Remarks", keying to the entry number being completed. Copies of this form, in limited quantities, may be obtained from the Secretary, Hazardous Materials Regulations Board. Additional copies in this prescribed format may be reproduced and used, if on the same size and kind of paper.

A INCIDENT

1. TYPE OF OPERATION: 1 [ ] AIR 2 [X] HIGHWAY 3 [ ] RAIL 4 [ ] WATER 5 [X] FREIGHT FORWARDER 6 [ ] OTHER (Identify)

2. DATE AND TIME OF INCIDENT (Month - Day - Year): May 30, 1972 — 11 a.m./p.m.

3. LOCATION OF INCIDENT: Mechanicsburg, Pa. ~~Terminal Dock~~

B REPORTING CARRIER, COMPANY OR INDIVIDUAL

4. FULL NAME: Hall's Motor Transit Co

5. ADDRESS (Number, Street, City, State and Zip Code): 6060 Carlisle Pike, Mechanicsburg, Pa 17055

6. TYPE OF VEHICLE OR FACILITY: van trailer

C SHIPMENT INFORMATION

7. NAME AND ADDRESS OF SHIPPER (Origin address): Technical Maintenance Prod., Inc. 2211 N. American St. Philadelphia, Pa.

8. NAME AND ADDRESS OF CONSIGNEE (Destination address): Ryder Truck Rental 854 S. 16th St., Rear Harrisburg, Pa.

9. SHIPPING PAPER IDENTIFICATION NO.: Hall's Pro 1340899

10. SHIPPING PAPERS ISSUED BY: [ ] CARRIER [X] SHIPPER [ ] OTHER (Identify)

D DEATHS, INJURIES, LOSS AND DAMAGE

DUE TO HAZARDOUS MATERIALS INVOLVED

11. NUMBER PERSONS INJURED: none

12. NUMBER PERSONS KILLED: none

13. ESTIMATED AMOUNT OF LOSS AND/OR PROPERTY DAMAGE INCLUDING COST OF DECONTAMINATION (Round off in dollars): $ 820.00

14. ESTIMATED TOTAL QUANTITY OF HAZARDOUS MATERIALS RELEASED: UNK.

E HAZARDOUS MATERIALS INVOLVED

15. CLASSIFICATION (Sec. 172.4)	16. SHIPPING NAME (Sec. 172.5)	17. TRADE NAME
corrosive liquid	liquid cleaning compound	Tech 115

F NATURE OF PACKAGING FAILURE

18. (Check all applicable boxes)

(1) DROPPED IN HANDLING	(2) EXTERNAL PUNCTURE	(3) DAMAGE BY OTHER FREIGHT
(4) WATER DAMAGE	(5) DAMAGE FROM OTHER LIQUID	(6) FREEZING
(7) EXTERNAL HEAT	(8) INTERNAL PRESSURE	(9) CORROSION OR RUST
(10) DEFECTIVE FITTINGS VALVES, OR CLOSURES	(11) LOOSE FITTINGS, VALVES OR CLOSURES	(12) FAILURE OF INNER RECEPTACLES
(13) BOTTOM FAILURE	X (14) BODY OR SIDE FAILURE	X (15) WELD FAILURE
(16) CHIME FAILURE	(17) OTHER CONDITIONS (Identify)	(19) SPACE FOR DOT USE ONLY

DEPARTMENT OF THE ARMY
OHIO RIVER DIVISION, CORPS OF ENGINEERS
P. O. BOX 1159
CINCINNATI, OHIO 45201

ORDPD-F

8 December 1972

Mr. B. C. Joiner
Traffic Manager
Stone & Webster Engineering
Corporation
225 Franklin Street
Boston, Massachusetts 02107

Dear Mr. Joiner:

The inclosed Ohio River 1970 Commodity Flow Charts are forwarded in response to your request of November 29, 1972 (JO 12241).

Sincerely yours,

DONALD T. WILLIAMS
Chief, Planning Division

Incl
As stated

2.2 METEOROLOGY AND CLIMATOLOGY

2.2.1 Summary

Meteorology in the region of the BVPS-1 site has been evaluated to provide a basis for determination of annual average process gas release limits, corresponding estimates of potential exposure from hypothetical accidents, and design criteria for storm protection.

Data from the Greater Pittsburgh Airport and from the Weather Bureau studies at the Shippingport Atomic Power Station site were used in the preliminary evaluation; however, an onsite meteorological program has been under way since September, 1969, in order to determine site dispersion factors for both the establishment of permissible annual average process gas release rates and the accident meteorology. It has been found that Pasquill stability Class F and a 0.84 m per second wind speed constitute a conservative set of meteorological conditions to be used as a basis for plant design in the case of an accident involving the release of radioactive gases to the atmosphere. The maximum annual average dilution factor for an elevated release and ground level receptor, based on site meteorological data, is 1.62×10^{-5} sec/m^3 2,500 feet from the containment at an elevation of 47 meters above the valley floor.

Information is provided in this section to show the adequacy of the design criteria established for storm protection, and the basis for the estimates of effects of routine and accidental releases of radioactive gases.

2.2.2 Descriptive Climatology

2.2.2.1 Climatic Summary

The western portion of Pennsylvania in the vicinity of the BVPS-1 site lies on the western slope of the Allegheny Mountains. The site is approximately 90 miles southeast of Lake Erie and 340 miles west of the Atlantic coastline. The climate of the region is of the humid continental variety. During the winter months, cold air from Canadian source regions is somewhat modified by passage over the Great Lakes. The site region is also relatively near the Great Lakes - St. Lawrence storm track, so that there are frequent periods of cloudiness and precipitation during the cooler half of the year. During the warmer months of the year, western Pennsylvania comes under the southerly and southwesterly air flow on the western side of the Bermuda High, causing frequent spells of warm, humid weather.

2.2.2.2 Topographical Factors

The BVPS-1 site is located on the south bank of the Ohio River, about 25 miles northwest of Pittsburgh, Pennsylvania, and about 4 miles east of the Ohio - West Virginia state line. The normal pool elevation of the Ohio River at the site is 664.5 ft above MSL. The Ohio River Valley is sharply defined by the hills and bluffs which extend to an average height of 400 to 500 ft above river level within short distances of the river banks. The average width of the Ohio River Valley in the vicinity of the site is approximately 1 mile (1,600 m).

Topographic cross sections for the 16 compass point sectors radiating from the plant out to a distance of five miles are shown in Figures 2.2-1, 2.2-2, 2.2-3, 2.2-4, 2.2-5, 2.2-6, 2.2-7, and 2.2-8.

The deep, enclosed Ohio River Valley affects the local meteorology in several ways:

1. At low levels within the valley, wind channeling occurs extensively. This effect has been studied by Weather Bureau personnel[1] and is discussed in Appendix 2A. Cold air frequently drains down the valley slopes during the nighttime hours causing a resulting convergence zone over the river. A Weather Bureau group[2] has investigated this aspect of the local atmosphere; the results of this work are also discussed in Appendix 2A.

2. Another local effect of topography is daytime solar "shielding" by the high valley walls, which in combination with the nighttime cold air drainage results in a high (approximately 65 percent) annual frequency of occurrence of inversions onsite. This high frequency of stability is reflected in the modest annual average dilution factor presented in Section 2.2.5.

2.2.2.3 Climatological Averages

Table 2.2-1, based on Weather Bureau climatological data from Pittsburgh and other nearby observing stations[3], presents average values of pertinent meteorological parameters.

Table 2.2-6 provides monthly summaries of absolute humidity in grams/m^3 and relative humidity in percent based on the two-year period from September 6, 1970 to September 5, 1972.

2.2.2.4 Climatological Extremes

Month and year of occurrence of climatological extremes have been recorded in the site areas as shown in Table 2.2-2, which is based on Weather Bureau data[3].

2.2.2.5 Severe Weather Phenomena

The following extremes of weather phenomena have been examined and evaluated:

Extreme Winds

The highest wind speed reported in 15 years (1952-1967) of Weather Bureau records for the Pittsburgh Airport was 58 mph from the west in February 1967. The current Weather Bureau listing[3] of historic extremes does not recognize any record of winds exceeding this speed; however, infrequent occurrences of higher wind speeds can be anticipated and have been considered in structure design. Table 2.2-3 lists probabilities and associated recurrence intervals for extreme winds at the BVPS-1 site, according to methods described by Thom[4]. Based on the relationship of extreme gusts to extreme winds noted by Huss[5], multiplication of the wind speed by a factor of 1.3 yields a value for the highest gust associated with that wind speed. These are probably quite conservative in view of the relatively sheltered location of the BVPS-1 in relation to the airport exposure.

Severe Storms

Thunderstorms occur in the area of the site with moderate frequency, with the maximum in June, July, and August. During these peak months, thunderstorms occur at approximately 5 day intervals. These localized storms are occasionally accompanied by high winds, very heavy, but unevenly distributed rainfall, with infrequent hail.

According to Weather Bureau information[6][7] covering the period 1871 through 1972, only 8 tropical storms have moved within 50 miles of the plant site. Essentially all but one of these storms have been in the final dissipation stages and have had little effect on western Pennsylvania other than heavy rainfall. However, in June of 1972 extremely heavy rainfall from Hurricane Agnes caused extensive flooding over much of the eastern United States. In the state of Pennsylvania the flood waters crested in Pittsburgh on June 24, 1972. The flood crest at the site was approximately El. 694 ft, well below the site grade elevation of 735 ft. No damage occurred to any completed safety-related structures, systems, components, or materials. No radioactive materials were released or lost, and no design bases used in the safety evaluations of the facility were exceeded.

Tornado Occurrences

During the period 1917 through 1970, only 5 tornadoes were reported in Beaver County. The closest observed was in Monaca, Pennsylvania, approximately ten miles from the site. In studies by Thom[8] and Wolford[9], tornadoes reported within a 1 degree square are accumulated over a period of record and divided by the number of years of record to yield a mean annual frequency. For the 1 degree square encompassing the BVPS-1 site, Thom lists 5 tornadoes over ten years (1953-1962) for a mean annual frequency of 0.5, while Wolford lists 4 tornadoes over six years (1953-1958) for a mean annual frequency of 0.67. From 1963 through 1970, 5 tornadoes have been noted[7] for a mean annual frequency of 0.6.

According to methods postulated by Thom[8], using values for path width and length of 0.1 mile and 4.0 miles, respectively, and the composite mean annual frequency of 0.6, the average annual probability of a tornado occurring within the 1 degree square in which the site is located and striking the site was calculated to be 6.6×10^{-5}, with an equivalent recurrence interval of once in 15,200 years. If an invariant value for a path area of 2.82 square miles, based on Iowa tornadoes, is assumed, as Thom suggests, the average annual probability becomes 4.7×10^{-4}, and the equivalent recurrence interval is once in 2,100 years.

The location of the site within the steep-walled valley of the Ohio River offers some measure of protection from tornadoes. An authority[10] on the behavior of these small, violent storms notes that rough country tends to diminish their violence and effects. According to the same source, tornadoes tend to move toward higher elevations, indicating that a tornado in the vicinity of the station would have a tendency to remain at the higher land elevations rather than descend into the valley.

Ice Storms

Freezing precipitation in the form of freezing rain or freezing drizzle occurs in the vicinity of BVPS-1 when a layer of below freezing air near the ground causes freezing on contact of rain which has passed through a layer of above freezing air overlaying the colder air. This situation occurs most frequently in mid-winter when polar air is overrun by warm, moisture laden air moving northward from the Gulf of Mexico.

An investigation of freezing precipitation frequency was based on ten years (1955-1964) of data taken by the National Weather Service at Greater Pittsburgh Airport. Figure 2.2-9 indicates the average and extreme freezing precipitation frequency for the winter months. Freezing precipitation occurs slightly less than 0.2 percent of the time. Of the 148 hours of freezing precipitation that occurred in ten years, 144 were classified as light (less than 1/10 inch per hr), 4 as moderate (1.10-3.10 inch per hr), and none as heavy (greater than 3.10 inch per hr).

Air Pollution Potential (Atmospheric Stagnation)

Based on five years of Pittsburgh radiosonde balloon observations only three episode days, of at least two days duration, with mixing height less than or equal to 500 meters, occurred. No episode days of at least five days duration with mixing height less than or equal to 500 meters occurred during the five years. Such episode occurrences are expected to result in increasing plume length and flattening of the plume trajectory. However, no instances of ground level fogging attributable to such occurrences are expected. Mixing height occurrences in excess of 500 meters are expected to have negligible influence on plume behavior because the plume will, in most instances, have evaporated by the time such heights are reached.

Ground-based nocturnal inversions are common at the site. Such inversions are shallow (less than 300 meters deep) and the height of plume release and plume buoyancy is expected to render the effect of these inversions negligible.

2.2.3 OnSite Meteorological Monitoring Program

The onsite meteorological program for Beaver Valley Power Station is described in BVPS-2 Updated Final Safety Analysis Report, Section 2.3.3.

A description of the initial Site Meteorological Program is included in Appendix 2A.1 and 2A.2, together with the results of analysis of data collected onsite between September 1969, and September 1971.

The results of the analysis of the data collected onsite for 1980 are included in Appendix 2A.3. For the most recent operating year refer to the annual meteorological report.

2.2.4 DBA Meteorology

In the event of an accidental release of radioactive gas into the atmosphere, transport and dispersal will be influenced by the weather conditions at the site for the duration of the incident. The site meteorological data were examined for limiting atmospheric conditions during a postulated accidental release of radioactive gases.

According to Weather Bureau sources[11] the following paragraphs describe the worst conditions which might be expected to exist at the site during an accidental release:

"Past meteorological studies suggest the following features about atmospheric diffusion for close-in distances (less than one mile) relative to an instantaneous or short period release of air-borne material from the plant site:

1. During inversion conditions when the river is considerably warmer than the air, any air-borne contaminants released at the site will slowly spread out over the plant area, displaying a tendency to remain over land. Eventually, the effluent will be carried out over the river by the drainage flow, where it will travel either up or downstream dictated by the channeled gradient flow. During stable conditions when a pronounced drainage wind flows over the site towards the river, the major plume concentration will probably exist along the river bank and channel. When no well-defined drainage flow exists, the plume can be expected to disperse laterally in all directions, covering the entire plant area. Vertical dispersion at the site area will be restricted to within the first few hundred feet for a release near the ground of material which is not appreciably warmer than the ambient air. For a release at approximately 150 ft above the surface, vertical dispersion to near ridge top elevations may occur. When the river is colder than the air, travel time from the site to over the river will be less.

2. Under neutral vertical temperature gradients, atmospheric diffusion becomes primarily a function of wind speed. When winds are very light, appreciable lateral dispersion of the plume over the entire plant area may be expected, similar to that during inversion conditions. During periods of higher wind speeds and more well-defined flow regimes, there will be more rapid dilution of the plume and air-borne material will be more quickly carried away from the plant area. However, within a mile radius of the release point, most of the plume will be vertically contained within the valley depth (approximately 500 ft).

3. Synoptic patterns indicate that winds out over the river will blow down-river during most stable regimes. Consequently, a plume originating at the site under inversion conditions may be expected to spread out over the plant area, slowly moving out over the river with an eventual traverse down-river. Transport of air-borne material up-river during inversion conditions will be infrequent.

4. During unstable conditions, the path of any released material to the atmosphere will be dictated by the prevailing channeled wind flow of the valley and by the gradient flow at levels above the ridges.

In view of the preceding, it was decided to determine the DBA meteorology for the initial time period following the accident in a way that would include a realistic assessment of both horizontal and vertical dispersion. Using the seven horizontal stability classes (A-G) and seven vertical stability classes (A-G) and the corresponding Sy and Sz values as presented in Reference 12, a computer code was used to determine the combinations of vertical and horizontal stability classes and wind speeds which result in a calculated X/Q value which will not be exceeded more than five percent of the time including period of calm.

These calculations of X/Q do not include a building wake effect since the objective was to find the meteorological conditions of stability and wind speed upon which the building wake correction is normally imposed for the Design Basis Accident. Thus the following equation is used for delineation of the ordered values of X/Q and the equivalent stability and wind conditions:

$$X/Q = \frac{1}{(3.14 S_y S_z u)} \qquad (2.2\text{-}1)$$

where: S_y = horizontal diffusion parameter (m)

S_z = vertical diffusion parameter (m)

u = mean wind speed (m/sec)

For the 0-2 hour period following the accident, the DBA meteorology has been computed for a ground level release at the containment structure to a receptor at the nearest site boundary (610m). A very conservative analysis includes the total calms, both daytime and nighttime, as found by the less responsive Bendix-Friez speed sensors to meet the five percent criterion. On this basis, the total occurrence of calms is 2.4 percent. Thus, five percent less the 2.4 percent calms yields 2.6 percent, the percentage of time during which the design basis meteorological conditions may be exceeded. From Table 2.2-4, it is noted that 2.11×10^{-3} sec/m^3 is the X/Q exceeded 2.6 percent of the time; thus the equivalent design basis meteorological conditions corresponding to this value at 610 meters are Pasquill stability class "F" and wind speed 0.64 m/sec.

A somewhat less conservative analysis would include only the 1.5 percent nighttime calms measured by the Bendix instrument. On this basis, the X/Q exceeded 3.5 percent of the time is 1.83×10^{-3} sec/m^3; the design basis meteorological conditions are "F" and 0.73 m/sec. Finally, a more realistic analysis would include only the calms found by the more responsive Packard-Bell wind sensors. Whether or not all such calms (0.25 percent) or only the nighttime calms (0.08 percent) are included, the resultant X/Q found from Table 2.2-4 is 1.62×10^{-3}; the equivalent design basis meteorological conditions are stability class "F" and 0.84 m/sec wind speed. These latter values are included in Table 2.2-7 as being the recommended choice for the 0-2 hours periods with an invariant wind. If an independent evaluation of the above values is desired, see Appendix 2A which provides the summary of wind distribution by stability class and wind speed. This distribution is based on 50 foot wind data and 50 to 150 foot temperature data.

Now using the meteorological conditions of "F" stability conditions and wind speed 0.84 m/sec, the X/Q calculated from design basis accident meteorology at the nearest site boundary (610m) from the containment for the 0-2 hour period is computed from the following equation (including a building wake factor) to be equal to 7.80×10^{-4} sec/m^3:

$$X/Q = \frac{1}{(3.14 S_y S_z + cA)u} \qquad (2.2\text{-}2)$$

where: X = concentration (units/m^3)

Q = source release rate (unit/sec)

S_y = horizontal diffusion parameter (m)

S_z = vertical diffusion parameter (m)

u = mean wind speed (m/sec)

A = cross-sectional area of containment (1,600 m^2)

c = building shape factor = 0.5 (dimensionless)

For the period 2-24 hours following the start of a release, it is assumed that the wind direction varies over one sector under "F" stability conditions and 0.84 m/sec wind speed. Inasmuch as the longest observed on-site wind direction persistence under stable conditions ("F" stability) was one occurrence for 24 hours, this assumption is conservative.

For the period from 24-96 hours, it is assumed that the mean wind direction is varying within the sector of interest 50 percent of the time. During this time, the stability is assumed to be "D" with a 2.0 m/sec wind speed and "F" with a 0.9 m/sec wind speed.

For the period from 4-30 days, meteorological conditions characteristic of the lowest dispersion have been chosen. These conditions, and those for the other time periods, are also presented in Table 2.2-5.

The results of the calculations for the four time periods comprising the 30 day model are shown in Figure 2A.2-12 which presents curves of X/Q versus distance. If an independent evaluation of the above results is desired, see Appendix 2A which provides the pertinent data.

In support of a re-analysis performed on the design basis loss-of-coolant accident (LOCA) in 1983, the X/Q values for the DBA meteorology were re-determined using the guidance and formulae of Regulatory Guide 1.145.(14)(15) The analyses were performed on hourly averaged meteorological data collected during the period from January 1 to December 31, 1982. The data recoverability for this period was 94.3 percent. As a result of these X/Q analyses, the maximum sector 0.5 percent X/Q value was determined to be more limiting than the 5 percent site X/Q value. Table 2.2-11 tabulates the values used in the re-analysis of the design basis LOCA.

In 1996, short-term diffusion estimates were re-calculated using the USNRC computer code PAVAN(15). Input data were hourly meteorological observations collected by the onsite meteorological monitoring program between 0000 1/1/86 and 2300 12/31/95. The 0.5% sector dependent and the 5% sector independent values defined in Regulatory Guide 1.145(14) were determined and are tabulated in Tables 2.2-11a and 2.2-11b. Data recoverability during this ten year period was 99.6%. The minimum recoverability for any year in this period was 99%. This re-analysis indicated a maximum 0-2 hour exclusion area boundary 0.5% value of 1.04E-3 sec/m^3 (NW sector). This value is 17% more restrictive than the value determined in 1983. As such, the values in Tables 2.2-11a and 2.2-11b will be used for radiological consequence analyses performed subsequent to 1996.

2.2.4.1 Main Control Room Short-Term Diffusion Estimates

The original licensing basis control room atmospheric dispersion factor (X/Q) values were calculated for both Units 1 and 2 using the methodology described by Murphy and Campe. Releases were postulated from each of the identified release points. The X/Q values were calculated to encompass 95 percent of the meteorological conditions (i.e., that are exceeded for only 5 percent of the meteorological conditions). Stability class G was assumed for conservatism. Adjustments for occupancy were included.

In 1991, the X/Q values for the control room were re-analyzed using a newer methodology outlined in NUREG/CR-5055. The updated X/Qs did not include adjustments for occupancy.

In NUREG/CR-5055, Ramsdell considered the methodology of Murphy-Campe and proposed new methodologies to improve the predictive capabilities of calculations of atmospheric dispersion in the presence of building wakes. NUREG/CR-5055 reported on the results of seven field experiments that showed that the Murphy-Campe methodology accounted for little of the variability in concentrations affected by wakes. An empirical model was proposed that showed a significant improvement in predicting centerline concentrations. The model, using multiple-variable linear regression, rotates downwind distance, building cross-sectional area, wind velocity, and stability class to X/Q. Because circulation in building wakes distributes effluents entering the wake more widely than normal atmospheric diffusion, it was recommended that relatively wide wind-direction sectors (perhaps as wide as 90 degrees) be used in applying the methodology to evaluating concentrations affected by these wakes.

In reports published subsequent to NUREG/CR-5055, Ramsdell generalized the statistical model into one that had comparable accuracy but had its basis in the physical mechanisms of importance. The concentrations near the source were seen to be directly related to wind speed, rather than the inverse relationship of previous models.

For Beaver Valley, Halliburton NUS Environmental Corporation adapted the work of Ramsdell to the site terrain, plant configuration, and site meteorology. As the releases at Beaver Valley are low velocity releases, all releases were treated as ground level releases that are fully entrained in the building wake. For short-term averaging periods of eight hours or less, the methodology assumed that if the wind direction is within 30 degrees to either side of a line (effective centerline width of 60 degrees) between release point and control room intake, the plume centerline passes over the control room intake. For longer term averaging periods (e.g., 8-24, 24-96, 96-720 hours) a Gaussian distribution normal to the centerline is assumed.

On-site meteorological data for the 5-year period of 1986-1990 were applied along with the physical parameters appropriate for each release point. Only 1 percent of the individual hourly data contained any missing data. A sensitivity analysis of the input parameters was performed indicating acceptable model performance.(17,18)

As part of the plant modifications associated with containment conversion, replacement steam generators and core power uprate, the control room X/Q values were re-calculated using the latest version of the "Atmospheric Relative Concentrations in Building Wakes" (ARCON96) methodology. The control room X/Q values applicable to release points associated with an accident at BVPS-1 or BVPS-2, are presented in Table 2.2-12A and 2.2-12B, respectively. The Emergency Response Facility (ERF) X/Q values for the environmental release paths associated with the Loss-Of-Coolant Accident are also provided. The X/Q values for all of the release-receptor combinations utilized to develop the post-accident control room operator occupancy doses are summarized in Table 2.2-12A. The X/Q values for all of the release-receptor combinations associated with BVPS-2 accidents addressed in Table 2.2-12B are taken into consideration when the dose consequences of the event is established based on an analysis that is bounding for both units. Occupancy factors are not included.

Input data consist of hourly on-site meteorological data, release characteristics (e.g., release height and stack flow rate), the cross-sectional building area affecting the release, and receptor information (e.g., distance and direction from the release to the control room air intake and intake height). All input data for the ARCON96 runs were developed in accordance with draft NRC guidance on control room habitability assessments; Draft Regulatory Guide DG-1111, "Atmospheric Relative Concentrations for Control Room Habitability Assessments at Nuclear Power Plants," December 2001.

The ARCON96 methodology has the ability to evaluate ground-level, vent, and elevated stack releases and treats building wake effects and stable plume meander effects when applicable. This methodology is also able to evaluate diffuse and area source releases using the virtual point source technique, wherein initial values of the dispersion coefficients are assigned based on the size of the diffuse or area source. The various averaging period X/Q values are calculated directly from running averages of the hourly X/Q values.

A continuous temporally representative 5-year period of hourly average data from the BVPS meteorological tower (i.e., January 1, 1990 through December 31, 1994) is used in this calculation. Each hour of data, at a minimum, must have a validated wind speed and direction at the 10-meter level and a temperature difference between the 45- and 10-meter levels. The BVPS meteorological measurement program meets the requirements of RG 1.23 and Regulatory Position C.1.1 of RG 1.145 and is described in detail in Chapter 2.2.3.

All releases are conservatively treated as ground-level as there are no releases at this site that are high enough to escape the aerodynamic effects of the plant buildings (i.e., 2.5 times Containment Building height). The applicable structure relative to building wake effects on the releases is based on release/receptor orientation. The distances from the Unit 1 containment building edge to the receptors are determined from the closest edge of the containment building. The release elevations are set equal to the receptor elevations in cases where the releases are not from a clearly defined point, such as the containment edge releases. Where both the release and receptor are not clearly defined points, both elevations are set equal to grade elevation.

Only the containment edge release is considered to be a diffuse source as the release is from the entire containment surface. Diffuse source treatment allows the calculation of initial values of the dispersion coefficients. These values are determined by the height and width of the containment building divided by a factor of six based on the draft NRC guidance on control room habitability assessments. All other releases are conservatively treated as point sources.

The ARCON96 default wind direction range of 90°, centered on the direction that transports the gaseous effluents from the release points to the receptors, is used in the calculation along with values for surface roughness length (i.e., 0.20 meter) and sector averaging constant (4.3) based on draft NRC guidance.

The control room air intake X/Q values are representative of the worst case X/Q values for control room unfiltered in-leakage purposes since the distances and directions from the release points to these receptors are very similar.

Control room tracer gas tests have indicated that a potential source of unfiltered inleakage into the control room during the post accident pressurization mode are the normal operation dampers associated with the control room ventilation system to which it is reasonable to assign the same X/Q as that of the Control Room air intake. The other source of inleakage is potentially that associated with ingress/egress and leakage via door seals. This inleakage is assigned to the door leading into the control room that is considered the point of primary access. This door is located in between the BVPS-1 and BVPS-2 control room air intakes and is located close enough to the referenced air intakes to allow the assumption that the X/Q associated with this source of inleakage would be reasonably similar to that associated with the air intakes.

The X/Q values at the ERF edge closest to Containment is conservatively assumed to be representative of the post-accident X/Q values to the Emergency Response Facility which includes the Technical Support Center (TSC) and the Emergency Operations Facility (EOF).

2.2.5 <u>Annual Average Release Meteorology</u>

The annual average X/Q for an elevated release is calculated according to the following equation:

$$\left[\frac{8\,\frac{2}{3.14}}{3.14D}\right]^{0.5}\left[\sum_{i=1}^{7}\frac{F_i f_i U_i}{S_{zi}\,e\,\frac{-(Z-h)^2}{2S_{zi}^{2}}}+e\,\frac{-(Z+h)^2}{2S_{zi}^{2}}\right] \qquad (2.2\text{-}3)$$

where:

where:	X	=	distance, m
	U_i	=	average reciprocal wind speed for sector of interest, sec per m
	S_{zi}	=	vertical diffusion parameter for stability class i, m
	F_i	=	fraction of time stability class i occurs
	h	=	height of stack, m
	Z	=	vertical height above valley floor, m
	f_i	=	fraction of time wind direction is in sector of interest for stability class i

In the calculation of X/Q, S_{zi} has been estimated from Pasquill stability curves;[(12)] $F_i f_i$ is based on the categorization of temperature difference discussed in Appendix 2A. (The value of S_z for G stability is defined as the S_z for class F, divided by SQRT [2.5].)

The release of normal process gas is from a vent 522 ft (158 m) above the valley floor. Although it is possible that the process gas exit velocity and the buoyant cooling tower plume would cause the process gas plume to become more elevated than the release height, for a conservative estimate of the highest annual average X/Q, no plume rise is assumed. Thus, for a release height of 158 m, the highest annual average X/Q is 1.42 x 10^{-6} sec/m^3 for a receptor located 2,000 m southeast of the containment structure at an elevation 158 m above the valley floor. In addition, a X/Q of approximately the same magnitude (1.3 x 10^{-6} sec/m^3) was calculated for a receptor located 1,300 m southeast of the containment structure at an elevation of 158 m.

Table 2.2-7 provides calculated atmospheric dispersion factors (X/Q) for an elevated (158 meters) release at the outer boundary of the low population zone for periods of 0-8 and 8-24 hours, 1-4 days, and 4-30 days and at the exclusion area boundary for a 0-2 hour period. Also Table 2.2-8 provides calculated atmospheric dispersion factors (X/Q) for a ground level release at the outer boundary of the low population zone for periods of 0-8 and 8-24 hours, 1-4 days and 4-30 days.

Table 2.2-9 provides calculated annual average atmospheric diffusion factors (X/Q) for an elevated (158 meters) release for 16 radial sectors out to 50 miles using site meteorological data. Figure 2.2-10 shows the X/Q isopleths (similar to Figure 2A.2-13) for a 158 meter release.

Table 2.2-10 provides calculated annual average atmospheric diffusion factors (X/Q) for a ground level release for 16 radial sectors out to 50 miles using site meteorological data.

Figure 2A.2-13 presents isopleths of ground level annual average X/Q for release from the 158 m vent. WINDVANE computer outputs giving the raw data from which the above calculations are made are provided in Appendix 2A.2.

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2.3 HYDROLOGY

2.3.1 Surface Water Hydrology

The BVPS-1 is located on the Ohio River at mile 34.8; that is, 3.1 miles downstream from Montgomery Lock and Dam and 19.6 miles upstream from New Cumberland Lock and Dam. The drainage area above the site is 23,000 sq miles.

2.3.1.1 River Flow

The river flow is regulated by several reservoirs on the Allegheny and Monongahela Rivers and their tributaries. Among these, the Allegheny and Conemaugh Reservoirs are the most important. The flow frequency information is based on a January, 1970 study made by the Pittsburgh District of the U.S. Army Corps of Engineers aimed at determining the effects of the reservoirs as if they had been in operation over the period of record. As a result of that study, a drought frequency curve was developed by the Corps of Engineers showing the percent of time any river discharge would be equalled or exceeded. This curve is shown in Figure 2.3-1.

2.3.1.2 River Stage

The river stage at the power station site is not determined by river flow only, since the operating rules of the New Cumberland Dam gates are such that the stage is maintained at El. 664.5 for a river flow range up to about 20,000 cfs, as shown in the flow-stage relationship curve of Figure 2.3-2.

Flood stage profiles have been developed by the Corps of Engineers for the Ohio River reach between Montgomery and New Cumberland Dams, including the effects of all the flood control reservoirs upstream from the site. The following tabulation indicates the characteristic flood stages at the BVPS-1 site, as defined by the Corps of Engineers:

1.	Ordinary High Water	El. 678.5
2.	Standard Project Flood	El. 705.0
3.	Probable Maximum Flood	El. 730.0

2.3.2 Groundwater Hydrology

2.3.2.1 Description and Onsite Conditions

2.3.2.1.1 Aquifers

The regional and local groundwater conditions and geology are discussed in Appendix 2B, Geological Considerations Influencing the Proposed Beaver Valley Power Station (Rand, J.R. and Mayrose, P.J., 1968). These general studies have been supplemented by additional data which were obtained from observation during excavation, well measurements, soil and rock seep localities, and survey of groundwater users.

The site is located within the Allegheny Mountains section of the Appalachian Plateaus physiographic province which is characterized by relatively flat upland plateaus with deeply dissected river valleys.

The general geology of the area is described in Section 2.4 and Appendix 2B. Briefly, the power station site is located within the bedrock valley of the Ohio River on an alluvial terrace along the south side of the channel. Bedrock under the site consists of horizontally bedded shales, with occasional sandstone and a few small coal seams, all of Pennsylvania age. One thin limestone member, the Vanport limestone, crops out in the valley wall above the elevation of bedrock under the station. The power station is located approximately 600 ft north of the south bedrock wall of the valley. At the power station site, bedrock is at approximately El. 630 ft and drops only slightly toward the north where is underlies the river. It is overlain by a terrace of granular material which extends to approximately El. 735 ft at the power station site. The northerly portion of this terrace was eroded subsequent to its placement and replaced by recent deposits of the river in two low level terraces. These younger terraces are silts and clays overlying the sands and gravels which in turn rest directly on the bedrock. The sands and gravels of the terrace form the only significant aquifers of the area.

The Ohio River at this location is controlled by a system of locks and dams for navigation purposes. The navigation pool at the site is normally held at El. 664.5 ft.

The upland surface, in the vicinity of the BVPS-1 is above El. 1,100 ft. The groundwater in the bedrock underlying the upland surface occurs in joints and occasional permeable sandstone beds. Migration takes place along bedding and nearly vertical joint planes and along weathered zones. Water well records indicate that normal groundwater flow potential in these rocks ranges from less than 1 to about 10 gallons per minute for each well with 2 to 4 gallons per minute as average. Sixteen seeps were observed to originate from bedrock along the rock wall of the valley above the terrace during a survey undertaken June 13 to June 16, 1972; all but one seep was less than 1 to 2 gallons per minute. The remaining seep at El. 900 ft, 4,000 ft southeast of the station, flowed at 4 to 5 gallons per minute along shale joints overlying a confined sandstone bed.

The regional groundwater map Figure 2.3-3 indicates the groundwater occurs under hydrostatic conditions with the phreatic surface having a contour approximating the land surface, but of subdued relief. The topographic divides along the ridge crests also mark the local groundwater basin divides. Groundwater levels under the upland surface lie at depths of 10 to 50 ft below surface, averaging 30 ft. The phreatic surface has a gradient of 50 percent on steep hillsides, 25-30 percent on gentler hillsides, and 15 percent or less along tributary streams. In all areas, the groundwater flows downslope and eventually enters the terrace upstream of the plant site or enters the river, downstream of the site. Groundwater migration in the bedrock appears to be constant and slow. Because of the low permeability of the rocks, recharge from rock to the terrace gravels is negligible. There are no known aquifers in the bedrock under the site.

2.3.2.1.2 Site Condition

The station is located on a system of terraces along the south side of the river. The terrace on which the station is located is about 4,000 ft long and 1,800 ft wide at its widest point. Downstream of the station, the terrace pinches out against the steep bedrock valley wall. To the northeast, it is limited by a buried bedrock spur which extends northwesterly almost to the river's edge at a point about 2,500 ft upstream of the station.

The soils of the terrace are predominantly sands and gravels except for the younger deposits near the river. The permeable gravels crop out in the river. Groundwater under the terrace is interconnected with the river. Observations during construction showed that groundwater level elevations are very close to river level at normal pool and respond very quickly with changes in river level as the river rises in flood.

Recharge to the groundwaters of the terrace in the site area is primarily from precipitation on the immediate area. Assuming an infiltration of about 35 percent which would be expected for these soils, topography, and climatic conditions, this would amount to an average infiltration of about 12 inches of water per year which is about 900 gallons per day per acre. Additional recharge occurs during periods of rising river level as the groundwater rises. This again is discharged as the river falls. Under normal river conditions, the groundwater levels under the terrace on which the station is located slope very gently towards the northwest as shown by the groundwater contours on Figure 2.3-3.

2.3.2.2 Usage

Two wells, in the terrace gravels, were drilled to supply cooling water (and augment water supplies) to the Shippingport Atomic Power Station (now decommissioned). They are located relatively close to the river as shown on Figure 2.3-3. A temporary well was drilled to provide water for sanitary uses and construction uses during the construction of the BVPS-1. Production is less than 50 gpm. This will be retained in service for similar purposes for BVPS-2. An additional temporary well will be installed about 1,000 ft upstream of the station to supply water to a concrete mixing plant during construction of BVPS-2. There are no municipal groundwater supplies located in this terrace. Two wells were drilled for the Bruce Mansfield Fossil Fuel Power Plant about 6,000 ft upstream of the station at the location shown on Figure 2.3-3. These wells are close to the river. As indicated, they are upstream of the buried bedrock nose. Consequently, they are effectively isolated from the groundwaters under the station and probably will be recharged largely by infiltration from the river.

There are approximately 48 domestic wells located upstream of the station as shown in Figure 2.3-3. All but three of these are located on or upstream of the buried bedrock nose and are thus isolated from the groundwaters under the station. The nearest domestic well is approximately 2,300 ft upstream of the plant. Groundwater level in this well was found at El. 681 ft, 15 ft above groundwater level in the station area at the time of observation.

Bedrock wells in the upland area all serve domestic purposes. Yield of all of these is very low and all terminate at elevations well above yard elevation at the station site.

There are no known plans for other future developments upstream of the station. Accordingly, maintenance of existing groundwater gradient is anticipated.

The hydraulic gradient in the terrace gravels along a northwest- southeast line along the cooling tower centerline varies from 8.6 percent near the toe of the bedrock scarp to about 0.1 to 0.2 percent in the power station and cooling tower foundation area. The coefficient of permeability is 0.2 to 0.46 ft per minute based on pumping tests from two wells developed for the Shippingport Atomic Power Station. For these gradients and coefficients of permeability, the velocity towards the river would be about 0.3 to 1.5 ft per day at the station.

Groundwater incursion, caused by excessive pumping on site, would not affect any domestic or industrial supplies because they all lie upstream and upgradient of the station site. Use of groundwater on the site is not expected to deplete regional or local supplies because of the alluvium which is part of the Ohio River groundwater regimen, which recharges the system.

2.3.2.3 Accidental Effects

As previously discussed, all groundwater passing under the power station site moves into the Ohio River, which acts as a natural barrier to the migration of groundwater contaminants. Groundwater migration is effectively blocked to the southwest where the alluvium pinches out against a bedrock cut scarp covered by relatively impervious colluvium just above river grade. The vent and drain system collects potentially radioactive fluids that could accidentally spill from various systems as described in UFSAR Section 9.7. Even if it were postulated that a spill to ground could occur, the volume of water and low flow rates in the alluvium below the plant site indicate that should liquid waste enter the groundwater, it would be diluted and slowly transported into the river. The time required to reach the river after a pollutant spill at the reactor probably would be between 620 days and 3,000 days, based on a range of gradients of 0.1 to 0.2 ft per 100 ft and a permeability coefficient range of 0.2 to 0.46 ft per minute. This migration rate of 1.7 to 8.2 years assumes steady conditions and an unchanged phreatic surface. Actually, one or more floods could be expected in this period; however, since the alluvium below the site is part of the Ohio River regimen, rising groundwater levels would correspond to rising river level. Therefore, the flood waters would tend to dilute any spilled pollutants and the diluted materials would then be discharged into the river as the river level fell.

Migration of contaminants upstream to domestic water supplies could not occur since such wells are upgradient from the station area.

2.3.2.4 Monitoring

The vent and drain system collects potentially radioactive fluids that could accidentally spill from various systems as described in UFSAR Section 9.7. Accordingly, there is no hazard of a spill to groundwater. Under these circumstances, monitoring of groundwater to protect users is not considered necessary and will not be provided.

2.3.3 Floods and Dam Failure Upstream

The station has the ability to achieve a safe shutdown condition, through the use of design features and procedural controls, before the maximum level of the Ohio River Probable Maximum Flood occurs. All Category I structures are designed for the buoyancy and hydrostatic pressures associated with this flood level. These flood conditions are discussed in the report dated January, 1970 from the Corps of Engineers. The Corps of Engineers concludes that the most critical conditions believed possible would result from the Probable Maximum Flood (PMF).

The development of the PMF is not detailed here. A general outline of its development is given in Attachment 2.3A. Information pertaining to further details of river hydrology may be obtainable from the U.S. Army Corps of Engineers, Pittsburgh District Office.

Coincident wind wave activity is discussed in Section 2.3.8. The PMF developed by the Corps is considered by them to be a one in a geologic era event and, as such, is extremely conservative without wave activity.

Potential dam failures are also discussed in general terms in Attachment 2.3A. Further details may be obtainable from the Corps.

Ice is not believed to be of concern here because lock and dam control systems have opened this part of the river to heavy amounts of ship and barge traffic year round.

The Corps of Engineers initially set a level of 707.2 ft for the Standard Project Flood. This level was used for initial station design. Subsequently, the analysis by the Corps of Engineers in 1970 revised the Standard Project Flood level downward to 705 ft. No portion of the station has been redesigned just to take advantage of this reduced level. However, portions of the station designed after the latter date, or which required a redesign for other reasons after that date, are designed for a Standard Project Flood of 705 ft. The emergency diesel generators are located at El. 735.5 ft. The containment is waterproofed generally to El. 730.0 ft, and is unaffected by the Probable Maximum Flood. The basement of the service building is at El. 713.5 ft; however, the structure is waterproofed and reinforced so that it is unaffected by floods to El. 730.0 ft. The duration of the Probable Maximum Flood above El. 728.0 ft is about 18 hr, which is insufficient time for soil permeability to provide hydraulic uplift above El. 728.0 ft. The service building is therefore designed for an uplift equivalent to a flood reaching El. 728.0 ft, but to prevent entry of water up to El. 730.0 ft. The turbine building, which contains no equipment or piping credited in accident analyses or meeting the definition of Category I in UFSAR Appendix A.1 (although some equipment may have been procured to that standard), is allowed to flood at water levels above the Standard Project Flood in order to reduce the weight of concrete slab which otherwise would be required to prevent flotation. The portion of the auxiliary building basement which houses safety-related equipment required for safe shutdown (charging pumps) is protected against flooding to El. 730.0 ft. The remainder of the basement is allowed to flood in order to eliminate hydraulic uplift.

The portion of the screenwell which houses the safety-related river water pumps and engine-driven fire pump is designed to accommodate a flood to El. 730.0 ft, and operation of the pumps is unaffected by the flood.

New fuel is stored in racks in the fuel storage building well above the Probable Maximum Flood level. The bottom of the spent fuel storage basin is at El. 727.3 ft, but the structure is designed so as to be unaffected by the flood.

The recurrence frequency of the Standard Project Flood is estimated by the Corps of Engineers to be once in 1,000 to 2,000 yr. The Corps of Engineers considers the Probable Maximum Flood to be so far beyond reasonable projection limits that it might be termed a geologic era event. However, the unit will be able to achieve a safe shutdown condition prior to such a flood affecting any safety-related equipment.

2.3.4 Failure of Downstream Dam Gates and Low Flow

The Pittsburgh District of the Corps of Engineers indicates (Attachments 2.3B and 2.3C) that for catastrophic failure of the New Cumberland Dam coincident with minimum flow in the river, the river would revert to an open channel flow condition and the water surface at the intake for the BVPS-1 would therefore drop to a minimum of El. 648.6 ft. The pit floor of the Beaver Valley screenwell is at El. 640.0 ft so that a water depth of 8.6 ft in the screenwell is ensured even for this water extreme condition. This is adequate to supply the required emergency river water flow to meet station safety related system requirements. The limiting credible dam failure is the loss of a single lock gate or tainter gate as described in Attachments 2.3B and 2.3C.

Channel diversions are not discussed. Information on river cutoffs and subsidence may be obtainable from the Corps.

Information on future probable minimum flow conditions may be obtainable from the Corps.

2.3.5 Environmental Acceptance of Effluents

Under normal operating conditions the expected radioactive releases are far below the standards specified in 10CFR20. The effects of these releases are discussed in Section 3.1.7 of the Environmental Report for BVPS-1 and Appendix 11B of the Updated FSAR. The design bases for effluent facilities are described in Sections 2.2.4 and 11.2. Sections 2.1.3 and 2.1.4 discuss surface and groundwater use. A discussion of accidents and their associated radioactive discharges takes place in Section 6 of the Environmental Report for BVPS-2. The BVPS-2 report discusses the total effect of both stations and is therefore, conservative when considering BVPS-1 alone.

2.3.6 Factors Affecting PMF Analysis

The Technical Report, Attachment 2.3A, discusses the results of the analysis for determining the standard project and probable maximum flood waters at the BVPS-1 site. This analysis requires establishing three key parameters; the drainage area, rainfall estimate and roughness coefficients for the runoff analyses.

Drainage Area

Figure 2.3-4 depicts the drainage area subdivisions for which hydrographs have been prepared. Each numbered area represents an uncontrolled area and each shaded area is controlled by a dam, as named. All the dams with the exception of Meander and Chautauqua are operated by the Corps of Engineers. The different routing reaches used in the PMF analysis are indicated by letters. A tabulation of the drainage values is included in Table 2.3-1. Table 2.3-2 provides a tabulation of the hourly unit hydrographic values and Muskingum routing coefficients for the identified drainage areas of Figure 2.3-4.

Rainfall

The rainfall used in estimating the PMF is discussed in Attachment 2.3A.

Since the PMF is a summer type storm it would be most likely to occur during a period when rainfall is normal or below, antecedent stream flow would also be low and infiltration loss to runoff high. The infiltration rates computed for the high intensity storm of August 3, 1964, which occurred over the French Creek basin, were used in the Probable Maximum Precipitation (PMP) computations. This storm possessed typical antecedent characteristics under which the PMP storm is generated. These infiltration rates were applied to several high intensity summer storms that occurred in or near the Stonewall Jackson Lake area, and the losses were found to be in close agreement to the actual losses. The infiltration rates used for the PMF are shown in Figure 2.3-15.

Curves for rainfall-excess plotted against precipitation for six- hour periods, contained in "Interim Report on Storms in the Kansas City District", Appendix C, U. S. Army Corps of Engineers, Kansas City Engineer District, May-June 1951, were considered suitable for use in the Standard Project Flood study. These curves, shown in Figure 2.3-16, take into account the probable variation in rainfall over a six-hour period.

Roughness Coefficient

The roughness coefficients were developed using the floods of record. A cross section of the site was drawn and the energy gradient was determined from the flood profiles. A value for "n" in the Manning equation was then computed. The analysis was made at two different sites in the vicinity of Shippingport with a resulting "n" value of 0.035.

Analysis Methodology

Locations of the flood control projects in effect in 1972 above the BVPS-1 site are shown in Figure 2.3-5. Pertinent data relative to these projects is listed on Table 2.3-5. Detailed information is available in the extracts from Reference 17 which are presented as part of Amendment 2 of the Beaver Valley Power Station Unit 2 PSAR (Docket No. 30-412). The distances from Shippingport to the dam sites is presented in Table 2.3-3.

Figure 2.3-6 shows a cross section of the Ohio River at the Shippingport intake. The contours used to estimate the Standard Project Flood and the Probable Maximum Flood may be developed from Figures 2.3-7, 2.3-8, 2.3-9, 2.3-10, 2.3-11, 2.3-12, and 2.3-13. The El. 740 ft and 760 ft contour lines were taken from the 7.5 minute Midland and Hookstown USGS Quadrangles. A plan view of BVPS-1 showing the containment, turbine building, and other structures is shown in Figure 1.2-1. Elevation views of the containment are shown in Figures 5.1-5, 5.1-6 and 5.1-7. Figure 2.3-14 provides a drawing showing historic high water marks.

After the flow hydrograph for the probable maximum flood was computed, a stage-discharge relationship was developed which would accommodate this flow while maintaining all of the hydrologic characteristics. These characteristics require that the valley storage reflect inflow and outflow into any reach and that the stage-discharge relationship adequately represent the computed flows.

When analyzing a particular reach, the valley storage was the average volume within that reach as defined by an average of the upstream and downstream stages. Stage capacity relationships for these reaches had been developed from which a height was determined which would equal the maximum volume stored within that reach representing the difference between the inflow and outflow. A water surface profile was established from these computations and is shown in Figure 2.3-17. The slope of this profile was then inserted into Manning's equation along with the other known values to compute a discharge. This value is then checked against the probable maximum flood peak to satisfy all of the requirements.

The validity of the runoff model used to estimate the Probable Maximum Flood can be demonstrated by Figure 2.3-18 and Table 2.3-4. Figure 2.3-18 shows a comparison of actual and reproduced Ohio River flow rate at the Dashields Lock and Dam during the October 1954 flood. Table 2.3-4 shows one page of the flood forecast.

2.3.7 Seismically-Induced Flood Potential

Removed in Accordance with RIS 2015-17

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2.3.8 Wind-Generated Waves Concurrent with Floods

An analysis of the wind-generated wave activity that might occur coincidentally with the worst flood level estimated at the site (PMF or seismically-induced flood) was performed.

The usual analytical practice has been to assume overland sustained wind speeds of approximately 40 miles an hour from the critical direction with respect to safety-related plant facilities which may be affected, in lieu of estimates of worst historical sustained overland wind speeds at the plant site.

Analytical techniques for such a wave analysis as are discussed in Corps of Engineers Engineer Technical Letter (ETL) 1110-2-8, dated August 1, 1966, and U.S. Army Coastal Engineering Research Center Technical Report No. 4, Shore Protection, Planning and Design, Third Edition, 1966, are generally employed to make estimates of "significant and maximum" wave heights and static and dynamic effects therefrom.

The analysis includes estimates of wave heights and periods, estimates of the static and dynamic consequences of such wave action, and provides assurance of the ability of safety-related structures, systems and components necessary for safe plant shutdown to resist such effects.

Extensive studies have established the relationships among meteorological factors, wind velocities at the air-water interface, and wave generation together with the limits on wave growth as they apply to the open ocean(8). Rigorous mathematical development of wave generation theories for open water exist(9)(10). A more limited body of work has established that, for practical purposes, most of the relations which obtain for the ocean apply with suitable restrictions to smaller bodies of water such as bays, lakes, and rivers(11)(12). Waves generated on flowing streams are modified, but the mechanism of their generation is not essentially different from that of waves generated on statistically still water. The modifications have been investigated theoretically(13). For application of the body of our knowledge of wave generation to rivers, it is necessary to consider a number of circumstances that are not pertinent to the ocean. They include the configuration of the river and its surrounding topography together with the roughness and the effects these may have on the wind field. The geometry of the river with its bends and varying depths must also be taken into account since they may dissipate the wave energy concentrations by absorption or by refraction.

2.3.8.1 Characteristics of Waves on a River

The Wave Spectrum

It is customary to characterize a wind-generated wave field by its energy spectrum. The energy spectrum is associated with the square of the heights of the waves. In general, the wave spectrum is broad-band, but not "white". The broader the band, the more irregular and "confused" are the wave heights, lengths, and periods. At the other extreme, the waves corresponding to a pure line spectrum - the narrowest conceivable narrow-band spectrum - would have the regularity of a pure sinusoid. The wave spectrum for a river is similar to that for the open ocean after certain filters have been applied.

1. Significant wave height (Hs): The significant wave height is the arithmetic mean of the heights of the one-third highest waves in a train of waves. It is thus a statistical description of the wave heights which concentrates on the higher waves.

2. Maximum wave height (Hmax): As usually used, "maximum" in this sense is also a statistic, one which concentrates even more on unusually high waves. It is defined as the arithmetic mean of the heights of the highest one percent of the waves present. Hmax is approximately 1.67 Hs.

3. Wave period corresponding to Hs (Ts): The period for the significant waves is also a statistic. It is the average time interval between passage of the wave crests whose heights were used to construct the average, Hs.

4. Wave length (L): Wave length is generally estimated from wave period. In deep water, where the water depth is greater than one-half the wave length, one uses the approximation:

$$L = 5.12\ T^2 \qquad (2.3\text{-}5)$$

where: T = seconds

L = feet.

5. Wave steepness (H/L): The wave steepness is defined as the ratio of the wave height to the wave length. Waves for which H/L > 1/17 are theoretically unstable and will break. Thus H/L = 0.143 is an upper bound on wave height for any given length. In reality, with heavy storm conditions, waves will break much sooner and wave steepness as great as the theoretical maximum are for the longer (and higher) waves.

Wind Velocity, Duration, and Wave Height

If the wind velocity over a given fetch were to remain constant for a sufficiently long time, the waves would grow until their energy content and distribution by wave-number and frequency reached a statistically steady-state limit. This is the wave spectrum corresponding to the fully aroused sea. For deep water the spectral form and its relation to fetch, wind speed, and wind direction with its consequent implications for wave heights and periods may be considered as well established(8)(9)(14). For rivers, with their universal meanders, it is always the limited fetch which imposes the most stringent limitation on the full development of the fully aroused spectrum. The effect is that of a high-pass filter with an extremely sharp cut-off. Long waves, those which can attain the greatest heights before becoming unstable, cannot be excited in the limited distances available. When this is considered together with the functional form of the spectrum at high frequencies (an f to the -5 power dependence) it is easy to see that most of the energy in the wave system is concentrated at frequencies just above the cut-off. In rivers one has, in effect, a very narrow-band spectrum. Thus, the waves which appear on rivers are far lower, shorter, and more regular than those which would be generated in the open sea by winds of the same force. They will show much less variability than the corresponding ocean waves.

The Effective Fetch

Since the river is not straight, but rather a series of reaches connected by bends, and since the width of the river is always small compared with the lengths of its reaches, a severe limitation is placed on wave heights which can be generated. A method for evaluating the effect of a narrow channel has been proposed by Saville(15) and used successfully in a number of studies(8)(11).

The Effect of Meanders Where the Direction Between Reaches Alters by Less Than 45 Degrees

In general, surface winds follow river valleys. However, the waves they generate in a reach run directly before the wind and do not follow the bends. Thus, at each bend the waves tend to run ashore, a tendency reinforced by refraction over the shallow water along the banks. Waves which go ashore are in part broken up and their energy absorbed, and in part, they are reflected. For these reasons, only a part of the wave energy makes it around the bend and is available to the wind for further growth. In a sense, the wind must begin building the wave energy anew at the head of each reach, although not from the zero levels appropriate to undisturbed water. An over estimate of the wave conditions can be found by considering each reach separately and assuming that no substantial energy loss occurs at the bends. Once an estimate of the wave energy, E (ft^2), is made for a point of interest, the significant wave height may be found from Hs = 2.83 E.

The Effects of River Currents

The river current may be either following (in the same direction as the wind) or opposed (in the opposite direction from the wind). A following current increases the wave lengths and decreases the wave heights (and the steepnesses) while an opposed current decreases the wave lengths and increases the wave heights (and the steepnesses). In either case, the wave periods are unaltered. The size of these modifications is a function of the ratio of the speed of the current (U) to the wave celerity in still water (c). Bigelow and Edmondson[(13)] studies the effects of following and opposed currents. A summary of their results is shown in Table 2.3-7.

2.3.8.2 Computation of Wave Parameters for the River

Wind Velocity and Duration

Over land, maximum sustained wind speeds of 40 mph may be taken. The two critical wind directions for the point of interest are east and north. For an east wind, the current would be following, while for a north wind it would be opposed. Of the two, only winds from the east need be considered seriously since the fetch available to a north wind is severely limited. With wind speeds of this magnitude, a duration of about two hours would be enough to bring the waves to their maximum development in the limited fetches available. It has been assumed that these winds will coincide with the worst flood level to be expected at the power station site.

Water Depth and Effective Fetch

For the flood stage assumed that the power station site would be at El. 730.0 ft. This is 65 ft above normal water level. The mean depth and width of the river under these conditions would be approximately 80 ft and 0.5 mi, respectively. The anticipated river current would be in excess of 6 ft per second. The fetch for an east wind would be the 10 mile section of the river between the Monaca-Rochester Bridge and Shippingport. This section of the river consists of four straight reaches separated by more or less gentle bends as shown in Figure 2.3-22. On the average, each reach is 2.5 miles long. For a narrow channel, the wind cannot generate waves over the full range of direction available to it as in open water, in other words, the width of the fetch places restrictions on the total amount of energy transferred from wind to water until the fetch width exceeds twice the fetch length. For a conservative estimation, the effective fetch in each reach of the river is computed by assuming the wind transfer energy to the water surface in the direction of the wind and in all directions within 20 degrees on either side of the wind direction. The definition sketch of the effective fetch computation is also shown in Figure 2.3-23.

$$F_{eff} = \Sigma X_i \cos\alpha / \Sigma \cos\alpha = 1.5 \text{ mi} \quad (2.3\text{-}6)$$

Total Energy and Significant Wave Height

From the established relations for significant wave height for a 40 mph wind and a fetch of 1.5 mile Hs = 2.1 ft. This corresponds to a total energy, E = 0.55 sq. ft and the two are related by:

$$Hs = 2.83\sqrt{E} \quad (2.3\text{-}7)$$

The wind would transfer energy in wave form to the water surface proportional to 0.55 sq ft within each 2.5 mile reach. The wave energy developed within each reach would be partially lost at each bend, only part being transmitted to the next reach. If we make the extreme assumption that only 10% of the wave energy is lost at bends and by refraction over the entire 10 mile section of the river, then the E-value at the power station site would be 2.0 sq ft and the corresponding significant wave height would be 4.0 ft. From the Fetch Graph by Pierson, Neuman, and James shown in Figure 2.3-23, the appropriate corresponding wave period is 4.0 second. The wave length from $L = 5.12\ T^2$ is 82 ft. Thus, with an average water depth of 80 ft, over most of the river the waves will be in deep water.

The Effect of River Currents

The celerity of a four-second wave in still water is:

$$c = 5.12\ T = 20.5 \text{ ft/second} \quad (2.3\text{-}8)$$

From Table 2.3-7, a following current greater than 5 ft/sec (U/c = 5/20.5 = 0.25) would give a wave height ratio (RH) of 0.76 and a wave length ratio (RL) of 1.43. Applying these modifications, one has for the east wind:

$$Hs = (RH)H = 0.76 \times 4 = 3.0 \text{ ft}$$

and

$$L = (RL)L = 1.43 \times 82 = 120 \text{ ft}$$

with

$$T = 4.0 \text{ sec.}$$

The maximum wave height in this case is:

$$H_{max} = 5.0 \text{ ft.}$$

A north wind results in a less serious case. The reach to the north of the power plant site is roughly 2.5 miles long and is terminated by a bend of nearly 90 degrees. Thus, the E-value to be expected from north winds is 0.55 sq ft and the corresponding significant height, were there no opposing current, would be:

$$Hs = 2.83\ \sqrt{E} = 2.1 \text{ ft.} \quad (2.3\text{-}9)$$

Waves from the north will be much shorter than those from the east, 2 second and 40 ft. The celerity would be c = 20 ft/second. With U = 5, U/c = -5/20 = -0.25 and, from Table 2.3-7, RH = 2.35 and RL = 0.43. Thus:

HS = (RH)H = 2.35 x 2.1 = 4.9 ft

and

L = (RL)L = 0.43 x 40 = 17.2 ft

The corresponding steepness would be:

$$H/L = 4.9/17.2 = 0.285, \qquad (2.3\text{-}10)$$

a value far in excess of the maximum possible steepness of 0.143. As a result, these waves never arrive at the power plant site. With the north wind and the opposing current the entire downstream reach would be a smother of torn water and foam, but compared with the east wind and following current, little wave action would reach the site.

2.3.8.3 Computation of Wave Forces on a Vertical Wall

Using a wave height of 5 ft (Hmax) and an unbroken wave since the water depth at the structure is greater than one and a half times the values of Hmax, the Sainflow method[8] for the determination of pressure due to unbroken waves was used. We have:

$$ho = (3.14\ H^2/L)\ \coth\ [2\ (3.14)\ d/L] \qquad (2.3\text{-}11)$$

and

$$P1 = WH/\cosh\ [2\ (3.14)\ d/L] \qquad (2.3\text{-}12)$$

where:

d = depth from stillwater level

H = height of original free wave

L = length of wave

W = weight per cu ft of water

P1 = pressure the Clapotis adds to the stillwater pressure

ho = height of orbital center (or mean level) above still water level

The maximum over-pressure due to wave action is thus 360 lbs/sq ft at the still water level.

2.3.8.4 Evaluation

An evaluation of the static and dynamic consequences of wave action has shown that there will be no loss of ability to maintain a safe shutdown condition, with coincident wave action with the PMF. The forces involved will not cause failure of the safety-related portions of the intake structure. The ventilation air intakes on the intake structure are located at El. 737 ft to allow for the 6.7 ft runup above the standing water level of 730 ft associated with the 5 ft maximum wave. Portable ventilation exhaust chimneys will be available for attachment to the ventilating exhaust slots inside the intake structure to protect against the 5 ft wave and associated runup. All safety-related structures and equipment are protected to El. 730 ft. The intake structure is the only safety-related structure which will be subjected to the effects of coincident waves and associated run up.

The safety-related facilities at the intake structure, including the portable ventilation exhaust chimneys and the ventilation air intakes, are designed for the static and dynamic effects of postulated wave action, including waterborne missiles and wave splash. In addition to the static equivalent loading resulting from wave and splash loading, the ventilation exhaust stacks can withstand a postulated waterborne missile consisting of a 4 inch x 12 inch by 12 ft long wood plank, weighing 200 lb, or a 55 gallon drum weighing 512 lb, striking at a velocity of 36 fps within a range of ±20 deg to the direction of the river flow. No benefit from the surrounding steel superstructure and siding was considered in the evaluation of the ventilation exhaust chimneys. Permanent safety related structures are protected against tornado generated missiles which are more limiting than the postulated waterbound missile.

2.3.9 Potential Ice Jam Flooding or Blockage

Formation of ice jams on the Ohio River is an almost unknown phenomenon. A significant occurrence of memory in the plant vicinity was in 1936, and that was under circumstances which would not be repeated today. Additional information from the Corps of Engineers is presented in Attachment 2.3F. At that time, all of the nonadjustable wicket-type gates on an old navigation dam were dropped for fear they would be taken out by a large ice flow coming down from the Monongahela River. This resulted in a very low pool with ice grounding on a sand bar and the formation of an ice jam about six miles above Shippingport. All of the old dams in this reach of the river have been removed, and the New Cumberland Dam now regulates the pool in the plant vicinity. This new dam is equipped with tainter gates, some of which are lowered to pass ice runs and then raised to maintain the normal navigation pool.

Normally, ice jams form at obstructions and irregularities such as bridge piers, islands, sharp bends, and at the upstream edge of a reach of solid ice. None of these conditions exist right at the intake structure, and there is no reason to believe that the intake would ever be blocked by an ice jam.

The Shippingport Bridge is located about 1000 ft upstream of the intake. The three pointed piers in the river supporting this structure do not form a significant channel obstruction, hence there is no reason to conclude that an ice jam would form there.

In general, the worst type of ice jam is a dry one which is formed by ice blocks completely plugging the river section down to the channel bottom. The water level behind the jam increases rapidly until the head and/or more ice flow destroys the plug.

The case of dry ice jam formation behind a solid ice sheet has been investigated by Mathieu and Michel[16]. They have concluded that the size of ice block for this situation must equal or exceed three-quarters the channel depth. For this case, with channel depths which range from 20 to 30 ft, ice blocks of 15 to 23 ft across would be required to start a dry jam. According to observations made by operating personnel at the Shippingport Station, ice flows of 6 to 8 hours duration have occurred every few years at the site, and the maximum block size is about 8 to 10 feet across by 1 foot thick, i.e., about half the minimum size required for starting a dry jam.

Other factors which tend to rule out the possibility of ice jam formation in this area are the heavy barge traffic which keeps the river open year-round and the mitigating effect of warm water discharges from industry upstream.

Blockage of the intake by accumulation of floating ice on the racks and screens is not expected to occur since the intake openings are protection from ice and trash by a curtain wall extending 5 feet below normal pool elevation of 664.5 ft. Ice cover on the Ohio River generally does not present a great hazard to river structures or navigation. Although freezing will occur during protracted periods having temperature below 20 F, an appreciable ice cover will not develop until occurrence of several days with a minimum temperature of 10 F or less.

2.3.10 Storm Drainage

Section 2.2.2.3, Climatological Averages, and Section 2.2.2.4, Climatological Extremes, (Tables 2.2-1 and 2.2-2, respectively) show both the 97 year average monthly precipitation figures and the 97 year maximum daily and monthly precipitation figures. From Table 2.2-2, the maximum 24 hr precipitation between 1870 and 1967 was 4.08 inches. From Table 2.2-1, the highest monthly average amount of precipitation between the same 97 years was 3.91 inches.

The roof and yard storm drainage systems are designed for a rainfall intensity as shown in Figure 2.3-24 which is extracted from Technical Paper No. 25, Rainfall Intensity - Duration - Frequency Curves, U.S. Department of Commerce, Weather Bureau. The design rainfall used to calculate drainage capacity has an intensity of 4 inches per hr for a statistical duration of ten minutes and a frequency of five years. Figure 2.3-24 shows that rainfall intensities higher than 4 inches per hr may be obtained at longer frequencies with longer or shorter duration. This increase in rainfall intensity over the design intensity produces a buildup of water level on areas being drained. Conservatively assuming that the capacity of the drainage system does not increase with water level buildup, Figure 2.3-24 shows that even for rainfall intensities greater than design, the water buildup is less than 1 inch.

The Probable Maximum Precipitation (PMP) as described in Reference 17, is less than the designed roof drainage capacity. There are a minimum of two roof drains for every roof and as many as 6 roof drains for large roofs. All drains are fitted with screens to prevent clogging of drain lines. The roof screens are inspected periodically and no buildup of water is expected.

All structures containing safety-related systems are protected against tornado winds and missiles and are constructed with two feet thick heavily reinforced concrete roof slabs capable of storing water to the height of their parapets.

Those structures such as the service building and intake structure, which have steel superstructure above the missile protected areas, have roofs constructed of 20 gage, 1 1/2 inch steel decking supported on steel framing. These roofs are capable of holding the full weight of the Probable Maximum Precipitation, as shown by Reference 17, as 13 inches of rainfall in 72 hr, assuming all drains completely plugged, utilizing design stresses of the decking and framing to 0.9 yield.

Prior to full buildup of the water, water would leak through roof openings. Critical equipment located below these areas are set on pads raised above the floor surface. The volume of water that may find its way below the roof is small and the dispersion area great, thereby no buildup above the "housekeeping" pads is probable. During this phenomenon, the plant would be shutting down since this precipitation is associated with the Probable Maximum Flood.

The roofs can safely store the full quantity of water associated with the worst storm based on a 100 year return period as shown in Figure 2.3-24 without any threat of water leaking below.

The roofs of all structures are generally inspected on a routine basis, ensuring that the screened roof drains are clean and in satisfactory condition. Any material on the roofs not secured will be removed or repaired, thereby eliminating the possibility of external plugging. The screening will eliminate the possibility of internal plugging of the lines.

It has been previously stated that all roofs located over Category I components can safely store a minimum of 13 inches of rainfall. In fact, with the exception of a portion of the service building roof, the roofs can safely withstand ponding of water up to their parapet tops. The accumulation incurred by the rainfall given indicates the maximum buildup of water that may be expected would be less than 6 inches.

In the case of the portion of service building roof area over the office and air conditioning rooms, even if it was assumed that only two of the four area roof drains were capable of passing water, the total accumulation would be less than 13 inches.

In order for this roof to also provide full storage to the parapets, only a 7.5 percent increase in minimum yield strength of the deck material need be assumed. Even if this roof is assumed to fail, detrimental effects are anticipated since any water deposited in the office and air conditioning areas would run out to the ground level below. In this situation, only minor seepage to the switchgear area would occur through the stairway in the clean shop.

All roof and surface drainage around the site passes on directly to the storm drainage system which slopes northward, as shown in Figure 2.3-25, until it discharges into the Ohio River at the intake structure. The site grade of El. 735 ft essentially forms a plateau surrounded on three sides by lower ground; to the north by the lower plant level at El. 705 ft (north of the turbine building) and thereon sloping to the Ohio River (pool level El. 664 ft); to the east by sloping ground to Peggs Run and to the south by a gully formed by the New Cumberland Pennsylvania Railroad. The west end of the plant borders on the former Shippingport Atomic Station site which has a similar site grade of El. 735 ft and the same topographical features to the north and south as for BVPS-1 and sloping ground to the Ohio River to its west.

For rainfall intensities greater than the 4 inches per hr used for the design of the yard drainage some puddling will occur. However, since the site pitches through natural drainage lines, to the Ohio River and Peggs Run, surface drainage will aid the yard storm drainage system in minimizing the buildup of water to less than a few inches.

2.3.11 Low River Flow

A low flow frequency curve for the Ohio River at Shippingport is shown in Figure 2.3-1. This curve represents the lowest continuous seven day mean flows that would occur. It is based on a statistical analysis of historical flows during the past 44 years (1929-1973) as modified by the present reservoir system. An instantaneous low flow could be slightly lower, but with the large impoundments behind the locks and dams, the seven day flow could be provided continuously by temporarily drawing on the river storage when needed.

The lowest flow of record occurred during the extreme drought of 1930. A minimum of 1,250 cfs flowed past Shippingport in August of that year. Since that time eight reservoirs with low flow augmentation capabilities have been constructed. The lowest flow that would have occurred in 1930 with the contemporary reservoir system in 4,000 cfs.

Several reservoirs in the authorized or planning stages (in 1973) would have a substantial influence on low flows. Included in this group are Stonewall Jackson, Rowlesburg, and St. Petersburg. Collectively, they would increase the minimum flow to approximately 6,000 cfs at Shippingport.

The revised minimum flow of 4,000 cfs, as discussed in Attachment 2.3C, results in a reduction of the minimum water surface elevation at the BVPS-1 site to El. 648.6 ft from the previous El. 649.0 ft.

By extrapolating an unregulated low-flow frequency for drought conditions, which may be characterized as the most severe reasonably possible at the plant site, an instantaneous low flow of about 800 cubic feet per second could occur. This condition was analyzed as discussed below.

Information on the regulation of the New Cumberland Pool during extreme low flow conditions was requested from the Pittsburgh District, Corps of Engineers (Attachments 2.3D and 2.3E).

At a flow of 800 cfs coincident with lock damage, which could reasonably be expected to occur, the pool would drop 1.8 ft to El. 662.7 ft M.S.L.

The New Cumberland Pool is maintained at El. 664.5 ft through the use of locks, dams, and storage reservoirs in the river basin. Records indicate that this elevation can be maintained at flows up to 20,000 cfs.

Normal plant operation can be continued at river levels between El. 695 ft and El. 654 ft. Actions to protect safety related equipment are initiated at El. 695 ft, as required by the Licensing Requirements Manual. At El. 654 ft, the river water, raw water and fire water pumps still have adequate NPSH to meet design requirements as summarized below:

Pump	Minimum Submergence Required (ft)	Submergence at El. 654 (ft)
River water	4	12.7
Fire	1.6	10.4
Raw water	5	5

Since the raw water pumps minimum NPSH is reached at El. 654 ft, BVPS-1 shutdown will be initiated. The occurrence of river levels below El. 654 ft is highly improbable. Plant operation with river level below 654 ft is prohibited by plant Technical Specifications.

For safe shutdown, the ultimate heat sink (Ohio River) must supply only the river water system. The river water pump suction minimum submergence is discussed in Section 9.9.

At the minimum possible river elevation (648.6 ft), the river flow assumes open channel flow characteristics at the rate of 800 fps or 360,000 gpm. The river water system flow requirement to maintain safe shutdown is a maximum of 7500 gpm or 2.1 percent of flow available. Therefore, the Ohio River can easily meet the cooling water requirements of BVPS-1. Further, assuming that BVPS-2 requires the same amount of cooling water, less than 5 percent of flow available would be required to maintain safe shutdown of both nuclear power stations.

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ATTACHMENT 2.3A

ANALYSIS OF FLOOD HEIGHTS

OHIO RIVER AT SHIPPINGPORT, PA.

U.S. ARMY CORPS OF ENGINEERS, PITTSBURGH DISTRICT JANUARY, 1970

SCOPE

The proposed Shippingport atomic energy plant site of the Duquesne Light Company is located on the left bank of the Ohio River, 35 miles below the head of the Ohio River at Pittsburgh, Pennsylvania.

The total drainage area of the river at this site is 22,989 square miles. Thirteen Federal reservoirs control flood runoff from 7,648 square miles of this area. The remaining area is 15,341 square miles.

Five additional Federal reservoirs which will control 1,367 square miles or about 9% of the now uncontrolled area should be in operation within about five years.

Runoff from the 15,341 square miles below the existing dams will be virtually unaffected by any other structures during floods of maximum proportions.

The drainage area limits above the site are shown on Plate 1 as are the areas tributary to the 13 completed reservoirs and the five future reservoirs presently under construction or in an active status for near future construction.

ACTUAL FLOODS OF RECORD

Actual flood records in the immediate vicinity of Mile 35.0 are only available since 1911. Comparable longer term records, however, have been obtained at Pittsburgh, Pennsylvania, 35 miles upstream and at Wheeling, West Virginia, about 52 miles downstream. The record at Pittsburgh dates back to 1762. Continuous records, however, did not begin until 1854, thus providing 116 years of records available for mathematical frequency analysis, but a record of 208 years for historical analysis.

Continuous records at Wheeling extend from 1838 to 1850 and from 1861 to date with 110 years of uninterrupted data and a historical period of 132 years.

Between 1937 and 1967, the flood control reservoirs were consecutively built and flood heights have been progressively reduced. An adjustment for reservoir reduction was required to place all floods of record in a natural or modified-by-reservoir status. Consequently, computations were made for reservoir storage impoundment and release for all floods since 1935, not only to determine the effect by completed reservoirs, but also to develop a relationship between natural and modified peak flood flow magnitude. The natural and modified peaks were used to compute the frequency of natural flooding and by relationship, the frequency of modified flooding.

These computations also showed how effective the reservoir system would have been on the March 1936 flood which was the highest of record. It attained an elevation of 703.1 feet at Mile 35 with a peak flow at 510,000 c.f.s.

This flood resulted from average runoff equal to 3.0 inches of precipitation from the whole basin. Maximum precipitation intensity occurred over the Conemaugh River basin in the contiguous areas now predominately controlled by reservoirs. The Conemaugh River is especially well situated near the center of the tributary area above Shippingport so that it was formerly a prime contributor to a great many of the District floods. Because the controlled areas were a source of much of the March 1936 flood runoff, the reduction they could have exerted was above average. The maximum computed reduced flood, therefore, was not the 1936 flood but that of December 1942. This maximum reduced flood flow at Mile 35.0 would be 390,000 c.f.s. having a corresponding elevation 692.9.

HYDRAULIC CHARACTERISTICS

Analysis of the 1936 and subsequent floods throughout the basin, stream flow measurements, backwater studies, and detailed topographic maps of the navigable portions of the Allegheny, Monongahela, and Ohio Rivers have provided unit graph and flood routing data for use in determination of actual flood factors and development of theoretical flood hydrographs. Unit hydrographs for 61 drainage areas comprising a separation into significant portions of the total uncontrolled basin, and 13 unit graphs for the reservoir inflows have been developed for flood forecasting and reservoir operation. Flood wave routing coefficients for the Muskingum method have been developed for transposition of the unit graph flows downstream through the basin. Valley storage curves 30 to 40 feet above the maximum flood of record profile were determined to check routing values and flood storage volumes. The stage discharge relation curve for the Ohio River at Mile 35 and other critical locations used in the flood routing procedures have been developed by projection of the curves beyond the flood of record by use of established channel roughness, measured cross-sections, and slope values based on various elevations and the related valley storage between rating station reaches. The stage discharge relation for the Ohio River at Mile 35.0 is shown as Plate 2.

STANDARD PROJECT FLOOD

Although the March 1936 flood is indicated to be the maximum for a period as long as 200 years, undoubtedly higher floods can occur. The Ohio River Standard Project Flood was developed to establish a plausible event in excess of the record. It was to be used for design of riverside structures where an extremely high degree of flood safety was advisable. Its storm rainfall values were those of an actual storm, over a further west location in the Ohio River Basin where rainfall intensities are greater due to closer proximity to the Gulf source of moisture. It was assumed that they could possibly have been more closely centered over this area. Total storm intensities used were as great as 10 inches over portions of the basin. All of the existing reservoirs were assumed to be in flood control operation during the storm. As in the 1936 storm, high intensities occurred over the Conemaugh Reservoir basin and this reservoir was filled by the time the flood had crested downstream. Spillway discharge from this reservoir and several others occurred on the flood recession. This flood has a computed peak flow of 630,000 c.f.s. at Shippingport with a maximum stage at elevation 705.0. This flow is about 60% greater than the maximum reduced flood and would appear to have only a one or two thousand to one change of occurring in any year.

DAM STABILITY

The chance of augmentation of flood flows by dam failure superimposes an extreme improbability on remote probability. All of the Pittsburgh District Corps of Engineers dams were designed for localized probable maximum storm runoff. They will not fail from overtopping especially from less intense rainfall of more generalized widespread storms such as the Standard Project Flood.

Military personnel also consider it highly improbable to critically breach these dams by sabotage, using conventional means or weapons, because of their mass. The most likely cause of their failure would be from a catastrophic event such as an atomic explosion or an earthquake in the immediate area coincidental with full or near full impoundment. The widespread destruction resulting from an atomic blast, or more significantly from an atomic attack of which it could be a part, could minimize the more local effects that might be caused by dam failure. The Pittsburgh District reservoirs whose failure would most likely have the greatest flooding effect at Shippingport function solely as flood control projects and consequently are usually at minimum storage. The decreased chance of destruction of these reservoirs when full compounds the improbability of flooding from this source.

At the World Conference of Earthquake Engineering in Chile, various charts and discussions indicated the improbability of dam failure from earthquakes in this area. Civil Engineering, October 1969, page 73, shows the seismic risk map presented at the conference. It indicates that this basin lies within a zone-one designation where earthquake damage can be only minor. Also presented at this conference was a paper that described an earthquake which produced horizontal cracks through a new 300-foot high concrete gravity dam at Koyna, India, in 1967. The shock was of high magnitude registering 6.5 on the Richter scale. Breaching did not occur (Civil Engineering, March 1969, page 83).

A more local example of the relation between stability of our gravity dams and earth shock was observed on 19 November 1969 at Bluestone Dam located in southeastern West Virginia. A tremor registered at 4.75 on the Richter scale occurred about 40 miles from the dam at 8 p.m. of this day. A thorough investigation at the dam showed no effect. Personnel on duty at the dam were not conscious of the tremor although people in nearby homes were alarmed at the vibration in these less substantial structures.

Even though breaching is believed to be improbable, especially coincidental with the peak of the Standard Project Flood, it was given consideration and a computation was made to show the effect of failure of the critically located Conemaugh Dam. The attendant wave from this failure would have raised the peak flow at Shippingport to 1,280,000 c.f.s. with a peak stage at elevation 725.2.

PROBABLE MAXIMUM FLOOD

Despite the extreme magnitude of such theoretical flood conditions, still more critical conditions are conceivable from the Probable Maximum Rainfall. Such a rainfall represents the culmination of combined critical meteorological factors. Meteorologists do not reasonably concur that more critical rainfall can be experienced. The flood runoff resulting from such rainfall, when compared to frequency projections developed by the accepted conventional computation methods, show this maximum event to be in excess of even extreme probability projections, indicating a frequency of once in a geologic age.

Although a probable maximum storm had not been previously developed for the tributary area upstream of Shippingport, a study of this type had been made for the Susquehanna River basin which is adjacent to this area and located to the east. This probable maximum precipitation was presented in Weather Bureau Hydrometeorological Report 40. Consultation with the Office of Chief of Engineers and the Weather Bureau Hydrometeorological Section confirmed the assumption that data in this report could be reasonably applied to the Pittsburgh area. This report presented a storm pattern in the form of isohyetal lines (contours of equal precipitation) developed for 24,100 square miles of drainage area in the Susquehanna basin above Harrisburg, Pennsylvania. This area is of about the same size as that above Shippingport.

Orientation of the storm pattern over the Pittsburgh District was performed by transposing it 2.5 deg longitude west and 0.8 deg latitude south. This was believed to be not only a logical transposition, but also one conducive to the peak runoff maximization. The isohyetal storm pattern is shown on Plate 1 with the values of intensity and time distribution of the isohyets tabulated on Plate 3. Both the pattern and table were obtained from Report No. 40.

Individual hydrographs for each of the 61 subareas in the basin and for the areas above the 13 reservoirs were developed from the unit graphs and the 6-hour rainfall values, applicable to the particular areas, modified by infiltration losses. These losses have been found applicable to storms of similar characteristics and seasonal occurrence in this area.

The uncontrolled area hydrographs routed to Shippingport resulted in a combined flood hydrograph of 1,430,000 c.f.s.

The reservoir inflow hydrographs were developed in a similar manner with unit graphs and the oriented rainfall values. In no case were these flood flows as great as the spillway design floods which were used to assure the safety of the dam against overtopping and failure. Reservoir storage during the early storm periods was sustained long enough to permit downstream passage of the flood peak before spillway discharge could appreciably add to its magnitude. Ultimate reservoir storage heights were below structural design levels.

Reservoir outflows were subsequently routed downstream through the basin and were combined with the uncontrolled flow hydrographs to form the probable maximum flood as modified by the 13 existing reservoirs.

This flood so developed has a maximum flow magnitude of 1,500,000 c.f.s. and would attain an elevation of 730.0 at Ohio River Mile 35. It is almost 4 times as great as the maximum reduced flood in our 200 years of record. The hydrograph of this flood is shown as Plate 4.

The mean velocity of the peak flood flow is estimated to be ten feet per second or about seven miles per hour. Bank velocities at the proposed structure should not exceed three miles per hour.

DURATION OF INUNDATION

These floods would not only cause the river to rise to the high peak stages which have been discussed, but would subject the banks and contiguous structures to protracted durations of inundation.

Plate 5 presents stage-duration curves which show the length of time that various elevations would be equalled or exceeded during the Maximum Probable, Standard Project, and maximum actual reduced floods. The short duration of additional flooding caused by breaching of Conemaugh Dam during the Standard Project Flood can be readily observed.

RESULTS AND CONCLUSIONS

1. The most critical conditions which we believe possible would result from the Probable Maximum Flood.

2. The Probable Maximum Flood would have a peak flow of 1,500,000 c.f.s. and attain an elevation of 730.0 at Mile 35.0.

3. Outflow from the flood control reservoirs would only contribute 70,000 c.f.s. to the flood peak. Reservoirs would operate according to their predetermined schedules and would be in no danger of failure as this flood is not as critical to them as results from their own design criteria.

4. Maximum scouring velocities at the structure should not exceed three miles per hour.

5. Failure of any of the flood control dams at any time and particularly coincidental with peak flood flow is not believed of practical consideration.

6. The probable maximum flow is 400 percent of the comparable maximum reduced flood in the 200-year period of record. Frequency computations which give consideration to the overall pattern of events place this flood as only a 100-year event. The same computations indicate the probable maximum value to be so far beyond reasonable projection limits it might be termed as a geologic era event.

7. The Ohio River Standard Project Flood at Mile 35.0 is 630,000 c.f.s. with a maximum elevation of 705.0. This flood has a computed frequency of about once in 1,000 to 2,000 years.

8. The Standard Project Flood augmented by breaching of the Conemaugh Dam (an event believed unlikely) is 1,280,000 c.f.s. with an elevation of 725.2 feet.

The studies have been of sufficient depth and detail to assure a degree of accuracy commensurate with the reliability of projections made.

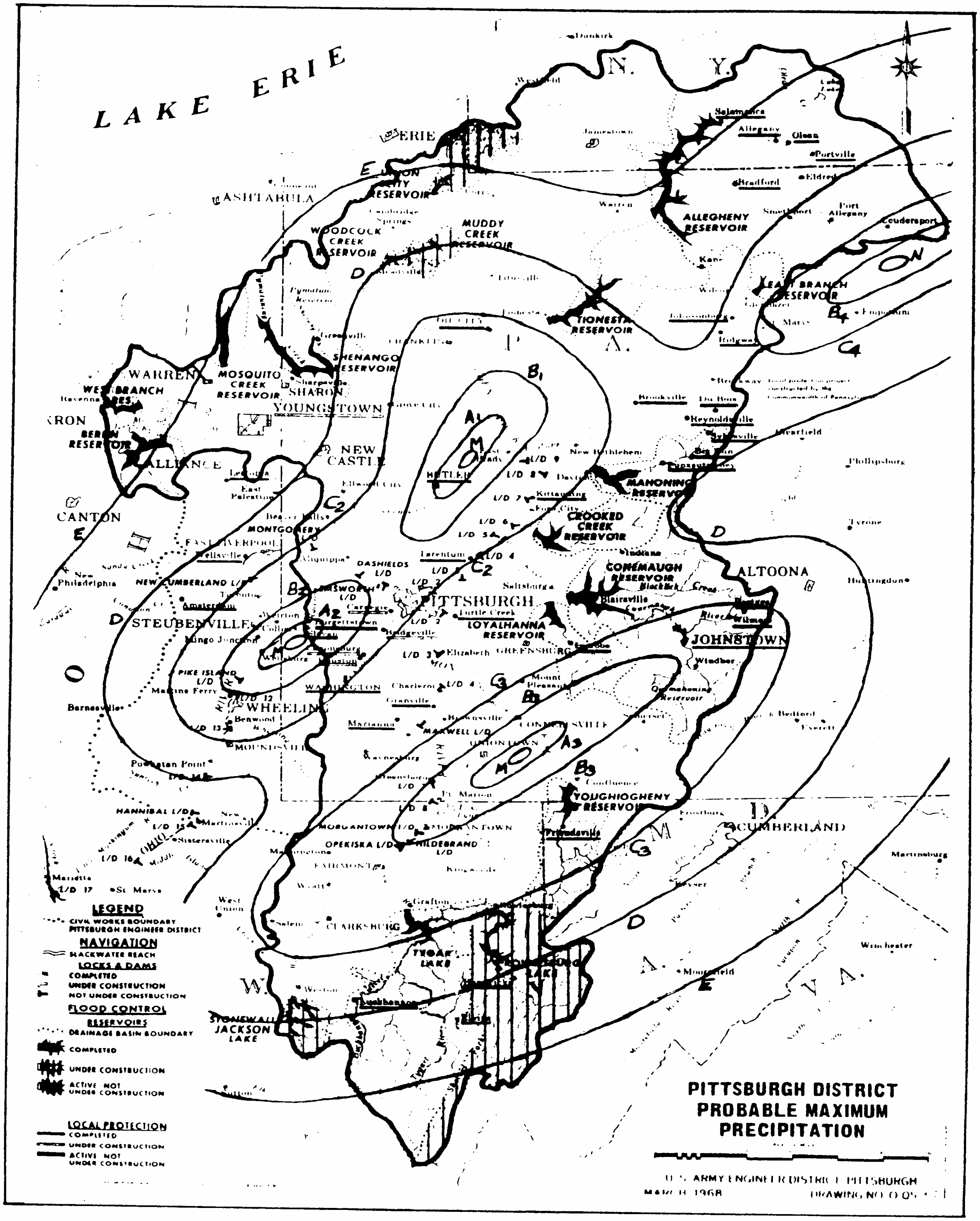
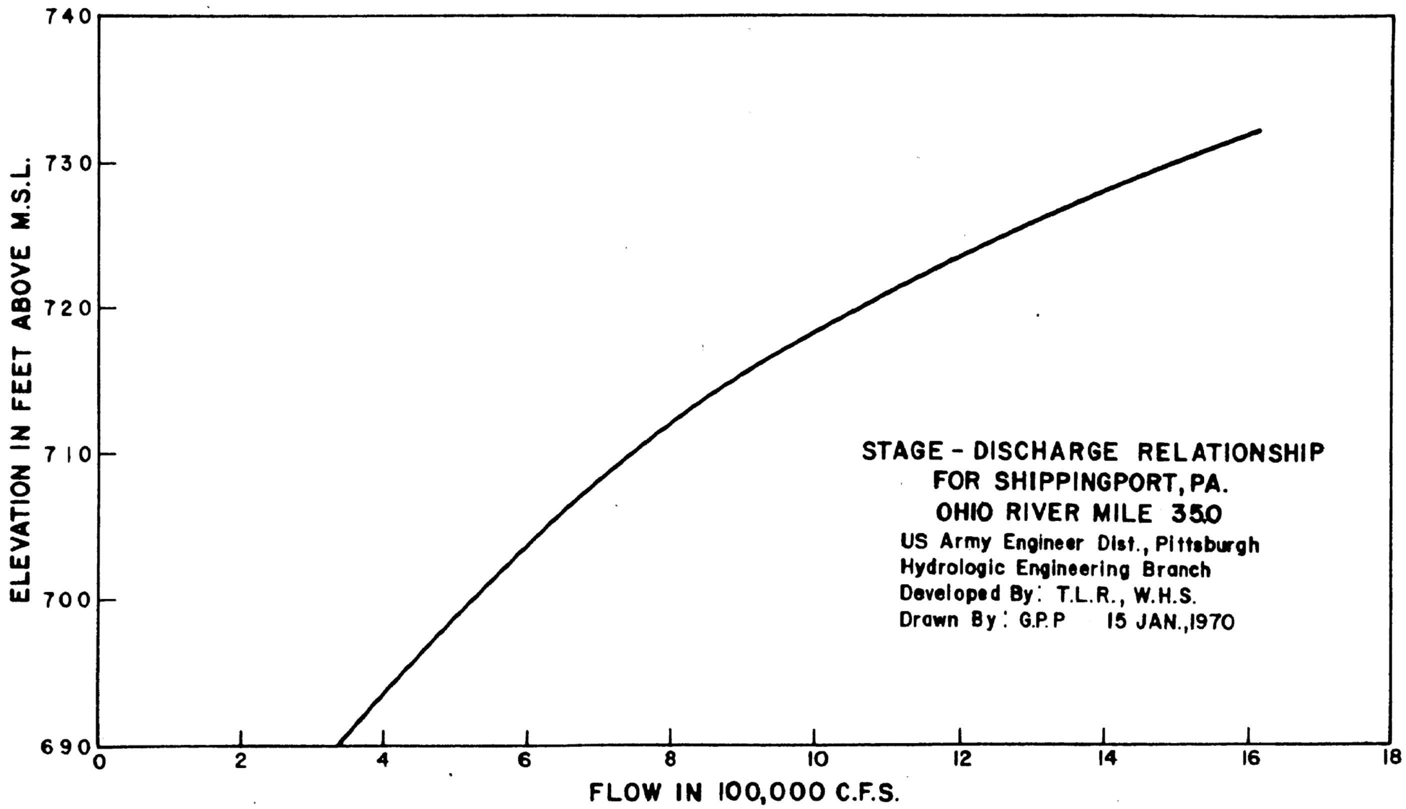

LAKE ERIE
N. Y.
ERIE
ASHTABULA
WARREN
YOUNGSTOWN
SHARON
NEW CASTLE
CANTON
ALLIANCE
STEUBENVILLE
WHEELING
PITTSBURGH
ALTOONA
JOHNSTOWN
CUMBERLAND
CLARKSBURG
WOODCOCK CREEK RESERVOIR
MUDDY CREEK RESERVOIR
ALLEGHENY RESERVOIR
TIONESTA RESERVOIR
SHENANGO RESERVOIR
MOSQUITO CREEK RESERVOIR
WEST BRANCH RES.
BERLIN RESERVOIR
MAHONING RESERVOIR
CROOKED CREEK RESERVOIR
CONEMAUGH RESERVOIR
LOYALHANNA RESERVOIR
YOUGHIOGHENY RESERVOIR
TYGART LAKE
STONEWALL JACKSON LAKE
MONTGOMERY
DASHIELDS
NEW CUMBERLAND L/D
PIKE ISLAND L/D
HANNIBAL L/D
MORGANTOWN L/D
OPEKISKA L/D
HILDEBRAND L/D
MAXWELL L/D
LEGEND
CIVIL WORKS BOUNDARY PITTSBURGH ENGINEER DISTRICT
NAVIGATION
BACKWATER REACH
LOCKS & DAMS
COMPLETED
UNDER CONSTRUCTION
NOT UNDER CONSTRUCTION
FLOOD CONTROL
RESERVOIRS
DRAINAGE BASIN BOUNDARY
COMPLETED
UNDER CONSTRUCTION
ACTIVE NOT UNDER CONSTRUCTION
LOCAL PROTECTION
COMPLETED
UNDER CONSTRUCTION
ACTIVE NOT UNDER CONSTRUCTION
PITTSBURGH DISTRICT
PROBABLE MAXIMUM
PRECIPITATION
U.S. ARMY ENGINEER DISTRICT PITTSBURGH
MARCH 1968

Plate 1



740
730
720
710
700
690
ELEVATION IN FEET ABOVE M.S.L.
0
2
4
6
8
10
12
14
16
18
FLOW IN 100,000 C.F.S.
STAGE - DISCHARGE RELATIONSHIP
FOR SHIPPINGPORT, PA.
OHIO RIVER MILE 35.0
US Army Engineer Dist., Pittsburgh
Hydrologic Engineering Branch
Developed By: T.L.R., W.H.S.
Drawn By: G.P.P 15 JAN., 1970

Plate 2

	Centers		A_1	A_2	A_3	B_1	B_2	B_3	B_4	C_2	C_3	C_4	D	E
	M	N	Isohyet Values (inches)											
72 hours	23.0	19.9	19.6	19.9	19.6	16.5	16.9	16.1	16.8	13.0	12.3	14.6	10.1	7.6
1st 6 hours	9.1	7.8	6.7	6.8	6.7	4.9	5.1	4.9	5.1	3.4	3.2	3.8	2.3	1.4
2nd 6 hours	3.0	2.6	2.5	2.5	2.5	2.2	2.2	2.1	2.2	1.9	1.8	2.1	1.5	1.2
3rd 6 hours	2.0	1.8	1.9	1.9	1.9	1.7	1.7	1.7	1.7	1.4	1.4	1.6	1.2	0.9
4th 6 hours	1.8	1.6	1.7	1.8	1.7	1.5	1.6	1.5	1.6	1.3	1.2	1.4	1.0	0.8
* 2nd day	4.9	4.2	4.6	4.7	4.6	4.2	4.2	4.0	4.2	3.4	3.3	3.9	2.8	2.3
∇ 3rd day	2.2	1.9	2.1	2.1	2.1	1.8	1.9	1.8	1.9	1.5	1.4	1.7	1.2	1.0
Total area of Isohyet (sq. mi.)	10	10	114	87	124	654	471	859	196	3389	4645	1092	22,990	41,760

*For successive 6-hr. values use 34, 28, 21, and 17% of 2nd day values

∇For successive 6-hr. values use 29, 26, 23 and 22% of 3rd day values

Note: Same value for all M centers

Plate 3

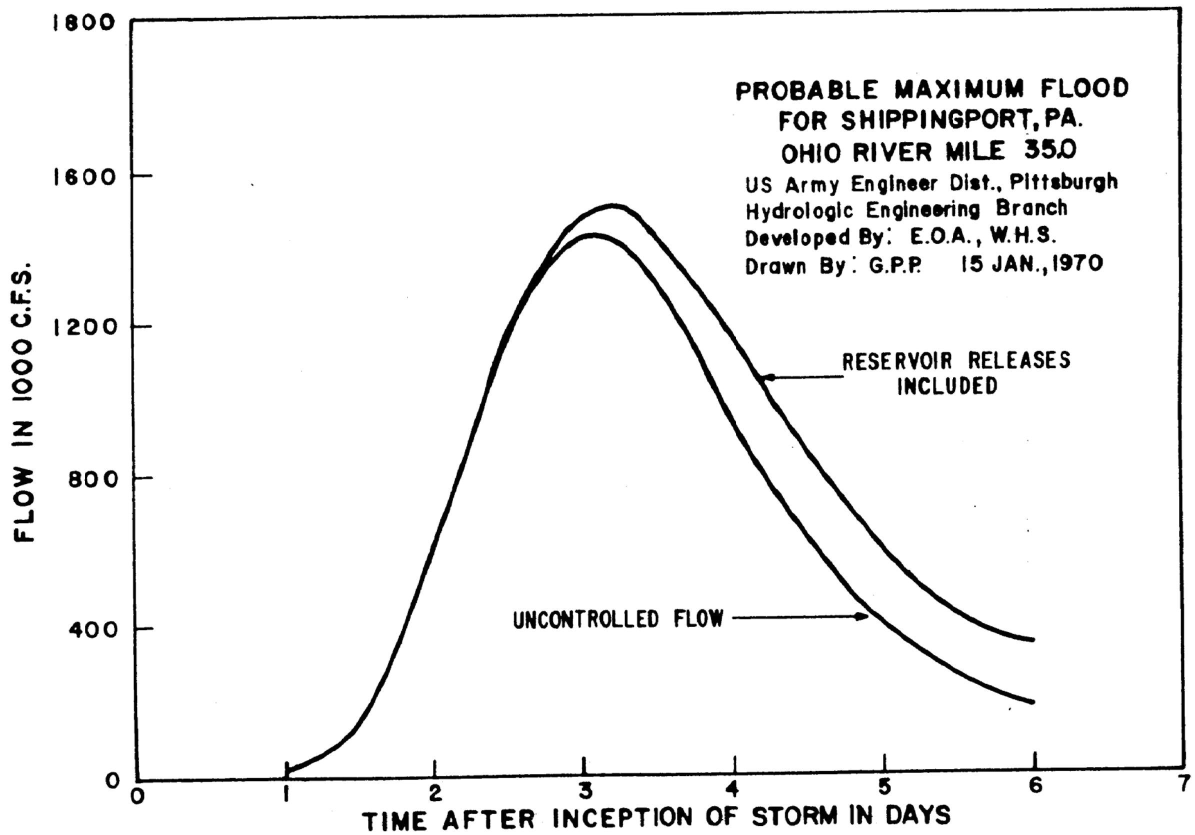

PROBABLE MAXIMUM FLOOD
FOR SHIPPINGPORT, PA.
OHIO RIVER MILE 35.0
US Army Engineer Dist., Pittsburgh
Hydrologic Engineering Branch
Developed By: E.O.A., W.H.S.
Drawn By: G.P.P. 15 JAN., 1970
RESERVOIR RELEASES INCLUDED
UNCONTROLLED FLOW
FLOW IN 1000 C.F.S.
TIME AFTER INCEPTION OF STORM IN DAYS
0
400
800
1200
1600
1800
0
1
2
3
4
5
6
7

Plate 4

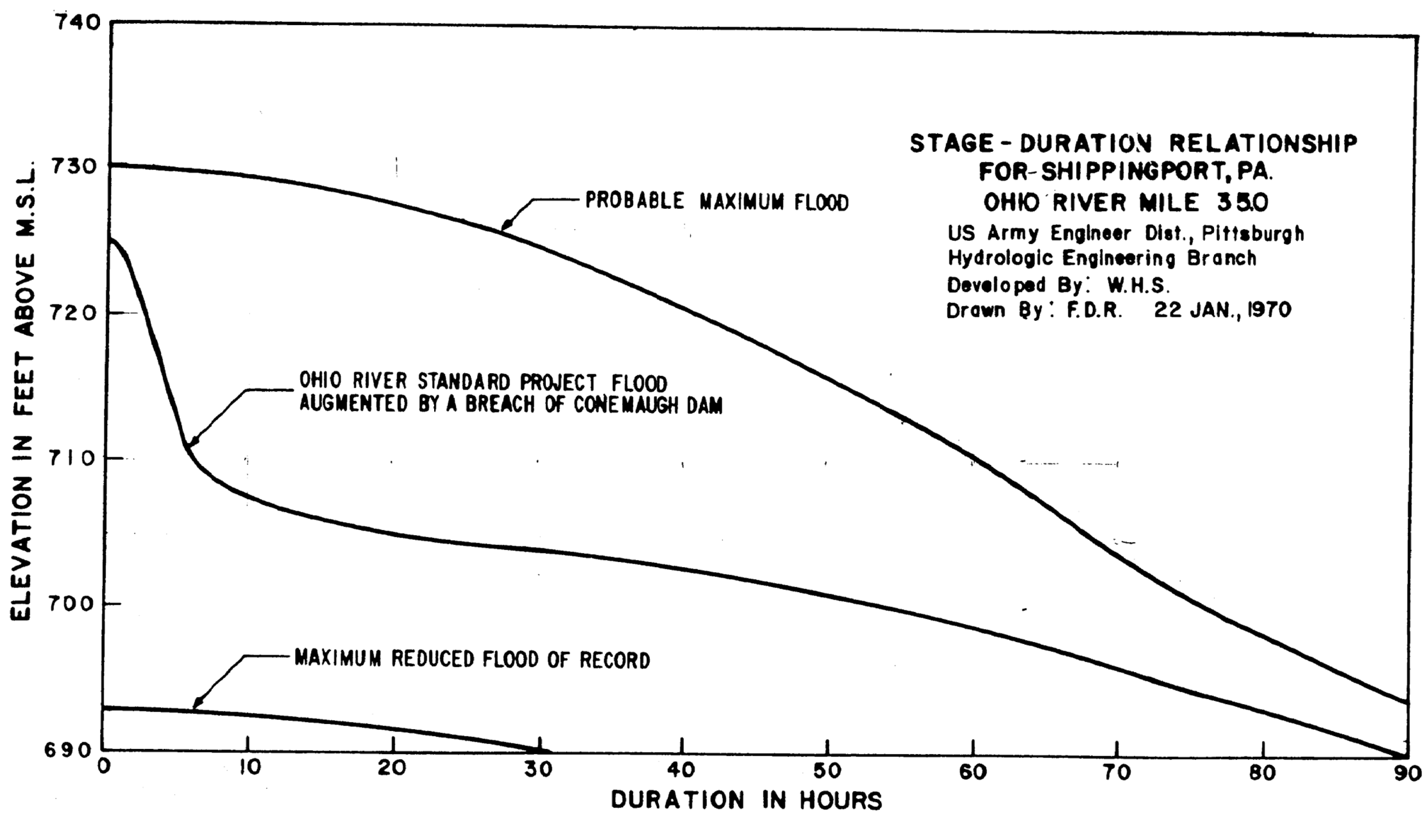

STAGE - DURATION RELATIONSHIP
FOR-SHIPPINGPORT, PA.
OHIO RIVER MILE 35.0
US Army Engineer Dist., Pittsburgh
Hydrologic Engineering Branch
Developed By: W.H.S.
Drawn By: F.D.R. 22 JAN., 1970
PROBABLE MAXIMUM FLOOD
OHIO RIVER STANDARD PROJECT FLOOD
AUGMENTED BY A BREACH OF CONEMAUGH DAM
MAXIMUM REDUCED FLOOD OF RECORD
ELEVATION IN FEET ABOVE M.S.L.
740
730
720
710
700
690
0
10
20
30
40
50
60
70
80
90
DURATION IN HOURS

Plate 5

ATTACHMENT 2.3B

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
FEDERAL BUILDING, 1000 LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA 15222

ORPED-DN 26 August 1969

Mr. Robert P. Kitchell
Engineer - Hydraulic Division
Stone & Webster Engineering Corporation
225 Franklin Street
Boston, Massachusetts 02107

Beaver Valley Power Station - Unit No. 1
J.O. NO. 11700 - O.F.E. NO. 5700 - C.O.
NO. 3468; Duquesne Light Company

Dear Mr. Kitchell:

The information you requested in your letter of 25 July 1969 is furnished below.

The possibility of a complete failure of the New Cumberland Locks and Dam, in addition to the failure of all the gates that you mentioned in your letter, is conceivable only as a result of deliberate hostile action. The major part of the project, including the dam and lock sills, the dam piers and the lock walls, are of concrete gravity construction founded on sound rock. The entire structure is considered safe against earthquake as discussed in our letter of 16 December 1968 addressed to Mr. Robert J. McAllister of Duquesne Light Company.

In the event that a catastrophic failure would take place during a period when the record minimum river flow of 4,700 c.f.s. occurs, we estimate that the river would revert to an open channel flow condition. A minimum water surface elevation of 649.0 feet m.s.l. would result at the proposed Beaver Valley Power Station site.

The minimum water surface elevation of 649.0 would also apply during failure of all gates of the New Cumberland Dam. This supersedes the minimum water surface elevation of 647.0, furnished in our above mentioned letter, which inadequately represented the effect of channel control.

Inclosed are four drawings. One is a map showing the physical features of the New Cumberland Locks and Dam, one is a topographic map showing the contours of the surrounding ground and the elevations of the river bed recorded on the given dates, and two are plans of soundings of the upper and lower pools taken in September 1968.

Sincerely yours,

Wayne S. Nichols

WAYNE S. NICHOLS
Colonel, Corps of Engineers
District Engineer

4 Incl
As stated

ATTACHMENT 2.3C

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
FEDERAL BUILDING, 1000 LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA 15222

ORPED-C

29 March 1973

Mr. Robert J. McAllister
Structural Engineer
Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Minimum River Flows at the
Beaver Valley Power Station

Dear Mr. McAllister:

We have made a reanalysis of low flows in the Ohio River. Computerized simulation models were developed to reproduce the hydrologic system of the Pittsburgh District. Included in this system were all of the reservoirs that normally augment low flows. The model was then used to simulate regulated stream flows for the period of record (1929-1966) according to the operating schedules adopted for each reservoir.

Results of these computer analyses show that, with the contemporary system of reservoirs, a minimum flow of 4000 c.f.s. would have occurred at Shippingport during the record drought of 1930. This value supersedes the minimum value of 4700 c.f.s. furnished several years ago. The corresponding minimum water surface elevation at the Beaver Valley Power Station site would be 648.6 instead of 649.0.

Sincerely,

DAN A. CONNER
Major, Corps of Engineers
Acting District Engineer

Copy furnished:

Mr. Richard C. Miller
Hydraulic-Environmental Engineer
Stone & Webster Engineering Corp.
225 Franklin Street
Boston, Mass. 02107

ATTACHMENT 2.3D

STONE & WEBSTER ENGINEERING CORPORATION

COPY

Copy to:
HAVan Wassen-4

BGFedderson	PD	EAZalgenas(Miss)
GWDenny	JHGoldberg	RGPaine
HWThomas	CAECarlson-3	WGCulp
DHArmstrong	LJAmorosi	RCMiller
LPWilliams	HSWhiting/Job Bk.	General Files
DCLumsden	FSestak,Jr.	DGSward

Mr. Eugene Armocida
Department of the Army
U.S. Army Engineer District
Corps of Engineers
Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

October 2, 1973

J.O.No. 11700

Dear Sir:

BEAVER VALLEY POWER STATION - UNIT NO. 1
J.O.NO. 11700 - O.F.E. NO. 8700 - C.O.NO. 3468
DUQUESNE LIGHT COMPANY
NEW CUMBERLAND LOCK AND DAM

This is a request for information on the regulation of the New Cumberland pool during low flows in the Ohio River. This information will be used in the design of certain safety related equipment for the Beaver Valley Power Station.

We are concerned that during extreme low flow periods the pool level may drop below the minimum level required at the river water intake structure. If this is a possibility, it is necessary that the station be shut down before this occurs.

It is important then to obtain adequate notification of such an event together with a schedule defining the rate of drop of the pool level.

Specifically, we would like to know the following:

1. In what way is notification of an expected drop in pool level made? How soon after an event is this notification made?

2. For what reasons would the pool be lowered during low flow periods? Would lock activity have an effect on pool level during extreme low flow periods (e.g., 800 cfs)?

STONE & WEBSTER ENGINEERING CORPORATION

EA 2 October 2, 1973

3. Is it reasonable to assume lock or gate damage during such periods?

4. At what rate would the pool level recede under either controlled gate opening or from damage? Assume damage as a result of the worst accident that could be reasonably postulated during this low flow condition.

We would appreciate any help you can give us in these areas.

Very truly yours,

R. C. Miller
Senior Hydraulic-Environmental Engineer

DCS:wcs

ATTACHMENT 2.3E

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
FEDERAL BUILDING, 1000 LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA 15222

ORPED-O

1 November 1973

Mr. Richard C. Miller
Senior Hydraulic-Environmental Engineer
Stone & Webster Engineering Corporation
P. O. Box 2325
Boston, Massachusetts 02107

Beaver Valley Power Station -
Loss of Pool

Dear Mr. Miller:

In response to your letter of 2 October 1973, we are submitting the following information relative to the possibility of a drop in the New Cumberland normal pool level during extreme low flow conditions.

Should such an event occur or be anticipated, the Pittsburgh District Emergency Center will be alerted. The Center will then be responsible for directly notifying the Beaver Valley Power Station, landings, intakes and other interested parties affected by a drawdown in the pool. It will also notify the public through press releases to the various news media.

During any low flow period, navigation pools such as New Cumberland would not be intentionally lowered. Locking activities could be continued at normal rates without any drawdown of the pool, even if the flow was at the minimum rate of 800 c.f.s. stated in your letter.

The only lock or tainter gate damage reasonable to assume during a drought period would be the loss of a lock gate due to a navigation accident. Sabotage is not considered in this evaluation. Inclosed is a copy of a letter sent to Mr. Robert J. McAllister of Duquesne Light Company explaining the situations which could cause loss of pool and the resulting measures that could be taken to correct the problem. In that letter, a flow of 4,700 c.f.s. was used for the analysis. Loss of more than one gate was also discussed. It was assumed that any such incident would occur during a flood and that repairs would be made within two weeks. At that time the flow would be no less than 20,000 c.f.s. with a corresponding elevation of 654 feet above mean sea level (m.s.l.) at the plant.

ORPED-O 1 November 1973
Mr. Richard C. Miller

Our present analysis considers an extreme drought with a flow of 800 c.f.s. Since the only damage that could reasonably be expected to occur with this flow is the loss of a lock gate, the bulkheads could be installed within four hours and there would be no further loss of pool. During these four hours of open lock flow, the pool would drop 1.8 feet to elevation 662.7 feet m.s.l.

Computations were made to evaluate the loss of a tainter gate or lock gate without placing the bulkheads, although we do not consider this a reasonable possibility. Since you are interested in the rate of fall to your critical elevation of 948.0 m.s.l., we have included Plate 1 showing the pool recession for these conditions.

Sincerely,

N. G. DELBRIDGE
Colonel, Corps of Engineers
District Engineer

2 Incl
As stated

BVPS Information

654' M.S.L. - Cold Shutdown in 36 hours required by Technical Specifications
648.6' M.S.L. - Minimum Design Basis Level

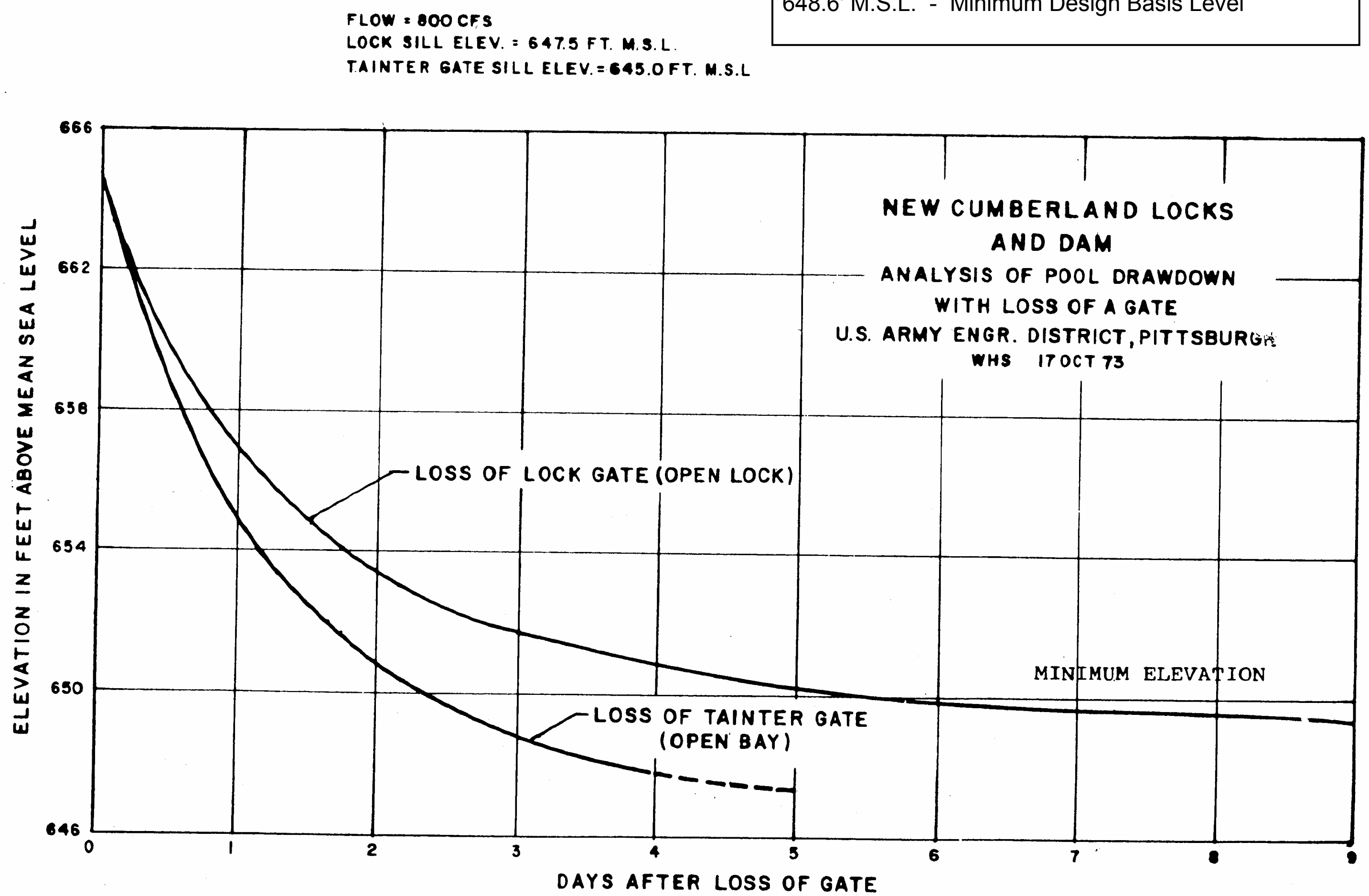


PLATE 1

ATTACHMENT 2.3F

ICE JAM POTENTIAL - INFORMATION FROM THE PITTSBURGH DISTRICT, U.S. ARMY CORPS OF ENGINEERS

Cover on the Ohio River generally does not present a great hazard to river structures or navigation. Although freezing will occur during protracted periods having temperature below 20 F, an appreciable ice cover will not develop until occurrence of several days with a minimum temperature of 10 F or less.

Ice conditions at Shippingport have changed since construction of New Cumberland Dam in 1959. Prior to 1914 the river at this point flowed in its natural condition and was subject to the many factors which generate ice formation and ice gorging. Between 1914 and 1959, Dam 7 maintained a navigable pool. This was a wicket type dam. The wickets were lowered to the bottom of the river during periods of high river flow, and sometimes if severe ice conditions existed, the wickets would remain down even after flow had receded. At such times open river gorging conditions could develop. The worst gorge known in this reach of the river was of this type. It occurred in mid-February of 1936 when ice from the Monongahela River moved down into the Ohio and grounded on a shallow sand bar about 6 miles upstream of Shippingport. A subsequent general rise in the river system carried this gorge rapidly on downstream with little damage. Re-occurrence of such a gorge is now impossible as New Cumberland Dam maintains a depth of more than 20 feet of water over the restraining sand bar.

Most critical ice conditions since early 1900 occurred during the severe cold spells of January 1918 and January 1940. During these months ice cover persisted for two to three weeks and was reported to be as much as 6 inches to 8 inches thick. This ice deteriorated, was broken by rising river stages and was carried downstream without gorging in the same manner as generally occurred with less freezing.

Ice cover above the present gated dams on the Ohio River spans the river some distance above the gates. If this ice cover persists without thermal deterioration and breakage by river traffic, it will move downriver past the dams coincidental with the breakage and higher velocities created by a rise of about 3 to 6 feet in the upstream end of the pools. No gorging will occur.

Most critical ice conditions result from the passage of the ice running out the upper Allegheny River where annual winter temperatures are lower and ice formation is greater. These ice flows occur when there is flood runoff in the basin and an ice gorge is carried on the rising flood water prior to the flood crest. The most critical ice gorges moving through the Upper Ohio River in recent years occurred in December 1959 and March 1964. Many barges, towboats and other floating equipment broke loose during the 1964 flood and floated downstream, causing extensive impact damage. Critical damage from an ice gorge will result during passage of such gorges, but will not result from static ice conditions in the local area. Although the momentum of the ice pack moving at a velocity of about 8 miles per hour can exert a great horizontal pressure on a river side structure its impact on such structure is less than could be experienced by a floating river vessel.

2.4 GEOLOGY

Geology of the site and its environs has been investigated by Mr. John R. Rand, Consulting Geologist, and Mr. Paul J. Mayrose, Geologist, Stone & Webster Engineering Corporation. A copy of their report is included as Appendix 2B. Their findings are summarized below.

Bedrock Geology

The bedrock of the area consists of sedimentary formations of Pennsylvanian age, composed of shales and sandstone, with a few thin coal members and at least one thin limestone member. They are essentially flat-lying, with regional dips amounting from 15 to 20 ft to the mile. The shales underlying the site are hard and are moderate to thinly bedded. Primary compression wave velocities in this material were measured at 10,000 fps to 12,000 fps, with shear wave velocities of approximately 6,000 fps.

The shale is essentially undeformed and very nearly level in position. There are no known faults under the plant or in its immediate vicinity. The nearest known fault lies approximately 60 miles to the southeast and trends in a northeasterly direction tangentially away from the plant site.

The only commercial coal in the area is the Upper Freeport Seam, which is located about 150 ft above founding level of the power station. There has been no mining of coal beneath the power station site or its immediate area and none is anticipated, as such seams as exist at this location are very thin and discontinuous, and are not considered commercially mineable.

No gas or oil has been produced in the immediate vicinity of the site, nor is such production planned or anticipated. The salt beds of the Salina group of the Cayuga series underlie the area at about a 4,700 ft depth. There has been no mining of salt by any process under or in the vicinity of the station nor is any anticipated, since the beds are relatively thin and very deep, which makes production from them noncompetitive.

Overburden Geology

The site lies within the bedrock valley of the Ohio River. This is a flat-bottomed, steep-walled valley constructed by erosion. The power station itself is located upon a terrace of alluvial gravels placed against the south bedrock valley wall, probably during the Pleistocene. This terrace was at one time much more extensive, but a portion of it along its north side was removed by erosion. Subsequent to this erosion, sand and gravels overlain by river clay and silts were placed over the surface of the rock and now form two benches or lower terraces between the high terrace and the river. Thus, the site consists of a high early terrace of granular material having a surface elevation of approximately El. 730 to El. 740 ft and to lower terraces consisting of recent river silts and clays underlain by sands and gravels.

The material of the older terrace on which the station is founded consists principally of sands and gravels with some cobbles and rock fragments and with some silt and clay intermingled. Distributed irregularly throughout the mass are occasional lenses of medium to fine, uniform sand. The upper portion of the terrace is sandier and somewhat looser than the great bulk of the terrace. These looser materials extend to a depth of about 10 to 20 ft below existing ground grade.

The nuclear portion of the power station, including the containment structure, auxiliary building, fuel building, and main control area, are founded in the granular materials of the high terrace. Under most of the turbine room area, the granular materials of the older high terrace had been partially removed by erosion and covered over by more recent silts and clays. Prior to construction the silts and clays were excavated and replaced by compacted granular fill extending from the surface of the granular materials to the foundation level of the structure.

Summary

Geologic conditions at the site are relatively simple. The power station is founded upon a gravel terrace having a maximum thickness of about 100 ft. This terrace, in turn, rests directly upon Pennsylvanian age shales which form the bedrock of the area. These gravel materials, which are relatively dense and incompressible soils, form an adequate foundation for the power station. The bedrock is horizontally bedded shale of Pennsylvanian age. It is essentially undeformed, with regional dips of only 15 to 20 ft per mile. There has been no mining of coal, oil, gas or salt from beneath the area nor is any anticipated, since deposits of these materials that exist are not commercially mineable. There are no known faults under or near the site and none are anticipated. The nearest known fault lies approximately 60 miles to the southeast and has a course tangentially away from the power station.

2.5 SEISMOLOGY

Historical seismicity of the site area was investigated by Weston Geophysical Research Incorporated of Weston, Massachusetts, Reverend Daniel Linehan, Consultant. A copy of their report is included as Appendix 2C. Also, a detailed study was made of amplification of earthquake motion from the bedrock through the overburden to the foundations of the structures by Dr. R. V. Whitman of Massachusetts Institute of Technology. His report is included as Appendix 2D.

2.5.1 Seismicity

The area is quiet seismically. Historically, no earthquake of epicentral Intensity V, or greater, Modified Mercalli, has occurred within 80 miles of the site. The nearest earthquake of epicentral Intensity V, or greater, took place on June 27, 1906 at Fairport, Ohio (near Cleveland), 80 miles northwest of the site. Only one earthquake having an epicenter within 60 miles of the site has been reported. This earthquake reportedly took place at Sharon, Pennsylvania, approximately 40 miles north of the site, on August 17, 1873. Details are limited, but it is estimated that it had an epicentral intensity of Modified Mercalli III and certainly no more than IV.

The site has experienced vibratory ground motion as a result of distant earthquakes, most notably the 1812 earthquake at New Madrid, Missouri, and the 1886 earthquake at Charleston, South Carolina. It is estimated that the latter earthquake may have caused ground motions in the vicinity of the site with an intensity of Modified Mercalli IV in the upland areas and possibly as high as V along some of the river banks, where the structures were located on alluvial soils of relatively recent age. Probably the New Madrid, Missouri, earthquakes resulted in much the same level of motion at Pittsburgh and Shippingport areas. Data are fragmentary and uncertain. It is known, however, that the nearest significant damage from the New Madrid earthquakes was at Cincinnati, Ohio, approximately 330 miles from the epicenter and about 250 miles closer to the epicenter than the site. The Attica, New York area, 180 miles northeast of the site, experienced an earthquake of epicentral Intensity VIII Modified Mercalli on August 12, 1929, and two earthquakes of epicentral Intensity VI have also occurred in this Attica area. An earthquake of epicentral Intensity VII to VIII occurred near Anna, Ohio, on March 8, 1937, and three earthquakes of epicentral Intensity VII have occurred in this same area. Anna, Ohio, is approximately 200 miles west of the site. Earthquakes which occurred in the Attica, New York area and the Anna, Ohio area apparently were not perceptible at the site.

2.5.2 Amplification Through Overburden

Qualitatively, it has been realized for some time that earthquake motions in the bedrock are modified and frequently amplified in being transmitted through the overburden to structures. For example, in the Mexico City earthquake of 1957, structures within the city founded on deep soft alluvials were damaged, whereas structures located closer to the epicenter, but founded on rock, were left undamaged. In addition, selectivity of damage in relation to the character of the overburden deposit and the character of the structures has been noted. Thus, short, rigid structures have been observed to be more susceptible to damage if founded upon shallow soils or upon firm materials, whereas, long period, high structures are more susceptible to damage if founded upon softer, deeper deposits.

These latter conditions were especially notable in the Caracas earthquake of 1967, where damage was highly selective. Detailed analyses have indicated that, in all probability, damage was limited to structures where natural periods of the damaged structures coincided rather closely to natural periods of shear vibration in the overburden above the rock.

Quantitative procedures have only recently become available for analyzing the effects of the overburden material on amplification and on modification of the frequency distribution or spectral content of the earthquake waves transmitted from the rock. Basically, two different procedures have been developed: a continuous wave reflection and refraction procedure which has been developed by Matthiesen(1) and others at U.C.L.A.; and a model procedure in which the soil mass is assumed to be a system of discrete lumps separated by springs and dashpots to account for stiffness and damping, by Seed and Idriss(2) at the University of California. If the number of elements in the model procedure is taken very large, the expressions of the two approaches become identical, assuming that proper cognizance is taken of radiational losses at the rock-soil interface due to differential dynamic impedances between the two materials(3). Assuming that the earthquake motion on rock exposed at the surface or very close to the surface can be defined, using these procedures the amplification within the soil or overburden column can be computed.

The amplification ratio expresses the ratio between the bedrock motion and the motion within the overburden; it can be computed readily using the continuous procedure for a steady state wave input. Earthquakes, however, are transient, rapidly varying events rather than steady state phenomena. Detailed analysis has indicated that amplification ratios based on the steady state conditions tend to be high at the fundamental period of the vibration of the soil column and at the second, third, and fourth modes of vibration of the soil column and slightly low between these modal points and at periods longer than the fundamental period of the soil column.

The transient effects can be investigated using the time-history records of actual individual earthquakes. Using these procedures, the structural response spectra for structures founded on overburden may be computed for a specific earthquake input to the base of the overburden using the modal technique, cognizance being taken of the effects of the differences in dynamic impedances between the soil and the overburden at the soil-rock interface. By making this analysis for several different earthquakes and for a reasonable range of soil conditions, it is possible to determine the envelope of response spectra for various structural periods. This has been done for the BVPS-1 site by Dr. R. V. Whitman. His report is included as Appendix 2D.

Analysis of the records of a number of strong earthquakes shows that the number of cycles of intense motion are quite limited. For example, the number of cycles in which the acceleration equaled or exceeded one-half the peak acceleration for several large earthquakes is as follows:

1.	Taff S69E	9
2.	1952 N21E	8
3.	El Centro NS	10
4.	1940 EW	12
5.	Olympia	3
6.	1949	

7.	Golden Gate N10E	3
8.	1957 S80E	5
9.	Helena NS	5

Accordingly, the number of cycles of strong shaking to which structures may be subjected is conservatively estimated at 10.

Subsystems which are lightly damped may be excited by the earth- quake and continue to vibrate thus being exposed to several times this number of cycles of motion. Stress levels in subsystems were kept at or below elastic limits, and for the low numbers of cycles of motion expected fatigue would not control.

Earthquakes used for input were digitalized records of El Centro, Taft, and Golden Gate earthquakes, and an artificial earthquake generated by statistical techniques. For convenience, the response spectrum at two percent structural damping and five percent structural damping are determined for each earthquake and compared with the response spectrum for that earthquake at the corresponding damping as if the structure was founded upon bedrock.

Ratios of acceleration response spectra at bedrock and on the overburden may properly be considered the amplification ratio by which structural response spectra for earthquake motion in the rock should be multiplied to obtain suitable and usable spectra for structures founded upon the overburden. Values obtained in these analyses are shown in Figures 2D-7, 2D-8, 2D-9, 2D-10, and 2D-11.

It is noted that the envelope for the several earthquakes analyzed reaches a maximum ratio of about 3.5 between periods of approximately 0.3 seconds and 0.6 seconds, falling very rapidly to values slightly in excess of one for periods less than 0.3 seconds and to values of approximately 1.8 at 0.7 seconds and 1.0 at 1.5 seconds. This illustrates rather clearly the peaking of the amplification ratio in the vicinity of the fundamental period of the soil column.

2.5.3 Seismic Design

As previously indicated, the maximum historic earthquake in this area on firm ground on the uplands had an intensity of approximately Modified Mercalli IV. This was for a very distant earthquake for which the longer periods might well be expected to be dominant in the spectrum. The nearest area where earthquakes have occurred of epicentral Modified Mercalli V or greater is in the Cleveland area where four earthquakes of epicentral Modified Mercalli V intensity are recorded. Assuming for the Design Basis Earthquake (DBE) on bedrock, an Intensity of V or, at the most, low VI would seem to be extremely conservative for this site. Based on published correlations, as shown in Appendix 2C, between intensity and maximum ground acceleration, and from experience on other sites, it has been concluded that this intensity would correspond to a maximum acceleration on bedrock of approximately 0.035 g. Using an amplification ratio through the overburden of 3.5, this maximum acceleration would correspond to a maximum surface acceleration at the site of about 0.125 g for the DBE. The analysis thus indicates reasonable agreement with recommendations by Weston Geophysical Research.

Accordingly, the design is based on a DBE normalized to 0.125 g and for the Operational Basis Earthquake (OBE) normalized to 0.06 g. Analysis and design are based on response spectra as shown in Figure 2.5-1 and 2.5-2 for the DBE and OBE, respectively. Dynamic amplification factors used for these spectra are such as to give a maximum spectral acceleration of 0.44 g for two percent damping for the DBE with appropriate relative values for other amounts of damping. The spectra are flat from 2 to 5 Hz (0.2 to 0.5 second period) and reduce to an amplification ratio of unity for frequency exceeding 20 Hz. Seismic Category I structures, systems, and components which are designed to resist seismic forces are listed in Table B.1-1 of Appendix B.

Vertical accelerations are taken as two-thirds of horizontal acceleration. The response spectra shown in Figure 2.5-1 and 2.5-2 were the basis for the design of all ground supported structures, equipment, and piping prior to 1979.

As part of the reanalysis of Seismic Category I piping systems, the response spectra shown in Figures 2.5-4 and 2.5-5 were developed using Soil Structure Interaction Methodology. The licensee now considers that the SSI-ARS forms the present and future design basis of the plant.

Amplified response spectra are used for the design of equipment, piping, and instrumentation supported from structures (See Appendix B).

The structures, systems and components designated Seismic Category I as defined in Appendix B are designed for seismic loading as represented by the seismic response spectra. Horizontal and vertical loadings are applied simultaneously. The methods employed to obtain the shear moduli, G, at very small strains, of the soils supporting the structures of the station are determined primarily from direct field measurements of shear wave velocities (Appendix 2G). Under earthquake motion, shear moduli are reduced in accordance with the discussion and appropriate figures of Appendix 2D. Figure 2.5-3 shows values of G for structures founded on or in the upper terrace considering earthquake strains. Shown also in this figure are shear moduli computed from observations of settlement of the turbine room, Shippingport Power Station, for a period of two years. Observation of tests has shown the dynamic or very short time modulus to be about 1.5 to 2.0 times the static modulus. The range of these values are shown and agree very well with the data from seismic shear wave measurements. Average reduced shear moduli considering strains under seismic conditions for the structures at the site are as follows:

1. Containment Structure — G = 22,000 psi

2. Fuel Building, Auxiliary Building, and Other Near Surface Buildings — G = 17,000 psi

3. Intake Structure — G = 17,000 psi

Shear moduli are incorporated in dynamic analyses using the Bycroft solution for dynamic response of a rigid cylindrical base supported on an elastic half space. In using this solution for a specific problem, consideration must be given to the effects of geometry and assumptions implicit in the solution which affect computation of the spring constants, virtual mass of soil moving with the base and scatter in experimental data.

2.5.3.1 Factors Affecting Spring Constant and Mass

Factors affecting spring constant and mass include embedment, effects of limited depth of elastic stratum and effects of actual contact pressure on the base of a structure as compared with distribution assumed in the Bycroft solution. Certain of these factors increase the stiffness and thus, increase the spring-mass ratio while others decrease it. Present technology does not afford definitive solutions.

However, the approximate range effect of each has been established. The elastic half space of the Bycroft solution is weightless and thus, the mass of the soil moving with the structure is ignored. For the containment structure, the virtual mass of soil is estimated not to exceed about 30 percent of the total rotary inertia for rocking and about 18 percent for swaying and may be somewhat less. Since the range of each factor and the effect on the spring-mass ratio are known, it is convenient in estimating the overall range of uncertainty to adjust each spring constant or mass by half the range for the selected factor and then add an uncertainty plus or minus to give the full range. This leads to the following:

	Range of Effect	Equivalent
Embedment	0 to +20%	1.1*(k1, k2-) ±10%
Limited Depth		
Swaying	0 to +20%	1.1*(k1, k2-) ±10%
Rocking	0 to +10%	1.05*(k1, k2-) ±5%
Contact Pressure Distribution		
Swaying	0 to -15%	0.92*(k1, k2-) ±8%
Rocking	0 to -30%	0.85*(k1, k2-) ±15%
Virtual Mass (For Reactor Containment)		
Swaying	+10 to +18%	1.14*(M) ±4%
Rocking	+15 to +30%	1.22*(Iθ) ±8%

Rocking determines the fundamental and dominant mode of the containment structure. Accordingly, for this mode:

$$k/I\theta = 1.1 \cdot 1.05 \cdot 0.85 \cdot (k1,\ k2\text{-})/(1.22 \cdot I\theta) \pm 20\% = 0.8 \cdot (k1,\ k2\text{-})/I\theta \pm 20\% \quad (2.5\text{-}1)$$

where k1, k2- are spring constants from the Bycroft solution. Since G (shear modulus) is linear in this solution, a G-equivalent may be computed and used directly in the Bycroft solution.

Then for the containment structure:

$$G\text{-equivalent} = (0.8)\ (22{,}000)\ \text{psi} \pm 20\% \quad (2.5\text{-}2)$$

= 17,000 psi ±20%

Use G = 18,000 psi ±20%

For the fuel building, auxiliary building, and intake structure, similar factors may be applied, although the effect of limited soil depth is somewhat less and virtual mass effect somewhat larger.

2.5.3.2 Factors Affecting Observed Data

Factors affecting observed data include scatter in measurement of seismic velocities and in the strain reduction factor used in estimating the effects of seismic strains.

Seismic velocity records were reviewed and showed:

Elev. (ft)	Cs Avg, (Ft/Second)	Range in Cs (Ft/Second)	(From Avg)	Range in Shear Modulus
700-665	1,050	1,000 to 1,100	±5%	±11%
665-625	1,300	1,250 to 1,400	+7%, -4%	+16%, -8%

Scatter in the strain reduction factors is estimated to be ±20 percent.

Combining the random variations by the root mean square gives a range of variation of ±31 percent.

For conservatism, a range of ±1/3 in the value of G is used.

Accordingly the following values of G-equivalent are used in analysis using the Bycroft solution:

1. Containment Structure 18,000 psi ±33%
2. Other Seismic Category I Structures 16,000 psi ±33%

References for Section 2.5

1. R. B. Matthieson, and C. M. Duke, "Earthquake Amplification Spectra Obtained from Site Characteristics", American Society of Civil Engineers.

2. H. B. Seed, and I. M. Idriss, "Influence of Soil Conditions on Ground Motion During Earthquakes", American Society of Civil Engineers.

3. R. V. Whitman, and J. M. Roesset, "Report No. 5, Effect of Local Soil Conditions Upon Earthquake Damage; Theoretical Background for Amplification Studies," Massachusetts Institute of Technology, Research Report R 69-15, Soils Publication No. 231.

2.6 SOIL MECHANICS

2.6.1 Site Conditions

The site is located approximately 550 ft east, that is, upstream of the former Shippingport Power Station. The general site area was investigated for foundation conditions in 1954 for foundations for the Shippingport Power Station. The site occupies three terraces along the south side of the Ohio River. The southernmost terrace is the highest at about El. 735 ft and is composed of granular soils. This is also the oldest terrace. Its northerly position was removed either partially or possibly completely to bedrock prior to emplacement of the intermediate and low terraces, the low terrace being the most recent. These lower terraces have cohesive soils near surface overlying granular soils.

Thirty-five dry sample borings were made for the Shippingport Power Station at locations as shown in Figure 2.6-1, under the direction of Stone & Webster Engineering Corporation, and detailed records of the borings and investigations were available for review. These original, rather widely spaced borings have been supplemented by 30 additional borings made specifically for the purpose of the Beaver Valley Power Station. These included 10 dry sample borings on the high terrace, in three of which attempts were made to obtain undisturbed samples with a Denison sampler. The remaining borings were located in the intermediate and low terrace materials, from which undisturbed samples of surface clays and silts were obtained for physical testing. The locations of these various borings are shown on Figure 2.6-1. A log for boring 101, which is typical of the containment structure, is shown in Figure 2.6-2. The Report on Foundations for the Shippingport Power Station, dated August 9, 1954, is included as Appendix 2E. Logs of all borings and results of soil tests made in these investigations are included in Appendixes 2F and 2H.

2.6.2 Subsurface Conditions

2.6.2.1 High Terrace

Ground surface in the area of the proposed station location is at approximately El. 735 ft. The ground underlying this portion of the site is an old, high level terrace of the Ohio River. It is composed of granular material, sands, and sands and gravels, containing variable amounts of cobbles and rock fragments. Some of the material has a silt or clay binder. However, no lenses of silt or clay were encountered in the boring operations and the granular soils extend to bedrock. In general, the materials of the terrace are pervious. There was a continuous loss of drilling water or drilling mud during the drilling operations. Blow counts in the standard penetration test indicated the upper 15 ft approximately of the terrace was looser than the deeper lying material and of somewhat finer grain size. Beginning at about the south side of the turbine building, this old terrace was either partially or completely removed by erosion in times past and two lower terraces consisting of silt and clay in their upper portions and sands and gravels below about El. 655 to 660 were emplaced by the river. These are in part overlain by granular fills placed for roads and railroads for construction access during construction of Shippingport Power Station.

Bedrock is horizontally bedded shale which was encountered at approximately El. 635 ft. The surface of the bedrock under the station site and out under the river is nearly horizontal. Approximately 1,000 ft south of the station site is the true valley wall where the bedrock surface rises steeply to approximately El. 1,000 ft. A typical subsurface profile section through the station site along an approximately north-south axis looking west is shown in Figure 2.6-3.

Similar foundation conditions exist under the Shippingport Power Station site. This station was founded directly upon the gravels of the high level terrace using mat type foundations. Settlements have been nominal and well within acceptable tolerances.

Profile drawings of all seismic Category I structures and buried river water lines showing subsurface materials to bedrock are included as Figure 2.6-15, 2.6-16, 2.6-17 and 2.6-18.

Attempts made in the investigation to secure undisturbed samples of the soils under the site by using 4 inch diameter Denison samplers were unsuccessful, probably because of difficulties with gravel and rock fragments contained throughout the gravel mass. Accordingly, all conclusions are based on behavior of the existing station and on the results of standard penetration tests made during these and the previous investigations. Plotted in Figure 2.6-4 are the results of standard penetration tests made for the borings located in the high terrace, both for these and for the previous investigations. In general, from the ground surface of the high terrace down to water level, increasing resistance values are shown ranging from approximately 15 near the surface, where the soils were somewhat looser, to approximately 20 at about El. 715 ft and then in a generally increasing trend to the groundwater level at El. 666 ft, where the median blow count is about 57. Approximately at the groundwater table there was a sudden reduction in driving resistance and then a gradual increase in resistance until bedrock was reached. The reason for this marked difference in driving resistance is not known.

There is no significant change in character of material above and below the groundwater table. A possible explanation is the fact that many of the soils contain a greater or lesser amount of silt and clay binder and, above the groundwater table, this material was in partially dry state and therefore, more resistant to deformation and to shear than if it were completely submerged. Ground water table at the time of these investigations was El. 666 ft, approximately 1 ft above river level. In general, the lower blow counts both above and below the groundwater table occurred in lenses of uniform, medium sands and the higher blow counts in the more gravelly materials.

2.6.2.2 Intermediate Terrace

The intermediate terrace ground surface, about El. 685 to 700 ft, is intermediate in age between the low and high terraces. The upper soils consist of medium clays which extend to about El. 660 ft. This terrace is overlain in part by fill placed in connection with construction of the Shippingport Power Station. It is underlain by sands and gravels which extend to bedrock.

The clay of this terrace north of the turbine building was sampled using 3 inch diameter thin wall samplers (Reference Borings 108 through 113). Quick shear tests made on essentially undisturbed samples of these clays showed shear strengths varying from about 800 to 1,250 psf, with some samples showing shear strengths in excess of 2,000 psf and one sample a shear strength of 500 psf. Stress strain curves from unconfined compression tests are included in Appendix 2F. For several of the samples, the soils were thoroughly remolded at constant water content, formed into cylinders and tested in unconfined compression. Quick shear strengths in the remolded state were about half that of the undisturbed state showing these soils to be of low sensitivity, having a sensitivity ratio of about 2. They are therefore, not susceptible to flow slides under dynamic loadings.

2.6.2.3 Low Terrace

The low terrace, ground level about El. 675 ft, is the most recent. Near surface soils consist of soft clays and clayey silts, many showing some organic contents. Soil test data for these soils are shown in Appendix 2H for borings 304 through 310. Included are both unconfined compression tests and consolidated undrained triaxial tests. Quick shearing strengths of the cohesive members of these soils are quite low, ranging from 160 psf to 440 psf and averaging about 250 psf. These recent river silts and clays extend down to about El. 655 ft where they are underlain by sands and gravels which extend to bedrock at about El. 625 ft.

2.6.3 Foundation Design

2.6.3.1 Foundations

Approximate founding elevations of the more important structures of the station are shown in relation to the soil structure on Figure 2.6-3. The reactor containment structure is founded on a 10 ft thick reinforced concrete mat at approximately El. 681. ft.

This structure has a dead load weight of approximately 7,300 psf over the area of its mat. Relief of load due to excavation of material from the present ground grade of El. 735 ft to El. 681 ft amounts to approximately 6,500 psf. Thus the net added dead load of this structure over its area is only approximately 800 psf. The fuel building, auxiliary building and main control area in the service building are founded upon reinforced concrete mats at about El. 720 ft. As previously indicated, the upper portion of the high level terrace is somewhat lower in density than the remainder. These looser soils, where encountered below founding level, were removed and replaced to founding grade with select compacted granular fill. The dead load of the control area and auxiliary building is approximately 800 to 1,000 psf in excess of the weight of material excavated. These structures therefore, impose small additional loads upon the soil. The average load under the fuel building is approximately 4,000 psf and accordingly it imposes an added load on the soil of approximately 2,000 psf.

As indicated on the section, the surface of the old terrace gravels slopes downward under the turbine building. Surface soils are recent deposits of clay and silt and some fill which has been placed in this area. These were removed to the surface of the stable gravels and replaced with select compacted granular fill under the turbine room and transformers as shown in Figure 2.6-3. This fill material was compacted using heavy vibratory compactors to a minimum density of 95 percent of Modified Proctor, ASTM D1557. Maximum soil pressures for static loadings are 8,000 psf for foundations on granular soils at depths of 8 ft or more below surrounding grades. Under lateral loadings such as from wind and earthquake, toe pressure under combined dead loads and lateral loads is limited to 12,000 psf. These are conservative and safe values for granular materials of this character.

The Shippingport Power Station site and the Beaver Valley Power Station are both located on the same large continuous terrace on the left (south) bank of the Ohio River. The boring program for Shippingport, which was made under the direction of S&W, extended well upstream and downstream of the site and thus bracketed borings for the Beaver Valley Power Station. Soil types and penetration resistances were consistent between the two sets of borings (Refer to Figure 2.6-4 where data from both the Shippingport borings and Beaver Valley borings are plotted). This terrace is a single, continuous structure a11 of the same age and made of deposition. Since it is of fluvial origin, stratification and cross-bedding are to be anticipated and are indicated by the boring records. Thus while variations in character may occur in a few inches vertically and a few feet horizontally, it is statistically uniform over depths and lateral dimensions significant to the foundations of the structures. Maximum bearing values for foundations in the sand and gravel below El. 715 ft at Shippingport and subject to groundwater levels were established at 8,000 psf for footings 8 ft or deeper below surrounding grade. Settlements have been small and performance completely satisfactory.

The natural draft cooling tower is located on the northeast corner of the site along the edge of the river. It is founded on well compacted granular fill placed to El. 700 ft. The soft, compressible silts, organic silts and clays were removed in this area to approximately El. 655 ft and/or the top of the lower gravels, prior to the placement of the structural fill under the tower. These precautions insured against any settlements or failure in the poorer soils. The structural fill for this purpose was compacted to 97 percent of a Standard Proctor Density Test, ASTM D698. In some areas surrounding the site, a nonstructural fill was used to fill in the recessed areas. These materials were compacted to 93 percent of a Standard Proctor Density Test. The embankment slope of this fill, exposed to the river, was provided with a concrete slope wall protection to El. 700 ft as a precaution against possible erosion by flooding in this area.

2.6.3.2 Settlement of Structures

The procedure for estimating settlements under the various structures is based on techniques developed in studies of the Alternating Gradient Synchrotron (AGS) at Brookhaven National Laboratory (BNL). Basically, the procedure is analogous to estimating displacements at the surface of an elastic mass due to an applied surface loading. Briefly, the additional stress of any element within the soil mass from the applied load is computed. The compression then of each such an element is equal to the increased stress times the height of the element divided by the modulus of deformation. The sum of the deformation of the elements from the bedrock surface to the founding level gives the total settlement at that point. Essentially, thus the modulus used corresponds to the modulus of elasticity in elastic analysis. Since, however, soils are not truly elastic, we prefer to call it a modulus of deformation and designate it by the symbol M. It is not a coefficient of subgrade reaction. The observed settlements of the turbine room of the Shippingport Power Station, which is founded upon the same soils and at approximately the

same elevation as the containment structure and turbine building of the BVPS-1, provide an excellent large scale load test for determining the deformation modulus. Settlement plates were set under the Shippingport turbine room mat before starting to pour it. Extending up from each settlement plate was a rod which was isolated from the mat by a pipe sleeve. Initial settlement records were taken before the start of pouring the mat which began in September of 1955 and observations were continued on a more or less regular basis until August of 1957, approximately a year after all loads had been placed. Figure 2.6-5 shows the location of the settlement observation points under the Shippingport turbine room, mat and the observed settlements in December 1956, approximately 15 months after start of construction and in August of 1957, approximately 23 months after the start of construction of the mat. Very little settlement occurred between December, 1956 and August, 1957, indicating that both primary and secondary settlements were essentially complete at the time of the last settlement observation. Observations at the Brookhaven National Laboratory on the AGS and other structures and at Shippingport have indicated there is an immediate primary settlement followed by a secondary settlement of some duration even for sand soils.

It has been known for some time that the modulus of deformation of granular soils varies with the effective stress. The studies at BNL showed that approximately:

$$M = K \sqrt{Z + A} \qquad (2.6\text{-}1)$$

where:

Z = depth below surface (position down)

K = a constant depending on soil properties

A = a constant whose value is such that the resulting value of M is approximately 1.5 to 2.0 x $10^{(6)}$ kips per sq ft at the surface

Using the observed long-term settlements at Shippingport, it is possible to compute the modulus of deformation "M" of the soils at Beaver Valley for long-term loadings. This is shown in Figure 2.6-6. Observations made during construction of the conjunction section at the AGS and observations on large scale loading tests at BNL on areas approximately 30 ft square shows that the modulus of deformation for a reloading cycle is approximately twice that of the initial loading. Further, the modulus for primary settlement, that is the settlement under very short time loadings as for dynamic loadings is approximately 1.5 to 2.0 times the modulus for long-term loadings.

Using these moduli and relations, average long-term settlements of the principal structures under static loadings have been computed as follows:

1. Containment Structure - 0.5 inches
2. Auxiliary Building - 0.25 inches
3. Fuel Building - 0.25 inches
4. Main Control Area - 0.2 inches

The granular soils as indicated by the grading curves contain some silt and clay binder. Such binder material provides a slight cohesive strength which greatly reduces the tendency of individual grains to shift under vibration. It may be noted that the generally higher "N" values in the penetration tests above the groundwater level have also been attributed to such slight cohesive bonds. Further above the water table, surface tension on small water films at points of contact provide additional bonds between grains, an additional factor in preventing densification under small vibrational motions. These effects have been clearly shown in laboratory tests of densification of somewhat silty sands by vibration[6].

Considering these factors, it is concluded that settlements due to soil densification under the very small and short duration vibrations of the DBE will be negligible.

In addition to the static settlements, the containment structure would rock and vibrate up and down under earthquake loadings. Such motions under the DBE are estimated to be:

Vertical translation	$\pm$ 0.12 inches
Rocking at edge of mat	$\pm$ 0.25 inches
Total	$\pm$ 0.37 inches

2.6.3.3 Bearing Values

Foundations for all major structures are continuous mats of reinforced concrete founded on the denser undisturbed gravels or compacted granular fill. The containment structure is founded at El. 680.9 ft on undisturbed gravel with excavation below El. 715 ft made within a circular sheet piling cofferdam. The turbine building mat with bottom at approximate El. 684 ft is located in part on undisturbed gravel and in part on compacted granular fill.

The other major structures and equipment are founded on the compacted granular fill as shown in Figure 2.7-1.

The allowable design bearing load for footings 8 ft or more below adjoining grade and mats under static loads only is 8 ksf. The total maximum allowable design load for combined static loads and dynamic loads resulting from wind, tornado or earthquake is 12 ksf.

Factors of safety for these bearing values for the reactor containment were computed in accordance with Terzaghi's procedures for shallow footings, since the containment diameter of 150 ft is large in relation to the depth of 54 ft of the founding level relative to surrounding grade. Computations were based on an estimated unit density above the water table of 120 pcf and below the water table of 65 pcf and angle of internal friction of 32. These values are reasonable and conservative. Factors of safety were computed on the conservative assumptions that local yielding could develop in the soil[12].

Indicated factors of safety are as follows:

1. Groundwater Level (GWL) at EL. 666 ft (normal groundwater level)

    a. Static loading 10

    b. Dynamic loading 10

2. Groundwater Level (GWL) at El. 707 ft (Standard Project Flood used)

   a. Static loading 10

   b. Dynamic loading 9+

The method of computation and assumptions used are conservative, especially since the founding grade is only about 60 ft above the rock surface and friction at the rock-gravel interface results in additional lateral resistance to displacement of the soil under the mat in a bearing type failure.

2.6.4 Effects of Dynamic Loadings

2.6.4.1 General

The effects of dynamic loadings on structures of nuclear power stations resulting from earthquake are particularly significant and interesting. Among the factors which must be considered are the effects of vibration on shear strength of granular soil, lateral loadings on buried structures under earthquake conditions, and relative displacement between structures for the design of piping and to ensure that adequate rattle space is provided between structures. Shear moduli for the soils underlying the site for small displacements were determined by refraction seismic surveys by Weston Geophysical Engineers, Inc. Their results have been analyzed and detailed by Dr. Whitman (see Appendix 2D) who developed, as a portion of his analysis of the dynamic characteristics of the soils of the site, values for the shear moduli of these soils under strains expected in earthquakes of moderate intensity. These shear moduli related to depth are shown in Figure 2.6-7. Also in the investigations, Dr. Whitman developed curves showing shear stress at various depths in the soil mass under earthquake for the average of the larger peaks and for the maximum pulse in the earthquake record.

The seismic studies by Weston Geophysical were made by crosshole, uphole, and downhole measurements in five drillholes located in the reactor area. P and S wave velocities were measured from direct arrival times. A copy of this report is included as Appendix 2G.

2.6.4.2 Liquefaction Potential

When subjected to cyclic shearing stresses or to vibration, granular soils tend to reduce in volume. The magnitude and rate of reduction in volume are dependent upon the looseness of the deposit (its density), the magnitude of the cyclic shearing forces, and the grading of the soil, especially the presence of clay or other cohesive materials. This reduction in volume can occur only as fast as fluids contained in the pore spaces between particles can be expelled from the soil mass. If the soil is totally saturated with an essentially incompressible fluid such as water, as is the case below the groundwater table, there is a temporary increase in pressure within the pore water and a decrease in the portion of the total load imposed upon the soil which is carried by the soil's structure, that is, by contact forces between individual grains. If a number of cycles of shearing load are applied relatively quickly compared with the time required for drainage to occur, the increase in pore water pressure may become a significant fraction of, approach, or become equal to the external loads on the soil mass with a corresponding decrease in intergranular pressures or forces. The shearing strength of granular soils is proportional to the contact between grains. Thus, the decrease in contact forces accompanying such a phenomenon results in a decrease of shearing strength of the soil mass. The number of cycles

of load required to result in a significant decrease in shearing strength of a given soil is dependent upon the magnitude of the shearing stresses in relation to the initial contact pressure between grains, which is termed the effective stress, and upon the relative density of the soil at the start of the loading.

In very loose granular soils (relative densities of the order of 30 percent) only a few cycles of loading may be required to cause a complete transfer of external loads from the soil structure to increased pressures in the pore water. In such loose soils, heavy vibrations or repeated cyclic shear loading may cause the individual soil grains to become completely separated from each other by films of water and the soil mass to behave as a dense liquid. This is true liquefaction.

Liquefaction as defined above cannot occur in soils of the medium dense to dense condition. After a number of cycles in such soils, shear loading results in an increase in pore water pressure which varies cyclically during the load cycle. If cyclic shear loads are continued for a sufficient length of time, pore water pressures will reach peak value momentarily during each cycle equal to the external loads on the soil. The number of cycles necessary for this to occur is dependent upon the relative intensity of the shearing stresses as compared with the initial effective stresses in the soil mass and upon the relative density of the soils. The point when pore water pressure first reaches equality with external loads on the soil mass has been termed by Seed(4) "initial liquefaction." As indicated above, pore water pressure does not remain constant throughout each cycle of loading, but reaches a momentary peak, and during the remainder of the cycle reduces to substantially lower values. During this momentary period of high excess pore pressure, there is a significant reduction in shearing strength. If the soil is under significant shearing stress, appreciable shear deformations may accumulate over a number of cycles of loading, however, as the soil distorts in shear, medium dense or dense granular soils dilate. This dilation causes an immediate reduction in pore water pressures(5). True liquefaction in which the soil behaves as a heavy fluid with great deformations, however, cannot occur in medium dense or denser sands.

Accumulative deformations, as discussed above, are of particular interest in the area immediately below the founding level for structures, since this usually is a zone of relatively high shearing stress, and moderate deformations from place to place at such locations possibly would result in significant differential settlements within the structure. Momentary losses of shearing strength in localized zones or lenses in soil of somewhat less than average density located deep within the soil mass beneath the foundations of a structure would be of little significance, since shearing stresses in such zones are modest and only small deformations could occur, even in a number of cycles of loading.

Since the power station and its nuclear units are founded in granular soils, it is pertinent to study the safety against liquefaction of these soils beneath the station. Procedures for such analyses have been developed by Seed(3). They require evaluating quantitatively:

1. The magnitude of the shearing stresses which may occur at varying depths in the soils beneath the proposed station due to earthquake.

2. The resistance of these granular soils to liquefaction, which may be expressed as the ratio of the cyclic shearing necessary to cause either initial liquefaction or a specific amount of deformation in the number of cycles estimated to occur in an earthquake of the intensity selected. For convenience, the cyclic shearing stress may be expressed as the ratio of actual shearing stress to effective stress in the soil mass.

The shearing stresses which may be expected under earthquakes may be computed from two different approaches. The first approach is to compute shears and distortions in the soil mass using a modal analysis technique from appropriate time-histories as shown in Appendix 2D. This is referred to as the DYALS program. Values for shearing stresses in the soil at Beaver Valley computed from this analysis for the high terrace for the DBE are shown in Figure 2.6-7.

The resistance to liquefaction is expressed in terms of the ratio of shearing stresses to vertical effective stress, t/Sv, at the elevation of interest. This ratio, for the soil only, is very close to the ratio for soil plus building loads where the weight of the structure equals or exceeds by a modest amount the weight of soil displaced by the structure. These conditions hold for the structures on the high terrace and t/Sv computed from Figure 2.6-7 may be used as one method of evaluating safety of structures in the high terrace against liquefaction.

The second approach is to compute the shear stress at any point as the shear at the base of a soil column necessary to accelerate the mass of soil and any superimposed structure to the average acceleration developed in the column during the earthquake considered. Factors of safety given later are based on this procedure since this method of analysis results in higher shearing stresses in the soil than the results from the DYALS program.

Thus the shear stress of any depth Z is computed from the relation:

t = (ALPHA) (M) (a) (2.6-2)

where: M = total mass above point considered including any superimposed structures

a = maximum ground acceleration, single pulse peak

ALPHA = ratio which gives average acceleration of mass above elevation considering the number of cycles of vibration to be expected and the reduction of acceleration with depth below surface, since at the soil rock interface the soil acceleration must be equal to the rock acceleration.

The number of cycles of significant motion in a number of earthquake records has been analyzed. Observation indicates maximum acceleration occurs as a single peak[13] (never appears more than once). Table 2.6-1 shows the number of cycles of motion in which an acceleration of half the peak was equalled or exceeded for a number of earthquake records. These were taken from accelerograms of the earthquakes listed. A decrease in acceleration to one-half the peak value corresponds approximately to a decrease of one order of intensity on the Modified Mercelli scale and, as a result, conservatively defines the number of cycles of significant motion.

For this site, the OBE is most probably characterized as a short local earthquake of Intensity IV or less. As indicated in Table 2.6-1, small sharp earthquakes or even greater intensity than anticipated here, such as Golden Gate '57 or Hollister, showed only a few cycles of significant motion. For the DBE, longer duration as well as large accelerations would be expected. Since even for great earthquakes such as El Centro '40 and Taft '52, which were much more intense than anticipated for the Design Basis Earthquake, there are only about 10 cycles of significant motion. Eight cycles for the DBE is reasonable and conservative and is used for the analysis of the hazards of liquefaction.

An ALPHA value of 1.0 assumes eight complete cycles of loading at the maximum surface ground acceleration throughout the entire depth of the overburden. As previously indicated, records show that maximum ground acceleration occurs only in a single pulse. All other peaks of acceleration are smaller and thus the average for eight complete cycles of loading must be less than 1.0. Further, the thickness of the overburden in the high level terrace, for which the dynamic analysis was made, is such that significant amplification of bedrock motion would be expected within the soil column. Acceleration immediately above the bedrock must be the same as that of the rock. Accordingly, accelerations in the soil column reduce with depth below the surface. Figure 2.6-8 shows the ratio of the average acceleration of the mass above the point considered for the single maximum peak to the surface maximum acceleration plotted against the depth below surface. This is from the dynamic analysis of soil amplification made for this site.

Evaluation of the vertical effective stress requires determination of the groundwater levels for various conditions. The soils beneath the site are pervious and groundwater levels in them are directly related to river level stages (Section 2.3.3). These may be summarized as follows:

1.	Normal river level (controlled by downstream dam)	El. 664.5 ft
2.	Ordinary high water level (recurrence frequence approximately 2 yr)	El. 678.5 ft
3.	Standard Project Flood (1,000 to 2,000 yr occurrence)	El. 705 ft
4.	Probable Maximum Flood (may be termed as a geologic era event)	El. 730 ft

The hydrograph of the Standard Project Flood is quite sharp, El. 705 ft being exceeded for only 3 days. The recurrence frequency of the DBE is estimated to be 10,000 yr. The probability of simultaneous occurrence of the DBE and a flood exceeding El. 705 ft is estimated to be less than 1×10^{-9}. The probability of simultaneous occurrence of the DBE and Probable Maximum Flood is so small as not to warrant evaluation of liquefaction potential under this assumed combination of circumstances.

Attempts to obtain undisturbed samples of the soils underlying the site suitable for dynamic triaxial tests were unsuccessful. Seed[(3)] has presented results of dynamic triaxial tests upon a sand considered extremely susceptible to liquefaction phenomenon. Figure 2.6-9 shows the relation between shearing stresses, expressed as a ratio of shear stress to effective stress, to the number of cycles necessary to cause initial liquefaction for this sand at various relative densities. These curves have been used for computing the factor of safety against initial liquefaction of the soils underlying the several structures which is taken as the cycle where the pore pressures first become equal to the test chamber pressure. This approach is conservative. The sand selected and tested by Seed was especially susceptible to liquefaction, whereas the materials underlying the site are much better graded. As indicated by the grading curves in Appendixes 2F and 2H, these soils contain a significant proportion of clay and silt binders which reduce their susceptibility to liquefaction. The effects of grading and silt and clay binders have been shown in studies by Lee[(1)]. The factors of safety have been computed for "initial liquefaction," whereas a number of additional cycles of loading would be required before significant distortion or deformations developed in the soil mass. In the computation, the factor

of safety is defined as the ratio of the shearing stress at a given effective stress necessary to cause "initial liquefaction" in eight cycles as compared to the shearing stress developed by the earthquake under the structure. This again is a conservative method of expression.

Relative densities for computations have been based on the median value of relative density for the soils as determined from the results of the standard penetration tests using the Gibbs and Holts[(2)] "average curve" for penetration resistance vs. relative density for the effective stresses existing at the time of these investigations. Effective stresses under the structures on the high terrace, reactor containment, fuel building, and office building in the soil at the depths of interest are substantially higher than effective stresses in the Gibbs and Holts tests. From experience, it is believed that for these large effective stresses, actual relative densities for the deeper soils of the high terrace are higher than values shown.

Relative densities as determined from the Standard Penetration Tests for the high terrace, intermediate terrace and low terrace are shown in Figure 2.6-10, 2.6-11 and 2.6-12, respectively. The penetration values indicate relative densities in the upper soils of the high level terrace (above El. 675 ft) of about 80 percent. Seven insitu samples were taken of these soils for field density measurement during excavation for the reactor and auxiliary building. Results are shown in Table 2.6-2. They indicate insitu densities of 80 percent to 90 percent, which compares favorably with the penetration test results.

These plots indicate median densities for the lower sands and gravels in the high terrace of about 60 percent relative density. During site excavating three small elongated lenses of fine sand were noted in the sands and gravels of the high terrace. These were small, 5 ft to 8 ft wide and 2 ft to 3 ft thick. They appeared to be small stream-cut channels which had filled with fine sand and a fine silt top. Because of their very limited extent, they are considered to not be significant as regards liquefaction hazard.

Relatively low blow counts were recorded in some locations under the intermediate and low terraces and accordingly a study was made to determine whether these indicated merely random and erratic variations, in which case the median values of density could be properly used for evaluation of liquefaction potential, or whether they represented continuous strata of loose materials which must be considered separately.

Comparison of "N" values in adjoining borings indicated no continuous loose stratum of significant extent. Thus boring 110 shows relatively low "N" values at about El. 655 ft and 640 ft. Boring 20 shows low values at El. 645 ft and El. 632 ft. Boring 310 which is located between them shows no low values. Again, borings 112 and 111 show low values at about El. 655 ft, but boring 8, between them shows appreciably higher "N" values at the same elevations. Accordingly, it was concluded that relative density would be defined by average values of penetration resistance.

A detailed analysis of liquefaction potential is given in Appendix 2H, computed for values of ALPHA = 0.72, 0.9, and 1.0. As previously indicated, an average value of ALPHA = 0.6 is correct for eight cycles of loading. Minimum factors of safety, assuming ALPHA = 1.0, are as follows:

	GWL at El. 675 ft	GWL at El. 705 ft Standard Project Design Flood
Containment Structure	2.1	1.7
Auxiliary Building	2.1	1.5
Fuel Building	2.1	1.8
Turbine Building	1.7	1.25
Transformer Area (Intermediate Terrace)	1.7	1.25

The indicated factors of safety are considered to be adequate to ensure a satisfactory level of safety for the following reasons. The probability of simultaneous occurrence of the peak or near-peak of the Standard Project Flood and the DBE is extremely small. These studies indicate no hazard of liquefaction under the containment structure, auxiliary building, fuel building, turbine building, or transformer area, especially considering the fact that the lowest factors of safety computed are about 1.25 for the turbine building for the very conservative assumptions of ALPHA = 1.0 and for simultaneous occurrence of the peak of the Standard Project Design Flood and the DBE.

The intake structure for the river water system (Section 9.9) is located along the edge of the river. The river water lines extend from the intake across the low level bench up over the stiff clays of the intermediate bench up to the station. Along the length of these lines all soft, compressible silts, organic silts and clays were removed to the top of the lower gravels. Vibroflotation was then used to compact the lower gravels, the density of these lower gravels after compaction as determined from the Standard Penetration Test is shown in Figure 2.6-13. As shown, the median relative density of these gravels after compaction was approximately 80 percent. These precautions ensure there can be no liquefaction in this area even when flooded. The river water pipes are founded in compacted select granular fill placed over the densified natural soils. Select fill for this purpose was compacted to 95 percent of Modified Proctor density ASTM 1557.

The vibroflotation compaction of the lower gravels underlying the river water intake pipe line was contracted to the Vibroflotation Foundation Company, Pittsburgh, Pennsylvania. Compaction to a minimum relative density of 75 percent was specified and achieved. The depth of penetration was to a minimum El. 630 ft and deeper as necessary to provide the required minimum density. Maximum penetration was to El. 620 ft or bedrock surface, whichever was shallower. Onsite inspection ensured penetration and compaction to the proper depths. The compaction pattern layout consisted of 121 penetrations spaced 7 ft center-to-center.

The general contractor cleared the site of top soil, trees, brush, and all other obstructions above and below grade before the start of vibroflotation. The area was excavated to granular material at approximately El. 655 ft. The area was then backfilled with select granular fill to establish a working grade at El. 659 ft. This fill material between working grade El. 659 ft and finish grade at El. 655 ft was used as backfill for the vibroflotation compaction work. The select granular fill consisted of well-graded sand and gravel with no more than 5 percent passing the No. 200 sieve and maximum particle size of 2 inches.

The vibroflot machine compacts by simultaneous vibration and saturation. The compactor vibrates granular soil with 10 ton (T) of centrifugal force. The vibrator itself weighs 2 T, is 17 inches in diameter, and 6 ft long. A follow-up pipe, which varies in length depending on compaction depth, is attached to the upper end of the vibrator. The compaction sequence has four basic steps:

1. The vibroflot is positioned over the spot to be compacted and its lower jet is opened full

2. Water is pumped in faster than it can drain away into the subsoil, which creates a momentary quick condition beneath the jet to permit the vibroflot to settle of its own weight and vibration

3. Water is switched from the lower to the top jets and the pressure is reduced enough to allow water to be returned to the surface, eliminating any arching of backfill material and facilitating the continuous feed of backfill

4. Compaction takes place during the 1 fpm lifts, which return the vibroflot to the surface.

First the vibrator is allowed to operate at the bottom of the crater. As the granular soil particles densify, they assume their most compact form. By raising the vibrator step-by-step and simultaneously backfilling, the entire depth of soil is compacted into a hard core. As the granular particles vibrate into a dense mass, the excess water floats the finest particles to the surface and washes them away. The surface was then compacted by a vibratory roller over which select granular fill was placed and compacted by vibration.

In coordination with the compaction program, relative densities of the materials were checked using standard penetration tests resulting from test borings. An earthboring contractor was employed to conduct standard penetration tests according to ASTM D1586, "Standard Methods for Penetration Tests and Split Barrel Sampling of Soils." This testing was done under the supervision of Stone & Webster engineers, who determined relative densities from these standard penetration tests by correlation with the Gibbs and Holtz plots. The results of these tests showed that the minimum relative density requirement of 75 percent was achieved throughout the compaction area.

2.6.4.3 Relative Displacements

Relative displacements between structures for determination of rattle space and for piping design have been estimated by computing the translation at the foundation of each structure using shear moduli under earthquake conditions as developed by Dr. Whitman in Appendix 2D, and then adding to these base translations additional translations or vertical motions, as appropriate, for the structural position of interest, resulting from flexure and rocking of the structure. Relative displacements were taken as the RMS of the displacements so computed plus orbital displacements due either to compression or shear waves as appropriate for the earthquake ground motion using a half-wavelength equal to the distance between centroids of the two structures. This approach is considered conservative. For the containment structure, which is the heaviest and has the largest rotations, the indicated values of vertical displacement at the outside edge of the mat from rotation are of the order of 1/4 inch for the DBE. Residual settlements from the DBE would be negligible. Relative displacements of structures due to

orbital ground motion from the DBE are shown in Figure 2.6-14. Values for the OBE may be taken as half of the values shown.

2.6.4.4 Lateral Soil Loads on Structures Below Grade

In order to describe the procedures used for analyzing the lateral soil loads on basement walls of Seismic Category I structures from earthquake, the procedure used for the containment structure is explained in detail.

Lateral loading on the containment structure was determined by computing the lateral resistance developed on the soil as the structure responds in flexure, translation, and rocking. In this analysis, the translational restraining force, which determines translational vibrational motion of the structure, has two components, a shear across the base of the structure and lateral soil pressures on the side wall of the containment structure developed by its displacement relative to its static state position.

The "spring constraint," that is, force per unit of lateral displacement by shear, for a circular rigid base on an elastic half space is given by Bycroft[14] as:

$$kx = \frac{32\,(1-\mu)\,Gro}{(7-8\mu)} \qquad (2.6\text{-}3)$$

where: G = shear modulus

ro = radius of base

μ = Poisson's ratio

For usual values of μ, this reduces approximately to:

$$kx = 5\,Gro \qquad (2.6\text{-}4)$$

In addition to the direct translational motion, the structure rocks and flexes. Since these several motions are coupled, the arithmetic sum of the maximum motion of translation, rotation, and flexure at any elevation above the base is taken as the displacement at that location of the structure from its static state position. Further, the soil adjoining is undergoing orbital particle motion. Relative orbital motion between structure and soil is a maximum for a ground frequency having a half-wavelength equal to the diameter of the structure and is then equal to the orbital displacement. Using this frequency, this maximum orbital ground displacement may be obtained from the ground motion spectrum. To compute the appropriate frequency, the shear wave velocity is used since the S wave displacements normally exceed P wave displacements. For the soil conditions at BVPS-1 and for the containment structure, the indicated orbital particle displacement is about 0.15 inch.

Total relative motion at any level is then taken as the RMS sum of the orbital motion plus the vibratory motion of the structure, considering translation, rotation, and flexure. The horizontal pressure on the side wall of the structure for a given relative displacement can be evaluated from the theories of horizontal subgrade reaction. From Terzaghi[15] the relation between horizontal deflection and pressure at any point is given by:

$$k_h = \frac{p}{Y_h} \qquad (2.6\text{-}5)$$

where: p = horizontal pressure at soil structure interface

Y_h = horizontal deflection of soil at interface

k_h = coefficient of horizontal subgrade reaction

further: $k_h = N_h\, Z/B$ (2.6-6)

where: N_h = coefficient dependent upon physical properties of the soil

Z = depth below free surface of soil

B = width of loaded area, which may be taken as diameter of containment structure

For purposes of this analysis a value of N_h = 40 tons per cu ft was selected from tables presented by Terzaghi. This value is appropriate to dense sand above the groundwater table. It is a conservative value since the higher the coefficient the stiffer the soil and the greater the loads imposed upon the side walls of the structure. In determining these pressures, the side wall of the structure was assumed to be rigid radially, since radial deflection of the side wall would reduce relative soil-structure deflections and thus the soil forces acting.

It should be noted that these forces, if included in the seismic loadings on the structure, would reduce the base shear and vertical bending stresses in the shell.

Accordingly, they are not included when computing such stresses in the shell and thereby, contribute to the conservatism of the design.

2.6.4.5 Slope Stability Analyses

Embankments have been constructed for the transformer area and adjacent to the intake piping for use as a construction laydown area, railroad approach, and access road to the site. The slopes have been analyzed under a number of conditions including the occurrence of a Design Basis Earthquake (0.125 g) after rapid drawdown from the Standard Projected Flood Water El. 705 ft. The analyses were first performed using a computer analysis where the failure surfaces are assumed to be arcs of circles, and the factor of safety is defined as the ratio of the moment of the available shearing forces on the trial failure surface to the net moment of the driving forces. The methods of analyses used were from both Bishop[7] and Fellenius[8]. In addition, noncircular slide surfaces have been analyzed using Morgenstern's procedures.[9]

The results of the analyses are indicated in Table 2.6-3, the location of sections analyzed being shown in Figure 2.6-1. Soil parameters used in these analyses were based on tests made on essentially undisturbed samples using unconfined compression and triaxials testing procedures as given in Appendix 2E and 2H.

As indicated in Table 2.6-3, factors of safety are adequate for the various conditions analyzed to ensure safety of the critical structures of the station. Even for the extremely unlikely coincidence of the DBE and simultaneous instantaneous drawdown from the standard project design flood, the computed single instantaneous peak factor of safety is 0.8. According to Newmarks[(10)] analysis, this would result in some very minor slumping. This condition, however, is for the construction laydown area and slumping or movement along this area would not affect safety of the station or river water system and therefore, is of no concern.

2.6.5 Placement of Structural Fills

All structural fills are required to be of granular materials placed to minimum densities of 95 percent of the maximum density obtained in the Modified Proctor Compaction test, ASTM-D1557-66. To ensure proper quality control, fill placement was done strictly in accord with Stone & Webster Quality Control Standards. A soils laboratory was set up at the site and staffed with experienced technicians. Field inspectors were assigned to the work to ensure that specified requirements for lift thickness, passes of compactors and types of compactors were met; that compaction was thorough and uniform over all areas; and that segregation was prevented. Control tests were run as necessary to verify compliance of material with specifications, and in place density tests run, as necessary, to verify compliance with compaction requirements. All records were thoroughly documented. In addition to the above an experienced soils engineer from the headquarters office visited the site at intervals to review procedures, tests results and records.

All tests were run in accordance with applicable ASTM procedures. In place density tests were run on the basis of a minimum of two tests per day and at a variable rate relative to the total quantity placed varying from about 1 test per 500 yd of material placed at the start of work to about 1 test per 1,500 yd of material placed after procedures had been established and personnel became experienced in behavior and characteristics of the material. The average was about 1 test per 1,200 yd of material placed.

2.6.6 Summary

The site of the station is underlain by approximately 100 ft of medium to dense sands and gravels laid in a high level terrace of the Ohio River. These are stable, relatively incompressible soils which provide a safe and adequate foundation for the power station. Settlements during construction were minor and settlements following operation will be negligible. The surface soils of the terrace are slightly looser than the deeper lying soils and these near surface soils were removed beneath the structures and replaced with densely compacted granular fill. The surface of the terrace has been eroded within the limits of the turbine building to below desired foundation grade. Clay soils in this region were removed and replaced under the turbine building and the transformers with densely compacted granular fill to afford a safe and adequate foundation for these structures. There is no hazard of liquefaction for the soils underlying the station under earthquake conditions.

Properties of the soil under dynamic loadings have been evaluated and proper cognizance taken of relative displacements between structures for piping design; the effects of earthquake loadings on lateral soil pressures on the containment structure and other earth retaining structures; and stability of slopes under earthquake and fluctuating water levels.

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2.7 SITE DESIGN DATA

2.7.1 Wind Loading

2.7.1.1 Seismic Category I Structures

The extreme mile wind at the site for the 100-year recurrent interval is predicted to be 84 mph in Table 2.2-3 of Section 2.2.2.5. Based on a gust factor of 1.3, the highest gust velocity for that wind is 110 mph. As noted in Section 2.2.2.5, the wind velocity values are conservative, due to the sheltered location of BVPS-1 site. From Figure 1(b) of Reference 2 the extreme mile wind velocity based on the 100 year recurrence interval is 80 mph, as determined from the isotach for the station location. As this value agrees essentially with the prediction in Section 2.2.2.5, the American Society of Civil Engineers (ASCE) paper is selected as the wind design basis. The maximum normal wind loading for Seismic Category I structures, based on this paper, the 100-year recurrence interval, and a shape factor of 1.3 (0.8 pressure + 0.5 vacuum) for typical rectangular buildings is as follows:

Height Zone (ft)	Maximum Normal Wind Loading on Building Walls (psf)
0 - 50	21
51 - 150	30
151 - 400	40

Gust coefficients selected on the basis of structure widths are multiplied by the maximum normal wind loading to determine the design wind pressure. As gust factors apply to wind velocity, gust coefficients which apply to the wind loading vary as the square of the applicable gust factor. The gust factors determined from Reference 2 and the resultant gust coefficients are as follows:

Width of Structure (ft)	Gust Factor	Gust Coefficient
0 - 50	1.3	1.7
51 - 100	1.2	1.4
101 - 150	1.1	1.2
Greater than 150	1.0	1.0

Wind loads are reviewed to determine the effect of the pressure and vacuum effects. Average wind pressures on the windward wall are considered to be 0.8 and on the leeward wall -0.5 of the total wind force (1.3) on the rectangular buildings. Since wind forces normally load structures from either direction, the break- down of loads into pressure and vacuum components has very little significance on the design of the structure.

Where wind pressures on other than typical building walls are considered, the maximum normal wind loading is adjusted for the appropriate shape or drag factor given in Reference 2 provides the design wind pressure. Roofs are designed for a negative pressure of 1.25, the horizontal wind pressure of the height.

Design wind pressures are combined with live and dead loads and other special loadings related to the structure. Wind and earthquake loadings are not considered to apply at the same time. Structures designed for tornadoes are not checked for maximum wind pressures, as the tornado design causes maximum stress conditions.

2.7.1.2 Other Structures

Structures, other than Seismic Category I structures listed in Table B.1-1 in Appendix B and those designed for tornadoes listed in Section 2.7.2.2, are designed for wind loading based on Figure 1(a) of Reference 2 for the 50-year recurrence interval. The maximum normal wind pressures for various height zones above the ground, for other than Seismic Category I structures, based on the ASCE Paper and a shape factor of 1.3 are:

Height Zone (ft)	Maximum Normal Wind Loading on Building Walls (psf)
0 - 50	19
51 - 150	27
151 - 400	33
401 - 700	44

Gust coefficients, given in Section 2.7.1.1, are applied to the normal wind loading to provide the design wind pressure. When wind loadings on other than typical building walls are considered, the maximum normal wind loading is adjusted for the appropriate shape or drag factor.

Design of the structures other than the reactor containment is on a working stress basis. When wind is combined with dead, live and other related loads, the allowable design values are increased by 33 percent, provided the resultant section of the member is not less than that required for the combined dead and live loads alone.

2.7.2 Tornado Model

In Section 2.2, the probability of tornado occurrence at the site was determined to be once in 2,100 years, as a maximum. Tornado design, therefore, is necessary only for structures and systems required for safe and orderly shutdown of the reactor. These structures and systems are listed in Section 2.7.2.2.

The tornado model used for design has the following characteristics:

1. Rotational velocity 300 mph (30 ft above ground)
2. Translational velocity 60 mph
3. Pressure drop 3 psi in 3 seconds

The velocity profile of a typical tornado has wind speeds that vary throughout the tornado's radius relative to the height from the ground at the point considered. It is assumed, as a matter of simplicity, however, that the average wind speed of the design tornado model is the sum of the rotational and translational velocities, totaling 360 mph.

The most critical missile that might be associated with a tornado, is assumed to be a 35 ft long utility pole, 14 inches in diameter, weighing 50 lb per cu ft, and moving with a velocity of 150 mph.

BVPS-1 is licensed to the design basis utility pole missile having only a horizontal trajectory.

2.7.2.1 Design Loading

The average wind velocity for the tornado model of 360 mph is converted to 330 psf by the formula

$$p = 0.00256v^2 \qquad (2.7\text{-}1)$$

where: p = resulting pressure (psf)

v = wind velocity (mph).

This pressure is multiplied by applicable shape factors and drag coefficients,[(2)(3)] and applied to the silhouette of the structure.

The tornado wind loading on structures is taken as the loading combination of three factors:

1. Rotational velocity
2. Translational velocity
3. Atmospheric pressure drop.

The effects of the rotational velocity and atmospheric pressure drop loading factors are interrelated relative to the distance from the tornado center, as noted in Figure 2.7-2 and 2.7-3, according to the relationship:

$$V = \left[\frac{rg}{\rho}\frac{\delta p}{\delta r}\right]1/2 \qquad (2.7\text{-}2)$$

Where: V = wind speed - rotational

r = distance from tornado center

g = gravitational acceleration

p = atmospheric pressure

ρ = air density

For analysis purposes, structures are assumed to be 350 ft from the tornado center. At this distance, the maximum rotational wind velocity of 300 mph will impact the structure. The corresponding pressure drop at the structure for this distance from the tornado center is seen to be 0.118 atmospheres (1.75 psi). The translational velocity of 60 mph, which is independent of the relationship to the tornado center, is added to the above loading conditions to provide the net effect on the structure from all three factors earlier described.

These results are considered conservative in that the force vectors of the rotational wind speed (300 mph) and the translational wind speed (60 mph) are considered to be additive. The combined dynamic pressure is multiplied by the shape coefficient applicable to the structure (generally 1.3). The combined pressure consists of 0.8 wind pressure on the windward side, 0.5 wind suction on the leeward wall and 0.7 wind suction on the side walls for the general case. These pressure contributions are then added algebraically to the pressure drop effect on the structure to obtain design loads.

The method used to combine the pressure differential and tornado wind forces on roofs and walls has been taken by superimposing the loads from Figures 2.7-2 and 2.7-4. This design mode is based on the pressure pattern shown in Reference 4. The Dallas tornado pressure pattern[4] was modified to fit the 3 psi requirement of the design tornado (Figure 2.7-3). The resultant cyclostrophic winds are shown in Figure 2.7-3. These winds were modified to fit the 300 mph maximum requirement of the design tornado (Figure 2.7-4).

The uplift on the roofs of the critical structures is based on a negative pressure differential of 3 psi less the dead load of the roof. A reduction of the full negative pressure differential is made when venting of the structures occurs during the time of the external pressure drop. The amount of reduction depends on the area of venting.

Two feet of reinforced concrete is generally provided to prevent perforation by the utility pole missile. When less thickness is required, the minimum depth of reinforced concrete is determined by the Modified Petry Formula[1].

For the tornado wind pressure and vacuum loading, the allowable design stresses are allowed to reach 90 percent of the minimum yield point stress for reinforcing steel. The allowable design stresses for concrete with ultimate strength design are allowed to reach 75 percent of the ultimate stresses. For concrete with working stress design, the allowable design stresses are increased 66.7 percent over the allowable concrete compressive strength used for working stress design. Loading combinations, including those for tornadoes, are given in Section B.1.4.

2.7.2.2 Structures and Systems Requiring Protection

The following structures and systems are designed for wind pressure resulting from a hypothetical tornado and for the associated missile described in Section 2.7.2:

1. Structures

   a. Reactor containment concrete structure, including access hatches and penetrations

   b. Cable vault and cable tunnel

   c. Pipe tunnel to containment from auxiliary building

   d. Main steam valve area

   e. Pump room below main steam valve area

   f. Safeguards area (only portion surrounding former Post DBA Hydrogen Control System)

   g. Auxiliary building concrete structure below El. 752 ft-6 inches and for the protection of the following components above El. 752 ft-6 inches: Boric Acid Tanks, Volume Control Tanks, Boric Acid Transfer Pumps, Degasifier Vent Chillers, Component Cooling Surge Tank.

   h. Fuel pool concrete structure (for horizontal missiles only)

   i. Structure containing primary plant demineralized water storage tank

   j. Control room

   k. Emergency switchgear and relay room, including battery rooms

   l. Air conditioning equipment room under control room

   m. Diesel generator building

   n. River water pumps and engine-driven fire pump portion of intake structure

   o. Waste gas storage area

   p. Seismic Category I components above El. 752 ft-6 inches.

2. Systems

   a. Piping from main steam lines to turbine-driven steam generator auxiliary feedpump

   b. Main steam piping from steam generators inside containment to the main steam trip and nonreturn valves outside the containment

c. River water piping for equipment required to cool down the station

d. Carbon dioxide fire protection system for engineered safety features equipment

e. Piping, valves, and supports from primary plant demineralized water storage tank to steam generator auxiliary feedpumps

f. Fuel oil piping, valves and supports for emergency diesel generators

g. Electrical systems for fuel oil transfer pumps.

The fuel building, decontamination building, and turbine building superstructures are designed so that the steel framing will not collapse and endanger the structures or systems listed above.

The uppermost, heavily reinforced, concrete slabs of the auxiliary building, intake structure, and service building have been checked to accommodate a collapse of the light steel framed structures that exist above them and thereby, do not detrimentally affect the integrity of the Seismic Category I portions below. The layout of these structures are such that the collapse of this framing cannot detrimentally affect adjacent Seismic Category I structures.

Non-tornado designed structures are so positioned, both in relative location and stature, so that a collapse of one will not affect the functionability of safety-related equipment or structures to function.

The following systems and components are not protected by missile barriers:

1. Safety Injection System

    a. Low head safety injection pumps and piping, valves

    b. Supports within the safeguard area.

2. Containment Depressurization System

    a. Refueling water storage tank

    b. Chemical addition tank (retired in place)

    c. All piping, valves, and supports associated with and connecting above components

    d. Outside recirculation spray pumps, and piping, valves, and supports within the safeguards area.

3. Fuel Pool Cooling System - Complete System

4. River Water System - where discharge enters turbine building.

5. Fuel Handling System

   a. Movable platform with hoist in fuel building

   b. Fuel handling trolley in fuel building

   c. Fuel transfer tube with blind flange.

6. Ventilation and Air Conditioning

   a. Supplementary Leak Collection and Release System

   b. Ventilation vent stack.

7. Fuel Building Ventilation Exhaust Monitors.

8. Turbine Driven Aux Feedwater Pump steam exhaust stack above elevation 790 ft.

9. Discharge pipes from the atmospheric dump valves, main steam safety valves, and residual heat release valve above the main steam valve area Roof elevation of 790 feet 6 inches.

Missile protection is necessary for equipment and systems required for safe and orderly shutdown and maintaining safe shutdown. With the exception of the river water system, the systems or portions of systems listed above are not considered necessary to attain and maintain a safe shutdown condition and therefore, are not protected from tornado generated missiles.

Missile protection is not required for the river water system from where the discharge structure enters the turbine building for the reasons discussed in Section 9.9.3.

Missile protection is not required for the steam discharge pipes of the atmospheric dump valves, main steam safety valves, or the residual heat release valve above the main steam valve area roof elevation of 790 feet 6 inches. Refer to Section 10.3.1 for further explanation.

Portions of the service building where equipment essential to attaining and maintaining safe shutdown (with the exception of the main control room) are located below El. 735 ft in a watertight and missile-proof concrete structure, capable of withstanding the collapse of the non-Category I portion of the service building structure (shop and lab area) above.

The main control room, which is located above El. 735 ft and over the east portion of the emergency switchgear and air-conditioning areas, is similarly protected by a missile-proof concrete structure designed for the collapse of the non-Category I portion of the service building structure (office area) above it.

Any missile generated by the "breakup" of a "nontornado" structure is not as severe as the most critical missile stated previously. Therefore, such a missile would be less of a hazard to the integrity of the tornado designed structures and protected equipment and systems. Typical details of removable slabs, hatch covers, and wall plates used in Category I structures are shown in Figure 2.7-5. Removable slabs or plugs protecting missile shielded enclosures are clamped or bolted back to the structure. These anchorages are capable of resisting suction loads as defined in Section 2.7.2.1. Block walls are designed to remain in place by transferring shear either horizontally or vertically depending on height and width ratio of wall. Typical details of block partitions are shown in Figure 2.7-6.

The turbine driven auxiliary feedwater pump (TDAFWP) exhaust stacks above elevation 790 feet are not enclosed by a tornado missile resistant structure. The exhaust stacks need not be protected from tornado missiles since the TDAFWP is not required for design basis accidents or other plant transients initiated by a tornado.

BVPS-1 has been engineered consistent with its PSAR commitments to provide tornado missile protection to only those engineered safety features necessary to effect and maintain a safe shutdown. The justification for this design is as follows. Tornado missile protection was provided where necessary to prevent the missile from causing a design basis accident; however, a tornado was not assumed to occur subsequent to a design basis accident.

2.7.2.3 Tornado Missile Barriers

The tornado generated telephone pole missile has a 14-inch diameter, 35 ft length, 50 lb per cu ft density, and a 150 mph velocity. The barrier thickness that is required to prevent perforation as calculated by utilizing the modified Petry Formula[(1)] is 13.0 inches. The Modified Petry Formula assumes an infinitely thick slab.

The Modified Petry Formula cannot be used to determine barrier thickness required to stop the missile and prevent spalling.

This thickness is determined as follows:

1. Determine penetration into an infinite barrier by Equations 4.1.14 and 4.1.15 from Reference 5.

2. Determine thickness of concrete to prevent spalling by Equation 31 from Reference 6.

The thickness calculated to stop the missile and prevent spalling from the above steps is 35.6 inches.

References 5 and 6 can also be used to determine the thickness required to just prevent perforation. This thickness, 20.7 inches, is calculated as follows:

1. Determine penetration into an infinite barrier by Equations 4.1.14 and 4.1.15 from Reference 5.

2. Determine thickness of concrete for the missile to just perforate by Equation 30 from Reference 6.

All the tornado missile barriers originally provided are at least 2 ft of concrete and therefore, are adequate to protect systems and components necessary for safe shutdown.

2.7.3 Flood-Water Loading

2.7.3.1 General

As concluded in Section 2.3, the following flood stages are possible at the Beaver Valley Power Station site:

1.	Ordinary high water	El. 678.5
2.	Standard Project Flood	El. 705.0
3.	Probable Maximum Flood	El. 730.0

As discussed in Section 2.3.3, portions of the station designed prior to January 23, 1970 are designed for a Standard Project Flood of El. 707.2 ft. Portions of the station designed or redesigned for other reasons after this date are designed for the 705 ft level given above.

All major buildings and structures except the turbine building, the intake structure, and the reactor containment structure are so located, or so constructed, as to be unaffected by the Standard Project Flood or lower flood stages. The turbine building, founded at approximately El. 683 ft, is designed to withstand buoyancy and water pressure of the Standard Project Flood. It is likewise designed to be watertight and operative for that condition. The intake structure is also designed for the water pressure and buoyancy of the Standard Project Flood, assuming that one well is dry at that time. That portion of the Intake Structure housing the river water pumps and allowing for continuous operation of the river water system is designed for the water pressure, buoyant forces, and wave action associated with the PMF.

The containment structure is not only designed to be watertight against, and to withstand the buoyancy and water pressure of, the Standard Project Flood, but is also so designed for the Probable Maximum Flood. The emergency switchgear, relay, and battery rooms located in the service building and founded at approximately El. 710 ft and the river water pump and engine driven fire pump cubicles in the intake structure, being essential for orderly shutdown of the reactor, are designed to be sound and operative during the Probable Maximum Flood stage. The turbine building is designed to be flooded when the water stage exceeds the Standard Project Flood level.

2.7.3.2 Structures and Systems Designed Against Flood Water Effects

All structures listed in Table B.1-1 and the equipment within these structures essential to attain a safe shutdown are designed against any adverse effects from the Standard Project Flood (SPF - El. 705 ft) and the Probable Maximum Flood (PMF - El. 730 ft).

2.7.3.2.1 Reactor Containment

The reactor containment is the only structure with a mat elevation below the Standard Project Flood - El. 705 ft. The reactor containment is protected from the SPF by a waterproof membrane, as explained in Section 5.2.7.3.

2.7.3.2.2 Intake Structure

The intake structure and the equipment housed within the intake structure incorporates various design considerations to withstand the adverse effects of flooding.

All equipment operating within the intake structure is protected from the SPF by placing the equipment on the operating floor located at El. 705 ft. Equipment required for a safe shutdown, such as the river water pumps, is protected by watertight concrete cubicle enclosures extending above the PMF elevation.

The design features of the sump pit, sump pump controls and power supply provided in the intake structure include a 12 inch by 12 inch by 12 inch deep sump pit, a 15 gpm 35 ft head sump pump controlled automatically from an integral float switch and connected to the emergency power source. The pumps discharge through check and gate valves to an elevation above 730 ft.

There are seven types of penetrations into the intake structure, all of which are sealed against water leakage during a PMF as described below:

1. VENTILATION OPENINGS: Air enters the compartments through concrete openings in the roof of the compartments. These openings extend to El. 737 ft with no penetrations below that level to prevent water entrance due to wave action coincident with the PMF. Air exits the compartments through an opening in the roof of the compartment at El. 730 ft. Gasketed seal plates are installed over half of the vent area, and 7 ft high steel box structures are installed over the other half. These are bolted to angles embedded in the concrete around the exit openings. This arrangement provides cubicle flood protection while maintaining air recirculation.

2. PUMP COLUMNS AND SHAFTS: All pump columns penetrate the compartment floor with a gasketed or 0-ring sealed double base plate assembly. The assembly consists of a pump base plate which is bolted onto a soleplate, grouted into the floor. A gasket or 0-ring prevents leakage between the two plates. All pumps have shaft seals where the shafts penetrate the pump column. The seals are designed for and normally operate at pressures in excess of that which will be experienced during a PMF; therefore, no inleakage will occur during a PMF.

3. PIPES: All pipes that penetrate the compartment floor or compartment walls are either fitted with a water stop or are sealed against inleakage.

4. VALVE STUFFING BOX FLOOR PENETRATIONS: There are two stuffing box/curb box assemblies which penetrate the compartment floor in B and C safety related pump cubicles. They were installed for possible future use as valve stem extensions but are unlikely to ever be used for such purpose. Closures are installed to prevent inleakage during times of high river flood level conditions. Removal of the closures at any time is controlled in accordance with Site programs for flood seals.

5. SLIDING STEEL CUBICLE FLOOD DOORS: These doors are 1 inch thick steel plate doors, sliding in an enclosed steel frame, which is embedded in the concrete opening, and supported by a track mounted above the door.

   Positive sealing is provided by inflating a seal against ground metal contact surfaces by means of a charging air tank mounted on the wall inside the protected compartment. This tank is sized to provide a complete seal fill in addition to makeup for small leakages while in use during the PMF. Figures 2.7-7 and 2.7-8 provide locations and details of the flood door assembly.

   The flood doors have been shop tested to leak less than 100 cc/hr and will be field tested to leak less than 0.5 cu ft per hr (0.063 gpm). All electrical panels are a minimum of 10 inches above the cubicle floor. Even if the inleakage exceeded ten times the maximum test rate, the water level in a 18.25 ft by 30.61 ft cubicle would be well below the ten inches elevation for the 70 hr duration of the PMF.

6. METAL SIDING: The metal siding used on the intake is similar to that used throughout the plant. The siding is box-rib sheet supported by subgirts attached to L2 liner panels. The liner panels are fastened to the structural girt framing system.

   The metal insulated siding of the intake structure is not required to protect safe shutdown equipment in the pump cubicles from flood.

7. ELECTRICAL CABLES: Electrical cables enter the compartments through the floor and wall sleeves. The sleeves are cast in the concrete with water stops or seals to prevent inleakage around the sleeves.

Flood seal techniques and materials used for the pipe and electrical cable intake structure penetrations shall be qualification tested as described on Figure 2.7-19 to resist the static head of water due to the probable maximum flood.

The Probable Maximum Flood waters cannot enter the cubicles protecting the river water pumps. Normal entrances to the four cubicles at El. 705 ft are closed off by the sliding steel flood doors. Pipe and electrical penetrations in cubicle floors and walls are sealed. All hatches in the cubicle roof at El. 730 ft are sealed to preclude water from postulated waves from entering through the hatch joints.

Egress from the intake structure pump cubicles after pressurization of the flood door seals will be through the roof hatches which will be removed and replaced before flood water exceeds El. 705 ft. During a flood condition above El. 705 ft (maximum duration of about 100 hours) there will not be any access to the cubicles.

The air supply to the flood door seals is more than adequate to supply the seals for the duration of the PMF. In addition, sump pumps have been provided in each cubicle to remove small amounts of leakage into the pump cubicles. Finally, a single failure of any flood door during the flood will only affect one cubicle, and therefore adequate river water pump capability remains for plant cooling. For these reasons, no access to the intake structure is required during the PMF.

2.7.3.2.3 Turbine Building

Flooding of the turbine building will allow water to enter into the pipe tunnel and elevator and stair shafts (see Figure 2.7-9). The service building area below El. 730 ft is isolated from these flooded areas by the perimeter concrete walls of the service building. All construction joints below El. 730 ft are water stopped and all through electrical penetrations are sealed.

Flooding of the pipe tunnel will result in flooding of the pipe tunnel area of the main steam-cable vault structure, the northern portion of the safeguards structure, and the primary auxiliary building (excepting the charging pump cubicles).

Water cannot enter the cable tunnel since this area is isolated from the rest of the main steam-cable vault area below El. 735 ft by concrete walls and is accessible only from the cable vault area at El. 735 ft.

2.7.3.2.4 Electrical Cable Protection

The cable tunnel is that portion of the service building allowing for transfer of cable from the cable vault structure to the cable tray area within the service building and is seismically designed as indicated in Table B.1-1.

The means for routing cable from the main portions of the plant to the intake structure is through cable ductlines extending from the high level terrace (El. 735 ft) to the lower level terrace (El. 675 ft) which is the ground elevation at the intake structure.

Figures 2.7-10, 2.7-11 and 2.7-12 show the cable duct from the plant to the intake structure including all manholes. The manholes are below PMF level and are allowed to flood. However, during normal river conditions, the manholes are dewatered to minimize cable exposure to significant moisture. See Table 16-1, item 11.

The protective measures to prevent flooding in areas where essential equipment for cold shutdown is located, will be duct or sleeve sealed. This sealing will be required where ductlines enter the intake structure and on the south end of the ductline at the service building.

The water barrier, where the cable tunnel, which is an extension of the ductline from the intake structure to the plant, interfaces with the service building, is shown in Section 1-1 of Figure 2.7-13.

All cables for 4 kV service, 480 V service, control and instrumentation for both primary and secondary plant use are of the same high quality construction. Each type of cable has been specified for use in wet and dry locations and will operate satisfactorily if submerged as proven by factory testing. The 4 kV power cable was submerged for a period of 24 hours before testing at the supplier's factory.

Where cables or conduits pass through penetrations into an area where safety-related equipment is located, and where these penetrations are below PMF level, sealing methods are implemented. These sealing procedures will make the penetrations leak resistant and will use materials which have been employed in the past, or newly developed methods.

The 5 kV cables installed in underground ductlines from the service building to the diesel generator building and to the intake structure are adequate for the intended service when these cables are operating under wet or dry conditions. The same qualification covers any splices. Wet conditions include immersion under water. The cable referred to above has an insulation thickness greater than that required by the Insulated Power Cable Engineers' Association(7).

Duquesne Light Company has had several occasions whereby 5 kV cable raceways have been flooded with water and no failure has resulted. This was experienced at the Cheswick Power Station. The Brunot Island Station also has had high voltage cables completely submerged on several occasions, including the 1936 flood, without failures. The cable as selected is suitable for operation in a ductline under wet or dry conditions; wet conditions are considered with cables immersed in water. Cables will be proof-tested prior to initial energization, and no further periodic testing is contemplated unless the cable has been exposed to an abnormal condition.

2.7.3.2.5 Other Plant Areas and Equipment

Water from the PMF could enter a 4 inch shake space between the service building and the turbine building. The openings through the service building north wall have wall sleeves as shown in Figure 2.7-14. Details of closures are shown in Figures 2.7-15 and 2.7-16. Closures plates are shown in Figure 2.7-15 with sleeve details shown in Section "A-A". The seals for the 4 kV cable bus, Figure 2.7-16, are Nelson "Multi-Cable Transits" which are watertight.

Flood protected areas have been indicated on Figures 2.7-17, 2.7-18, and 2.7-19. Floors and walls within these areas are constructed with concrete. Penetrations, such as pipes, which enter these areas and are embedded in concrete, utilize water stops to prevent inleakage. All

penetrations which enter through the openings in the concrete are sealed after installation of the item. Where banks of wall sleeves for electrical cables enter protected areas, the sleeves are O-ring sealed to a galvanized steel plate. The plate is bolted and gasketed to the wall as shown on Figure 2.7-18. The cables are sealed within the sleeve. Flood seal techniques and materials used for the pipe and electrical cable penetrations shall be qualification tested as described on Figure 2.7-19 to resist the static head of water due to the probable maximum flood.

With the exception of pump shaft seals, all water barriers are in a static condition, do not contact rotating parts of equipment, and are not located in a hostile environment. Selected seal materials have a long life under these conditions, and degradation over the life of the plant, which would reduce their adequacy as a water barrier, is not expected. Pump shaft seals which are subject to wear will be replaced as required by operation or testing of these seals.

Flood penetration sealing methods that utilize high density cellular concrete as shown on Figure 2.7-19, were preoperationally tested to ensure that the techniques used are adequate. This was accomplished by simulating actual seal configurations and subjecting one side of the seal to a hydrostatic pressure of 125 percent of the PMF conditions. A leakage rate of 0.04 gpm was considered acceptable. This leak rate is based on the worst case which is the service building north wall containing approximately 200 penetrations. This ensures that the sump pump has a capacity with a minimum safety factor of 2 to 1.

All pumps in the intake structure are preoperationally and periodically operated during which their seals are checked for seal water leakage. Any abnormal seal water leakage would be noted during testing of the pumps and the seals would be repaired or replaced.

All flood protected areas have sumps or 12 inch high curbs along walls containing sealed penetrations. Any inleakage which would occur during a PMF would be collected in these areas. All sumps and curbs contain either a float-actuated sump pump or a level switch and transmitter with a control room alarm. Portable sump pumps are provided which can be used, wherever needed. Emergency power supply connections are located at each wall curb, and each permanent sump pump is connected to the emergency power supply.

The control room air conditioning room is protected from flooding by a manually-operated gate valve in series with a check valve in the six-inch drain line from the control room air conditioning room. The gate valve, labeled back water valve VGF-12D, is located in the turbine building at El. 698 ft-6 inch. This valve will be closed when river level reaches El. 695 ft. Since the turbine building does not begin flooding until the river reaches El. 707 ft-6 inch, there is adequate time to operate this valve prior to turbine building flooding when this valve would become inaccessible. During the PMF condition, this valve will not be operated, but will only be opened following the flooding event. Internal flood protection of the control room air conditioning room with the drain line gate valve closed is discussed in Section 9.7.2.

Each penetration with a flood seal shall receive a periodic visual inspection.

The charging pump cubicles are designed against ingress of water during a PMF. Any penetrations below El. 730 ft are sealed. The ventilation duct enters the charging pump cubicles with the bottom of the duct at El. 731 ft 9 inches. There is also a horizontal slot in the north wall of the charging pump cubicles through which piping passes. The bottom of the slot is at El. 730 ft 6 inches.

The charging pumps, Figures 2.7-20 and 2.7-21 (circled), are enclosed by walls that are missile-proof and are extended to El. 730 ft-6 inches, which is 6 inches above the PMF level.

2.7.4 Soils Design Loading

The looser granular material above El. 715 ft in the containment structure area and the silty sands and clays in the turbine building area were removed and replaced by compacted granular material (Section 2.6). The compacted granular fill is composed of selected sands and gravels and compacted in 6 inch layers to a minimum density of 95 percent as determined by modified compaction tests performed in accordance with ASTM D1557.

Foundations for all major structures are continuous mats of reinforced concrete founded on the denser undisturbed gravels or compacted granular fill. The containment structure is founded at El. 681 ft on undisturbed gravel and compacted granular material, with excavation below El. 715 ft made within a circular sheet piling cofferdam. The turbine building mat with bottom at approximately El. 683 ft is located in part on undisturbed, inplace gravel and in part on compacted granular fill.

The other major structures and equipment are founded on the inplace soil or compacted granular fill as shown in Figure 2.7-1.

The allowable design bearing load for footings and mats under static loads only is 8 ksf. The total maximum allowable design load for combined static loads and dynamic loads resulting from tornado or earthquake is 12 ksf.

As shown in Table 2.7-1, the removal of earth for structures founded below the original ground level substantially reduced the additive load on the soil. The additional building load placed on the soil for each structure, considering relief of load from excavation, is relatively small compared with the allowable static design load of 8 ksf. Settlement of the structure is expected to be similarly low. The relief of load is based on soil density of 120 pcf.

Tests shown in Table 2.6-2 indicate the density of in-place soils below El. 715 ft to vary with depth from approximately 130 to 140 pcf. The nominal density of compacted granular fill is 140 pcf.

The angle of friction and cohesive values of the in-place soil and compacted granular fill are as follows:

	Angle of Internal Friction, ϕ (degrees)	Cohesion Coefficient, C (ksf)
Sand and gravel (in-place)	34	0
Silty clay (in-place)	0	0.4
Compacted granular fill	38	0

2.7.5 Site Design Considerations for Essential Lines

Plot plans of the facility indicating and identifying all essential lines (cooling, power sensing and control) that pass between seismic Category I structures are shown in Figures 2.7-22, 2.7-23, 2.7-24 and 2.7-25. Essential cooling lines are shown in Figure 2.7-23. Leak collection ducting is shown in Figure 2.7-23. Instrument sensing lines are shown in Figure 2.7-24. Electrical cables are shown in Figure 2.7-25. Various measures have been taken to prevent the loss of those lines required to attain and maintain a safe shutdown due to seismic events, missiles from rotating equipment and tornadoes, fires, floods and the collapse of non-seismic Category I structures.

All essential lines shown between buildings have been seismically designed, which includes analysis for adverse building movement.

With the exception of (1) river water lines between the intake structure and the auxiliary building, (2) the demineralized water supply to the auxiliary feedwater pumps, (3) the refueling water storage tank supply to the quench spray and low head safety injection pumps, and (4) the diesel generator-switchgear cable ducts, essential lines pass directly from one seismic Category I structure to another seismic Category I structure, through, at most a 4-inch shake space. As such, these lines are not susceptible to loss due to seismic events, missiles from rotating equipment, tornadoes and the collapse of non-seismic Category I structures.

The measures taken to prevent the loss of the refueling water storage tank and associated lines are discussed in Section 6.4.2. The demineralized water supply lines are protected from missiles from rotating equipment, tornadoes and the collapse of non-seismic Category I structures as they are buried 5.5 ft below grade between the seismic Category I protected demineralized water storage tank and the cable vault area pipe tunnel. The river water lines between the intake structure and the auxiliary building are buried a minimum of 6 ft below grade, thereby protecting them from the aforementioned hazards. Similarly, the underground diesel generator-switchgear cable ducts are protected by burial a minimum of 5 ft below grade and concrete encased.

References for Section 2.7

1. A. Amirikian, "Design of Protective Structures," NavDocks P-51, Bureau of Yards and Docks, Department of the Navy (August 1950).

2. "Wind Forces on Structures", American Society of Civil Engineers Transactions, Vol. 126, Part II, Paper No. 3269 (1961).

3. T. W. Singell, "Forces on Enclosed Structures", Journal of the Structural Division, American Society of Civil Engineers, (July 1958).

4. W. E. Hoecker "Three - Dimensional Pressure Pattern of the Dallas Tornado and Some Resultant Indications", Monthly Weather Review (December 1961).

5. Amman and Whitney, "Industrial Engineering Study to Establish Safety Design Criteria for Use in Engineering of Explosive Facilities and Operations - Wall Response" (April 1963).

6. R. Gwaltney, "Missle Generation in Light Water - Cooled Power Reactor Plants", ORNL-NSIC-22 (September 1968).

7. Interim Standard No. 1 to JPCEA Publication No. S-68-516 (March 1971).

2.8 ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM

2.8.1 Technical Discussion

The objectives of the environmental radiological monitoring program at the Beaver Valley Power Station are twofold: first, to establish the preoperational levels of radioactivity and radiation in the site environment against which potential operational contributions can be measured; and second, to verify the adequate control of the station's radioactive material releases.

The factors that have been considered in the development of the environmental radiological monitoring program include a review of the station environment, a review of the facility's radioactive waste processing systems, an evaluation of the radionuclides anticipated in the normal discharges, and those environmental media that could transport radioactivity. Environmental surveillance involves sampling and determining the radioactivity concentrations in environmental media that could transport radioactivity from its source, both before and after station startup.

The analysis and data interpretation required in the environmental radiological monitoring program includes various statistical procedures used in the laboratory and statistical techniques needed in the interpretation of data.

Alpha and beta measurements are obtained using a low background proportional counter. Specific gamma emitting radionuclides are determined by sodium iodide or gamma spectrometry detection systems.

In the interpretation of the data, various procedures are followed. Data are averaged and reported giving the average and range of the observed values. Where appropriate, the data are compiled according to a number of parameters to show any trends or relationships. Preoperational data will constitute the baseline to which operational data will be compared.

In the operational phase, data is compared to the baseline data to determine the influence of the plant on the environment and the resultant doses to the habitants of the area.

2.8.2 Preoperational Surveillance

The preoperational monitoring program (initiated in January of 1971) was conducted prior to station startup. The program documents seasonal variations in radioactivity as well as possible annual changes. The preoperational program was terminated prior to fuel load and replaced with the operational program.

The media sampled included air, river water, groundwater, drinking water, bottom sediments from the station intake, soil from the station periphery, milk, wildlife, and ambient radiation levels. Species of aquatic organisms that are eaten by man, specifically fish, were also sampled. Algae and other lower forms of aquatic organisms that are not directly a part of man's food chain or exposure route were not sampled, except as their reconcentration effectiveness that was reflected in edible fish of whose diet they may be a part.

The locations, sampling frequencies, and analyses are listed in Table 2.8-1. The number and location of samples was determined by considering the expected spatial distribution of station effluents and points where concentrations of effluents in the environment were expected to be greatest, site meteorological conditions, population distribution, and ease of access to the sampling station. During the preoperational program, the sampling frequency for each type of sample was fixed and was established on the basis of providing enough samples to yield statistically valid results and on the expected frequency of the operational phase of the environmental surveillance program.

2.8.3 Operational Surveillance

The operational program was implemented prior to fuel loading. During operation of the station, the contributions of radioactive material to the environment from the station are due to controlled releases of radioactive gases, airborne particulates and liquids. Measurements of radioactivity in the air and water, therefore, serves as one of the earliest means of detecting changes in environmental radioactivity levels. The evaluation of appropriate environmental media and pathways by which radioactivity is transported through the environment take place in this program. The program is periodically reviewed to determine any changes that may be desirable in its content. Therefore, the extent of sampling may be adjusted if warranted.

The current environmental radiological monitoring program (REMP) requirements are documented in the Offsite Dose Calculation Manual (ODCM). The ODCM contains the site number, sector, distance, sample point, description, sampling and collection frequency, analysis, and analysis frequency for various exposure pathways in the vicinity of the Beaver Valley Power Station (BVPS). These are the minimum requirements for the REMP program and may be supplemented with additional samples, increased collection frequency, and increased analysis requirements. Environmental sampling and analyses include air, water, milk, vegetation, river sediments, fish, soil, and ambient radiation levels in areas surrounding the site.

The results of the REMP program are documented and submitted to the NRC each year in the Annual Radiological Environmental Operating Report.

BVPS UFSAR UNIT 1

TABLES FOR SECTION 2

TABLE 2.1-1

DISTANCE AND DIRECTION FROM REACTOR TO POPULATION CENTERS HAVING MORE THAN ABOUT 20,000 INHABITANTS AND LOCATED WITHIN 50 MILES OF THE SITE(2)(3)(4)

Community	Distance(1) and Direction From the Site (Miles)	Population (1970 Census)
East Liverpool, Ohio	4.7 WNW	20,020
Aliquippa, Pa.	7.6 ESE	22,277
Weirton, West Va.	15.2 SSW	27,131
Steubenville, Ohio	19.4 SSW	30,771
Pittsburgh, Pa.	22.1 SE	520,117
New Castle, Pa.	24.8 NNE	38,559
Youngstown, Ohio	29.0 NNW	139,788
West Mifflin, Pa.	32.0 SE	28,070
Wilkinsburg, Pa.	32.0 ESE	26,780
McKeesport, Pa.	35.4 SE	37,977
Monroeville, Pa.	39.0 ESE	29,011
Wheeling, West Va.	39.5 SSW	48,188
Alliance, Ohio	39.2 NW	26,547
Sharon, Pa.	41.0 N	22,653
Warren, Ohio	44.5 NNW	63,494
Canton, Ohio	49.2 WNW	110,053

(1) Distance to nearest boundary, in miles.

(2) "Description of the Shippingport Atomic Power Station Site and Surrounding Area", WAPD-SC-547, Westinghouse Electric Corporation, (June, 1957).

(3) "1970 Census of Population, Pennsylvania", Bureau of Census, Advance Report PC(VI)-40, U.S. Department of Commerce, (January, 1971).

(4) "1970 Census of Population, Ohio", Bureau of Census, Advance Report PC(VI)-37, U.S. Department of Commerce, (January 1971).

TABLE 2.1-2

LOCAL POPULATION DISTRIBUTION

Radial Distance From Reactor, Miles	Total Estimated Population (1970 Estimates)
0-1	592
1-2	5,772
2-3	3,598
3-4	4,506
4-5	3,644
0-1	592
0-2	6,364
0-3	9,962
0-4	14,468
0-5	18,112

TABLE 2.1-3

PUBLIC FACILITIES AND INSTITUTIONS IN THE VICINITY OF
BEAVER VALLEY POWER STATION

Facility	Location	From BVPS Miles	From BVPS Direction	Average Population
Hospitals				
East Liverpool City Hospital	East Liverpool, Ohio	7	W	176 patients
Osteopathic Hospital	East Liverpool, Ohio	7	W	40
Aliquippa Hospital	Aliquippa, Pa.	7 3/4	E	160
Rochester General Hospital	Rochester, Pa.	10	NE	235
Prisons and Jails				
Midland Jail	Midland, Pa.	2	NW	<10
County Prison System	Beaver, Pa.	8	NE	app. 40
Juvenille Detention Home	Brighton Township	8 1/2	NE	6
Schools				
Midland School District	Combined - Elementary Jr. - Sr. High School	1 2/3 1 1/3	NW NW	1,000 combined

TABLE 2.1-3 (CONT'D)

PUBLIC FACILITIES AND INSTITUTIONS IN THE VICINITY OF BEAVER VALLEY POWER STATION

Facility	Location	From BVPS Miles	From BVPS Direction	Average Population
Western Beaver School District	Fairview Elementary	5	NNW	492
	Snyder Elementary	3 1/3	N	309
	Login Elementary (Ohioview)	3 1/3	NE	117
	Jr. - Sr. High School (Snyder)	3 1/3	N	928
Green Turnpike School District	Hookstown Elem.	3 3/4	S	645
	Hookstown Kinder.	3 3/4	S	95
	Southside High School	3 3/4	S	610
Potter Township School District	Potter Township School	2 1/4	NNE	210
Raccoon Township School District	Raccoon Township School (Elementary)	3 2/3	ESE	327
East Liverpool City School District	Elementary Schools (4 buildings)			2,809
	Junior High School (2 buildings)	7	W	1,362
	High School			1,219
Beaver Local School District	Elementary Schools (2 buildings)			
	Junior High School	10	NW	951
	High School			888

TABLE 2.1-3 (CONT'D)

PUBLIC FACILITIES AND INSTITUTIONS IN THE VICINITY OF BEAVER VALLEY POWER STATION

Facility	Location	From BVPS Miles	From BVPS Direction	Average Population
Institutions				
Beaver County Hospital (old age home)	Brighton Township	8 1/2	NE	550
Parks				
Raccoon Creek St. Park	Hanover Township	8	S	
State Game Land No. 17	Ohioville Township	4	N	
Brady's Run Cty. Park	Brighton Township	9 1/2	NE	
Beaver Creek St. Park	Columbiana County	6 1/2	NNE	
Tomlinson Run St. Park	West Virginia	9	SW	

TABLE 2.1-4

MAJOR EMPLOYERS IN THE VICINITY OF THE BEAVER VALLEY POWER STATION

Product Type	Company	Location	Miles and Direction From Site	Number of[1] Employees 1960	1969
Steel	Jones & Laughlin Steel Company	Aliquippa	11 ESE	13,147	11,751
Steel	Crucible Steel Company	Midland	1 NW	6,492	5,745
Steel	Babcock and Wilcox Company	West Mayfield	13 NNE	4,078	5,480
Electrical	Westinghouse Electric Corporation	Borough Township	8 NE	1,960	2,920
Steel	U. S. Steel Corporation	Ambridge	12 ESE	2,670	2,569
Steel Pipe	Armco Steel Corporation	Ambridge	12 ESE	1,982	2,111
Zinc	St. Joseph Minerals Corporation	Potter Township	6 NE	1,151	1,442
Pottery	Homer Laughlin China Company	Newell, W. Va.	8 W	1,500	1,000[2]
Plastics	Sinclair - Koppers Company	Potter Township	5 NE	1,087	991
Steel	E. W. Bliss Company	Midland	1 NW	300	352

[1] Source: Pennsylvania Department of Commerce

[2] East Liverpool Chamber of Commerce Estimate

TABLE 2.1-5

STATISTICS FOR MANUFACTURING INDUSTRIES BEAVER COUNTY, 1969

Money Figures in Thousands of Dollars

Manufacturing Industries	Number of Establishments	Capital Expenditures	Employment	Wages and Salaries	Value of Production
Primary metal	23	$58,090	29,233	$261,353	$1,082,924
Fabricated metal	25	1,694	4,761	37,954	137,919
Machinery	23	391	663	5,136	17,263
Electrical machinery	3	1,141	3,562	27,224	107,001
Stone, clay, glass	25	662	1,889	12,912	32,984
Chemicals	8	4,498	1,333	10,982	91,292
Food products	34	295	593	3,915	15,295
Printing products	19	106	342	2,230	5,278
Total all industries(1)	180	$67,157	43,330	$336,823	$1,513,549

(1) Total includes minor industries which are not shown in table

Source: Pennsylvania Department of Commerce

TABLE 2.1-6

SOUTHWESTERN PENNSYLVANIA PROVISIONAL EMPLOYMENT FORECAST

(Thousands of Employed Persons)

Industry Group	1970	2000	Percent Change 1970-2000
MANUFACTURING	342.4	305.1	-11
Selected manufacturing groups			
Primary metals	138.4	98.1	-29
Fabricated metals & machinery	103.2	116.0	12
Stone, clay and glass	20.6	13.0	-37
Transportation equipment	13.3	20.0	50
Chemicals	9.7	10.0	3
NONMANUFACTURING	643.3	1089.9	69
Selected nonmanufacturing groups			
Services	196.5	446.0	127
Trade	190.5	295.0	55
Government	79.3	179.0	126
Construction	50.0	42.0	-16
Mining	10.7	3.0	-72
Agriculture	8.6	6.0	-30
TOTAL EMPLOYMENT	985.7	1395.0	+42

SOURCE: Provisional Employment and Population Forecasts, prepared by Southwestern Pennsylvania Regional Planning Commission June, 1968.

TABLE 2.1-7
AIRPORTS IN VICINITY OF BEAVER VALLEY POWER STATION

Airport	Distance (Miles) From Beaver Valley	Direction From Beaver Valley
Aliquippa Hopewell (c)	7.5	ESE
Herrom (c)	8.5	SSW
Beaver Co. (c)	10.5	NNE
Black Rock (c) (p)	11.0	NE
Johnston (c) (nf) (p)	12.0	W
Columbiana (c) (nf)	12.0	WNW
Greater Pittsburgh Inter- national Airport (c) (m)	15.0	SE

Key to abbreviations

c = Civil airport

p = Private airport

nf = No facilities

m = Military airport

SOURCE: Sectional Aeronautical Chart, U. S. Coast and Goedetic Survey

TABLE 2.1-8
BEAVER COUNTY AGRICULTURAL DATA

		1965	1969
Estimated Number of Farms		878	750
Acres Harvested			
Field and forage crops		25,900	29,600
Vegetable crops		180	150
Livestock and Poultry on Farms			
All Cattle		13,200	12,500
Hogs		1,800	1,700
Sheep		2,700	1,800
All chickens		116,000	115,000
Average number of cows milked		4,800	4,300
Cash Receipts for Sale of Agricultural Crops			
Field crops		$ 153,000	$ 374,000
Vegetables		63,000	107,000
Forest products		19,000	54,000
Fruits		127,000	88,000
Horticulture specialties		308,000	415,000
	Total	$ 607,000	$1,038,000
Cash Receipts from Sale of Livestock Products			
Meat animals		$ 694,000	$ 577,000
Dairy products		1,752,000	2,157,000
Poultry products		606,000	637,000
	Total	$3,052,000	$3,371,000
Government payments		95,000	111,000
Total cash receipts and payments		$3,817,000	$4,520,000
Average cash receipts per farm		$ 4,347	$ 6,027

SOURCE: Pennsylvania Department of Agriculture

TABLE 2.1-9a

PRINCIPAL AGRICULTURAL PRODUCTS IN 1969

Products	Acreage Harvested	Yield[1]	Total Production[1]
Field Crops			
Corn, grain	3,800	78B	296,400B
Corn, sileage	2,400	14.5T	34,800T
Wheat	1,500	32B	48,000B
Oats	3,400	54B	184,000B
Barley	1,500	49B	73,000B
Grass sileage	1,400	57T	8,000T
Hay	16,400	20T	32,300T
Potato	40	200 cwt	8,000 cwt
Fruit Crops			
Apples	___	________	44,400 43E
Peaches	___	________	1,300 42E
Tart Cherries	___	________	3,000B

Total acres harvested = 29,600

Vegetables)
Snap beans)
Cabbage) Total acres harvested = 150
Corn)
Tomatoes)

(1) Key to Units
B = Bushels
T = Tons
cwt = Hundredweight
42E = 42 pound equivalent

SOURCE: Pennsylvania Department of Agriculture

TABLE 2.1-9b

PRINCIPAL AGRICULTURAL PRODUCTS IN 1969

PRODUCTS

<u>Livestock and Livestock Products</u>

Milk
- Number of cows - 4,300 milk cows
- Milk yield - 8,900 lb/cow/yr
- Total milk produced - 38,270,000 lb

Livestock Inventory
- Cows - 5,100, 2 year or older
- Heifers - 3,600
- Beef animals - 3,800
- Hogs - 1,700
- Sheep - 1,800

Poultry Inventory
- Hens - 55,000
- Pullets - 59,000
- Other - 400
- Farming chickens and turkeys - 50,000
- Broilers - 11,000

Eggs
- Number of layers - 101,000
- Egg yield - 203 eggs/yr
- Total egg production - 20,500,000 eggs

SOURCE: Pennsylvania Department of Agriculture

TABLE 2.1-10

FISH POPULATION, OHIO RIVER,
AT MONTGOMERY LOCK AND DAM (MILE POINT 31.7) FOR
SEPTEMBER 19, 1968

Species	Number	Weight, lb
Gizzard shad	79	13.27
Carp	146	78.79
Emerald shiner	7	0.01
Spotfin shiner	1	0.01
Sand shiner	4	0.01
Mimic shiner	19	0.01
Bluntnose minnow	6	0.01
Black bullhead	3	0.09
Yellow bullhead	117	1.87
Brown bullhead	85	11.24
Channel catfish	150	4.78
Golden redhorse	1	0.80
Pumpkinseed[(1)]	26	0.76
Bluegill[(1)]	25	0.28
Green sunfish[(1)]	21	0.41
Rock bass[(1)]	3	0.04
Largemouth bass[(1)]	2	0.90
Black crappie[(1)]	46	3.03
Walleye[(1)]	1	0.60
Total - 19 species	742	116.86

(1) Game fish represent 6.02 lb or 5.15 percent of the total sample.

TABLE 2.1-11

FISHING AREAS IN VICINITY OF BEAVER VALLEY POWER STATION

Name of Fishing Area	Distance and Direction from BVPS		Fish Species Present(1)
Mill Creek	3	SW	t, s
Brady Run Lake	7-1/2	NE	lm, t, sf, b, s, cr, y, c, cc, w, bg
Raccoon State Park Lake	8	S	lm, w, y, cr, sf, b, s, c, t, bg, sm
Traverse Creek	8	S	t, s

(1) Species of fish are abbreviated.
The following is the key to the abbreviations:

b	Bullhead	s	Sucker
bg	Bluegill	sf	Sunfish
c	Carp	t	Trout
cc	Channel catfish	w	Walleye
cr	Crappie	y	Yellow perch
lm	Largemouth bass		

SOURCE: Pennsylvania Fish Commission

TABLE 2.1-12

DOWNSTREAM POTABLE WATER INTAKES

Downstream Distance, Miles	Town	Population[(1)]
1.3	Midland, Pa.	5,271
5	East Liverpool, Ohio	20,020
7	Chester, West Va.	3,614
12	Wellsville, Ohio	5,891
24	Toronto, Ohio	7,705
27	Weirton, West Va.	27,131
30	Steubenville, Ohio	30,771
36	Mingo Junction, Ohio	5,278
52	Wheeling, West Va.	48,188
54	Martins Ferry, Ohio	10,757
59	Bellaire, Ohio	9,655

(1) Based on the 1970 Census

TABLE 2.1-13

AREA POPULATION-1970

Direction	0 to 1 Miles	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	4 to 5 Miles	5 to 10 Miles	10 to 20 Miles	20 to 30 Miles	30 to 40 Miles	40 to 50 Miles
NNE	0	280	212	200	232	7,093	45,103	18,869	13,477	22,332
NE	148	136	400	856	296	20,795	26,384	13,020	17,322	9,341
ENE	84	80	164	200	124	12,697	19,181	19,899	44,868	27,699
E	8	52	428	488	132	8,080	35,547	53,100	111,349	52,407
ESE	32	200	136	304	276	7,726	51,692	585,196	469,216	109,040
SE	4	96	244	104	44	792	12,000	225,484	145,189	101,589
SSE	4	16	52	80	252	783	8,092	35,374	60,087	23,398
S	0	20	208	128	248	431	6,971	7,122	6,947	4,568
SSW	12	36	92	188	707	431	32,795	56,709	40,668	105,109
SW	0	48	406	216	156	4,004	19,954	20,442	12,263	10,474
WSW	0	8	188	96	80	7,145	6,075	5,354	5,802	11,188
W	0	12	48	72	60	23,651	8,132	4,254	14,645	19,751
WNW	16	24	12	310	520	5,717	4,462	8,862	37,052	105,073
NW	264	4,480	808	800	596	1,770	5,358	32,691	14,085	23,297
NNW	20	264	88	80	196	1,566	8,888	37,893	265,416	140,781
N	0	20	112	384	292	2,327	6,418	58,796	26,024	67,644

TABLE 2.1-13 (CONT'D)

AREA POPULATION ESTIMATE FOR 1980[1]

Direction	0 to 1 Miles	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	4 to 5 Miles	5 to 10 Miles	10 to 20 Miles	20 to 30 Miles	30 to 40 Miles	40 to 50 Miles
NNE	0	276	209	197	229	6,996	45,579	19,999	14,556	23,820
NE	146	134	395	844	292	20,512	26,508	13,948	19,106	10,276
ENE	83	79	162	197	122	12,524	19,468	21,948	49,490	30,552
E	8	51	422	481	130	7,970	35,485	54,112	112,587	54,175
ESE	32	197	134	300	272	7,621	52,276	594,510	476,134	108,669
SE	4	95	241	103	43	782	12,180	228,765	147,067	101,699
SSE	4	16	51	79	249	772	8,098	35,279	59,907	23,612
S	0	20	205	126	245	425	6,950	7,101	6,935	4,805
SSW	12	36	91	185	727	425	35,951	60,580	42,119	108,301
SW	0	47	400	213	154	4,196	21,139	21,246	12,972	10,952
WSW	0	8	185	95	79	7,888	6,469	5,582	6,188	12,152
W	0	12	47	71	59	25,390	8,723	4,534	15,602	21,847
WNW	16	24	12	306	513	6,128	4,784	9,499	40,639	117,838
NW	260	4,419	797	789	588	1,864	5,744	35,048	15,146	27,922
NNW	20	260	87	79	193	1,554	9,436	40,657	288,641	164,414
N	0	20	110	379	288	2,296	6,465	62,291	28,372	72,537

(1) Projected from 1970 Census data.

TABLE 2.1-13 (CONT'D)

AREA POPULATION ESTIMATE FOR 1990[1]

Direction	0 to 1 Miles	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	4 to 5 Miles	5 to 10 Miles	10 to 20 Miles	20 to 30 Miles	30 to 40 Miles	40 to 50 Miles
NNE	0	272	206	195	226	6,901	46,112	21,197	15,727	25,412
NE	144	132	389	833	288	20,223	26,681	14,974	21,074	11,306
ENE	82	78	160	195	121	12,354	19,808	24,209	54,587	33,699
E	8	51	416	475	128	7,862	35,429	55,162	113,892	56,138
ESE	31	195	132	296	269	7,517	52,874	604,004	483,156	108,302
SE	4	93	237	101	43	771	12,363	232,094	148,975	101,821
SSE	4	16	51	78	245	762	8,104	35,184	59,727	23,851
S	0	19	202	125	241	419	6,930	7,080	6,923	5,062
SSW	12	35	90	183	749	419	39,436	64,803	43,654	111,638
SW	0	47	395	210	152	4,400	22,412	22,081	13,725	11,462
WSW	0	8	183	93	78	8,708	6,892	5,820	6,599	13,202
W	0	12	47	70	58	27,259	9,356	4,833	16,625	24,174
WNW	16	23	12	302	506	6,570	5,128	10,181	44,594	132,217
NW	257	4,359	786	778	580	1,966	6,157	37,576	16,295	33,627
NNW	19	257	86	78	191	1,544	10,024	43,624	314,207	192,016
N	0	19	109	374	284	2,264	6,519	65,993	30,989	77,832

(1) Projected from 1970 Census data.

TABLE 2.1-13 (CONT'D)

AREA POPULATION ESTIMATE FOR 2000[1]

Direction	0 to 1 Miles	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	4 to 5 Miles	5 to 10 Miles	10 to 20 Miles	20 to 30 Miles	30 to 40 Miles	40 to 50 Miles
NNE	0	269	203	192	223	6,807	46,707	22,468	16,999	27,112
NE	142	131	384	822	284	19,958	26,906	16,109	23,245	12,441
ENE	81	77	157	192	119	12,186	20,204	26,702	60,210	37,170
E	8	50	411	468	127	7,755	35,381	56,252	115,266	58,319
ESE	31	192	131	292	265	7,415	53,487	613,682	490,284	107,936
SE	4	92	234	100	42	761	12,548	235,474	150,912	101,956
SSE	4	15	50	77	242	751	8,110	35,089	59,548	24,118
S	0	19	200	123	238	413	6,909	7,058	6,911	5,342
SSW	12	35	88	180	771	413	43,285	69,415	45,280	115,128
SW	0	46	390	207	150	4,616	23,781	22,949	14,526	12,007
WSW	0	8	180	92	77	9,614	7,348	6,068	7,039	14,344
W	0	12	46	69	58	29,266	10,035	5,152	17,721	26,757
WNW	15	23	12	298	499	7,043	5,497	10,912	48,954	148,432
NW	253	4,300	775	468	572	2,074	6,601	40,286	17,540	40,693
NNW	19	253	84	77	188	1,535	10,655	46,807	342,395	224,254
N	0	19	107	369	280	2,234	6,580	69,916	33,912	83,569

1. Projected from 1970 Census data.

TABLE 2.1-13 (CONT'D)

AREA POPULATION ESTIMATE FOR 2010[1]

Direction	0 to 1 Miles	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	4 to 5 Miles	5 to 10 Miles	10 to 20 Miles	20 to 30 Miles	30 to 40 Miles	40 to 50 Miles
NNE	0	265	201	189	220	6,175	47,365	23,815	18,380	28,930
NE	140	129	379	810	280	19,686	27,188	17,363	25,639	13,692
ENE	80	76	155	189	117	12,020	20,662	29,453	66,411	40,998
E	8	49	405	462	125	7,649	35,340	57,386	116,718	60,739
ESE	30	189	129	288	261	7,314	54,115	623,550	497,519	107,573
SE	4	91	231	98	42	750	12,736	238,905	152,879	102,104
SSE	4	15	49	76	239	741	8,117	34,994	59,369	24,415
S	0	19	197	121	235	408	6,888	7,037	6,899	5,646
SSW	11	34	87	178	794	408	47,539	74,458	47,007	118,783
SW	0	45	384	204	148	4,847	25,256	23,851	15,376	12,590
WSW	0	8	178	91	76	10,613	7,838	6,328	7,507	15,589
W	0	11	45	68	57	31,422	10,764	5,492	18,896	29,627
WNW	15	23	11	293	492	7,550	5,893	11,695	53,763	166,743
NW	250	4,241	765	757	564	2,192	7,076	43,192	18,893	49,472
NNW	19	250	83	76	186	1,526	11,334	50,222	373,523	261,905
N	0	19	106	364	276	2,203	6,650	74,073	37,183	89,791

1. Projected from 1970 Census data.

TABLE 2.1-13 (CONT'D)

AREA POPULATION ESTIMATE FOR 2020[1]

Direction	0 to 1 Miles	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	4 to 5 Miles	5 to 10 Miles	10 to 20 Miles	20 to 30 Miles	30 to 40 Miles	40 to 50 Miles
NNE	0	261	198	187	217	6,623	48,091	25,245	19,881	30,874
NE	138	127	374	799	276	19,419	27,533	18,750	28,280	15,072
ENE	78	75	153	187	116	11,857	21,189	32,486	73,251	45,221
E	7	49	400	456	123	7,545	35,306	58,566	118,253	63,422
ESE	30	187	127	284	258	7,214	54,758	633,615	504,863	107,212
SE	4	90	228	97	41	740	12,927	242,388	154,877	102,267
SSE	4	15	49	75	235	731	8,125	34,901	59,191	24,744
S	0	19	194	120	232	402	6,867	7,016	6,888	5,976
SSW	11	34	86	176	818	402	52,238	79,978	48,843	122,612
SW	0	45	379	202	146	5,092	26,845	24,790	16,281	13,215
WSW	0	7	176	90	75	11,717	8,366	6,600	8,007	16,944
W	0	11	45	67	56	33,738	11,547	5,855	20,155	32,815
WNW	15	22	11	289	486	8,093	6,318	12,535	49,070	187,451
NW	247	4,184	755	747	557	2,318	7,585	46,306	20,366	60,418
NNW	19	247	82	75	183	1,519	12,062	53,887	407,953	305,881
N	0	19	105	359	273	2,173	6,728	78,477	40,853	96,552

1. Projected from 1970 Census data.

Table 2.1-14

STANDARD GAS BASIS

Service	Operating Pressure (psia)	Design Pressure (psia)	Max Pressure (psia)	Location	Total Energy Stored (Btu's)
Nitrogen (Plant Heating)	2,490	2,490	4,000	S.E. Corner of Service Building	$9.8X10^{3}$
Propane Storage	189.7	264.7	264.7	South of Warehouse & North of Turbine Building	$11.11X10^{6}$ $11.11X10^{6}$
	189.7	264.7	264.7	75 feet south of the Alternate Intake Structure (4 mo./yr.)	$36.64X10^{7}$
Hydrogen Makeup	2,014.1	4,000	4,000	Storage Pad Adjacent to South Coolant Recovery Tank Cubicle (BR-TK-4B)	$3.26X10^{4}$
Hydrogen for Turbine Generator	2,314.7	2,464.7	2,464.7	North of Turbine Building	$3.75X10^{5}$

TABLE 2.1-14 (CONT'D)

STANDARD GAS BASIS

Service	Operating Pressure (psia)	Design Pressure (psia)	Max Pressure (psia)	Location	Total Energy Stored (Btu's)
Air Storage Diesel Generators	214.7	289.7	289.7	Diesel Generator Building	$3.58X10^4$
CO_2 Storage	314.7	377.7	371.7	1 Unit East of Turbine Building	$4.7X10^5$
				1 Unit in Separate Structure Adjacent to Diesel Generator Building	$9.4X10^5$

TABLE 2.1-15

PIPELINE LEAKAGE DETECTION AND ISOLATION

Company[1]	Ashland Pipeline Co.	Buckeye Pipeline Co.	Laurel Pipeline Co.	Mobil Pipeline Co.	National Transit
1. How is leak detected? (Pressure or level drop or visual indication on ground or in river.)	1. Pressure drop and visual inspection of line on regular basis. Line is monitored continuously from Ashland, Ky. and East Sparta, Ohio. Volumetric metering also.	1. Pressure drop and routine air patrol. Line is monitored continuously from Macungie, Pa. Main dispatch center also Midland, Pa. & Co.	1. Pressure drop. Line is monitored continuously from Camp Hill, Pa. and Aliquippa Station, Beaver Co. Pa. Also Volumetric metering.	1. Pressure drop. Volumetric metering and visual inspection (air patrol) line is monitored continuously from Plainfield, N.J.	1. Pressure drop. Line is monitored continuously from Meadowlands, Pa.
2. Who is to be notified to close isolation valves in leaking oil line on either side of the river?	Refer to Emergency Preparedness Plan Implementing Procedure 1.1	Refer to Emergency Preparedness Plan Implementing Procedure 1.1	Refer to Emergency Preparedness Plan Implementing Procedure 1.1	Refer to Emergency Preparedness Plan Implementing Procedure 1.1	Refer to Emergency Preparedness Plan Implementing Procedure 1.1
2a. Tanks on Midland side of river?		2a. Mobile Oil & Exxon Tanks supplied by Buckeye.		2a. Mobil Oil Tanks supplied by Mobil Pipeline Co.	
3. How are valves closed local or remote?	3. Both manual (local). (Nearest pumping stations for line isolation are Rogers, Ohio, and Freedom, Pa.)	3. Both manual (local). (Nearest pumping stations for line isolation are Midland, Pa. and Coraopolis, Pa.)	3. Both manual (local). (Nearest pumping stations for line isolation are Aliquippa, Pa. and Ellsworth, Ohio.)	3. Valve on B.V. site is manual. Midland valve is remote. (Personnel located at Midland, Pa. and McKees Rocks, Pa. and Irwin, Pa.)	3. Both manual (local). (Nearest pumping station for line isolation are Meadowlands, Pa.)

TABLE 2.1-15 (CONT'D)

PIPELINE LEAKAGE DETECTION AND ISOLATION

Company[1]	Ashland Pipeline Co.	Buckeye Pipeline Co.	Laurel Pipeline Co.	Mobil Pipeline Co.	National Transit
4. How long will it take to close valves from time of notification?	4. Approx. 1 hour.	4. Less than an hour.	4. Approx. 1 hour.	4. Within an hour.	4. Less than an hour.
5. Is oil tank located southeast of bridge approach in use?					5. No. No plans presently for future use.

Note: 1. Pipeline company at time of BVPS-1 licensing.

TABLE 2.1-16

MATERIALS UTILIZING CRUDE OIL AS THE DESIGN FLUID

Type 304 Stainless Steel[1]

Oil	Temperature, F	Corrosion Rate (Mils/yr)*
West Texas and Michigan Crude	200 to 250	25

Carbon Steel[2]

Oil	Temperature, F	Corrosion Rate (Mils/yr)*
Pennsylvania Crude	800	79
Naptha	650	79
Light Gas Oils	775	238
Heavy Gas Oils	825	158
Topped Crude	800	79

90-10 Copper Nickel[3]

Oil	Temperature, F	Corrosion Rate (Mils/yr)*
West Texas Crude (with 0.1. w/o (Sulfur)	290 to 295	74

* This corrosion rate was magnified since the crude oil pH was maintained at 7 to 8 with ammonia which is known to be deleterious to copper alloys.

Bronze Since bronze would be a poor technical-economic choice for the petroleum industry, data is lacking. However, its corrosion rate would approximate, but not exceed, that of carbon steel.

Neoprene[4] Neoprene is nearly impervious to crude oils. Neoprene hose is standard dockside equipment for unloading ocean- going tankers carrying crude oils. The projected response of neoprene to crude oils is swelling over a 4 to 5 month period. The maximum swelling would be 15 percent in this period. Under the design accident duration of one hour, no measurable effect is to be expected[5].

(1) E. N. Skinner, et al., "High Temperature Corrosion in Refinery and Petrochemical Service," Corrosion, Vol 16, p. 85, (December, 1960).

(2) Armstead, Jr., "Safety in Petroleum Refining and Related Industries," John G. Simmonds and Company, Inc., New York, N.Y., first edition, p. 277, (1950).

TABLE 2.1-16

MATERIALS UTILIZING CRUDE OIL AS THE DESIGN FLUID

(3) F. L. Laque, "Corrosion Resistance of Cupronickel Alloys Containing 10-30 Percent Nickel," Corrosion, Vol 10, p. 396, (November, 1954).

(4) "Dupont Neoprene," E. I. Dupont, Engineering, Report A-33448, (revised November, 1969).

(5) Personal Communication, Dupont Elastomer Chemical Department, 140 Federal Street, Boston, Mass.

TABLE 2.1-17

PEAK "SIDE-ON" OVERPRESSURES AND DYNAMIC PRESSURES

Hazard	Closest Safety-Related Structure	Distance, Ft	Peak Dynamic Pressure, Psi	Peak Overpressure Psi
Railway Explosion	Control Room	2,065	.007	.54
Gasoline Barge Explosion	Control Room	710	.0022	.29
Highway Explosion	Auxiliary Building	1,250	.011	.67

TABLE 2.2-1

CLIMATOLOGICAL AVERAGES[1]

Month	Temperature (F)	Precipitation (Inches)	Snowfall (Inches)	Average Number Thunderstorms
January	28.9	2.97	10.8	<1
February	29.2	2.19	10.5	<1
March	36.8	3.32	9.9	2
April	49.0	3.08	2.0	4
May	59.8	3.91	0.3	5
June	68.4	3.78	0.0	6
July	72.1	3.88	0.0	7
August	70.8	3.31	0.0	6
September	64.2	2.54	0.0	3
October	53.1	2.52	0.2	2
November	40.8	2.24	3.9	<1
December	30.7	2.40	8.4	<1
Annual	50.3	36.14	46.0	35

(1) Based on Pittsburgh data, 1870-1967

TABLE 2.2-2

CLIMATOLOGICAL EXTREMES (1870-1967)[1]

	Pittsburgh
Maximum Temperature, F	103 (July, 1936)
Minimum Temperature, F	-20 (Feb., 1899)
Maximum Monthly Precipitation, inches	10.25 (June, 1951)
Maximum 24-Hr Precipitation, inches	4.08 (Sept., 1876)
Minimum Monthly Precipitation, inches	0.06 (Oct., 1874)
Maximum Monthly Snowfall, inches	36.30 (Dec., 1890)
Maximum 24-Hr Snowfall, inches	17.50 (Nov., 1950)
Fastest Mile Wind, mph	58 (Feb., 1967)

(1) Local Climatological Data and Summaries for Pittsburgh and Pennsylvania, U. S. Weather Bureau Publications.

TABLE 2.2-3

EXTREME MILE WINDS

Probability	Wind Speed (mph)	Extreme Gusts (mph)	Recurrence Interval Years
0.50	48	63	2
0.10	62	81	10
0.04	70	91	25
0.02	76	99	50
0.01	84	110	100

TABLE 2.2-4
JOINT FREQUENCY DATA

50 ft Level Wind Data | 50 and 150 ft Level Temperature

Wind Speed	Horizontal Stability	Vertical Stability	X/Q	Frequency	Cumulative	Remarks
1.0	G	G		0.05	0.05	
1.0	F	G		0.21	0.26	
1.0	G	F		0.08	0.34	
2.0	G	G		0.0	0.34	
1.0	E	G		0.73	1.07	
1.0	F	F		0.17	1.24	
1.0	G	E		0.04	1.28	
1.0	D	G		0.69	1.97	
3.0	G	G		0.0	1.97	
2.0	F	G		0.59	2.56	
2.0	G	F		0.02	2.58	
1.0	G	D		0.0	2.58	
			2.11×10^{-3}			Using all Bendix calms, effective F and 0.64
1.0	E	F		0.27	2.85	
4.0	G	G		0.0	2.85	
1.0	F	E		0.35	3.20	
			1.83×10^{-3}			Using only Bendix nighttime calms, effective F and 0.73
2.0	E	G		1.13	4.33	
1.0	C	G		0.29	4.62	
			1.62×10^{-3}			Using all P-Bell calms, effective F and 0.84
1.0	D	F				
3.0	F	G				
3.0	G	F				
4.0	G	G				
2.0	F	F				
2.0	G	E				

TABLE 2.2-5

DESIGN BASIS ACCIDENT AND EXTENDED RELEASE METEOROLOGICAL CONDITIONS

Period	Pasquill Class	Mean Wind Speed (m/second)	Fi*fi	Wind Direction
0-2 hours	F	0.84	1.0	Invariant
2-24 hours	F	0.84	1.0	Sector Average
24-96 hours	D	2.0	0.25	Sector Average
	F	0.9	0.25	Sector Average
4 days	D	1.5	0.020	Sector Average
30 days	E	1.0	0.020	Sector Average
	F	0.9	0.020	Sector Average
	G	1.4	0.025	Sector Average

TABLE 2.2-6

AVERAGE MONTHLY RELATIVE HUMIDITY (PERCENT) AND ABSOLUTE HUMIDITY (gm/m^3) AT BEAVER VALLEY

BASED ON SEPTEMBER 6, 1970 - SEPTEMBER 5, 1972 DATA

Month	Relative Humidity (Percent)	Absolute Humidity (gm/m^3)
January	89.0	3.1
February	77.3	2.6
March	44.2	2.3
April	56.9	4.7
May	70.4	8.4
June	80.4	14.2
July	76.3	14.6
August	77.7	13.5
September	81.4	13.6
October	78.9	9.2
November	74.5	5.5
December	62.8	3.8

TABLE 2.2-7

χ/Q (SEC/M^3) FOR 158 METER RELEASE - BASED ON THE JOINT FREQUENCY OF BENDIX-FRIEZ 150 FOOT WIND DATA AND ΔT (150'-50') TEMPERATURE DATA FOR THE PERIOD SEPTEMBER 5, 1970 - SEPTEMBER 4, 1971

Time Period	Exclusion Distance, Unit 1 - 610 meters		Exclusion Distance, Unit 2 - 456 meters	
0-2 hours	worst case	2.2×10^{-4}	worst case	2.5×10^{-4}
	5% probability level	8.4×10^{-7}	5% probability level	1.5×10^{-7}
	50% probability level	8.1×10^{-27}	50% probability level	8.7×10^{-40}
	Outer Boundary of Low Population Zone (3.6 miles - 5,794 meters)			
0-8 hours	worst case	1.0×10^{-5}		
	5% probability level	1.5×10^{-6}		
	50% probability level	1.3×10^{-7}		
	Outer Boundary of Low Population Zone (3.6 miles - 5,794 meters)			
8-24 hours	worst case	5.1×10^{-6}		
	5% probability level	7.5×10^{-7}		
	50% probability level	1.1×10^{-7}		

TABLE 2.2-7 (CONT'D)

χ/Q (SEC/M^3) FOR 158 METER RELEASE - BASED ON THE JOINT FREQUENCY
OF BENDIX-FRIEZ 150 FOOT WIND DATA AND ΔT (150'-50') TEMPERATURE DATA
FOR THE PERIOD SEPTEMBER 5, 1970 - SEPTEMBER 4, 1971

Time Period	Exclusion Distance, Unit 1 - 610 meters		Exclusion Distance, Unit 2 - 456 meters
	Outer Boundary of Low Population Zone (3.6 miles - 5,794 meters)		
1-4 days	worst case	1.3×10^{-6}	
	5% probability level	6.3×10^{-7}	
	50% probability level	8.2×10^{-8}	
	Outer Boundary of Low Population Zone (3.6 miles - 5,794 meters)		
4-30 days	worst case	(1)	
	5% probability level	(1)	
	50% probability level	(1)	

(1) No consecutive observations of 624 hours (26 days); i.e., there was always a missing wind and/or temperature measurement in any 624 hour period.

TABLE 2.2-8

χ/Q (SEC/M^3) AT THE OUTER BOUNDARY OF THE LOW POPULATION ZONE (3.6 MILES - 5,794 METERS) FOR A GROUND LEVEL RELEASE - BASED ON THE JOINT FREQUENCY OF PACKARD BELL 50 FOOT WIND DATA AND ΔT (150'-50') TEMPERATURE DATA FOR THE PERIOD SEPTEMBER 5, 1970 - SEPTEMBER 4, 1971

Time Period		
0-8 hours	worst case	1.6×10^{-4}
	5% probability level	2.6×10^{-5}
	50% probability level	4.0×10^{-6}
8-24 hours	worst case	8.2×10^{-5}
	5% probability level	2.3×10^{-5}
	50% probability level	3.9×10^{-6}
1-4 days	worst case	2.3×10^{-5}
	5% probability level	1.3×10^{-5}
	50% probability level	2.8×10^{-6}
4-30 days	worst case	(1)
	5% probability level	(1)
	50% probability level	(1)

(1) No consecutive observations of 624 hours (26 days); i.e., there was always a missing wind and/or temperature measurement in any 624 hour period.

TABLE 2.2-9

ANNUAL AVERAGE ATMOSPHERIC DIFFUSION FACTORS (X/Q)
FOR A 158 METER RELEASE FOR 16 RADIAL SECTORS TO 50 MILES
(USING SITE METEOROLOGICAL DATA)

**** ANNUAL AVERAGE **** BEAVER VALLEY 50 FT WIND DATA - DELTA T - 9/5/70-9/5/71

CHI/Q FOR RELEASE HEIGHT OF * 1.5800E+02 METERS * (IN SEC PER CU METER)

DIST,M	SSW	SW	WSW	W	WNW	NW	NNW	N
2.0000E+02	8.9518E-13	6.8382E-13	4.0407E-13	3.7299E-14	1.9893E-13	1.8650E-13	1.3676E-13	6.9001E-20
4.0000E+02	6.9423E-09	5.2240E-09	3.0997E-09	3.5460E-10	1.5656E-09	1.4963E-09	1.0712E-09	3.1933E-11
6.0000E+02	1.0547E-08	6.5497E-09	4.1118E-09	1.7820E-09	2.9010E-09	3.3799E-09	1.9177E-09	7.5840E-10
8.0000E+02	9.1642E-09	4.4040E-09	3.0096E-09	3.5528E-09	4.0594E-09	5.9757E-09	2.8522E-09	2.6266E-09
1.2000E+03	7.4859E-09	4.4578E-09	2.7954E-09	5.5965E-09	7.2925E-09	1.2386E-08	5.8840E-09	7.0293E-09
1.6000E+03	6.4680E-09	5.2675E-09	3.0314E-09	6.0127E-09	8.8795E-09	1.5296E-08	7.4276E-09	9.0149E-09
2.4000E+03	5.3659E-09	6.0222E-09	3.4648E-09	6.0581E-09	1.0474E-08	1.6812E-08	8.5350E-09	9.7850E-09
3.2000E+03	5.7131E-09	7.1159E-09	4.5023E-09	7.0596E-09	1.2950E-08	1.8685E-08	9.8442E-09	1.0696E-08
4.0000E+03	7.1610E-09	8.6151E-09	6.0982E-09	8.9174E-09	1.5936E-08	2.0889E-08	1.1237E-08	1.2149E-08
4.8000E+03	9.1219E-09	1.0205E-08	7.9056E-09	1.1105E-08	1.8839E-08	2.2869E-08	1.2428E-08	1.3749E-08
5.6000E+03	1.1084E-08	1.1622E-08	9.5946E-09	1.3167E-08	2.1282E-08	2.4371E-08	1.3310E-08	1.5173E-08
6.4000E+03	1.2767E-08	1.2738E-08	1.0986E-08	1.4864E-08	2.3116E-08	2.5339E-08	1.3872E-08	1.6267E-08
7.2000E+03	1.4075E-08	1.3532E-08	1.2032E-08	1.6127E-08	2.4348E-08	2.5823E-08	1.4154E-08	1.7003E-08
8.0000E+03	1.5020E-08	1.4040E-08	1.2755E-08	1.6984E-08	2.5060E-08	2.5911E-08	1.4212E-08	1.7418E-08
8.8000E+03	1.5653E-08	1.4315E-08	1.3206E-08	1.7499E-08	2.5357E-08	2.5700E-08	1.4101E-08	1.7571E-08
9.6000E+03	1.6038E-08	1.4411E-08	1.3442E-08	1.7742E-08	2.5338E-08	2.5272E-08	1.3870E-08	1.7521E-08
1.0400E+04	1.6231E-08	1.4376E-08	1.3514E-08	1.7778E-08	2.5088E-08	2.4695E-08	1.3558E-08	1.7323E-08
1.1200E+04	1.6281E-08	1.4245E-08	1.3463E-08	1.7661E-08	2.4674E-08	2.4022E-08	1.3192E-08	1.7020E-08
1.2000E+04	1.6225E-08	1.4048E-08	1.3323E-08	1.7433E-08	2.4147E-08	2.3290E-08	1.2795E-08	1.6644E-08
1.2800E+04	1.6092E-08	1.3807E-08	1.3120E-08	1.7127E-08	2.3547E-08	2.2529E-08	1.2382E-08	1.6222E-08
1.4400E+04	1.5679E-08	1.3246E-08	1.2599E-08	1.6376E-08	2.2237E-08	2.0994E-08	1.1549E-08	1.5307E-08
1.5200E+04	1.5427E-08	1.2947E-08	1.2305E-08	1.5963E-08	2.1562E-08	2.0244E-08	1.1142E-08	1.4839E-08
1.6000E+04	1.5157E-08	1.2645E-08	1.2003E-08	1.5540E-08	2.0890E-08	1.9515E-08	1.0747E-08	1.4374E-08
1.6800E+04	1.4877E-08	1.2343E-08	1.1696E-08	1.5115E-08	2.0229E-08	1.8811E-08	1.0365E-08	1.3917E-08
1.7600E+04	1.4592E-08	1.2044E-08	1.1389E-08	1.4693E-08	1.9584E-08	1.8135E-08	9.9991E-09	1.3471E-08
1.8400E+04	1.4304E-08	1.1751E-08	1.1086E-08	1.4277E-08	1.8959E-08	1.7489E-08	9.6485E-09	1.3040E-08
1.9200E+04	1.4017E-08	1.1465E-08	1.0789E-08	1.3871E-08	1.8355E-08	1.6871E-08	9.3139E-09	1.2624E-08
2.0000E+04	1.3733E-08	1.1186E-08	1.0499E-08	1.3476E-08	1.7773E-08	1.6283E-08	8.9949E-09	1.2223E-08
2.0800E+04	1.3453E-08	1.0916E-08	1.0217E-08	1.3093E-08	1.7215E-08	1.5723E-08	8.6913E-09	1.1839E-08
2.1600E+04	1.3177E-08	1.0654E-08	9.9435E-09	1.2724E-08	1.6681E-08	1.5191E-08	8.4025E-09	1.1471E-08
2.2400E+04	1.2908E-08	1.0401E-08	9.6795E-09	1.2368E-08	1.6169E-08	1.4685E-08	8.1280E-09	1.1119E-08
2.3200E+04	1.2645E-08	1.0156E-08	9.4248E-09	1.2025E-08	1.5680E-08	1.4204E-08	7.8670E-09	1.0783E-08
2.4000E+04	1.2388E-08	9.9198E-09	9.1793E-09	1.1696E-08	1.5213E-08	1.3747E-08	7.6189E-09	1.0461E-08
5.0000E+04	7.0631E-09	5.3909E-09	4.6866E-09	5.8137E-09	7.2415E-09	6.2755E-09	3.5289E-09	4.9821E-09
1.0000E+05	3.6104E-09	2.7118E-09	2.3273E-09	2.8635E-09	3.5021E-09	2.9750E-09	1.6804E-09	2.4105E-09

TABLE 2.2-9 (CONT'D)

ANNUAL AVERAGE ATMOSPHERIC DIFFUSION FACTORS (X/Q)
FOR A 158 METER RELEASE FOR 16 RADIAL SECTORS TO 50 MILES
(USING SITE METEOROLOGICAL DATA)

**** ANNUAL AVERAGE **** BEAVER VALLEY 50 FT WIND DATA - DELTA T - 9/5/70-9/5/71

CHI/Q FOR RELEASE HEIGHT OF * 1.5800E+02 METERS * (IN SEC PER CU METER)

DIST,M	NNE	NE	ENE	E	ESE	SE	SSE	S
2.0000E+02	4.6624E-14	1.2433E-13	4.9732E-13	3.1083E-13	3.7299E-14	7.4598E-13	6.2165E-14	7.5841E-13
4.0000E+02	4.3094E-10	9.4988E-10	3.8222E-09	2.3746E-09	2.9517E-10	5.7498E-09	4.7497E-10	5.7939E-09
6.0000E+02	1.9807E-09	1.2558E-09	5.2408E-09	3.0240E-09	6.0098E-10	8.0839E-09	6.7214E-10	7.2293E-09
8.0000E+02	3.9089E-09	1.4766E-09	4.3795E-09	2.4889E-09	1.0915E-09	6.1487E-09	1.1986E-09	4.5216E-09
1.2000E+03	6.2659E-09	3.5975E-09	5.3566E-09	4.0372E-09	2.5425E-09	4.3303E-09	3.6907E-09	3.4556E-09
1.6000E+03	6.7599E-09	4.8710E-09	6.1880E-09	5.2443E-09	3.3068E-09	3.7093E-09	5.0254E-09	3.8441E-09
2.4000E+03	6.4382E-09	5.6266E-09	6.6114E-09	6.2513E-09	4.1644E-09	3.7281E-09	5.4307E-09	5.1007E-09
3.2000E+03	6.5724E-09	6.2353E-09	7.2414E-09	7.4556E-09	5.7487E-09	5.3044E-09	6.1866E-09	7.4698E-09
4.0000E+03	7.0587E-09	6.8415E-09	8.0722E-09	8.9303E-09	8.1635E-09	8.1862E-09	8.1167E-09	1.0747E-08
4.8000E+03	7.6161E-09	7.3283E-09	8.8733E-09	1.0396E-08	1.0921E-08	1.1670E-08	1.0725E-08	1.4323E-08
5.6000E+03	8.0914E-09	7.6557E-09	9.5165E-09	1.1646E-08	1.3518E-08	1.5047E-08	1.3368E-08	1.7616E-08
6.4000E+03	8.4249E-09	7.8281E-09	9.9585E-09	1.2589E-08	1.5674E-08	1.7914E-08	1.5659E-08	2.0321E-08
7.2000E+03	8.6112E-09	7.8699E-09	1.0207E-08	1.3221E-08	1.7308E-08	2.0138E-08	1.7458E-08	2.2362E-08
8.0000E+03	8.6694E-09	7.8109E-09	1.0294E-08	1.3582E-08	1.8451E-08	2.1744E-08	1.8766E-08	2.3795E-08
8.8000E+03	8.6262E-09	7.6789E-09	1.0254E-08	1.3725E-08	1.9177E-08	2.2819E-08	1.9647E-08	2.4722E-08
9.6000E+03	8.5076E-09	7.4970E-09	1.0122E-08	1.3703E-08	1.9571E-08	2.3467E-08	2.0181E-08	2.5252E-08
1.0400E+04	8.3356E-09	7.2830E-09	9.9238E-09	1.3558E-08	1.9709E-08	2.3783E-08	2.0445E-08	2.5480E-08
1.1200E+04	8.1277E-09	7.0502E-09	9.6822E-09	1.3326E-08	1.9656E-08	2.3849E-08	2.0504E-08	2.5485E-08
1.2000E+04	7.8972E-09	6.8083E-09	9.4132E-09	1.3036E-08	1.9464E-08	2.3729E-08	2.0411E-08	2.5326E-08
1.2800E+04	7.6540E-09	6.5640E-09	9.1287E-09	1.2707E-08	1.9171E-08	2.3475E-08	2.0207E-08	2.5051E-08
1.4400E+04	7.1566E-09	6.0857E-09	8.5456E-09	1.1991E-08	1.8401E-08	2.2707E-08	1.9587E-08	2.4282E-08
1.5200E+04	6.9110E-09	5.8568E-09	8.2575E-09	1.1623E-08	1.7963E-08	2.2245E-08	1.9211E-08	2.3833E-08
1.6000E+04	6.6712E-09	5.6367E-09	7.9760E-09	1.1258E-08	1.7509E-08	2.1756E-08	1.8813E-08	2.3361E-08
1.6800E+04	6.4388E-09	5.4260E-09	7.7031E-09	1.0898E-08	1.7048E-08	2.1250E-08	1.8400E-08	2.2877E-08
1.7600E+04	6.2148E-09	5.2250E-09	7.4400E-09	1.0548E-08	1.6587E-08	2.0738E-08	1.7981E-08	2.2388E-08
1.8400E+04	5.9997E-09	5.0338E-09	7.1873E-09	1.0208E-08	1.6130E-08	2.0227E-08	1.7562E-08	2.1899E-08
1.9200E+04	5.7939E-09	4.8521E-09	6.9453E-09	9.8802E-09	1.5682E-08	1.9720E-08	1.7145E-08	2.1416E-08
2.0000E+04	5.5972E-09	4.6797E-09	6.7140E-09	9.5648E-09	1.5244E-08	1.9222E-08	1.6735E-08	2.0940E-08
2.0800E+04	5.4097E-09	4.5163E-09	6.4934E-09	9.2623E-09	1.4819E-08	1.8734E-08	1.6333E-08	2.0474E-08
2.1600E+04	5.2311E-09	4.3613E-09	6.2831E-09	8.9725E-09	1.4408E-08	1.8259E-08	1.5941E-08	2.0018E-08
2.2400E+04	5.0611E-09	4.2144E-09	6.0828E-09	8.6953E-09	1.4010E-08	1.7798E-08	1.5559E-08	1.9574E-08
2.3200E+04	4.8992E-09	4.0752E-09	5.8921E-09	8.4304E-09	1.3626E-08	1.7352E-08	1.5188E-08	1.9143E-08
2.4000E+04	4.7452E-09	3.9432E-09	5.7105E-09	8.1774E-09	1.3257E-08	1.6920E-08	1.4829E-08	1.8724E-08
5.0000E+04	2.1955E-09	1.8013E-09	2.6790E-09	8.8750E-09	6.6111E-09	8.8011E-09	7.9118E-09	1.0379E-08
1.0000E+05	1.0479E-09	8.5105E-10	1.2841E-09	1.8716E-09	3.2649E-09	4.4041E-09	3.9855E-09	5.2641E-09

TABLE 2.2-10

ANNUAL AVERAGE ATMOSPHERIC DIFFUSION FACTORS (X/Q)
FOR A GROUND-LEVEL RELEASE FOR 16 RADIAL SECTORS TO 50 MILES
(USING SITE METEOROLOGICAL DATA)

**** ANNUAL AVERAGE **** BEAVER VALLEY 50 FT WIND DATA - DELTA T - 9/5/70-9/5/71

CHI/Q FOR RELEASE HEIGHT OF * 0. METERS * (IN SEC PER CU METER)

DIST,M	NNE	NE	ENE	E	ESE	SE	SSE	S
2.0000E+02	2.8208E-05	2.4146E-05	3.6584E-05	5.4822E-05	1.0961E-04	1.4967E-04	1.6045E-04	2.8848E-04
4.0000E+02	7.5850E-06	6.5078E-06	9.8500E-06	1.4778E-05	2.9626E-05	4.0457E-05	4.3496E-05	7.8513E-05
6.0000E+02	3.6260E-06	3.1193E-06	4.7192E-06	7.0892E-06	1.4270E-05	1.9504E-05	2.1047E-05	3.8181E-05
8.0000E+02	2.1942E-06	1.8929E-06	2.8635E-06	4.3068E-06	8.7093E-06	1.1919E-05	1.2913E-05	2.3552E-05
1.2000E+03	1.1243E-06	9.7350E-07	1.4741E-06	2.2234E-06	4.5341E-06	6.2179E-06	6.7779E-06	1.2465E-05
1.6000E+03	7.0618E-07	6.1221E-07	9.2831E-07	1.4036E-06	2.8776E-06	3.9490E-06	4.3182E-06	7.9749E-06
2.4000E+03	3.6746E-07	3.1912E-07	4.8489E-07	7.3570E-07	1.5195E-06	2.0873E-06	2.2927E-06	4.2596E-06
3.2000E+03	2.3164E-07	2.0142E-07	3.0651E-07	4.6619E-07	9.6801E-07	1.3305E-06	1.4662E-06	2.7359E-06
4.0000E+03	1.6219E-07	1.4116E-07	2.1508E-07	3.2776E-07	6.8343E-07	9.3979E-07	1.0382E-06	1.9440E-06
4.8000E+03	1.2137E-07	1.0571E-07	1.6123E-07	2.4609E-07	5.1491E-07	7.0828E-07	7.8411E-07	1.4724E-06
5.6000E+03	9.5079E-08	8.2857E-08	1.2649E-07	1.9333E-07	4.0573E-07	5.5823E-07	6.1913E-07	1.1654E-06
6.4000E+03	7.7023E-08	6.7154E-08	1.0260E-07	1.5701E-07	3.3037E-07	4.5462E-07	5.0503E-07	9.5269E-07
7.2000E+03	6.4014E-08	5.5834E-08	8.5362E-08	1.3078E-07	2.7583E-07	3.7961E-07	4.2232E-07	7.9822E-07
8.0000E+03	5.4288E-08	4.7366E-08	7.2463E-08	1.1114E-07	2.3490E-07	3.2330E-07	3.6015E-07	6.8191E-07
8.8000E+03	4.6797E-08	4.0842E-08	6.2520E-08	9.5980E-08	2.0326E-07	2.7977E-07	3.1203E-07	5.9178E-07
9.6000E+03	4.0887E-08	3.5693E-08	5.4669E-08	8.4003E-08	1.7822E-07	2.4531E-07	2.7391E-07	5.2027E-07
1.0400E+04	3.6130E-08	3.1548E-08	4.8345E-08	7.4350E-08	1.5801E-07	2.1749E-07	2.4311E-07	4.6241E-07
1.1200E+04	3.2236E-08	2.8153E-08	4.3164E-08	6.6436E-08	1.4142E-07	1.9465E-07	2.1779E-07	4.1481E-07
1.2000E+04	2.9001E-08	2.5333E-08	3.8858E-08	5.9856E-08	1.2760E-07	1.7563E-07	1.9670E-07	3.7511E-07
1.2800E+04	2.6280E-08	2.2960E-08	3.5234E-08	5.4314E-08	1.1595E-07	1.5959E-07	1.7890E-07	3.4157E-07
1.4400E+04	2.1980E-08	1.9208E-08	2.9502E-08	4.5542E-08	9.7487E-08	1.3416E-07	1.5064E-07	2.8827E-07
1.5200E+04	2.0259E-08	1.7707E-08	2.7206E-08	4.2028E-08	9.0076E-08	1.2395E-07	1.3929E-07	2.6683E-07
1.6000E+04	1.8757E-08	1.6396E-08	2.5202E-08	3.8958E-08	8.3597E-08	1.1502E-07	1.2936E-07	2.4806E-07
1.6800E+04	1.7438E-08	1.5245E-08	2.3440E-08	3.6257E-08	7.7893E-08	1.0717E-07	1.2061E-07	2.3152E-07
1.7600E+04	1.6271E-08	1.4226E-08	2.1881E-08	3.3868E-08	7.2841E-08	1.0020E-07	1.1286E-07	2.1684E-07
1.8400E+04	1.5233E-08	1.3320E-08	2.0495E-08	3.1741E-08	6.8341E-08	9.4004E-08	1.0595E-07	2.0376E-07
1.9200E+04	1.4305E-08	1.2510E-08	1.9254E-08	2.9838E-08	6.4312E-08	8.8452E-08	9.9763E-08	1.9203E-07
2.0000E+04	1.3471E-08	1.1782E-08	1.8140E-08	2.8128E-08	6.0689E-08	8.3458E-08	9.4193E-08	1.8147E-07
2.0800E+04	1.2720E-08	1.1125E-08	1.7135E-08	2.6585E-08	5.7415E-08	7.8947E-08	8.9159E-08	1.7192E-07
2.1600E+04	1.2038E-08	1.0531E-08	1.6223E-08	2.5185E-08	5.4446E-08	7.4855E-08	8.4592E-08	1.6325E-07
2.2400E+04	1.1419E-08	9.9897E-09	1.5395E-08	2.3913E-08	5.1744E-08	7.1130E-08	8.0432E-08	1.5535E-07
2.3200E+04	1.0854E-08	9.4963E-09	1.4639E-08	2.2751E-08	4.9275E-08	6.7727E-08	7.6632E-08	1.4812E-07
2.4000E+04	1.0338E-08	9.0447E-09	1.3946E-08	2.1687E-08	4.7013E-08	6.4609E-08	7.3147E-08	1.4150E-07
5.0000E+04	3.8458E-09	3.3701E-09	5.2337E-09	8.2663E-09	1.8337E-08	2.5054E-08	2.8817E-08	5.6914E-08
1.0000E+05	1.8501E-09	1.6249E-09	2.5464E-09	4.1266E-09	9.4466E-09	1.2729E-08	1.4995E-08	3.0538E-08

TABLE 2.2-10 (CONT'D)

ANNUAL AVERAGE ATMOSPHERIC DIFFUSION FACTORS (X/Q)
FOR A GROUND-LEVEL RELEASE FOR 16 RADIAL SECTORS TO 50 MILES
(USING SITE METEOROLOGICAL DATA)

**** ANNUAL AVERAGE **** BEAVER VALLEY 50 FT WIND DATA - DELTA T - 9/5/70-9/5/71

CHI/Q FOR RELEASE HEIGHT OF * 0. METERS * (IN SEC PER CU METER)

DIST,M	SSW	SW	WSW	W	WNW	NW	NNW	N
2.0000E+02	3.0612E-04	2.0734E-04	8.5251E-05	8.2270E-05	9.2738E-05	7.8633E-05	4.6946E-05	6.3337E-05
4.0000E+02	8.3571E-05	5.6574E-05	2.3073E-05	2.2171E-05	2.4959E-05	2.1156E-05	1.2651E-05	1.7037E-05
6.0000E+02	4.0789E-05	2.7588E-05	1.1137E-05	1.0640E-05	1.1948E-05	1.0115E-05	6.0633E-06	8.1500E-06
8.0000E+02	2.5258E-05	1.7066E-05	6.8147E-06	6.4686E-06	7.2407E-06	6.1210E-06	3.6791E-06	4.9358E-06
1.2000E+03	1.3451E-05	9.0731E-06	3.5615E-06	3.3449E-06	3.7221E-06	3.1352E-06	1.8930E-06	2.5343E-06
1.6000E+03	8.6388E-06	5.8208E-06	2.2640E-06	2.1138E-06	2.3435E-06	1.9684E-06	1.1913E-06	1.5945E-06
2.4000E+03	4.6396E-06	3.1215E-06	1.1983E-06	1.1093E-06	1.2234E-06	1.0236E-06	6.2155E-07	8.3152E-07
8.2000E+03	2.9919E-06	2.0108E-06	7.6467E-07	7.0347E-07	7.7290E-07	6.4492E-07	3.9254E-07	5.2493E-07
4.0000E+03	2.1327E-06	1.4322E-06	5.4057E-07	4.9486E-07	5.4206E-07	4.5136E-07	2.7525E-07	3.6794E-07
4.8000E+03	1.6197E-06	1.0869E-06	4.0772E-07	3.7169E-07	4.0613E-07	3.3761E-07	2.0620E-07	2.7555E-07
5.6000E+03	1.2851E-06	8.6188E-07	3.2156E-07	2.9210E-07	3.1848E-07	2.6437E-07	1.6168E-07	2.1599E-07
6.4000E+03	1.0527E-06	7.0569E-07	2.6204E-07	2.3728E-07	2.5821E-07	2.1409E-07	1.3108E-07	1.7506E-07
7.2000E+03	8.8372E-07	5.9213E-07	2.1893E-07	1.9768E-07	2.1476E-07	1.7787E-07	1.0901E-07	1.4555E-07
8.0000E+03	7.5629E-07	5.0653E-07	1.8655E-07	1.6801E-07	1.8224E-07	1.5079E-07	9.2500E-08	1.2348E-07
8.8000E+03	6.5740E-07	4.4014E-07	1.6152E-07	1.4511E-07	1.5717E-07	1.2994E-07	7.9777E-08	1.0647E-07
9.6000E+03	5.7885E-07	3.8741E-07	1.4169E-07	1.2702E-07	1.3739E-07	1.1350E-07	6.9734E-08	9.3045E-08
1.0400E+04	5.1522E-07	3.4472E-07	1.2568E-07	1.1243E-07	1.2146E-07	1.0027E-07	6.1647E-08	8.2237E-08
1.1200E+04	4.6283E-07	3.0957E-07	1.1253E-07	1.0046E-07	1.0841E-07	8.9434E-08	5.5024E-08	7.3386E-08
1.2000E+04	4.1908E-07	2.8023E-07	1.0158E-07	9.0514E-08	9.7566E-08	8.0438E-08	4.9520E-08	6.6032E-08
1.2800E+04	3.8210E-07	2.5543E-07	9.2338E-08	8.2134E-08	8.8441E-08	7.2874E-08	4.4889E-08	5.9846E-08
1.4400E+04	3.2324E-07	2.1598E-07	7.7684E-08	6.8866E-08	7.4011E-08	6.0920E-08	3.7565E-08	5.0064E-08
1.5200E+04	2.9954E-07	2.0009E-07	7.1801E-08	6.3549E-08	6.8235E-08	5.6138E-08	3.4634E-08	4.6149E-08
1.6000E+04	2.7878E-07	1.8618E-07	6.6655E-08	5.8904E-08	6.3192E-08	5.1966E-08	3.2075E-08	4.2732E-08
1.6800E+04	2.6046E-07	1.7391E-07	6.2124E-08	5.4818E-08	5.8759E-08	4.8300E-08	2.9825E-08	3.9728E-08
1.7600E+04	2.4421E-07	1.6302E-07	5.8110E-08	5.1201E-08	5.4838E-08	4.5058E-08	2.7836E-08	3.7071E-08
1.8400E+04	2.2970E-07	1.5331E-07	5.4533E-08	4.7982E-08	5.1350E-08	4.2176E-08	2.6066E-08	3.4709E-08
1.9200E+04	2.1669E-07	1.4460E-07	5.1331E-08	4.5102E-08	4.8231E-08	3.9599E-08	2.4483E-08	3.2596E-08
2.0000E+04	2.0498E-07	1.3675E-07	4.8449E-08	4.2514E-08	4.5429E-08	3.7285E-08	2.3061E-08	3.0698E-08
2.0800E+04	1.9437E-07	1.2966E-07	4.5846E-08	4.0176E-08	4.2901E-08	3.5198E-08	2.1779E-08	2.8986E-08
2.1600E+04	1.8474E-07	1.2321E-07	4.3484E-08	3.8058E-08	4.0611E-08	3.3308E-08	2.0616E-08	2.7435E-08
2.2400E+04	1.7596E-07	1.1734E-07	4.1334E-08	3.6131E-08	3.8528E-08	3.1589E-08	1.9560E-08	2.6024E-08
2.3200E+04	1.6793E-07	1.1196E-07	3.9369E-08	3.4371E-08	3.6627E-08	3.0022E-08	1.8595E-08	2.4737E-08
2.4000E+04	1.6057E-07	1.0703E-07	3.7569E-08	3.2760E-08	3.4888E-08	2.8587E-08	1.7713E-08	2.3560E-08
5.0000E+04	6.6152E-08	4.3921E-08	1.4708E-08	1.2415E-08	1.3008E-08	1.0593E-08	6.6148E-09	8.7552E-09
1.0000E+05	3.6797E-08	2.4312E-08	7.6013E-09	6.1002E-09	6.2529E-09	5.0719E-09	3.1966E-09	4.1852E-09

TABLE 2.2-11

Design Basis LOCA X/Q Values

(sec/m^3)

	Exclusion Area Boundary 610 meters		Low Population Zone 3.6 miles	
	0.5%	50%	0.5%	50%
0-2 hours	8.9×10^{-4}	6.3×10^{-4}	9.5×10^{-5}	7.9×10^{-5}
0-8 hours	-	-	4.2×10^{-5}	3.6×10^{-5}
0-24 hours	-	-	2.7×10^{-5}	2.4×10^{-5}
0-31 days	-	-	6.8×10^{-6}	6.6×10^{-6}

Note: Appendix 2A and Table 2.2-11 values were used for analyses performed prior to 1996. The values in Tables 2.2-11a and 2.2-11b will be used for radiological consequence analyses performed subsequent to 1996.

TABLE 2.2-11a

0.5% Accident Analysis 0- to 2-Hour X/Q Values at the Exclusion Area Boundary (1/1/86 - 12/31/95)

Downwind Sector	Downwind Distance (m)	Sector X/Q (sec/m^3)
N	610	5.41E-4
NNE	610	3.31E-4
NE	610	2.11E-4
ENE	610	1.84E-4
E	610	1.85E-4
ESE	610	2.01E-4
SE	610	1.86E-4
SSE	610	1.92E-4
S	610	2.08E-4
SSW	610	2.36E-4
SW	610	3.17E-4
WSW	610	3.93E-4
W	610	5.67E-4
WNW	610	8.00E-4
NW	610	1.04E-3
NNW	610	7.35E-4
Maximum Value (NW)		1.04E-3
5% Site Value		6.09E-4

Notes:

1. The data above were generated in 1996. Appendix 2A and Table 2.2-11 values were used for analyses performed prior to 1996.

2. Ref: ERS-SFL-96-021 r0, 1996

TABLE 2.2-11b

0.5% Accident Analysis X/Q Values for Various Time Periods
at the Low Population Zone Boundary (1/1/86 - 12/31/95)

Downwind Sector	Distance (m)	sec/m^3 0-2 Hrs	0-8 Hrs	8-24 Hrs	1-4 days	4-30 days
N	5794	5.22E-5	2.42E-5	1.64E-5	7.12E-6	2.14E-6
NNE	5794	2.79E-5	1.33E-5	9.16E-6	4.09E-6	1.29E-6
NE	5794	1.66E-5	8.16E-6	5.72E-6	2.65E-6	8.76E-7
ENE	5794	1.40E-5	7.50E-6	5.49E-6	2.80E-6	1.06E-6
E	5794	1.32E-5	6.52E-6	4.59E-6	2.14E-6	7.17E-7
ESE	5794	1.28E-5	6.16E-6	4.27E-6	1.93E-6	6.19E-7
SE	5794	1.45E-5	6.95E-6	4.81E-6	2.17E-6	6.92E-7
SSE	5794	1.47E-5	6.80E-6	4.62E-6	2.00E-6	5.99E-7
S	5794	1.64E-5	7.51E-6	5.09E-6	2.18E-6	6.48E-7
SSW	5794	1.88E-5	8.68E-6	5.90E-6	2.55E-6	7.65E-7
SW	5794	2.80E-5	1.30E-5	8.83E-6	3.83E-6	1.15E-6
WSW	5794	4.22E-5	1.99E-5	1.37E-5	6.08E-6	1.89E-6
W	5794	6.41E-5	3.00E-5	2.06E-5	9.03E-6	2.77E-6
WNW	5794	9.06E-5	4.58E-5	3.26E-5	1.56E-5	5.38E-6
NW	5794	1.18E-4	6.04E-5	4.33E-5	2.10E-5	7.44E-6
NNW	5794	8.32E-5	3.94E-5	2.71E-5	1.21E-5	3.78E-6
Max. Value (NW)		1.18E-4	6.04E-5	4.33E-5	2.10E-5	7.44E-6
5% Site Value		6.68E-5	3.77E-5	2.83E-5	1.52E-5	6.23E-6

Notes:

1. The data above were generated in 1996. Appendix 2A and Table 2.2-11 values were used for analyses performed prior to 1996.

2. Ref: ERS-SFL-96-021 r0, 1996

TABLE 2.2-12A

BVPS-1 ON-SITE ATMOSPHERIC DISPERSION FACTORS (SEC/M^3) - ARCON96 Methodology

Release	Receptor	0-2 hr	2-8 hr	8-24 hr	1-4 d	4-30 d
U1 Containment Edge	BVPS-1 CR Intake	7.48E-04	5.77E-04	2.53E-04	2.00E-04	1.78E-04
U1 Containment Top	BVPS-1 CR Intake	8.16E-04	5.78E-04	2.27E-04	1.71E-04	1.47E-04
U1 Ventilation Vent	BVPS-1 CR Intake	4.75E-03	3.66E-03	1.43E-03	1.02E-03	8.84E-04
U1 RWST Vent	BVPS-1 CR Intake	7.34E-04	6.17E-04	2.54E-04	1.96E-04	1.57E-04
U1 MS Relief Valves	BVPS-1 CR Intake	1.24E-03	9.94E-04	4.08E-04	3.03E-04	2.51E-04
U1 MSL (break)/AEJ	BVPS-1 CR Intake	1.05E-02	7.72E-03	3.01E-03	2.14E-03	2.00E-03
U1 Gaseous Waste Storage Vault	BVPS-1 CR Intake	1.40E-03	8.78E-04	3.16E-04	2.93E-04	2.62E-04
U1 Containment Equipment Hatch	BVPS-1 CR Intake	6.25E-04	4.23E-04	1.76E-04	1.27E-04	1.11E-04
U1 Cooling Tower	BVPS-1 CR Intake	1.19E-04	8.79E-05	3.41E-05	2.76E-05	2.09E-05
U1 Containment Edge	BVPS-2 CR Intake	4.88E-04	4.07E-04	1.79E-04	1.41E-04	1.22E-04
U1 Containment Top	BVPS-2 CR Intake	5.93E-04	4.63E-04	1.84E-04	1.34E-04	1.16E-04
U1 Ventilation Vent	BVPS-2 CR Intake	2.00E-03	1.62E-03	6.76E-04	5.05E-04	4.06E-04
U1 RWST Vent	BVPS-2 CR Intake	4.76E-04	4.10E-04	1.70E-04	1.33E-04	1.07E-04
U1 MS Relief Valves	BVPS-2 CR Intake	7.46E-04	6.31E-04	2.62E-04	1.98E-04	1.62E-04
U1 MSL (break)/AEJ	BVPS-2 CR Intake	4.24E-03	3.87E-03	1.69E-03	1.18E-03	1.06E-03
U1 Gaseous Waste Storage Vault	BVPS-2 CR Intake	1.42E-03	8.19E-04	3.38E-04	2.78E-04	2.49E-04
U1 Containment Equipment Hatch	BVPS-2 CR Intake	4.48E-04	3.33E-04	1.36E-04	1.02E-04	8.70E-05
U1 Cooling Tower	BVPS-2 CR Intake	1.33E-04	9.49E-05	3.61E-05	2.87E-05	2.25E-05
U1 Containment Edge	BVPS-2 Aux. Bldg. NW Corner	3.34E-04	2.85E-04	1.23E-04	9.62E-05	8.37E-05
U1 Containment Top	BVPS-2 Aux. Bldg. NW Corner	4.37E-04	3.41E-04	1.39E-04	1.02E-04	8.79E-05
U1 RWST Vent	BVPS-2 Aux. Bldg. NW Corner	3.23E-04	2.83E-04	1.18E-04	9.32E-05	7.52E-05
U1 Cooling Tower	BVPS-2 Aux. Bldg. NW Corner	1.57E-04	1.12E-04	4.13E-05	3.35E-05	2.60E-05
U1 Containment Edge	BVPS-1 Service Bldg.	1.90E-03	1.57E-03	4.54E-04	5.08E-04	4.55E-04
U1 Containment Top	BVPS-1 Service Bldg.	1.64E-03	8.59E-04	3.35E-04	2.71E-04	2.29E-04
U1 RWST Vent	BVPS-1 Service Bldg.	2.37E-03	1.88E-03	7.58E-04	5.71E-04	4.48E-04

TABLE 2.2-12A (CONT'D)

BVPS-1 ON-SITE ATMOSPHERIC DISPERSION FACTORS (SEC/M^3) - ARCON96 Methodology

Release	**Receptor**	**0-2 hr**	**2-8 hr**	**8-24 hr**	**1-4 d**	**4-30 d**
U1 Cooling Tower	BVPS-1 Service Bldg.	1.09E-04	8.10E-05	3.28E-05	2.65E-05	1.92E-05
U1 Containment Edge	ERF Intake	4.53E-05	2.97E-05	1.41E-05	1.23E-05	1.09E-05
U1 Containment Top	ERF Intake	4.57E-05	3.74E-05	1.50E-05	1.44E-05	1.23E-05
U1 RWST Vent	ERF Intake	4.53E-05	2.87E-05	1.39E-05	1.21E-05	1.05E-05
U1 Cooling Tower	ERF Intake	5.75E-05	4.97E-05	2.31E-05	1.80E-05	1.66E-05
U1 Containment Edge	ERF Edge Closest to Cont.	4.70E-05	3.16E-05	1.54E-05	1.32E-05	1.14E-05
U1 Containment Top	ERF Edge Closest to Cont.	5.00E-05	3.94E-05	1.62E-05	1.52E-05	1.30E-05
U1 RWST Vent	ERF Edge Closest to Cont.	4.54E-05	3.14E-05	1.50E-05	1.29E-05	1.13E-05
U1 Cooling Tower	ERF Edge Closest to Cont.	7.67E-05	6.28E-05	3.10E-05	2.36E-05	2.17E-05

Notes:

1. Table 2.2-12A provides the main control room X/Q information for the Waste Gas System Rupture and the Fuel Handling Accident
2. Table 2.2-12B provides the main control room X/Q information for all of the release-receptor combinations associated with BVPS-2 accidents. The BVPS-2 accident X/Q values are taken into consideration when the dose consequences of the event are established based on an analysis that is bounding for both units.
3. Occupancy factors are not addressed in these values.
4. The Control Room In-leakage X/Q values can be represented by the Control Room air intake X/Q values. The higher values from among the Unit 1 and Unit 2 Control Room Intake X/Qs are conservatively used for this purpose.

TABLE 2.2-12B

BVPS-2 ON-SITE ATMOSPHERIC DISPERSION FACTORS (SEC/M^3) - ARCON96 Methodology

Release	**Receptor**	**0-2 hr**	**2-8 hr**	**8-24 hr**	**1-4 d**	**4-30 d**
U1 Containment Edge	BVPS-1 CR Intake	3.19E-04	2.38E-04	1.06E-04	8.08E-05	6.19E-05
U 2 Containment Top	BVPS-1 CR Intake	3.83E-04	3.10E-04	1.34E-04	9.83E-05	6.65E-05
U 2 Ventilation Vent	BVPS-1 CR Intake	5.32E-04	3.89E-04	1.75E-04	1.30E-04	9.02E-05
U 2 RWST Vent	BVPS-1 CR Intake	1.70E-04	1.30E-04	5.56E-05	4.40E-05	3.31E-05
U 2 MS Relief Valves	BVPS-1 CR Intake	3.33E-04	2.38E-04	1.09E-04	7.88E-05	5.66E-05
U 2 MSL (break)/AEJ	BVPS-1 CR Intake	6.21E-04	4.87E-04	2.30E-04	1.65E-04	1.10E-04
U 2 Gaseous Waste Storage Vault	BVPS-1 CR Intake	7.71E-04	4.90E-04	2.26E-04	1.76E-04	1.31E-04
U 2 Containment Equipment Hatch	BVPS-1 CR Intake	2.47E-04	1.69E-04	7.94E-05	6.05E-05	4.56E-05
U 2 Contain. Edge	BVPS-2 CR Intake	4.82E-04	3.59E-04	1.55E-04	1.21E-04	9.18E-05
U 2 Containment Top	BVPS-2 CR Intake	5.56E-04	4.45E-04	1.91E-04	1.39E-04	9.35E-05
U 2 Ventilation Vent	BVPS-2 CR Intake	9.39E-04	6.69E-04	3.08E-04	2.23E-04	1.54E-04
U 2 RWST Vent	BVPS-2 CR Intake	2.18E-04	1.58E-04	7.31E-05	5.53E-05	4.12E-05
U 2 MS Relief Valves	BVPS-2 CR Intake	5.01E-04	3.58E-04	1.61E-04	1.19E-04	8.32E-05
U 2 MSL (break)/AEJ	BVPS-2 CR Intake	1.03E-03	7.84E-04	3.57E-04	2.64E-04	1.86E-04
U 2 Gaseous Waste Storage Vault	BVPS-2 CR Intake	1.55E-03	9.04E-04	4.08E-04	3.30E-04	2.45E-04
U 2 Containment Equipment Hatch	BVPS-2 CR Intake	3.45E-04	2.23E-04	1.06E-04	8.29E-05	6.14E-05
U 2 Contain. Edge	BVPS-2 Aux. Bldg. NW Corner	9.12E-04	7.13E-04	3.05E-04	2.35E-04	1.79E-04
U 2 Containment Top	BVPS-2 Aux. Bldg. NW Corner	1.14E-03	8.87E-04	3.83E-04	2.74E-04	1.83E-04
U 2 RWST Vent	BVPS-2 Aux. Bldg. NW Corner	3.19E-04	2.25E-04	1.06E-04	7.95E-05	5.84E-05
U 2 Contain. Edge	BVPS-1 Service Bldg.	1.96E-04	1.54E-04	6.37E-05	5.05E-05	3.89E-05
U 2 Containment Top	BVPS-1 Service Bldg.	2.46E-04	2.07E-04	8.84E-05	6.56E-05	4.49E-05
U 2 RWST Vent	BVPS-1 Service Bldg.	1.24E-04	9.81E-05	4.10E-05	3.24E-05	2.51E-05

TABLE 2.2-12B (CONT'D)

BVPS-2 ON-SITE ATMOSPHERIC DISPERSION FACTORS (SEC/M^3) - ARCON96 Methodology

Release	Receptor	0-2 hr	2-8 hr	8-24 hr	1-4 d	4-30 d
U 2 Contain. Edge	ERF Intake	6.02E-05	4.67E-05	2.22E-05	1.78E-05	1.59E-05
U 2 Containment Top	ERF Intake	6.16E-05	5.36E-05	2.42E-05	2.08E-05	1.81E-05
U 2 RWST Vent	ERF Intake	7.28E-05	6.58E-05	3.01E-05	2.31E-05	2.08E-05
U 2 Contain. Edge	ERF Edge Closest to Containment	6.72E-05	5.69E-05	2.65E-05	2.13E-05	1.89E-05
U 2 Containment Top	ERF Edge Closest to Containment	7.22E-05	6.43E-05	2.96E-05	2.48E-05	2.15E-05
U 2 RWST Vent	ERF Edge Closest to Containment	9.42E-05	8.37E-05	3.81E-05	2.97E-05	2.58E-05

Notes:

1. The X/Q values presented above are for all of the release-receptor combinations associated with BVPS-2 accidents. These X/Q values are taken into consideration when the dose consequences of the event are established based on an analysis that is bounding for both units.
2. Occupancy factors are not addressed in these values.
3. The Control Room In-leakage X/Q values can be represented by the Control Room air intake X/Q values. The higher values from among the Unit 1 and Unit 2 Control Room Intake X/Qs are conservatively used for this purpose.

TABLE 2.3-1

DRAINAGE AREA VALUES[1]

Unit Drainage Area	Area In Square Miles	Unit Drainage Area	Area In Square Miles	Dam	Area In Square Miles
1	290	35	119	Berlin	249
2	332	36	180	Chautauqua	194
3	136	37	74	Conemaugh	1,351
4	321	38	458	Crooked Creek	277
5	205	39	382	East Branch	72.4
6	222	40	121	Kinzua	2,180
7	576	41	94	Kirwin	80.5
8	230	42	295	Loyalhanna	290
9	166	43	389	Mahoning	340
10	303	44	145	Meander	84
11	350	45	267	Milton	27
12	234	46	257	Mosquito	97.4
13	501	47	504	Shenango	589
14	144	48	242	Tionesta	478
15	738	49	120	Tygart	1,184
16	329	50	203	Youghogheny	434
17	199	51	239		
18	443	52	304		
19	137	53	398		
20	184	54	356		
21	498	55	118		
22	384	56	178		
23	121	57	505		
24	125	58	149		
25	129	59	409		
26	116	60	124		
27	330	61	667		
28	214				
29	504				
30	254				
31	200				
32	241				
33	227				
34	354				

(1) Refer to Figure 2.3-4 for map of unit drainage areas.

TABLE 2.3-2
HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

																		REC	1, LN	80
AREA 1	00	50	100	160	240	300	390	480	600	730	870	1090	1300	1510	1650	1770		REC	2, LN	80
AREA 1	1840	1900	1940	1980	2010	2030	2060	2070	2080	2090	2100	2110	2120	2130	2140	2150		REC	3, LN	80
AREA 1	2150	2160	2160	2170	2170	2170	2175	2175	2180	2180	2185	2185	2185	2185	2180	2180		REC	4, LN	80
AREA 1	2175	2170	2165	2160	2150	2140	2130	2120	2110	2095	2080	2065	2050	2030	2010	1990		REC	5, LN	80
AREA 1	1970	1945	1920	1895	1870	1845	1820	1795	1770	1745	1720	1690	1660	1625	1590	1555	HOURLY UNIT HYDROGRAPH VALUES	REC	6, LN	80
AREA 1	1520	1485	1450	1420	1390	1360	1330	1295	1260	1230	1200	1170	1140	1110	1080	1050		REC	7, LN	80
AREA 1	1020	990	960	930	900	870	840	815	790	765	740	715	690	665	640	615		REC	8, LN	80
AREA 1	590	565	540	520	500	475	450	430	410	390	370	355	340	320	300	285		REC	9, LN	80
AREA 1	270	255	240	225	210	195	180	165	150	140	130	120	110	100	90	80		REC	10, LN	80
AREA 1	70	60	50	45	40	35	30	25	20	15	10	05	00					REC	11, LN	80
	k = 6.0	x = 0.0				6		MUSKINGUM ROUTING COEFFICIENTS (K IS IN HRS) PLUS NUMBER OF ITERATIONS PER REACH										REC	12, LN	80
	REACH:	AREA 1 TO STA. AA																REC	13, LN	80
	140		2		2															
AREA 2	00	20	50	110	140	240	330	610	1100	1720	2430	3080	3480	3630	3680	3690		REC	14, LN	80
AREA 2	3700	3690	3680	3670	3660	3650	3630	3610	3580	3550	3510	3480	3440	3390	3340	3290		REC	15, LN	80
AREA 2	3240	3170	3110	3040	2970	2890	2820	2750	2680	2600	2530	2460	2390	2310	2240	2180		REC	16, LN	80
AREA 2	2120	2060	2000	1950	1900	1860	1820	1785	1750	1720	1690	1665	1640	1615	1590	1570		REC	17, LN	80
AREA 2	1550	1530	1510	1485	1460	1440	1420	1405	1390	1375	1360	1345	1330	1320	1310	1200		REC	18, LN	80
AREA 2	1290	1285	1280	1270	1260	1245	1230	1215	1200	1185	1170	1145	1120	1095	1070	1040		REC	19, LN	80
AREA 2	1010	980	950	915	880	845	810	775	740	710	680	650	620	590	560	525		REC	20, LN	80
AREA 2	500	475	450	425	400	375	350	325	300	280	260	240	220	200	180	160		REC	21, LN	80
AREA 2	140	125	110	95	80	70	60	45	30	20	10	00						REC	22, LN	80
	RUSSELL																	REC	23, LN	80
	2.0		0.1	REACH: STA. AA TO STA. AB														REC	24, LN	80
	95		2		2													REC	25, LN	80
AREA 3	00	40	90	190	320	530	1180	2170	3650	4620	5280	5610	5730	5730	5360	5270		REC	26, LN	80
AREA 3	4550	2960	2490	2040	1750	1520	1380	1220	1110	1040	970	905	840	810	780	750		REC	27, LN	80
AREA 3	720	700	680	660	640	625	610	595	580	560	540	525	510	500	490	475		REC	28, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	460	440	420	410	400	390	380	365	350	335	320	305	290	280	270	260	REC	29, LN	80
	250	240	230	220	210	200	190	180	170	160	150	140	130	120	110	105	REC	30, LN	80
	100	95	90	85	80	70	60	50	40	30	20	15	10	05	00		REC	31, LN	80
	WARREN, PA.																REC	32, LN	80
	6.0		0.2	- REACH: STA. AB TO STA. AC													REC	33, LN	80
	152																REC	34, LN	80
	00	240	480	1020	2520	4040	4760	5400	5820	6090	6110	5820	5500	5210	5000	4810	REC	35, LN	80
	4640	4480	4290	4030	3760	3440	3140	2990	2810	2690	2580	2460	2380	2350	2360	2370	REC	36, LN	80
	2390	2410	2430	2450	2460	2470	2470	2460	2440	2410	2380	2330	2280	2220	2160	2100	REC	37, LN	80
	2040	1980	1920	1860	1800	1745	1690	1635	1580	1530	1480	1430	1380	1335	1290	1240	REC	38, LN	80
AREA 4	1190	1145	1100	1055	1010	965	920	890	860	825	790	755	720	695	670	640	REC	39, LN	80
	610	590	570	545	520	500	480	460	440	420	400	385	370	355	340	325	REC	40, LN	80
	310	300	290	280	270	260	250	240	230	220	210	205	200	190	180	170	REC	41, LN	80
	160	150	140	130	125	120	115	110	105	100	95	90	90	90	85	80	REC	42, LN	80
	75	70	65	60	60	60	55	50	45	40	35	30	30	30	25	20	REC	43, LN	80
	20	20	15	10	10	10	05	00									REC	44, LN	80
	6.0		0.4 - REACH: AREA 4 TO STA. AC														REC	45, LN	80
	94		3		2												REC	46, LN	80
	00	20	120	320	740	1670	3150	5500	6750	7950	8850	9650	9810	9810	9500	7900	REC	47, LN	80
AREA 5	6350	4600	3700	3130	2750	2410	2080	1830	1620	1500	1350	1240	1110	990	910	820	REC	48, LN	80
	730	670	610	560	530	490	460	420	400	390	380	360	340	320	310	300	RED	49, LN	80
	300	295	290	280	270	260	250	235	220	215	210	205	200	195	190	185	REC	50, LN	80
	180	165	150	140	130	120	110	105	100	95	90	85	80	75	70	65	REC	51, LN	80
	60	55	50	45	40	35	30	25	20	15	10	05	05	00			REC	52, LN	80
	WEST HICKORY																REC	53, LN	80
	8.0		0.2	- REACH: STA AC TO STA. AF													REC	54, LN	80
	97																REC	55, LN	80
	00	360	710	1070	1490	1890	2160	2330	2500	2620	2720	2810	2880	2940	3000	3050	REC	56, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	3110	3170	3220	3300	3370	3420	3490	3520	3570	3580	3570	3510	3430	3310	3220	3100	REC	57, LN	80
	2990	2830	2700	2570	2460	2330	2220	2090	1980	1880	1780	1680	1580	1500	1420	1340	REC	58, LN	80
	1260	1190	1120	1060	1000	950	900	850	800	760	720	680	640	605	570	540	REC	59, LN	80
AREA 6	510	485	460	430	400	380	360	340	320	305	290	275	260	240	220	205	REC	60, LN	80
	190	175	160	145	130	120	110	100	90	80	70	55	40	30	10	05	REC	61, LN	80
	00																REC	62, LN	80
	5.0		0.1		NO. OF ITERATIONS												REC	63, LN	80
	5.8		0.0			2											REC	64, LN	80
	5.5		0.0			2	REACHES: AREA 6 TO STA. AD										REC	65, LN	80
	5.0		0.2														REC	66, LN	80
	3.0		0.4														REC	67, LN	80
	164		2		2												REC	68, LN	80
	00	20	60	100	120	190	280	400	700	1290	1920	2440	3050	3750	4450	5070	REC	69, LN	80
	5460	5860	6160	6310	6390	6400	6350	6210	6080	5930	5840	5780	5710	5700	5690	5680	REC	70, LN	80
AREA 7	5690	5670	5640	5610	5590	5520	5490	5390	5290	5210	5120	5020	4920	4830	4720	4610	REC	71, LN	80
	4510	4410	4320	4210	4110	4020	3940	3860	3790	3710	3640	3600	3530	3490	3420	3390	REC	72, LN	80
	3340	3300	3250	3200	3180	3120	3100	3060	3020	2990	2910	2880	2800	2710	2640	2590	REC	73, LN	80
	2500	2410	2320	2270	2190	2100	2010	1930	1850	1780	1690	1600	1510	1450	1380	1200	REC	74, LN	80
	1230	1170	1100	1040	1000	930	900	840	800	770	730	700	650	610	590	560	REC	75, LN	80
	530	500	490	450	420	400	390	360	330	310	300	290	280	260	250	230	REC	76, LN	80
	210	205	200	195	190	180	160	150	145	140	130	120	110	105	100	95	REC	77, LN	80
	95	90	85	80	75	70	60	50	45	40	35	30	25	20	15	10	REC	78, LN	80
	05	05	05	00													REC	79, LN	80
	MEADVILLE				NO. OF ITERATIONS												REC	80, LN	80
	7.0		0.0			2											REC	81, LN	80
	6.0		0.1				REACHES: STA. AD TO STA. AE										REC	82, LN	80
	123		2														REC	83, LN	80
	00	05	10	20	30	40	70	130	230	480	820	1360	1900	2620	3210	3830	REC	84, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	4280	4710	4900	5080	5170	5220	5230	5210	5160	5020	4900	4730	4580	4360	4180	3890	REC	85, LN	80
	3620	3230	2840	2550	2220	2010	1850	1700	1570	1440	1370	1290	1210	1150	1090	1045	REC	86, LN	80
AREA 8	1000	955	910	880	850	820	790	765	740	715	690	665	640	615	590	570	REC	87, LN	80
	550	535	520	500	480	455	430	415	400	385	370	355	340	330	320	310	REC	88, LN	80
	300	290	280	270	260	250	240	230	220	210	200	190	180	170	160	150	REC	89, LN	80
	140	135	130	125	120	115	110	105	100	95	90	85	80	75	70	65	REC	90, LN	80
	60	50	40	35	30	25	20	15	10	05	00						REC	91, LN	80
	4.0		0.2 -	REACH: STA. AE TO STA. AF													REC	92, LN	80
	121																REC	93, LN	80
	00	90	240	550	1380	2270	2880	3460	3770	4180	4710	5370	5380	4940	4560	4070	REC	94, LN	80
	3460	2910	2410	2140	1960	1770	1650	1560	1480	1400	1320	1255	1190	1115	1060	1015	REC	95, LN	80
AREA 9	970	930	890	855	820	790	760	730	700	680	660	640	620	600	580	565	REC	96, LN	80
	550	535	520	510	500	490	480	465	450	435	420	405	390	380	370	360	REC	97, LN	80
	350	340	330	320	310	305	300	295	290	285	280	270	260	250	240	230	REC	98, LN	80
	220	215	210	205	200	195	190	185	180	170	160	150	140	135	130	125	REC	99, LN	80
	120	115	110	105	100	95	90	85	80	75	70	65	60	55	50	45	REC	100, LN	80
	40	35	30	25	20	15	10	05	00								REC	101, LN	80
	4.0		0.4 -	REACH: AREA 9 TO STA. AF													REC	102, LN	80
	161																REC	103, LN	80
	00	430	910	1570	2270	3120	3890	4290	4520	4870	5350	6350	6940	7390	7450	7240	REC	104, LN	80
	6600	6050	5610	5150	4660	4330	4260	4190	4130	4050	3970	3830	3700	3520	3350	3160	REC	105, LN	80
	2970	2770	2600	2415	2230	2070	1910	1770	1630	1515	1400	1300	1200	1115	1030	915	REC	106, LN	80
	800	755	710	675	640	615	590	570	550	530	510	495	480	465	450	435	REC	107, LN	80
AREA 10	420	405	390	380	370	360	350	335	320	310	300	295	290	280	270	260	REC	108, LN	80
	250	240	230	220	210	205	200	195	190	185	180	175	170	160	150	145	REC	109, LN	80
	140	135	130	125	120	115	110	105	100	95	90	90	90	90	90	85	REC	110, LN	80
	80	80	80	80	80	75	70	70	70	70	70	65	60	60	60	60	REC	111, LN	80
	60	55	50	50	50	50	50	45	40	40	40	40	40	35	30	30	REC	112, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	30	30	30	25	20	20	20	20	20	15	10	10	10	10	10	05	REC	113, LN	80
	00																REC	114, LN	80
	1.0		0.2 - REACH: AREA 10 TO STA. AF														REC	115, LN	80
	193		5		2												REC	116, LN	80
	00	10	70	180	290	530	900	1470	2220	3340	5950	8720	9060	9090	9020	8880	REC	117, LN	80
	8600	8280	7950	7530	7200	6810	6390	6000	5590	5280	4840	4460	4130	3810	3500	3220	REC	118, LN	80
	2960	2670	2450	2270	2110	1960	1810	1680	1570	1440	1370	1290	1210	1150	1090	1050	REC	119, LN	80
	1010	970	930	900	870	840	810	780	750	725	700	680	660	640	620	605	REC	120, LN	80
AREA 11	590	575	560	545	530	515	500	490	480	475	470	465	460	455	450	445	REC	121, LN	80
	440	435	430	425	420	415	410	405	400	395	390	385	380	375	370	365	REC	112, LN	80
	360	355	350	345	340	334	330	325	320	315	310	310	310	305	300	300	REC	123, LN	80
	300	295	290	285	280	275	270	265	260	255	250	245	240	235	230	225	REC	124, LN	80
	220	215	210	205	200	200	200	195	190	190	190	185	180	180	180	175	REC	125, LN	80
	170	165	160	155	150	145	140	135	130	125	120	120	120	115	110	110	REC	126, LN	80
	110	105	100	100	100	100	100	100	100	95	90	90	90	85	80	80	REC	127, LN	80
	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	05	REC	128, LN	80
	00																REC	129, LN	80
	FRANKLIN																REC	130, LN	80
	6.0		0.4 - REACH: STA. AF TO STA. AI														REC	131, LN	80
	133																REC	132, LN	80
	00	380	710	1270	1650	2260	2930	3830	4600	5290	6020	6430	6470	6210	5570	4940	REC	133, LN	80
	4480	4060	3790	3480	3250	3020	2870	2690	2560	2410	2290	2180	2080	1995	1910	1840	REC	134, LN	80
	1770	1705	1640	1595	1550	1495	1440	1395	1350	1305	1260	1220	1180	1140	1100	1060	REC	135, LN	80
AREA 12	1020	975	970	935	900	870	840	815	790	765	740	715	690	665	640	615	REC	136, LN	80
	590	570	550	530	510	495	480	465	450	435	420	410	400	390	380	370	REC	137, LN	80
	360	350	340	330	320	310	300	290	280	270	260	250	240	230	220	210	REC	138, LN	80
	200	195	190	185	180	175	170	160	150	140	130	125	120	115	110	105	REC	139, LN	80
	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	REC	140, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	20	15	10	05	00												REC	141, LN	80
	4.0		0.4			NO. OF ITERATIONS 2		REACH: AREA 12 TO STA. AG									REC	142, LN	80
	170		2														REC	143, LN	80
	00	90	150	260	360	540	770	1250	2130	3170	4130	5260	6200	6960	7490	7950	REC	144, LN	80
	8310	8620	8800	8890	8870	8700	8430	7960	7600	7210	6910	6520	6160	5710	5430	5100	REC	145,LN	80
	4860	4520	4310	4040	3840	3620	3460	3250	3110	2940	2820	2690	2600	2490	2400	2300	REC	146, LN	80
	2220	2160	2110	2040	2000	1960	1940	1900	1860	1810	1800	1760	1730	1700	1670	1630	REC	147, LN	80
	1600	1580	1540	1520	1500	1480	1440	1420	1400	1380	1360	1330	1310	1290	1280	1260	REC	148, LN	80
AREA 13	1240	1220	1200	1190	1180	1160	1140	1130	1110	1100	1090	1050	1030	1010	990	980	REC	149, LN	80
	950	940	930	900	890	880	860	840	830	800	790	780	770	750	730	710	REC	150, LN	80
	700	690	680	670	650	630	610	600	590	580	560	540	525	510	505	500	REC	151, LN	80
	485	470	455	440	425	410	405	400	390	380	360	340	330	320	310	300	REC	152, LN	80
	290	280	270	260	245	230	215	200	195	190	175	160	145	130	120	110	REC	153, LN	80
	100	95	80	70	55	40	30	20	10	00							REC	154, LN	80
	4.0		0.4	- REACH: STA. AG TO STA. AH													REC	155, LN	80
	137		2														REC	156, LN	80
	00	20	90	180	290	410	620	880	1240	1850	3040	5260	5990	5730	5270	4560	REC	157, LN	80
	4000	3430	2990	2680	2420	2210	2010	1840	1700	1560	1450	1330	1260	1175	1090	1010	REC	158, LN	80
	930	870	810	755	700	660	620	590	560	535	510	490	470	450	430	415	REC	159, LN	80
AREA 14	400	390	380	365	350	340	330	320	310	305	300	295	290	280	270	260	REC	160, LN	80
	250	245	240	235	230	225	220	215	210	205	200	200	200	195	190	190	REC	161, LN	80
	190	185	180	180	180	175	170	165	160	155	150	145	140	135	130	125	REC	162, LN	80
	120	120	120	115	110	110	110	110	110	105	100	100	100	100	100	100	REC	163, LN	80
	100	100	100	100	100	95	90	85	80	75	70	65	60	55	50	45	REC	164, LN	80
	40	35	30	25	20	15	10	05	00								REC	165, LN	80
	5.0		0.4														REC	166, LN	80
	186		3		2	- REACH: STA. AH TO STA. AI											REC	167, LN	80
	00	230	590	1100	1690	2540	4030	6240	9480	14500	17660	20090	20320	20270	19630	17720	REC	168, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	16100	14890	13590	12400	11310	0330	9390	8430	7630	6970	6520	6110	5720	5390	5100	4850	REC	169, LN	80
	4650	4460	4270	4095	3920	3790	3660	3535	3410	3305	3200	3095	3010	2920	2830	2750	REC	170, LN	80
	2670	2590	2510	2445	2380	2310	2240	2185	2130	2075	2020	1970	1920	1870	1820	1775	REC	171, LN	80
AREA 15	1730	1685	1640	1605	1570	1535	1500	1470	1440	1410	1380	1350	1320	1295	1270	1245	REC	172, LN	80
	1220	1200	1180	1160	1140	1120	1100	1085	1070	1055	1040	1025	1010	1005	980	960	REC	173, LN	80
	940	925	910	895	880	865	850	835	820	805	790	775	760	745	730	715	REC	174, LN	80
	700	685	670	655	640	620	610	600	590	580	570	560	550	540	530	520	REC	175, LN	80
	510	500	485	470	455	440	430	420	410	400	390	380	370	360	350	340	REC	176, LN	80
	330	320	310	300	290	280	270	260	250	240	230	220	215	210	205	200	REC	177, LN	80
	195	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	REC	178, LN	80
	45	40	35	30	25	20	15	10	05	00							REC	179, LN	80
	PARKER																REC	180, LN	80
	4.2		0.4	- REACH: STA. AI TO STA. AK													REC	181, LN	80
	159																REC	182, LN	80
	00	180	370	750	1350	2250	3050	4050	4800	5750	6330	6640	6670	6540	6290	5870	REC	183, LN	80
	5340	4750	4290	3960	3730	3580	3420	3300	3200	3110	3010	2910	2820	2750	2690	2610	REC	184, LN	80
AREA 16	2540	2480	2400	2350	2300	2250	2190	2140	2090	2030	1990	1940	1900	1850	1800	1780	REC	185, LN	80
	1720	1690	1650	1610	1580	1540	1500	1480	1430	1400	1380	1340	1300	1280	1240	1210	REC	186, LN	80
	1190	1160	1120	1100	1090	1060	1020	1000	990	970	940	910	900	880	840	820	REC	187, LN	80
	800	790	780	760	740	710	700	680	670	650	630	610	600	590	570	550	REC	188, LN	80
	520	510	500	490	480	470	460	430	410	400	390	380	370	360	350	340	REC	189, LN	80
	320	310	300	290	280	270	260	250	240	230	220	215	210	205	200	195	REC	190, LN	80
	190	185	180	170	160	155	150	145	140	130	120	115	110	105	100	95	REC	191, LN	80
	90	85	80	70	60	50	40	35	30	25	20	15	10	05	00		REC	192, LN	80
	8.0		0.0	REACH: AREA 16 TO STA. AJ													REC	193, LN	80
	121		2														REC	194, LN	80
	00	40	110	200	310	480	690	1080	1490	2090	2750	3940	5060	5760	5860	5600	REC	195, LN	80
	5220	4720	4320	3990	3700	3400	3190	2980	2780	2610	2460	2310	2180	2030	1920	1815	REC	196, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	1710	1615	1520	1450	1380	1310	1240	1185	1130	1095	1060	1025	990	955	920	895	REC	197, LN	80
	870	840	810	790	770	745	720	700	680	660	640	620	600	585	570	555	REC	198, LN	80
	540	520	500	490	480	465	450	435	420	405	390	380	370	360	350	335	REC	199, LN	80
AREA 17	320	310	300	290	280	270	260	250	240	230	220	210	200	195	190	185	REC	200, LN	80
	180	170	160	150	140	130	120	110	100	95	90	85	80	70	60	50	REC	201, LN	80
	40	35	30	25	20	15	10	05	00								REC	202, LN	80
	5.0		0.3	REACH: STA. AJ TO AK													REC	203, LN	80
	175		3		2												REC	204, LN	80
	00	1000	1840	2890	3990	5260	6680	8400	9840	11040	12150	12790	12860	12770	11640	9780	REC	205, LN	80
	8260	7010	6185	5430	4900	4500	4170	3910	3650	3430	3260	3080	2940	2790	2690	2560	REC	206, LN	80
	2450	2340	2235	2140	2040	1975	1910	1830	1755	1700	1640	1590	1540	1495	1450	1410	REC	207, LN	80
AREA 18	1370	1340	1310	1275	1245	1210	1180	1160	1130	1110	1080	1060	1030	1010	990	970	REC	208, LN	80
	950	930	910	890	870	850	840	820	810	790	775	760	745	735	720	710	REC	209, LN	80
	700	690	680	670	660	650	640	630	620	615	610	605	600	595	590	585	REC	210, LN	80
	580	575	570	560	550	540	530	525	520	515	510	505	500	490	480	470	REC	211, LN	80
	460	450	440	430	420	410	400	390	380	375	370	365	360	355	350	340	REC	212, LN	80
	330	320	310	305	300	295	290	285	280	270	260	255	250	240	230	220	REC	213, LN	80
	210	205	200	195	190	185	180	170	160	150	140	130	120	115	110	105	REC	214, LN	80
	100	95	90	85	80	75	70	60	50	40	30	25	20	10	0		REC	215, LN	80
	LOCK 7,ALLY.																REC	216, LN	80
	3.3		0.2	REACH: STA. AK TO AL													REC	217, LN	80
	101																REC	218, LN	80
	00	220	430	710	1010	1360	1730	2150	2670	3340	4380	4490	4470	4310	4090	3850	REC	219, LN	80
	3590	3320	3080	2810	2560	2290	2050	1790	1590	1410	1290	1190	1090	1025	960	895	REC	220, LN	80
AREA 19	830	770	710	665	620	585	550	515	480	450	420	395	370	350	330	315	REC	221, LN	80
	300	290	280	275	270	265	260	250	240	230	220	215	210	205	200	195	REC	222, LN	80
	190	180	170	160	150	140	130	120	110	105	100	100	100	95	90	90	REC	223, LN	80
	90	85	80	80	80	75	70	65	60	55	50	45	40	35	30	25	REC	224, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	20	15	10	05	00												REC	225, LN	80
	0.8		0.2		REACH: AREA 19 TO STA. AL												REC	226, LN	80
	127																REC	227, LN	80
	00	220	420	760	1240	1970	2720	3780	5380	5860	6170	6180	5990	5590	5270	4630	REC	228, LN	80
	4050	3580	3210	2880	2570	2330	2100	1910	1750	1600	1490	1385	1280	1195	1110	1055	REC	229, LN	80
AREA 20	1000	960	920	885	850	815	780	745	710	690	670	640	610	585	560	535	REC	230, LN	80
	510	490	470	450	430	410	390	375	360	345	330	315	300	290	280	270	REC	231, LN	80
	260	250	240	230	220	215	210	205	200	195	190	185	180	175	170	165	REC	232, LN	80
	160	155	150	145	140	135	130	125	120	115	110	105	100	100	100	100	REC	233, LN	80
	100	100	100	100	100	100	100	95	90	85	80	75	70	70	70	65	REC	234, LN	80
	60	55	50	50	50	45	40	35	30	25	20	15	10	05	00		REC	235, LN	80
	5.3		0.2		REACH: AREA 20 TO STA. AL												REC	236, LN	80
	155		4														REC	237, LN	80
	00	120	350	630	1050	1680	2520	3810	5500	6380	7020	7400	7430	7210	6760	6040	REC	238, LN	80
	5330	4570	3910	3270	2850	2400	2020	1710	1500	1320	1210	1110	1020	960	900	845	REC	239, LN	80
AREA 21	790	740	690	650	610	580	550	525	500	480	460	454	430	415	400	390	REC	240, LN	80
	380	370	360	350	340	330	320	315	310	305	300	295	290	290	290	285	REC	241, LN	80
	280	280	280	275	270	270	270	265	260	260	260	255	250	250	250	245	REC	242, LN	80
	240	240	240	235	230	230	230	225	220	220	220	215	210	210	210	205	REC	243, LN	80
	200	200	200	195	190	190	190	185	180	180	180	175	170	165	160	155	REC	244, LN	80
	150	145	140	135	130	130	130	125	120	120	120	115	110	110	110	105	REC	245, LN	80
	100	100	100	95	90	90	90	85	80	80	80	75	70	65	60	55	REC	246, LN	80
	50	45	40	35	30	25	20	15	10	05	00						REC	247, LN	80
	LOCK 4,ALLY.																REC	248, LN	80
	6.8		0.1		REACH: STA. AL TO STA. OA												REC	249, LN	80
	94																REC	250, LN	80
	00	140	260	450	610	910	1201	1880	2500	3080	3490	3870	4300	4740	5100	5570	REC	251, LN	80
	5950	6380	6610	6830	7000	7370	7400	7520	7560	7550	7520	7430	7300	7150	6850	6630	REC	252, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	6350	6140	5830	5580	5340	5060	4770	4520	4220	3990	3670	3380	3090	2740	2520	2290	REC	253, LN	80
	2130	1980	1800	1670	1530	1420	1310	1210	1120	1050	960	880	790	710	620	590	REC	254, LN	80
AREA 22	510	480	410	375	340	310	280	250	220	200	180	160	140	130	120	115	REC	255, LN	80
	110	105	100	95	90	85	80	70	60	45	30	10	05	00			REC	256, LN	80
	CLARKSBURG																REC	257, LN	80
	5.0		0.4	REACH: AREA 22 TO STA. MA													REC	258, LN	80
	81																REC	259, LN	80
	00	80	130	230	320	470	610	830	1050	1390	1610	1840	2060	2270	2490	2590	REC	260, LN	80
AREA 23	2670	2710	2710	2700	2640	2600	2520	2440	2350	2260	2150	2030	1920	1820	1730	1620	REC	261, LN	80
	1560	1480	1390	1310	1220	1140	1070	1000	950	880	810	760	710	660	610	570	REC	262, LN	80
	520	490	450	420	390	360	330	315	300	280	260	235	210	205	200	175	REC	263, LN	80
	150	135	120	110	100	90	80	65	50	40	30	25	20	15	10	05	REC	264, LN	80
	00																REC	265, LN	80
	4.5		0.4.	REACH: AREA 23 TO STA. MA													REC	266, LN	80
	62																REC	267, LN	80
	00	140	290	480	680	1020	1380	1780	2130	2420	2700	2980	3260	3350	3500	3640	REC	268, LN	80
	3780	3900	3930	3900	3780	3600	3460	3270	3040	2800	2600	2360	2160	1900	1680	1430	REC	269, LN	80
AREA 24	1280	1040	910	750	630	560	510	450	410	360	340	310	290	260	230	210	REC	270, LN	80
	190	175	160	130	110	100	90	80	60	40	20	10	05	00			REC	271, LN	80
	1.5		0.4	REACH: AREA 24 TO STA. MA													REC	272, LN	80
	85		4		2												REC	273, LN	80
	00	50	120	300	900	1720	3000	4000	4450	4850	5100	5140	5000	4760	4440	4000	REC	274, LN	80
	3690	3230	2940	2540	2240	1930	1690	1430	1260	1030	970	760	660	590	520	480	REC	275, LN	80
AREA 25	420	400	390	360	350	335	320	315	310	305	300	295	290	275	260	250	REC	276, LN	80
	240	235	230	220	210	205	200	195	190	180	170	165	160	150	140	135	REC	277, LN	80
	130	120	110	105	100	95	90	85	80	75	70	60	50	20	30	25	REC	278, LN	80
	20	15	10	05	00												REC	279, LN	80
	ENTERPRISE																REC	280, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	2.8		0.4														REC	281, LN	80
	85		1	REACH: STA. MA. TO STA. MB													REC	282, LN	80
	00	10	30	90	200	670	1870	2430	2850	3080	3250	3370	3490	3590	3660	3670	REC	283, LN	80
	3660	3620	3550	3420	3230	2970	2630	2180	1740	1330	1060	910	800	710	630	560	REC	284, LN	80
AREA 26	510	470	440	410	380	360	340	320	300	285	270	255	240	230	220	210	REC	285, LN	80
	200	190	180	170	160	150	140	135	130	125	120	115	110	105	100	95	REC	286, LN	80
	90	85	80	75	70	65	60	55	50	45	45	40	40	35	30	25	REC	287, LN	80
	20	15	10	05	00												REC	288, LN	80
	109			3	2												REC	289, LN	80
	00	160	320	540	830	1240	1880	3630	6140	8530	8980	9030	8950	8690	8400	7910	REC	290, LN	80
	7450	6820	6170	5680	5350	5080	4920	4780	4600	4410	4250	4030	3830	3620	3460	3280	REC	291, LN	80
	3110	2970	2830	2690	2560	2435	2310	2205	2100	2005	1910	1815	1720	1640	1560	1475	REC	292, LN	80
AREA 27	1390	1310	1230	1160	1090	1035	980	930	880	835	790	750	710	675	640	615	REC	293, LN	80
	590	565	540	520	500	485	470	455	440	425	410	395	380	365	350	335	REC	294, LN	80
	320	310	300	290	280	265	250	235	220	210	200	190	180	170	160	150	REC	295, LN	80
	140	130	120	105	90	75	60	50	40	30	20	10	00				REC	296, LN	80
	LOCK 15,MON.																REC	297, LN	80
	6.4		0.2														REC	298, LN	80
	148			REACH: STA. MB TO STA. MD													REC	299, LN	80
	00	280	530	850	1210	1730	2320	3500	4240	4740	4790	4800	4790	4700	4690	4340	REC	300, LN	80
	4030	3760	3540	3320	3130	2960	2800	2640	2510	2370	2240	2110	2000	1890	1780	1670	REC	301, LN	80
	1580	1500	1420	1340	1270	1210	1160	1105	1050	1015	980	940	900	870	840	815	REC	302, LN	80
	790	765	740	720	700	680	660	640	605	590	575	560	550	540	530	520	REC	303, LN	80
AREA 28	505	490	475	460	445	430	420	410	400	390	380	370	360	350	340	330	REC	304, LN	80
	320	310	305	300	290	280	270	260	255	250	245	240	230	220	215	210	REC	305, LN	80
	205	200	195	190	185	180	175	170	165	160	155	150	145	140	135	130	REC	306, LN	80
	125	120	115	110	105	100	100	100	95	90	85	80	75	70	65	60	REC	307, LN	80
	60	60	55	50	45	40	40	40	35	30	25	20	20	20	15	10	REC	308, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	10	10	05	00													REC	309, LN	80
	2.0		0.4		REACH: AREA 28 TO STA. MK												REC	310, LN	80
	109		2														REC	311, LN	80
	00	240	500	880	1340	2270	4650	8730	10700	11530	11570	11480	11090	10600	10140	9650	REC	312, LN	80
	9240	8800	8380	7990	7600	7185	6770	6385	6000	5660	5320	5050	4780	4570	4360	4165	REC	313, LN	80
AREA 29	3970	3815	3660	3545	3430	3345	3260	3190	3120	3060	3000	2940	2880	2820	2760	2700	REC	314, LN	80
	2640	2580	2520	2460	2400	2345	2290	2235	2180	2125	2070	2015	1960	1910	1860	1810	REC	315, LN	80
	1750	1700	1650	1600	1550	1500	1450	1400	1350	1305	1260	1215	1170	1120	1070	1025	REC	316, LN	80
	980	935	890	845	800	760	720	675	630	585	540	505	470	430	390	355	REC	317, LN	80
	320	285	250	220	190	160	130	110	90	65	40	20	00				REC	318, LN	80
	PARSONS																REC	319, LN	80
	8.0		0.3		REACH: STA. MK TO STA. MC												REC	320, LN	80
	61		2														REC	321, LN	80
	00	110	230	420	600	840	1140	1700	3950	6630	8470	10180	11820	12180	12100	11640	REC	322, LN	80
	10710	9290	8000	6830	5960	5160	4440	3700	3150	2640	2240	1870	1590	1310	1160	1020	REC	323, LN	80
AREA 30	930	860	790	730	670	615	560	515	470	430	390	355	320	295	270	245	REC	324, LN	80
	220	195	170	145	120	105	90	75	60	45	30	15	00				REC	325, LN	80
	ROWLESBURG																REC	326, LN	80
	5.0		0.4		REACH: STA. MC TO STA. MD												REC	327, LN	80
	95																REC	328, LN	80
	00	40	110	370	800	1430	2240	3510	4690	5360	5810	6000	5970	5820	5680	5460	REC	329, LN	80
	5250	4990	4730	4430	4140	3820	3550	3230	2930	2620	2360	2120	1950	1800	1670	1540	REC	330, LN	80
AREA 31	1440	1320	1270	1195	1120	1060	1000	950	900	850	800	760	720	685	650	620	REC	331, LN	80
	590	560	530	505	480	460	440	420	400	380	360	340	320	305	290	275	REC	332, LN	80
	260	245	230	220	210	200	190	180	170	160	150	140	130	120	110	105	REC	333, LN	80
	100	95	90	80	70	60	50	40	30	25	20	15	10	05	00		REC	334, LN	80
	2.6		0.4		REACH: AREA 31 TO STA. MD												REC	335, LN	80
	59		3														REC	336, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	00	100	200	330	510	780	1270	2630	4480	7850	12250	12890	12490	11620	10780	9630	REC	337, LN	80
AREA 32	8780	7940	7160	6400	5690	4920	4210	3590	3000	2460	2000	1550	1200	970	770	610	REC	338, LN	80
	500	420	360	315	270	240	210	195	180	170	160	150	140	130	120	115	REC	339, LN	80
	110	100	90	80	70	55	40	30	20	10	00						REC	340, LN	80
	LAKE LYNN																REC	341, LN	80
	2.0		0.2	REACH: STA. MD TO STA. ME													REC	342, LN	80
	89																REC	343, LN	80
	00	90	200	390	640	1140	1670	2230	2690	3290	3680	4100	4420	4820	5080	5390	REC	344, LN	80
	5590	5810	5960	6110	6210	6300	6300	6170	6010	5740	5460	5030	4580	3940	3360	2620	REC	345, LN	80
AREA 33	2060	1730	1510	1320	1180	1050	950	850	790	710	680	620	600	530	500	480	REC	346, LN	80
	450	410	390	360	340	310	300	280	270	240	220	210	200	190	180	170	REC	347, LN	80
	160	145	130	125	120	115	110	105	100	95	90	80	70	60	50	45	REC	348, LN	80
	40	35	30	25	20	15	10	05	00								REC	349, LN	80
	1.5		0.2	REACH: AREA 33 TO STA. ME													REC	350, LN	80
	81		4		2												REC	351, LN	80
	00	950	1900	3010	4150	5300	6570	7810	8930	10300	11200	12120	12900	12900	12340	11340	REC	352, LN	80
AREA 34	10250	9300	8360	7170	6250	5180	4560	4130	3700	3370	3100	2790	2570	2410	2230	2100	REC	353, LN	80
	2000	1910	1820	1750	1680	1600	1510	1430	1380	1300	1250	1200	1140	1100	1050	1000	REC	354, LN	80
	980	940	900	865	830	805	780	740	700	675	650	620	590	550	510	480	REC	355, LN	80
	450	425	400	370	340	315	290	245	210	190	170	135	100	70	40	10	REC	356, LN	80
	00																REC	357, LN	80
	LOCK 7,MON.					NO. OF ITERATIONS											REC	358, LN	80
	4.4		0.2			2			REACH: STA. ME TO STA. MF								REC	359, LN	80
	62																REC	360, LN	80
	00	110	340	780	1170	1770	2280	2720	3060	3370	3700	3980	4090	4130	4100	3950	REC	361, LN	80
AREA 35	3710	3430	3160	2860	2550	2240	1970	1760	1530	1320	1180	1050	950	870	790	730	REC	362, LN	80
	670	625	580	545	510	475	440	415	390	365	340	315	290	265	240	220	REC	363, LN	80
	200	185	170	150	130	110	90	75	60	45	30	20	10	00			REC	364, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	5.0		0.4	REACH: AREA 35 TO STA. MF													REC	365, LN	80
	84																REC	366, LN	80
	00	50	120	750	1450	2250	3200	4200	5500	5825	5990	5960	5890	5780	5680	5550	REC	367, LN	80
AREA 36	5380	5210	5000	4740	4360	3800	3400	2840	2050	1580	1400	1250	1100	1010	925	850	REC	368, LN	80
	780	725	670	625	580	550	520	500	475	450	430	410	390	370	350	330	REC	369, LN	80
	320	300	280	270	255	240	225	210	200	180	175	165	150	140	130	120	REC	370, LN	80
	110	100	90	80	75	70	65	60	50	45	40	35	30	25	20	15	REC	371, LN	80
	10	05	05	00													REC	372, LN	80
	4.9		0.4	REACH: AREA 36 TO STA. MF													REC	373, LN	80
	82																REC	374, LN	80
	00	90	270	540	810	1130	1450	1850	2240	2370	2390	2380	2340	2290	2240	2170	REC	375, LN	80
	2070	1930	1800	1640	1460	1260	1070	880	750	640	580	530	480	450	420	395	REC	376, LN	80
	370	350	330	315	300	285	270	260	250	240	230	210	200	190	180	170	REC	377, LN	80
AREA 37	160	150	145	140	130	120	115	110	105	100	95	90	85	80	75	70	REC	378, LN	80
	65	60	55	50	50	50	45	40	35	30	25	20	20	20	15	10	REC	379, LN	80
	05	00															REC	380, LN	80
	2.8		0.4	REACH: AREA 37 TO STA. MF													REC	381, LN	80
	83		5		2												REC	382, LN	80
	00	370	750	1160	1590	2100	2700	3330	3990	5070	6530	8640	10750	12410	13130	13380	REC	383, LN	80
		13350	13190	12660	11620 10790	9970	9290	8700	8100	7490	7020	6510	6090	5680	5320	4940	REC	384, LN	80
AREA 38	4660	4350	4060	3810	3590	3330	3140	2935	2730	2555	2380	2240	2100	1975	1850	1750	REC	385, LN	80
	1650	1555	1460	1385	1310	1220	1130	1065	990	920	850	775	700	640	580	525	REC	386, LN	80
	470	430	390	355	320	280	240	215	190	165	140	115	90	70	50	35	REC	387, LN	80
	20	10	00														REC	388, LN	80
	LOCK 4.MON.																REC	389, LN	80
	6.0		0.1	REACH: STA. MF TO STA. MJ													REC	390, LN	80
	93																REC	391, LN	80
	00	130	670	2630	4600	7250	10060	12870	14000	14310	14280	13890	13310	12660	11970	11100	REC	392, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	10240	9120	8070	7250	6240	5310	4720	4140	3500	3080	2760	2450	2200	1970	1790	1660	REC	393, LN	80
	1520	1400	1310	1210	1130	1070	1010	960	910	865	820	775	730	695	660	625	REC	394, LN	80
AREA 39	590	560	530	505	480	455	430	410	390	370	350	330	310	295	280	265	REC	395, LN	80
	250	235	220	205	190	180	170	160	150	140	130	120	110	105	100	95	REC	396, LN	80
	90	80	70	60	50	40	30	25	20	15	10	05	00				REC	397, LN	80
	4.0		0.4	REACH: AREA 39 TO STA. MG													REC	398, LN	80
	71		1														REC	399, LN	80
	00	180	410	740	1030	1390	1780	2280	2810	3280	3590	3720	3660	3380	3110	2840	REC	400, LN	80
	2540	2360	2250	2150	2060	1980	1910	1840	1750	1670	1590	1500	1420	1320	1240	1150	REC	401, LN	80
AREA 40	1060	970	900	840	780	725	670	625	580	540	500	470	440	415	390	365	REC	402, LN	80
	340	320	300	285	270	250	230	210	190	175	160	145	130	115	100	85	REC	403, LN	80
	70	60	50	40	30	15	00										REC	404, LN	80
	36		3		2												REC	405, LN	80
	00	70	170	400	880	1600	2380	3340	4070	5170	5960	5980	5160	4160	3460	2910	REC	406, LN	80
AREA 41	2490	2100	1800	1510	1270	1060	850	690	540	410	320	260	200	150	110	80	REC	407, LN	80
	50	30	10	00													REC	408, LN	80
	CONFLUENCE																REC	409, LN	80
	3.0		0.2	REACH: STA. MG TO STA. MH													REC	410, LN	80
	78		2		2												REC	411, LN	80
	00	410	640	1190	1780	2600	3370	4790	8150	15700	16600	16200	12500	9600	7850	6300	REC	412, LN	80
AREA 42	5650	5020	4700	4310	4000	3730	3490	3310	3130	2940	2810	2610	2480	2320	2210	2080	REC	413, LN	80
	1980	1850	1740	1650	1550	1500	1400	1340	1290	1210	1140	1090	1010	960	900	850	REC	414, LN	80
	790	740	700	680	620	590	540	500	480	430	400	390	340	300	280	240	REC	415, LN	80
	200	190	180	150	120	100	90	70	50	40	20	10	05	00			REC	416, LN	00
	CONNELLSVILLE																REC	417, LN	80
	7.7		0.3		REACH: STA. MH TO STA. MI												REC	418, LN	80
	84		2		2												REC	419, LN	80
AREA 43	00	160	400	750	1040	1590	2140	3080	4210	5580	7830	10590	12430	13440	13600	13330	REC	420, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	12610	11450	10170	9100	8080	7270	6580	6010	5450	5110	4730	4340	4020	3750	3440	3210	REC	421, LN	80
	2980	2810	2600	2460	2320	2190	2060	1970	1880	1810	1740	1670	1600	1535	1470	1410	REC	422, LN	80
	1350	1290	1230	1170	1110	1055	1000	955	910	865	820	770	720	670	620	575	REC	423, LN	80
	530	495	460	430	400	375	330	300	270	245	220	190	160	135	110	85	REC	424, LN	80
	60	35	10	00													REC	425, LN	80
	SUTHERSVILLE																REC	426, LN	80
	4.0		0.1	REACH: STA. MI TO STA. MJ													REC	427, LN	80
	105		1														REC	428, LN	80
	00	330	840	1450	2100	3000	3870	4620	5020	5230	5280	5180	4830	4370	3950	3520	REC	429, LN	80
	3030	2640	2320	2060	1810	1610	1450	1310	1220	1130	1070	1000	950	900	850	815	REC	430, LN	80
AREA 44	780	740	700	670	640	615	590	565	540	520	500	485	470	455	440	425	REC	431, LN	80
	410	395	380	365	350	335	320	310	300	290	280	265	250	240	230	220	REC	432, LN	80
	210	205	200	195	190	185	180	170	160	150	140	135	130	120	110	105	REC	433, LN	80
	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	REC	434, LN	80
	20	20	20	15	10	10	10	05	00								REC	435, LN	80
	83		4		2												REC	436, LN	80
	00	530	1280	2250	3320	4570	5970	8030	10510	12600	13920	15190	16000	16100	15720	14810	REC	437, LN	80
	13790	12260	11050	9880	8810	7840	6900	6030	5320	4520	3940	3450	2970	2660	2340	2060	REC	438, LN	80
AREA 45	1820	1630	1440	1305	1170	1060	950	870	790	725	660	600	540	495	450	420	REC	439, LN	80
	390	355	320	295	270	250	230	220	210	200	190	180	170	160	150	140	REC	440, LN	80
	130	120	110	105	100	90	80	70	60	50	40	35	30	25	20	15	REC	441, LN	80
	10	05	00														REC	442, LN	80
	LOCK 2, MON.																REC	443, LN	80
	4.0		0.1	REACH: STA. MJ TO STA. OA													REC	444, LN	80
	97																REC	445, LN	80
	00	390	800	1390	2170	2950	3630	4460	5080	5720	6370	7090	7620	7690	7600	7410	REC	446, LN	80
	7130	6850	6500	6110	5700	5250	4820	4450	4040	3670	3300	2990	2650	2330	2040	1780	REC	447, LN	80
AREA 46	1530	1380	1220	1110	1010	955	900	855	810	780	750	720	690	660	630	600	REC	448, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	570	550	530	510	490	470	450	430	410	395	380	365	350	335	320	305	REC	449, LN	80
	290	280	270	260	250	240	230	220	210	205	200	195	190	185	180	175	REC	450, LN	80
	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	15	REC	451, LN	80
	00																REC	452, LN	80
	2.6		0.1	REACH: AREA 46 TO STA. OA													REC	453, LN	80
	61		4		2												REC	454, LN	80
	00	290	690	1360	2120	3450	5230	8720	11530	14930	18270	21410	24380	26330	26320	22720	REC	455, LN	80
AREA 47	19650	15900	12170	9620	8340	7400	6590	5930	5360	4880	4420	4040	3620	3250	2940	2660	REC	456, LN	80
	2380	2130	1880	1710	1540	1380	1220	1075	930	815	700	610	520	455	390	350	REC	457, LN	80
	310	270	230	200	170	140	110	90	70	50	30	15	00				REC	458, LN	80
	DASHIELDS																REC	459, LN	80
	3.7		0.1	REACH: STA. OA TO STA. OB													REC	460, LN	80
	118				2												REC	461, LN	80
	00	30	60	100	140	260	350	490	620	790	930	1100	1320	1540	1720	1910	REC	462, LN	80
AREA 48	2100	2350	2510	2750	2940	3140	3290	3470	3540	3620	3700	3740	3790	3800	3810	3830	REC	463, LN	80
	3830	3820	3810	3790	3740	3680	3600	3500	3380	3290	3150	3060	2960	2840	2720	2610	REC	464, LN	80
	2480	2390	2250	2140	2010	1900	1770	1660	1540	1420	1320	1220	1140	1050	960	890	REC	465, LN	80
	810	750	700	650	600	560	510	500	480	450	410	400	380	340	320	310	REC	466, LN	80
	300	290	260	240	230	210	200	200	190	180	170	160	150	140	130	125	REC	467, LN	80
	120	110	105	100	100	95	90	80	70	65	60	50	40	35	30	25	REC	468, LN	80
	20	15	10	05	05	00											REC	469, LN	80
	WARREN,OHIO																REC	470, LN	80
	6.0		0.2			No. OF ITERATIONS 2				REACH: AREA 48 TO STA.BA							REC	471, LN	80
	97		2		2												REC	472, LN	80
	00	180	350	850	1730	3050	3840	4150	4310	4390	4350	4090	3740	3350	2970	2600	REC	473, LN	80
	2280	2020	1820	1550	1330	1200	1100	1010	950	900	860	810	790	750	710	690	REC	474, LN	80
AREA 49	640	620	600	590	560	510	500	480	440	420	400	390	370	340	310	300	REC	475, LN	80
	290	275	260	240	220	210	200	190	180	165	150	135	120	115	110	100	REC	476, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	95	90	85	80	75	70	65	60	55	50	50	50	50	50	45	40	REC	477, LN	80
	35	30	25	20	20	20	15	15	15	10	10	10	05	05	05	05	REC	478, LN	80
	00																REC	479, LN	80
	YOUNGSTOWN																REC	480, LN	80
	4.0		0.2		NO. OF ITERATIONS 2			REACH: STA. BA TO STA. BB									REC	481, LN	80
	120		1														REC	482, LN	80
	00	160	340	530	720	950	1200	1500	1740	2120	2300	2460	2560	2630	2710	2780	REC	483, LN	80
	2790	2810	2820	2830	2830	2810	2810	2790	2740	2700	2680	2610	2560	2500	2460	2400	REC	484, LN	80
AREA 50	2340	2290	2230	2170	2110	2060	2000	1910	1860	1800	1750	1700	1640	1590	1520	1480	REC	485, LN	80
	1410	1380	1320	1290	1220	1190	1140	1100	1050	1010	990	940	900	860	820	800	REC	486, LN	80
	760	720	700	660	630	600	580	560	530	500	490	480	460	430	410	400	REC	487, LN	80
	390	370	350	330	320	310	300	290	270	250	240	230	220	210	200	190	REC	488, LN	80
	180	160	140	130	120	110	100	95	90	85	80	70	60	50	40	35	REC	489, LN	80
	30	25	20	15	10	10	05	00									REC	490, LN	80
	113		2		2												REC	491, LN	80
	00	260	520	880	1150	1520	1890	2300	2730	3290	3860	4510	5000	5440	5550	5590	REC	492, LN	80
	5580	5380	4900	4590	4360	4100	3810	3560	3320	2680	2480	2320	2160	2020	1890	1790	REC	493, LN	80
AREA 51	1690	1600	1520	1450	1380	1350	1280	1180	1090	1050	1010	970	930	900	870	835	REC	494, LN	80
	800	765	730	705	680	655	630	605	580	555	530	510	490	470	450	430	REC	495, LN	80
	410	395	380	365	350	335	320	305	290	280	270	260	250	235	220	210	REC	496, LN	80
	200	195	190	180	170	160	150	140	130	125	120	115	110	105	100	95	REC	497, LN	80
	90	85	80	75	70	60	50	45	40	35	30	25	20	15	10	05	REC	498, LN	80
	00																REC	499, LN	80
	NEW CASTLE																REC	500, LN	80
	3.0		0.2	REACH: AREAS 50 AND 51 TO STA. BB													REC	501, LN	80
	127		3														REC	502, LN	80
	00	90	180	300	470	760	1300	2020	2930	4550	5840	6680	7230	7570	7560	7380	REC	503, LN	80
AREA 52	7140	6760	6330	5810	5380	4920	4590	4310	4070	3840	3680	3520	3370	3240	3110	2990	REC	504, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	2890	2780	2670	2560	2450	2375	2280	2185	2090	2005	1920	1845	1770	1700	1630	1570	REC	505, LN	80
	1510	1450	1390	1335	1280	1230	1180	1130	1080	1035	990	950	910	870	830	795	REC	506, LN	80
	760	730	700	670	640	615	590	570	550	530	510	495	480	465	450	435	REC	507, LN	80
	420	405	390	375	360	345	330	320	310	300	290	280	270	260	250	240	REC	508, LN	80
	230	220	210	205	200	190	180	170	160	150	140	130	120	115	110	105	REC	509, LN	80
	100	95	90	85	80	75	70	60	50	40	30	20	10	05	00		REC	510, LN	80
	3.0		0.2		REACH: STA. BB TO STA. BC												REC	511, LN	80
	144																REC	512, LN	80
	00	100	200	380	670	1300	2400	3650	3980	4130	4280	4390	4560	4910	5180	5280	REC	513, LN	80
	5270	5130	4940	4780	4610	4480	4390	4390	4410	4490	4600	4790	4810	4790	4730	4640	REC	514, LN	80
AREA 53	4550	4450	4360	4230	4140	4050	3940	3820	3730	3600	3480	3330	3210	3100	2850	2690	REC	515, LN	80
	2600	2500	2400	2300	2210	2120	2030	1940	1860	1770	1700	1610	1530	1490	1430	1400	REC	516, LN	80
	1350	1300	1280	1230	1210	1190	1170	1150	1110	1100	1080	1040	1010	1000	980	960	REC	517, LN	80
	930	910	900	870	850	810	800	780	760	730	710	700	690	660	650	620	REC	518, LN	80
	610	600	590	570	560	540	520	500	500	480	470	430	420	410	400	390	REC	519, LN	80
	370	350	320	300	290	280	260	250	240	230	210	200	190	170	150	140	REC	520, LN	80
	130	110	100	100	95	90	80	70	60	50	40	30	20	10	05	00	REC	521, LN	80
	3.0		0.4		REACH: AREA 53 TO STA. BC												REC	522, LN	80
	126																REC	523, LN	80
	00	00	100	200	360	520	800	1150	1550	2000	2410	2820	3290	3680	4070	4380	REC	524, LN	80
	4690	5000	5300	5520	5710	5830	5930	5990	6000	5980	5900	5800	5680	5550	5410	5270	REC	525, LN	80
AREA 54	5140	5000	4830	4680	4500	4310	4120	3940	3790	3620	3450	3300	3120	2970	2790	2680	REC	526, LN	80
	2520	2410	2300	2200	2090	2000	1900	1810	1710	1620	1560	1500	1410	1360	1280	1200	REC	527, LN	80
	1150	1100	1020	980	910	880	810	780	730	700	660	620	590	560	520	500	REC	528, LN	80
	480	440	410	400	380	340	310	300	290	280	270	240	210	200	200	190	REC	529, LN	80
	180	150	140	120	110	105	105	100	95	90	85	80	75	70	65	60	REC	530, LN	80
	55	50	45	40	35	30	25	20	15	10	05	05	05	00			REC	531, LN	80
	4.0		0.4	REACH: AREA 54 TO STA. BC													REC	532, LN	80

TABLE 2.3-2 (CONT'D)

	HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS																REC	533, LN	80
	00	220	430	770	1150	1610	2200	3270	4200	5060	5760	6120	5780	5450	5070	4480	REC	534, LN	80
	3910	3100	2640	2220	1900	1600	1390	1190	1010	870	720	620	520	460	400	350	REC	535, LN	80
AREA 55	300	255	210	180	150	120	90	65	40	20	00						REC	536, LN	80
	BEAVER FALLS																REC	537, LN	80
	2.1		0.1	REACH: STA. BC TO STA. OB													REC	538, LN	80
	71																REC	539, LN	80
	00	220	490	810	1210	1670	2150	2680	3140	3650	4200	4770	5310	5870	6190	6320	REC	540, LN	80
	6260	6000	5700	5420	5060	4650	4280	3770	3300	2850	2440	2170	1820	1570	1370	1210	REC	541, LN	80
AREA 56	1070	940	830	740	660	600	540	505	470	430	390	355	320	290	260	235	REC	542, LN	80
	210	195	180	160	140	125	110	100	90	80	70	60	50	45	40	35	REC	543, LN	80
	30	25	20	15	10	05	00										REC	544, LN	80
	0.5		0.1		3		REACH: AREA 56 TO STA. OB										REC	545, LN	80
	4.5		0.0														REC	546, LN	80
	135																REC	547, LN	80
	00	30	80	170	210	620	970	1440	1930	2530	3220	4250	5730	7000	8260	9580	REC	548, LN	80
	10170	10380	10000	9380	8920	8530	8130	7770	7540	7450	7510	7980	8380	8350	7990	7570	REC	549, LN	80
	7220	6830	6500	6270	5850	5490	5160	4820	4510	4220	3960	3710	3490	3290	3090	2910	REC	550, LN	80
AREA 57	2760	2600	2450	2310	2180	2040	1960	1870	1790	1710	1650	1590	1540	1490	1440	1400	REC	551, LN	80
	1360	1320	1280	1240	1200	1160	1120	1085	1050	1020	990	960	930	900	870	845	REC	552, LN	80
	820	795	770	745	720	695	670	645	620	600	580	560	540	520	500	485	REC	553, LN	80
	470	455	440	425	410	395	380	365	350	335	320	310	300	290	280	270	REC	554, LN	80
	260	245	230	220	210	190	180	170	160	150	140	130	120	110	100	90	REC	555, LN	80
	80	65	50	35	20	10	00										REC	556, LN	80
	3.8		0.0	REACH: AREA 57 TO STA. OB													REC	557, LN	80
	105																REC	558, LN	80
	00	40	90	140	200	260	320	390	490	690	1120	1670	2130	2500	2770	2990	REC	559, LN	80
AREA 58	3210	3400	3430	3380	3320	3320	3350	3410	3540	3760	3880	3810	3440	2920	2460	2060	REC	560, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

	1700	1420	1280	1190	1100	1035	970	910	850	800	750	715	680	640	600	570	REC	561, LN	80
	540	515	490	470	450	435	420	405	390	375	360	345	330	315	300	290	REC	562, LN	80
	280	270	260	245	230	220	210	200	190	180	170	165	160	150	140	130	REC	563, LN	80
	120	115	110	105	100	95	90	85	80	75	70	65	60	55	50	45	REC	564, LN	80
	40	35	30	25	20	15	10	05	00								REC	565, LN	80
	0.5		0.0			REACH: AREA 58 TO STA. OB											REC	566, LN	80
	62		4		2												REC	567, LN	80
	00	910	1720	2870	4050	5500	7090	9000	11100	15200	19140	22980	23150	21000	14100	11050	REC	568, LN	80
	9250	7830	7090	6200	5690	5020	4640	4230	3810	3430	3210	2980	2720	2510	2380	2180	REC	569, LN	80
AREA 59	2010	1830	1750	1610	1520	1410	1350	1220	1190	1100	1020	970	900	820	790	710	REC	570, LN	80
	670	610	580	470	420	400	380	330	300	260	220	200	180	150	110	100	REC	571, LN	80
	80	60	40	30	25	20	10	00									REC	572, LN	80
	NEW CUMBERLAND																REC	573, LN	80
	6.6		0.0		REACH: STA. OB TO STA. OC												REC	574, LN	80
	93																REC	575, LN	80
	00	10	50	90	160	220	290	370	470	590	740	890	1140	1470	1750	2190	REC	576, LN	80
	2660	3260	3840	4270	4510	4600	4420	4110	3650	3220	2870	2510	2220	1990	1780	1580	REC	577, LN	80
AREA 60	1410	1270	1120	1010	900	810	720	655	590	545	500	465	430	410	390	370	REC	578, LN	80
	350	330	310	285	270	255	240	225	210	200	190	185	180	170	160	155	REC	579, LN	80
	150	140	130	125	120	115	110	105	100	95	90	85	80	75	70	65	REC	580, LN	80
	60	55	50	45	40	35	30	25	20	15	10	05	00				REC	581, LN	80
	2.4		0.1		REACH: AREA 60 TO STA. OC												REC	582, LN	80
	109		3		2												REC	583, LN	80
	00	102	300	520	750	1050	1550	2020	2700	3480	4200	5250	6280	7700	9370	11600	REC	584, LN	80
AREA	13900	17200	20750	23080	24190	24400	24000	21650	19490	17200	15470	13220	11900	10500	9500	8420	REC	585, LN	80
61	7510	6720	6080	5420	4800	4310	3950	3600	3280	3000	2780	2580	2400	2210	2090	1960	REC	586, LN	80
	1840	1750	1660	1580	1500	1420	1370	1290	1230	1190	1130	1070	1030	1000	980	920	REC	587, LN	80
	870	830	800	790	770	730	700	670	640	610	600	580	550	510	480	450	REC	588, LN	80

TABLE 2.3-2 (CONT'D)

HOURLY UNIT HYDROGRAHIC VALUES AND MUSKINGUM ROUTING COEFFICIENTS

430	410	400	390	360	335	310	290	270	245	220	210	200	190	180	160	REC	589, LN	80
140	125	110	100	90	75	60	45	30	25	20	10	00				REC	590, LN	80
WHEELING																REC	591, LN	80

TABLE 2.3-3

DISTANCES FROM SHIPPINGPORT TO DAM SITES

Dam	Distance from Shippingport in miles
Union City	231
Chautauqua	258.8
Kinzua	233
Tionesta	188.5
East Branch	225.3
Mahoning	112.4
Crooked Creek	82.4
Conemaugh	99.6
Loyalhanna	96.8
Youghiogheny	125.6
Tygart	186.3
Shenango	87.0
Meander Creek	65.3
Mosquito Creek	75.8
Milton	94.4
Kirwin	97.5

TABLE 2.3-4

FLOOD FORECAST FOR DASHIELDS
BEGINNING ON 10/15/1954

Day	Time	Increase in Predicted Flow CFS
15	6	47.
	12	1,463.
	18	22,381.
	24	111,396.
16	6	212,113.
	12	275,696.
	18	317,480.
	24	321,660.
17	6	294,720.
	12	248,305.
	18	198,122.
	24	154,732.
18	6	122,149.
	12	98,827.
	18	81,785.
	24	68,974.

TABLE 2.3-5

DAMS ABOVE BVPS SITE - PERTINENT DATA

Removed in Accordance with RIS 2015-17

TABLE 2.3-5 (CONT'D)

DAMS ABOVE BVPS SITE - PERTINENT DATA

Removed in Accordance with RIS 2015-17

TABLE 2.3-6

ANALYSIS OF LIQUEFACTION POTENTIAL
KINZUA DAM ABUTMENT SECTION

Elevation	Mass Above, Psf	Aavg (Peak)	S, Psf = 0.65.M.Aavg	, Psf	S/	0.65	Factor of Safety
At Center - DBE Plus 25-Yr Flood							
1210	22,700	0.15 g	2,200	22,700	0.097	0.21	2.2
1200	24,090	0.15 g	2,350	23,450	0.10	0.21	2.1
1180	26,870	0.14 g	2,440	24,950	0.098	0.21	2.1
1160	29,650	0.13 g	2,520	27,450	0.092	0.21	2.3
1140	32,430	0.12 g	2,530	28,950	0.088	0.21	2.4
1120	35,210	0.11 g	2,520	30,450	0.083	0.21	2.6
At Toe - DBE Plus 25-Yr Flood							
1210	4,170	0.11 g	300	4,170	0.072	0.21	2.9
1200	5,560	0.11 g	395	4,920	0.081	0.21	2.6
1180	8,340	0.10 g	540	6,420	0.084	0.21	2.5
1160	11,120	0.09 g	650	7,920	0.082	0.21	2.6
1140	13,900	0.08 g	720	9,420	0.077	0.21	2.7
1120	16,680	0.07 g	760	10,920	0.070	0.21	3.0
At Center - Historic Earthquake Plus Standard Project Flood							
1240	18,700	0.04 g	490	18,700	0.026	0.21	8.0
1220	21,580	0.04 g	565	20,200	0.028	0.21	7.5
1200	24,360	0.04 g	630	21,700	0.029	0.21	7.2
1180	27,140	0.035 g	620	23,200	0.027	0.21	7.8
1160	29,920	0.032 g	620	24,700	0.025	0.21	8.4
1140	32,700	0.03 g	640	26,200	0.024	0.21	8.7
1120	35,480	0.0275 g	630	27,700	0.023	0.21	9.1

NOTE: / from triaxial tests by Seed on Sacramento River sand, as shown on Figure 2.6-9, for relative density of 60%.

Number of cycles of loading - 10

TABLE 2.3-7

RATIOS BETWEEN THE HEIGHTS, LENGTHS AND STEEPNESS OF WAVES AND IN CURRENTS OF DIFFERENT RELATIVE VELOCITIES

(Based on a theoretical study made at the Scripps Institution of Oceanography)

Ratio Between Wave Characteristics in Current and in Still Water	Ratio Between Current Velocity and Wave Velocity in Still Water									
	Contrary Currents					Following Currents				
U/C	-0.25	-0.20	-0.15	-0.10	-0.05	+0.05	+0.10	+0.15	+0.20	+0.25
Height	2.35	1.75	1.39	1.21	1.08	0.93	0.87	0.82	0.79	0.76
Length	.43	.52	.67	.79	.90	1.08	1.19	1.26	1.36	1.43
Steepness	5.49	3.40	2.07	1.53	1.21	.86	.73	.65	.58	.53

TABLE 2.6-1

NUMBER OF CYCLES IN WHICH ACCELERATION EQUALS OR EXCEEDS ONE-HALF THE PEAK ACCELERATION FOR DIRECTION RECORDED

Earthquake Record	Number of Cycles of Significant Motion
Taft '52 S69E	9
Taft '52 N21E	9
El Centro '40 NS	10
El Centro '40 EW	12
Golden Gate '57 NE	3
Golden Gate S80E	5
Olympia '49 S86W	7
Helena '35 NS	5
Helena '35 EW	5
Eureka N79E	4
Eureka NIIW	7
Parkfield Site 2	2
Parkfield Site 5 - N5W	1
Parkfield Site 5 - N85E	1
Hollister	3

TABLE 2.6-2

RELATIVE DENSITIES AND RELATED SOIL PROPERTIES FOR SOILS UNDERLYING BEAVER VALLEY POWER STATION SITE VIBRATORY COMPACTION TESTS AT 1 PSI FOR 8 MIN

Test No.	Depth, Ft	Elevation, Ft	Description of Soils	Grain Size Analysis, % Passing		Natural Wet Density (PCF) (In-Place)	Minimum Density, PCF	Maximum Density, PCF		Natural Dry Density, PCF (In-Place)	Relative Density, % *4	Location	
				No. 200 Mesh	D60/D10			VIB	Field*1			North Coordinates	East Coordinates
1	25.0	710.0	Medium brown coarse sand slightly silty, some gravel	1	50.0	129.0	112.0	136.8	139.3	120.6	87	3710	7500
2	35.0	700.0	Fine to medium brown sand, some coarse sand and gravel, trace of clay and silt	1	42.5	139.8	117.4	134.3	141.4	131.3	92	3799	7550
3	40.0	695.0	Same as Test 2 with large pieces of broken gravel	2	44.0	141.3	115.0	134.9	141.4	132.9	94	3751	7600
4 *2	45.0	690.0	Same as Test 1	2	89.0	131.7	120.0	128.4	141.4	123.7	87.5	3730	7575
5	47.5	687.5	Same as Test 2	1	47.5	138.5	115.4	134.5	141.4	129.6	91	3730	7588
6	49.8	685.2	Same as Test	1	50.0	136.6	116.8	133.9	143.7	130.0	92	3691	7550
7	52.5	682.5	Fine to medium gravel and sand slightly silty, some large gravel	1	29.0	143.9	116.4	134.7	143.7	136.5	95	3782	7550

Maximum densities were obtained both by laboratory (ASTM D2049-64T), and field compaction using a vibratory compactor.

*1 Field in-place density tests were performed in area soils during the reactor containment excavation.
*2 Test No. 4 was performed using the Bureau of Reclamation Procedure for determining minimum and maximum densities
*3 Field compaction tests were not available for this material (soil was excavated and wasted)
*4 Relative density was calculated using measured natural (in-place) and field compacted densities

TABLE 2.6-3

RESULTS OF STABILITY ANALYSES FOR NATURAL AND DESIGN CONDITIONS

Stability Analyses Plan:	As-built Conditions		As-built Conditions with DBE = 0.125		As-built Conditions with Project Flood El. 707’		As-built Conditions with Rapid Drawdown from Project Flood Level		As-built Conditions with Rapid Drawdown from Project Flood Level with DBE = 0.125		As-built Conditions with Rapid Drawdown Level with DBE = 0.125 Morgenstern Analysis
	*F	**B	F	B	F	B	F	B	F	B	
Section as shown on figure											
Section E 8100 TO N 4825 E 8550	2.136	2.702	1.741	1.777	1.273	1.204			0.974	0.982	0.975
Section N 7550 (Proposed fill river side of turbine building)	2.73	2.61	2.36	2.29	1.781	1.701	1.771	1.70	1.431	1.492	1.310

Note: Many circles where analyzed; tabulated values indicate lowest factor of safety obtained for particular section under listed condition.

For combined static and earthquake loading indicated factor of safety is instantaneous single peak value. Value of less than 1.0 indicates some distortion might occur at section considered.

*F - Indicates Fellenius Method of Analyses
**B - Indicates Bishops Simplified Method of Analyses (Side forces used in calculations)

TABLE 2.7-1

ADDITIVE BUILDING LOADING

Structure	Nominal El. Of Base of Founda-tion (ft)	Approximate El. Of Original Ground (ft)	Approximate Structure Dead Wt (ksf)	Removed Soil Load (ksf)	Addi-tional Bldg. Load (ksf)
Containment Structure	681	735	7.3	6.5	0.8
Fuel Building	720	735	4.0	1.8	2.2
Auxiliary Building	714	735	4.0	2.5	1.5
Turbine Building	683	715	4.0	4.2	-0.2
Service Building					
Switchgear Room	711	732	4.0	2.5	1.5
High Part of Building	730	730	1.0	-	1.0

TABLE 2.8-1

PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM FOR THE BEAVER VALLEY STATION[3]

SAMPLING DESCRIPTION			SAMPLING FREQUENCY		
Type of Sample	Sample Point	Sampling Point Description	Pre-Operational Program	Analysis	Remarks
Surface Water	49[4] 2 3 4 5	Upstream Side Montgomery Dam Station discharge Shippingport station discharge Midland water plant (raw water) East Liverpool water plant (raw water)	Monthly composite of weekly samples	Gross beta (suspended and dissolved) tritium	Gamma Spectrum when gross beta >10pCi/1,periodic gross alpha
Drinking Water	4 5	Midland water plant (treated water) East Liverpool water plant (treated water)	Weekly composite of daily samples	Gross beta (suspended and dissolved) tritium	Gamma Spectrum when gross beta >10pCi/1,periodic gross alpha
Fish (any available species	2	In or near station discharge	Quarterly	Gross beta Potassium-40 gamma spectrum Sr-90 (bone)	
Bottom Sediments	49[4] 2 50 4	Upstream Side Montgomery Dam near mile 31 In or near station discharge Upstream Side New Cumberland Dam near mile 54 Midland Water intake near mile 36	Quarterly	Gross beta Potassium-40 gamma spectrum	

TABLE 2.8-1 (CONT'D)

PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM FOR THE BEAVER VALLEY STATION(3)(CONT'D)

SAMPLING DESCRIPTION			SAMPLING FREQUENCY		
Type of Sample	Sample Point	Sampling Point Description	Pre-Operational Program	Analysis	Remarks
Well Water	6,7	2 wells near Shippingport discharge	Quarterly	Gross beta (suspended and dissolved) tritium	Gamma Spectrum when gross beta >10pCi/1,periodic gross alpha
	8	Spring southwest of site			
	9	On-site well			
	10,11	2 wells in Shippingport, Pa			
	12	Spring in Shippingport, Pa			
	13	Wells at Meyers Dairy Farm			
	14	Hookstown, Pa			
	15	Georgetown, Pa			
Soil	16,17	2 east of site	Quarterly	Gross beta Potassium-40 gamma spectrum Sr-89 Sr-90	
	18,19	2 west of site			
	20,21	2 north of site			
	22,23	2 south of site			
Wildlife (rabbit)	24	On-site	Quarterly	I-131 in thyroid gamma spectrum on flesh Sr-89,90 in bone	
Milk	25	Searight Dairy	Monthly(2) (weekly at sample pt. 13)	I-131 Cs-137 Sr-90	I-131 only on weekly samples
	26	Hobbs Dairy			
	27	Brunton Dairy			
	28	Sherman Dairy			

TABLE 2.8-1 (CONT'D)

PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM FOR THE BEAVER VALLEY STATION[3] (CONT'D)

SAMPLING DESCRIPTION			SAMPLING FREQUENCY		
Type of Sample	Sample Point	Sampling Point Description	Pre-Operational Program	Analysis	Remarks
Milk (Cont'd)	29	Nichols Dairy		Sr-89	
	13	Meyers Dairy		Ba-140	
				La-140	
				Elemental Ca	
Air Particulates	30	On-site east[1]	Weekly	Gross Beta	Periodic gross
	31	On-site west[1]		I-131 on	alpha, gamma
	32	Midland, Pa		charcoal	spectrum if gross
	51	Aliquippa, Pa		only	beta >10pCi/m^3
	46	Industry, Pa			Composited for
	28	Sherman Dairy			each station
	13	Meyers Dairy			monthly for gamma
	29	Nichols Dairy (Beaver)			spectrum analysis
	47	East Liverpool, Ohio			
	48[4]	Weirton, West Virginia			
Gamma Dosimeters	33-44	Site periphery	Monthly	Beta and	
(3 sets each location)	10	Shippingport, Pa	Quarterly	gamma dose	
	45	Mount Pleasant Church	Annual		
	30	On-site east			
	31	On-site west			
	32	Midland, Pa			
	14	Hookstown, Pa			
	15	Georgetown, Pa			
	51	Aliquippa, Pa			
	46	Industry, Pa			

TABLE 2.8-1 (CONT'D)

PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM FOR THE BEAVER VALLEY STATION(3)(CONT'D)

SAMPLING DESCRIPTION			SAMPLING FREQUENCY		
Type of Sample	Sample Point	Sampling Point Description	Pre-Operational Program	Analysis	Remarks
Gamma Dosimeters (3 sets each location) (Cont'd)	28	Sherman Dairy			
	13	Meyers Dairy			
	29	Nichols Dairy (Beaver)			
	47	East Liverpool, Ohio			
	48(4)	Weirton, West Virginia			
Vegetation and Food Crops	25	Searight Dairy	Quarterly	Beta, Sr-89 Sr-90 gamma spectrum	Vegetation during growing season, silage and supplemental feed
	26	Hobbs Dairy			
	27	Brunton Dairy			
	28	Sherman Dairy			
	29	Nichols Dairy			
	13	Meyers Dairy			
	--	Fruit and vegetables (within 5 miles of plant if available)	Fruit at harvest, vegetables during growing season	Sr-89, Sr-90 gamma spectrum	

TABLE 2.8-1 (CONT'D)

PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM FOR THE BEAVER VALLEY STATION[3] (CONT'D)

(1) On site stations to be relocated elsewhere on site due to interference with future construction.

(2) The weekly sampling will be instituted at all dairies if I-131 is detected in any milk sample orif I-131 is detected in the weekly airborne particulate samples. Sampling will continue at the weekly level until I-131 levels drop below minimum detectable concentrations associated with this program.

(3) Revised environmental monitoring program, Beaver Valley Power Station, Unit 1, Final Environmental Statement, App. B.

(4) Control point location.

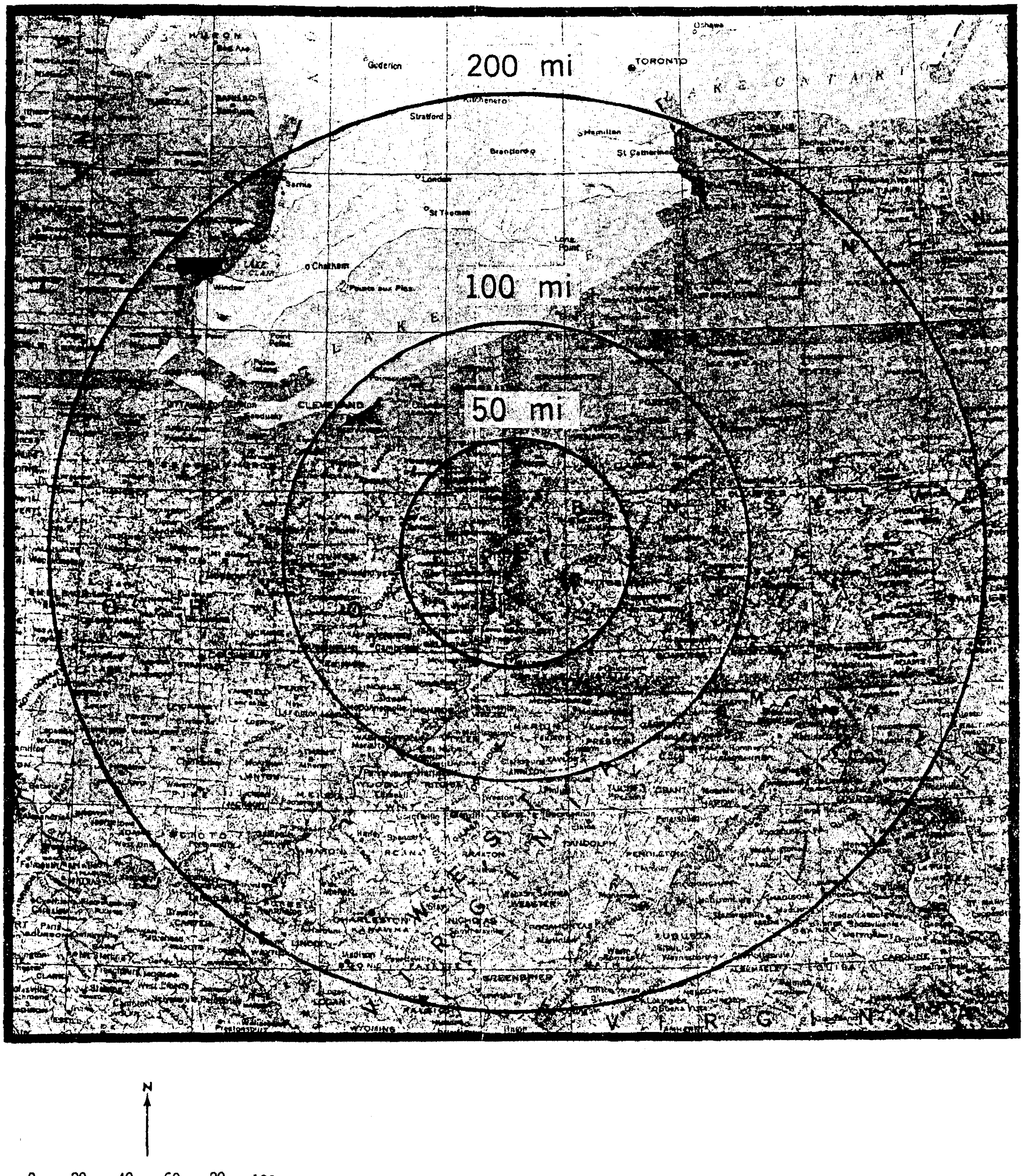


FIGURE 2.1-1
GENERAL SITE LOCATION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

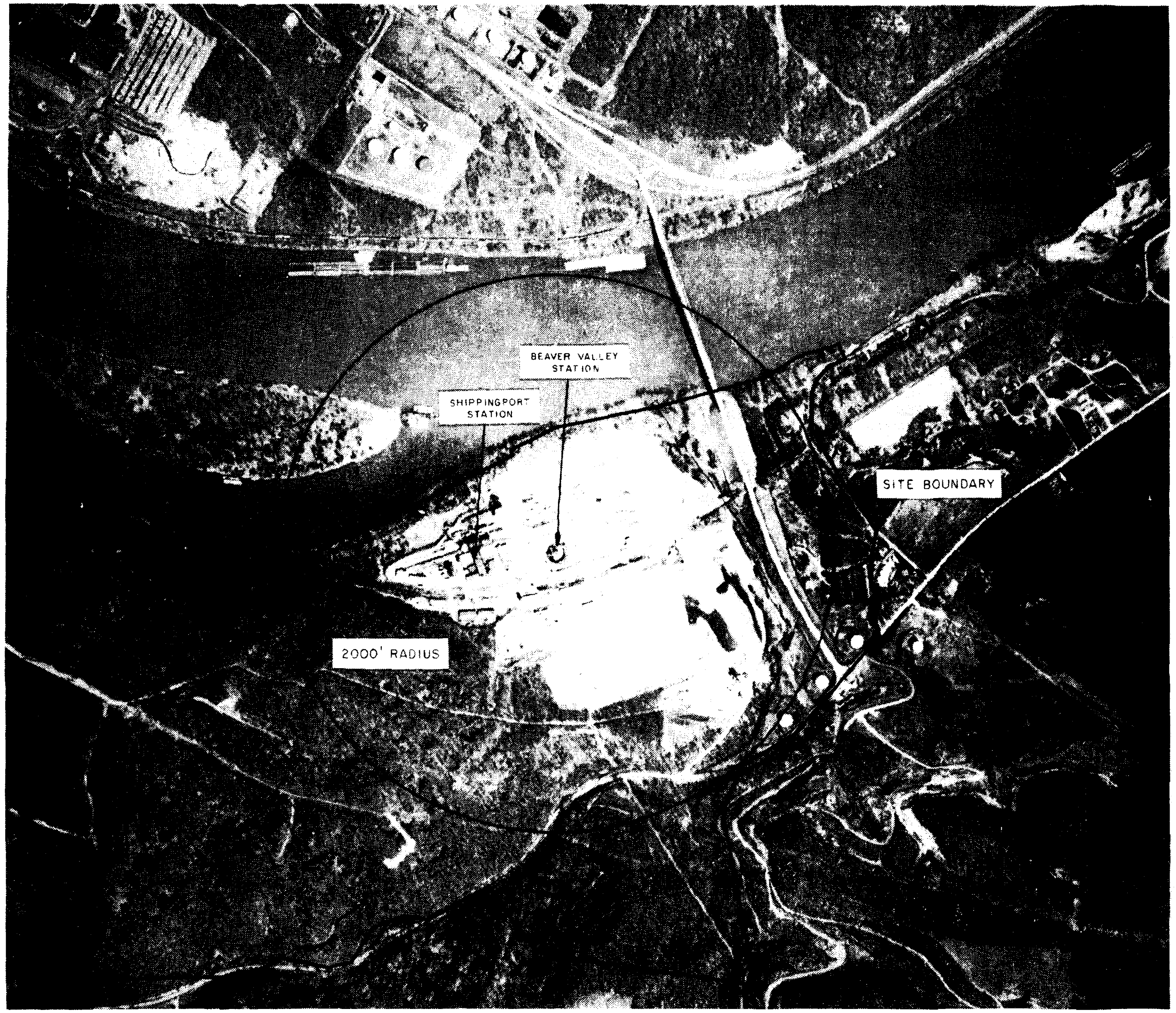


FIGURE 2.1-2
AERIAL PHOTOGRAPH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

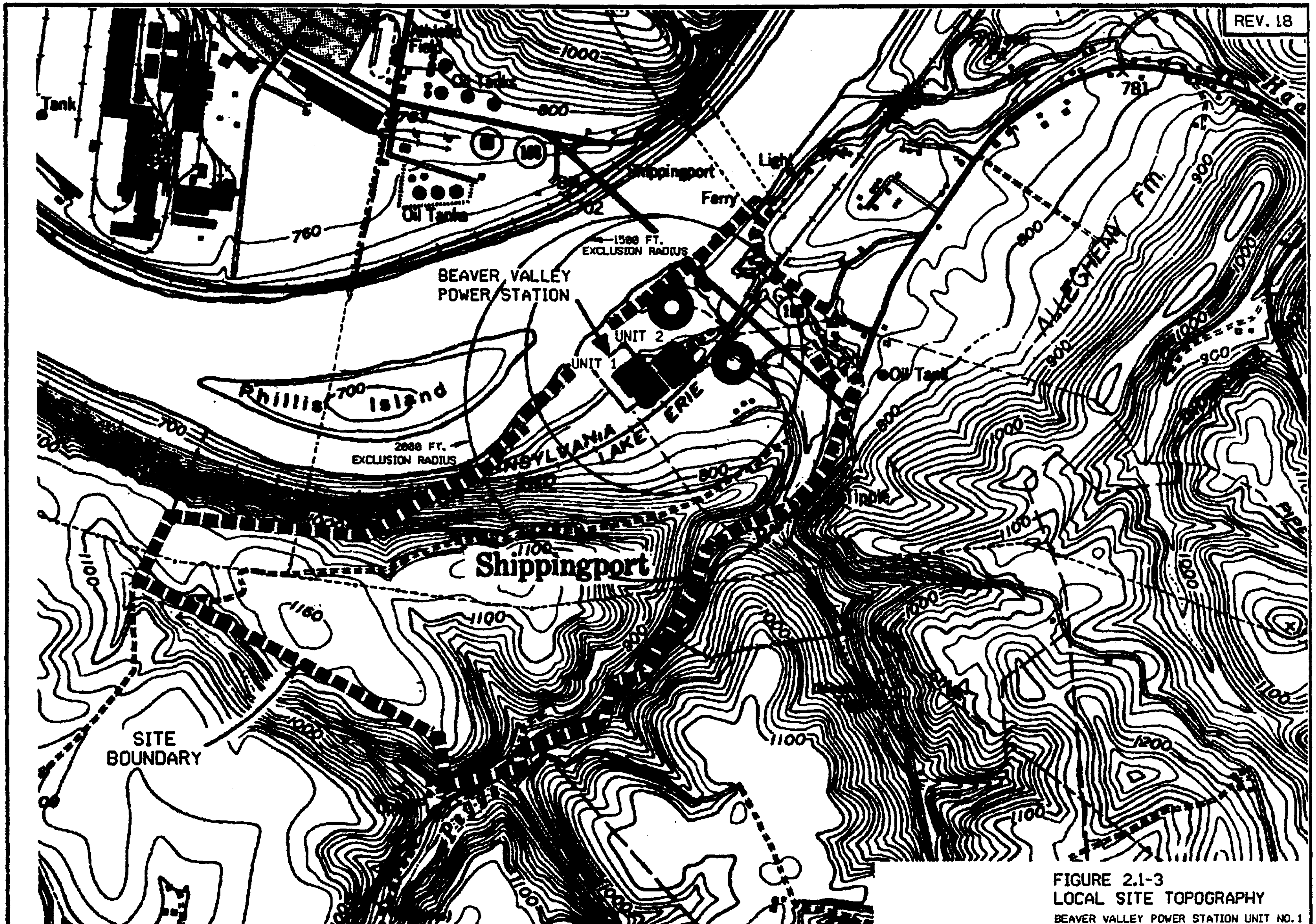


FIGURE 2.1-3
LOCAL SITE TOPOGRAPHY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

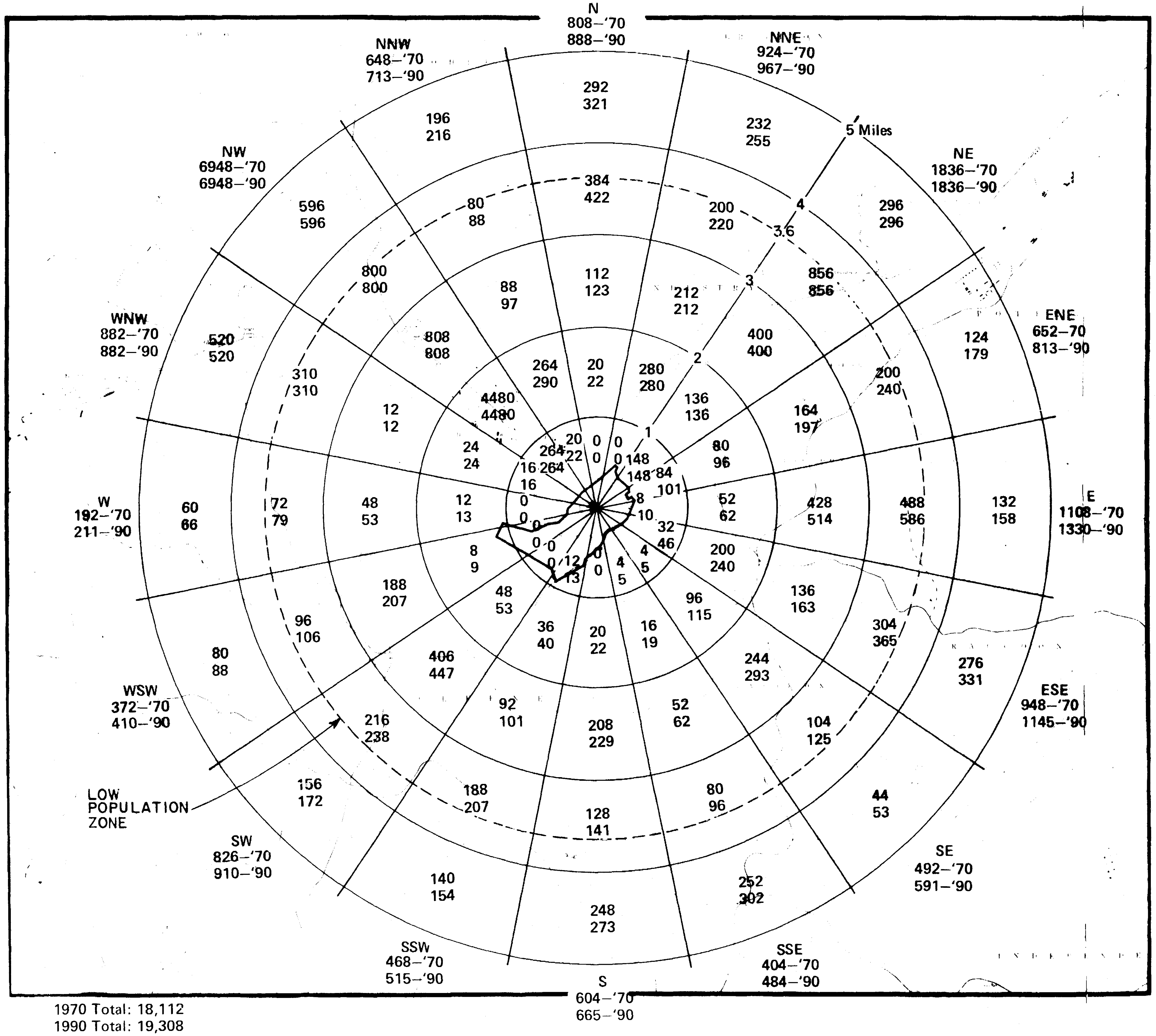
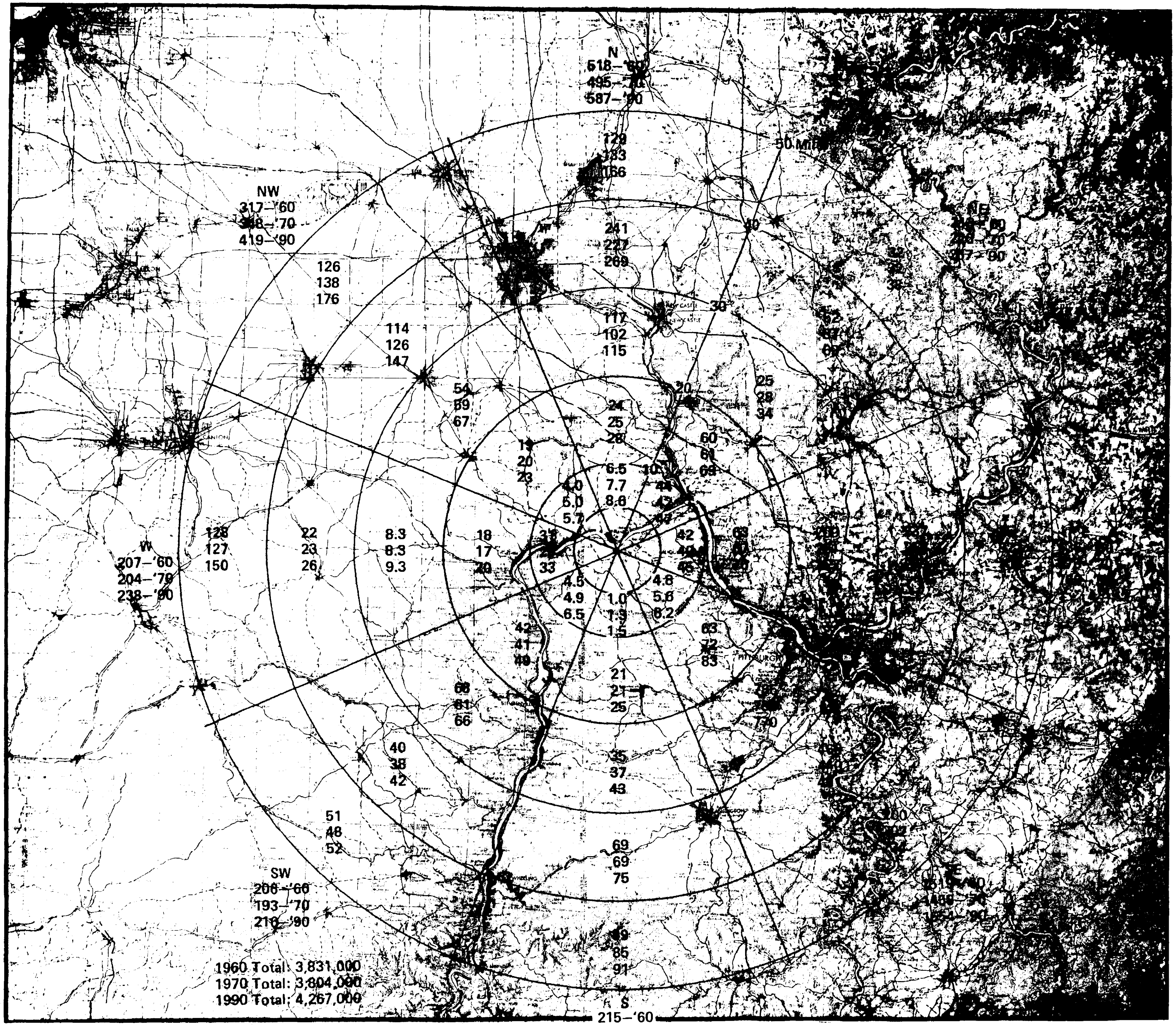


FIG. 2.1-4
POPULATION DISTRIBUTION 0-5 MILES
BEAVER VALLEY POWER STATION
UPDATED FINAL SAFETY ANALYSIS REPORT



Note: All Numbers in the Population Wheel are in Thousands

Miles	5–10	10–20	20–30	30–40	40–50
1960	138,000	310,000	1,301,000	1,241,000	840,000
1970	135,500	324,000	1,254,000	1,238,000	852,000
1990	154,000	373,000	1,359,000	1,368,000	1,012,000

FIGURE 2.1-5
POPULATION DISTRIBUTION 5-50 MILES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

FIGURE 2.1-6
AREA HIGHWAY MAP
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

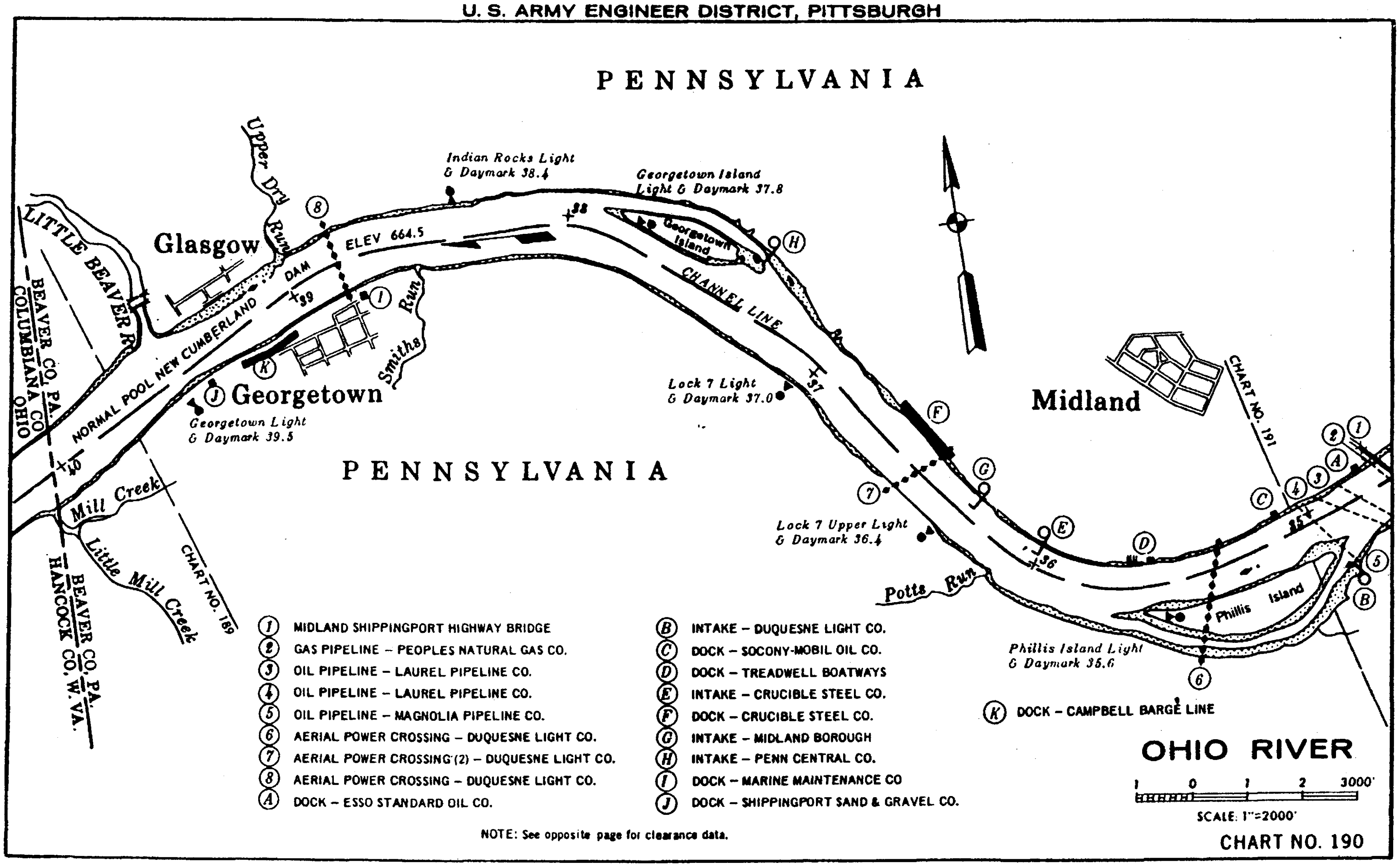
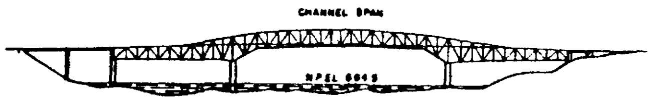


FIGURE 2.1-8
NORMAL RIVER CHANNEL SH 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

(6)
AERIAL POWER CROSSING

ELEVATION LOW POINT OF SAG	774.9
VERTICAL CLEARANCE AT POOL STAGE	110.4'



(1)
MIDLAND-SHIPPINGPORT HIGHWAY BRIDGE
CHANNEL SPAN

ELEVATION OF LOW STEEL	732.5 *
VERTICAL CLEARANCE AT POOL STAGE	68.0'*
HORIZONTAL CLEARANCE	606.0'

* FOR 580 FEET OF CHANNEL SPAN

(7)
AERIAL POWER CROSSING

ELEVATION LOW POINT OF SAG	791.3
VERTICAL CLEARANCE AT POOL STAGE	126.8'

(8)
AERIAL POWER CROSSING

ELEVATION LOW POINT OF SAG	765.7
VERTICAL CLEARANCE AT POOL STAGE	101.2'

BRIDGE SCALE
400' 0 400'
ELEVATIONS LOOKING DOWNSTREAM

FIGURE 2.1-9
NORMAL RIVER CHANNEL SH 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

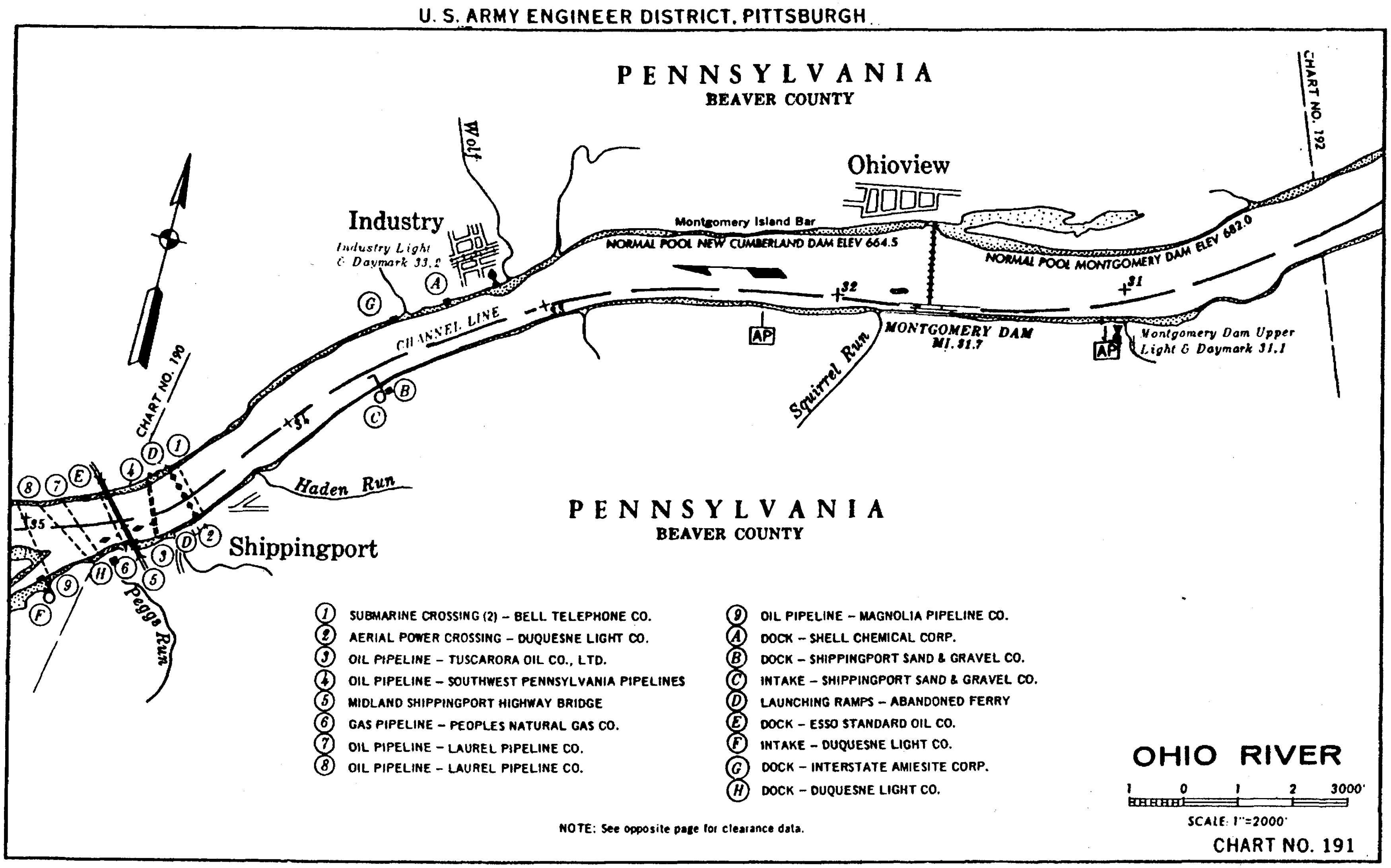
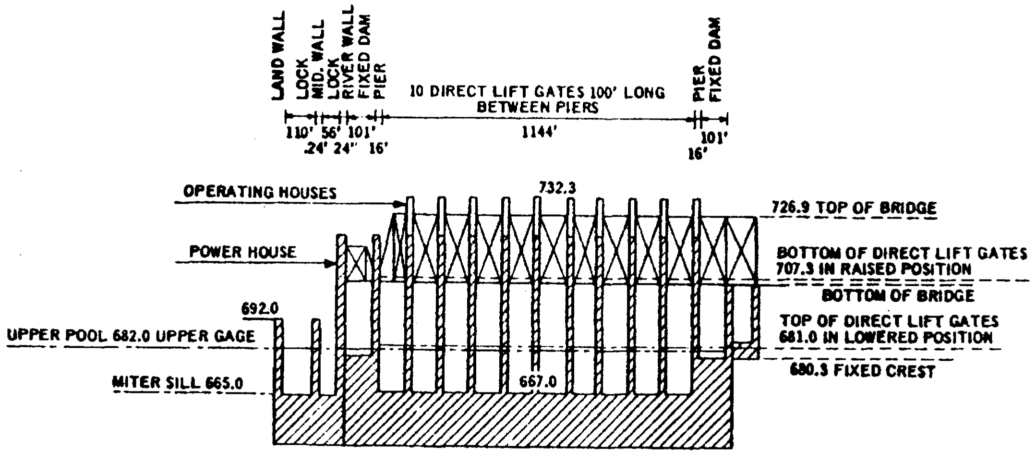


FIGURE 2.1-10
NORMAL RIVER CHANNEL SH 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



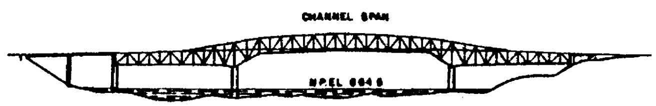
MONTGOMERY DAM

MONTGOMERY DAM	
UPPER GAGE	
ZERO EL.	666.1
N.P. READS	15.9'
LOWER GAGE	
ZERO EL.	653.6
N.P. READS	10.9'

(2)

AERIAL POWER CROSSING

ELEVATION LOW POINT OF SAG	760.3
VERTICAL CLEARANCE AT POOL STAGE	95.8'

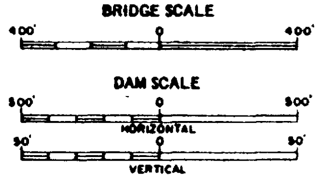


(5)

MIDLAND-SHIPPINGPORT HIGHWAY BRIDGE CHANNEL SPAN

ELEVATION OF LOW STEEL	732.5 *
VERTICAL CLEARANCE AT POOL STAGE	68.0'*
HORIZONTAL CLEARANCE	606.0'

* FOR 580 FEET OF CHANNEL SPAN



ELEVATIONS LOOKING DOWNSTREAM

FIGURE 2.1-11
NORMAL RIVER CHANNEL SH 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

Removed in Accordance with RIS 2015-17

FIGURE 2.1-12
PIPELINE LOCATION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

BARGE CHARACTERISTICS

TYPE	BARGE DESCRIPTION	SIZE	DRAFT	CAPACITY	DISPLACEMENT*
I	JUMBO SIZE CARGO-TRANSIENT	290' x 50'	9'	3000T	3900T
II	COAL BARGES-MOORED UPSTREAM	175' x 26'	9'	900T	1050T

*DISPLACEMENT T = 2240LB.

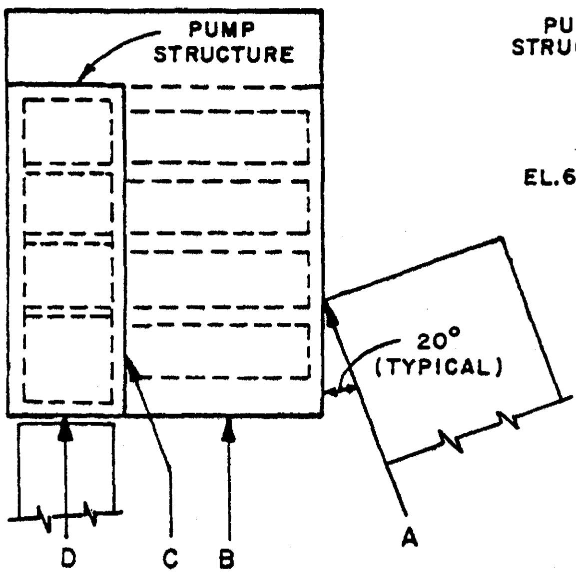
POSTULATED IMPACT CRITERIA BASIS

FLOOD BELOW EL.705 FT.

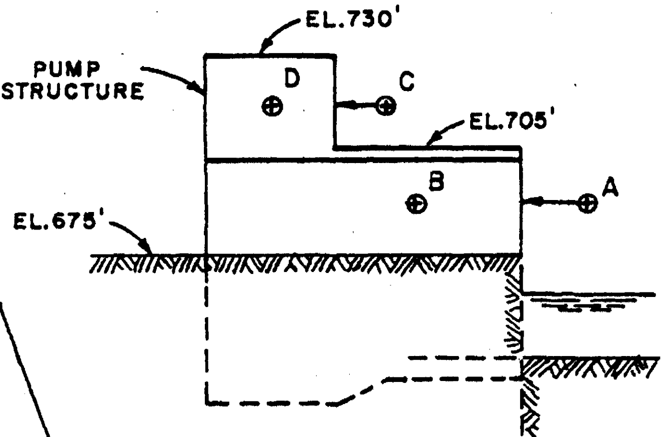
1. TYPE A BARGE-DISPLAÇEMENT 3900T
2. CRITICAL IMPACT LEVEL-EL. 690 FT.
3. RIVER VELOCITY AT BANK-V=4.4 FT./SEC. OR 3M.P.H.
4. CRITICAL BLOW ON INTAKE
   UPSTREAM WALL-FULL IMPACT (ITEM B)
   FRONT CURTAIN WALL-GLANCING IMPACT AT 20° (ITEM A)

FLOOD ABOVE EL.705 FT.

1. TYPE B BARGE-DISPLACEMENT 1050 T
2. CRITICAL IMPACT LEVEL-EL.725 FT.
3. RIVER VELOCITY AT BANK-V=2.5FT/SEC OR 1.7MPH
4. CRITICAL BLOW ON INTAKE
   UPSTREAM WALL-FULL IMPACT (ITEM D)
   FRONT CURTAIN WALL-GLANCING IMPACT AT 20° (ITEM C)



PLAN OF INTAKE



EAST ELEVATION
OF INTAKE

ARROW AND ⊕ DESIGNATE
POINT OF BARGE IMPACT

FIGURE 2.1-14
BARGE IMPACT CRITERIA
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

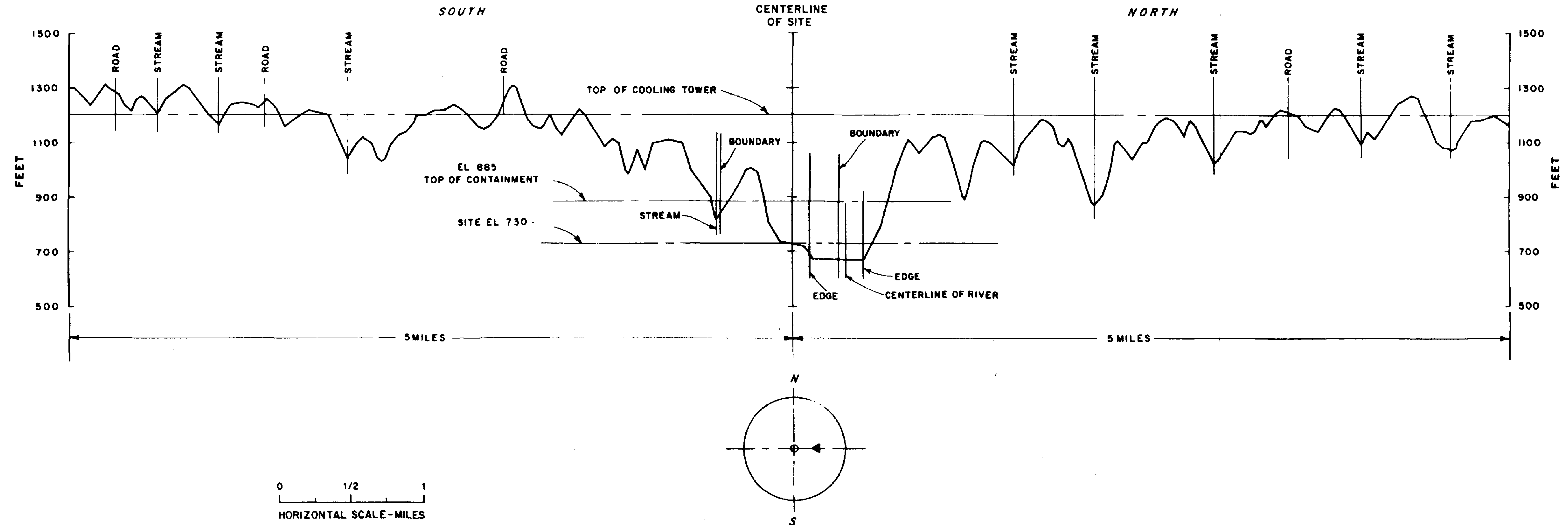


FIGURE 2.2-1
TOPOGRAPHIC CROSS SECTIONS SH 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

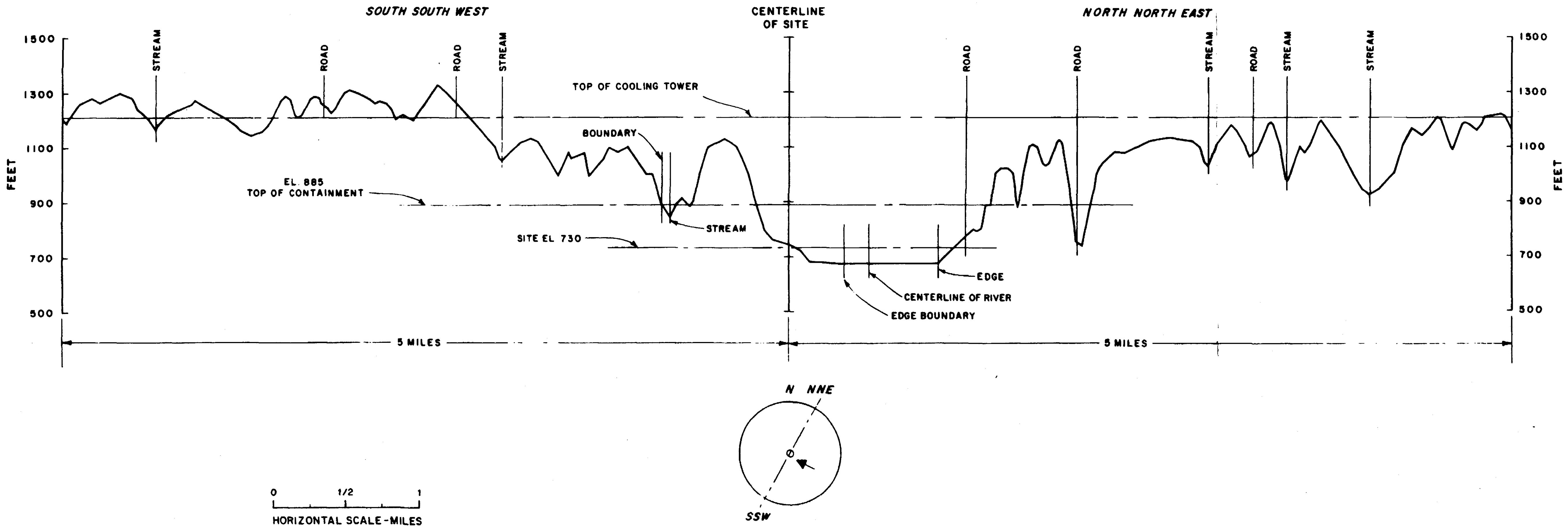


FIGURE 2.2-2
TOPOGRAPHIC CROSS SECTIONS SH 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

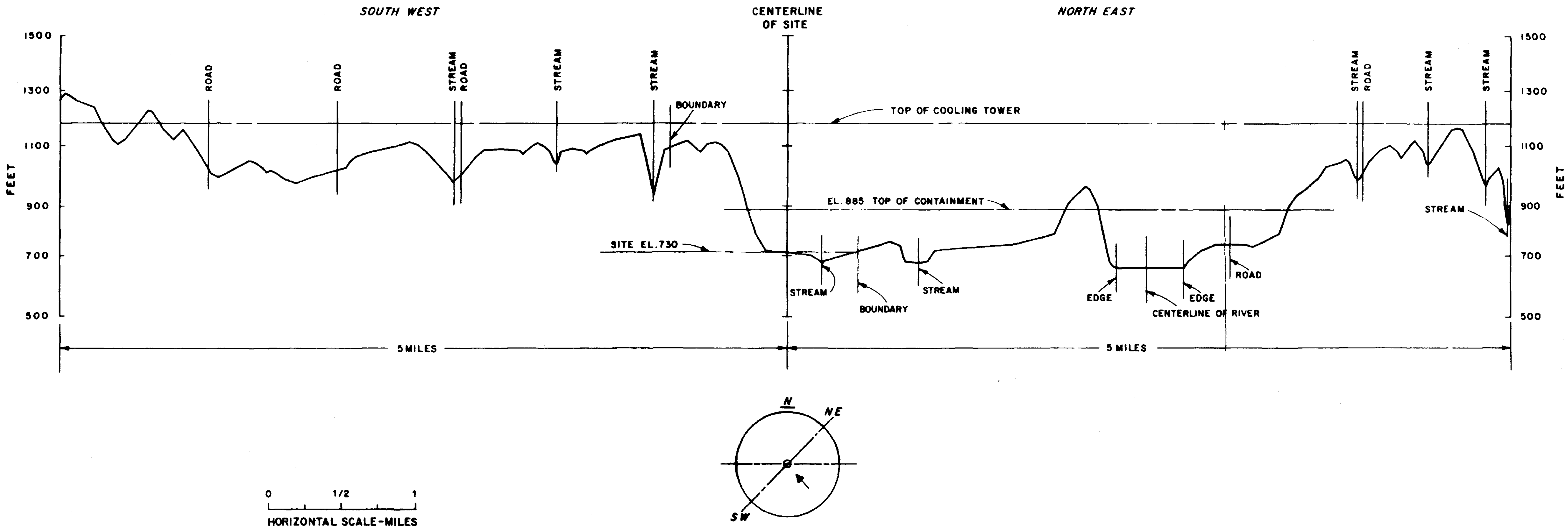


FIGURE 2.2-3
TOPOGRAPHIC CROSS SECTIONS SH 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

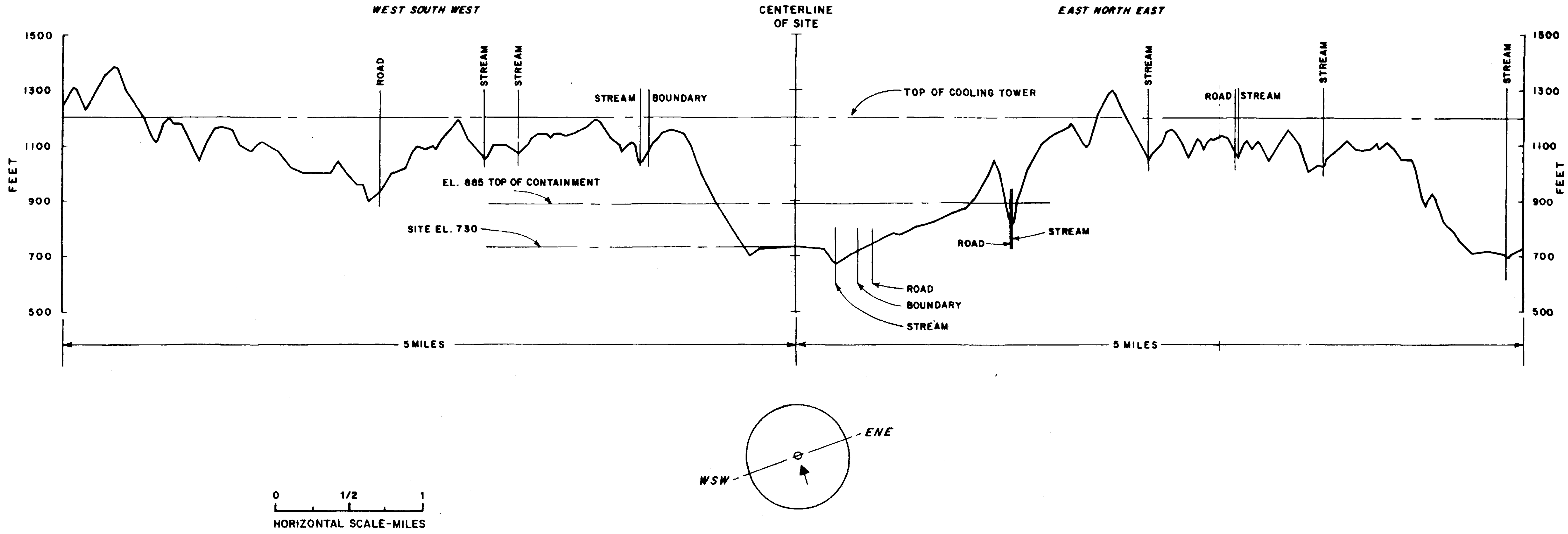


FIGURE 2.2-4
TOPOGRAPHIC CROSS SECTIONS SH 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

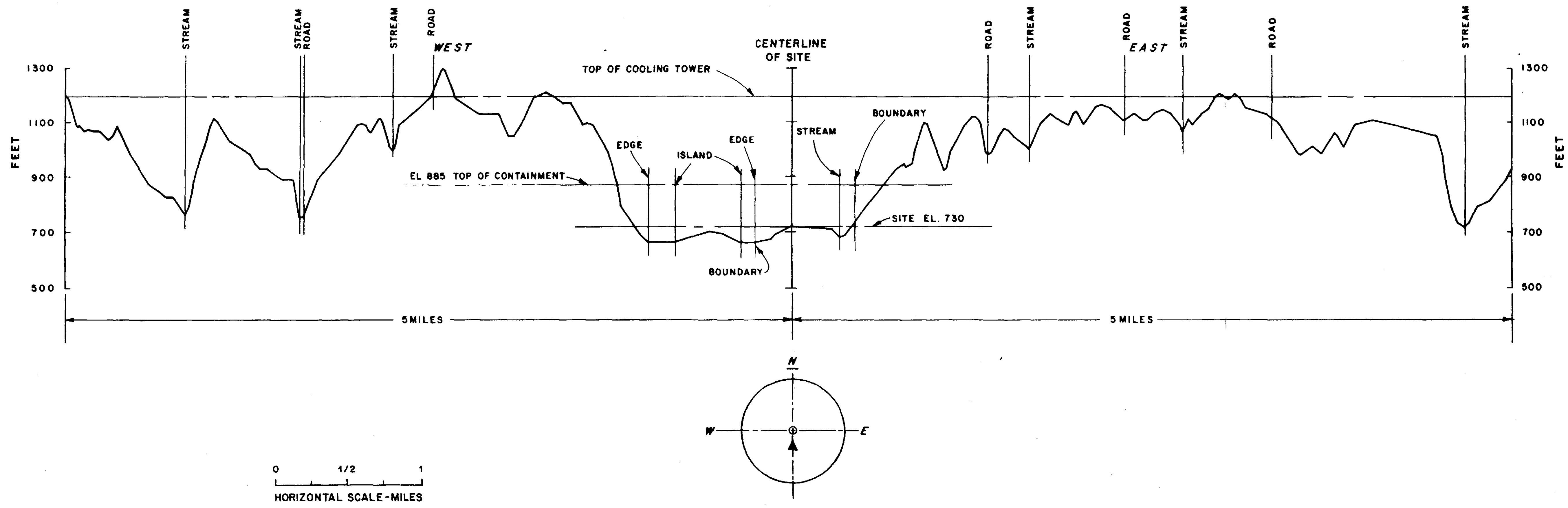


FIGURE 2.2-5
TOPOGRAPHIC CROSS SECTIONS SH 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

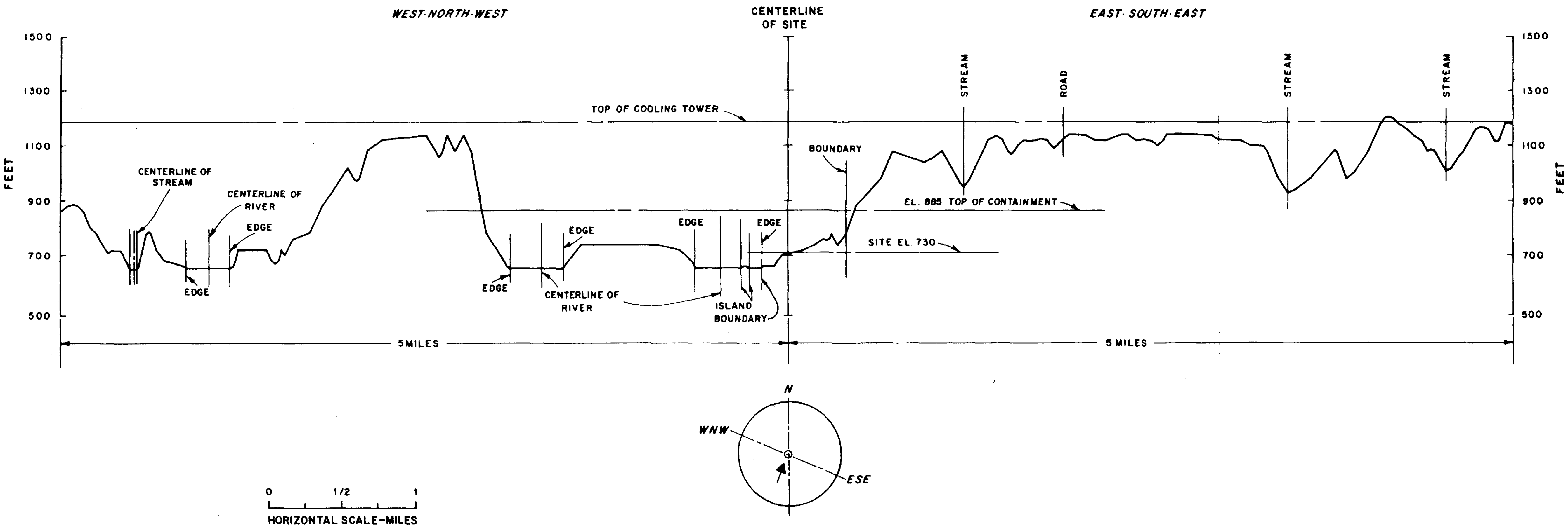


FIGURE 2.2-6
TOPOGRAPHIC CROSS SECTIONS SH 6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

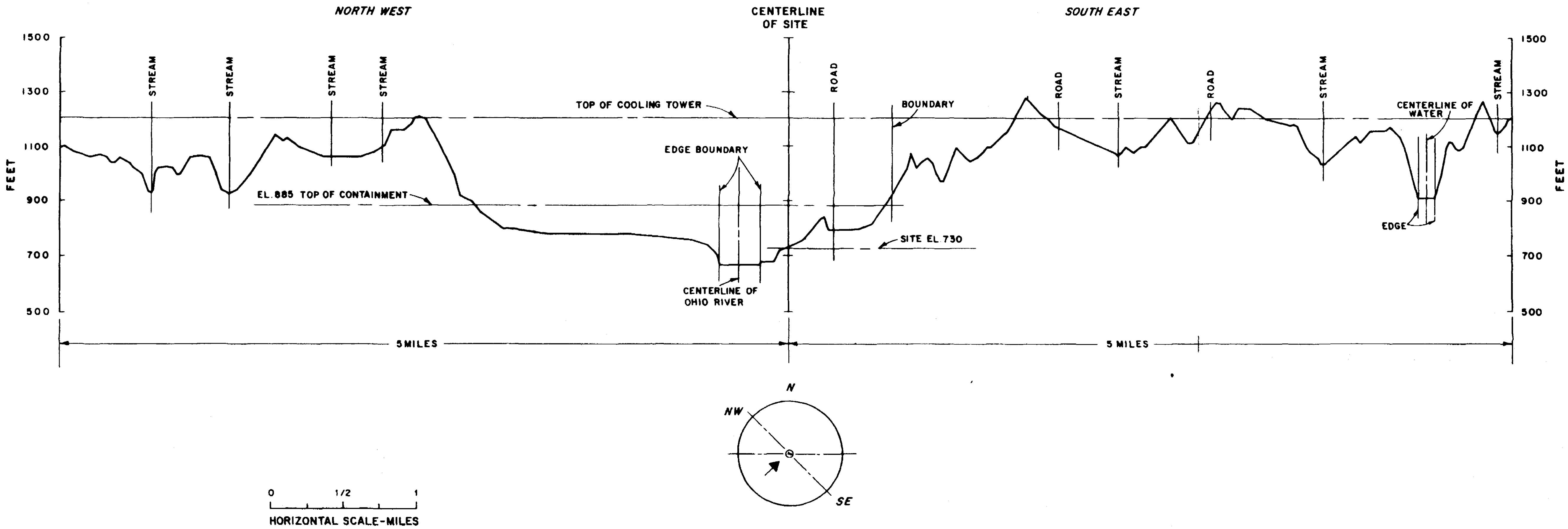


FIGURE 2.2-7
TOPOGRAPHIC CROSS SECTIONS SH 7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

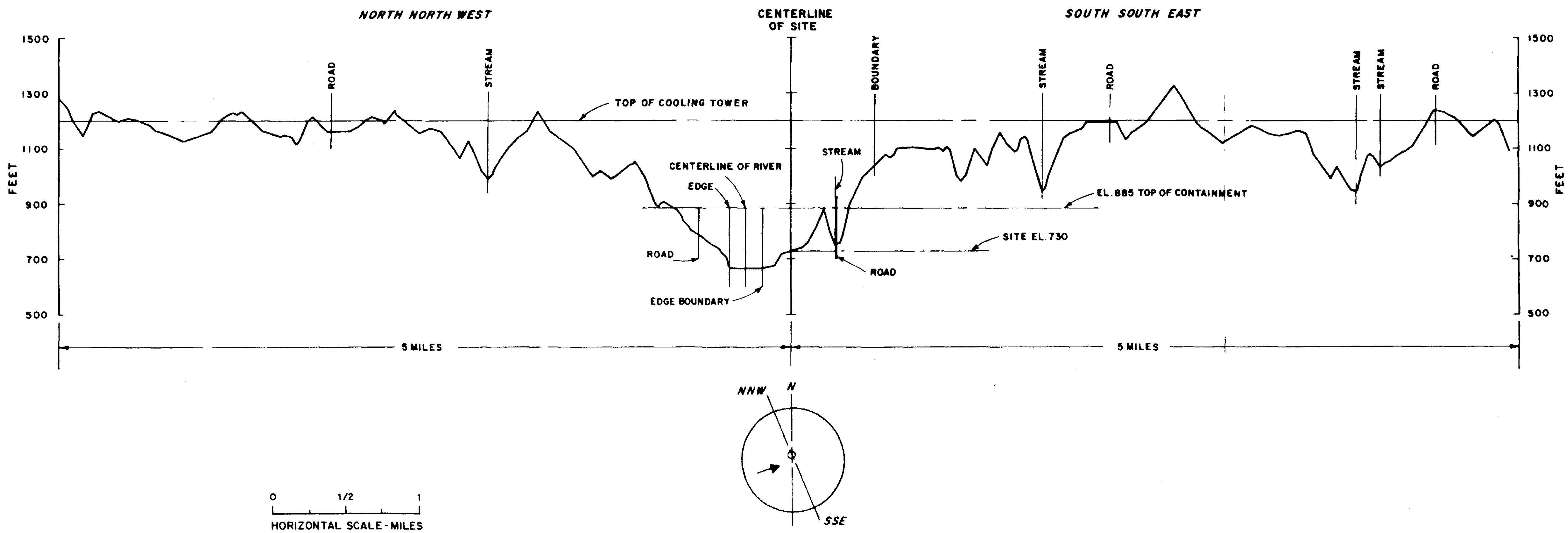


FIGURE 2.2-8
TOPOGRAPHIC CROSS SECTIONS SH 8
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

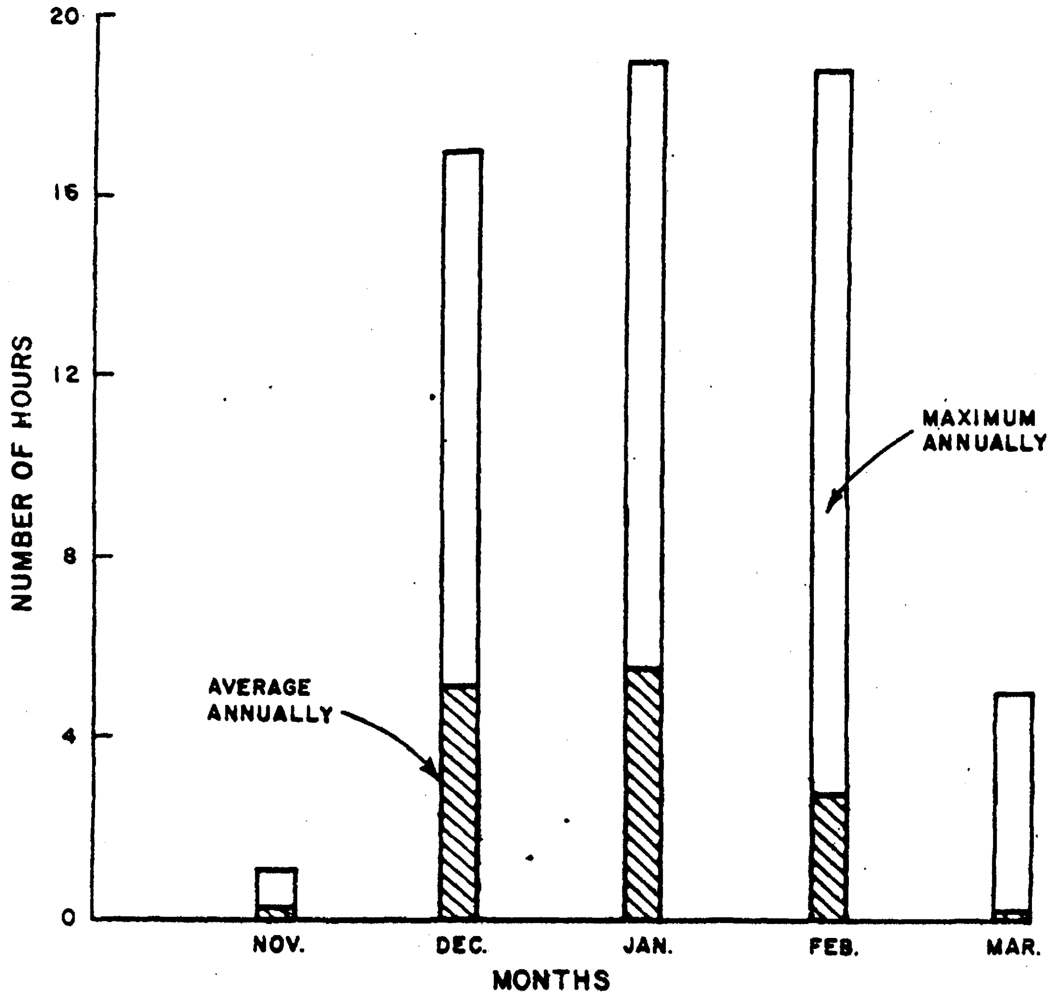


FIGURE 2.2-9
FREEZING PRECIPITATION FREQUENCY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

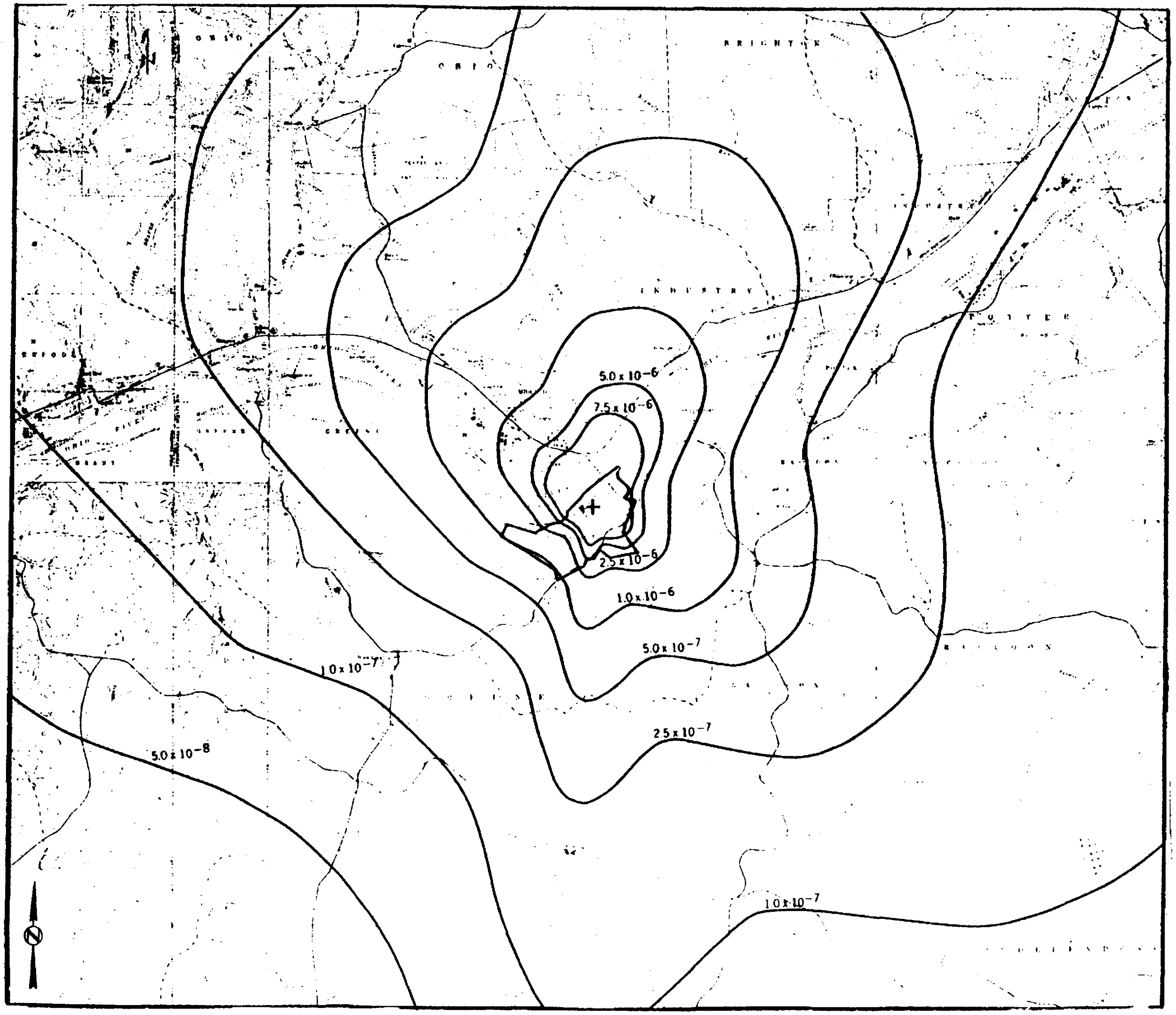
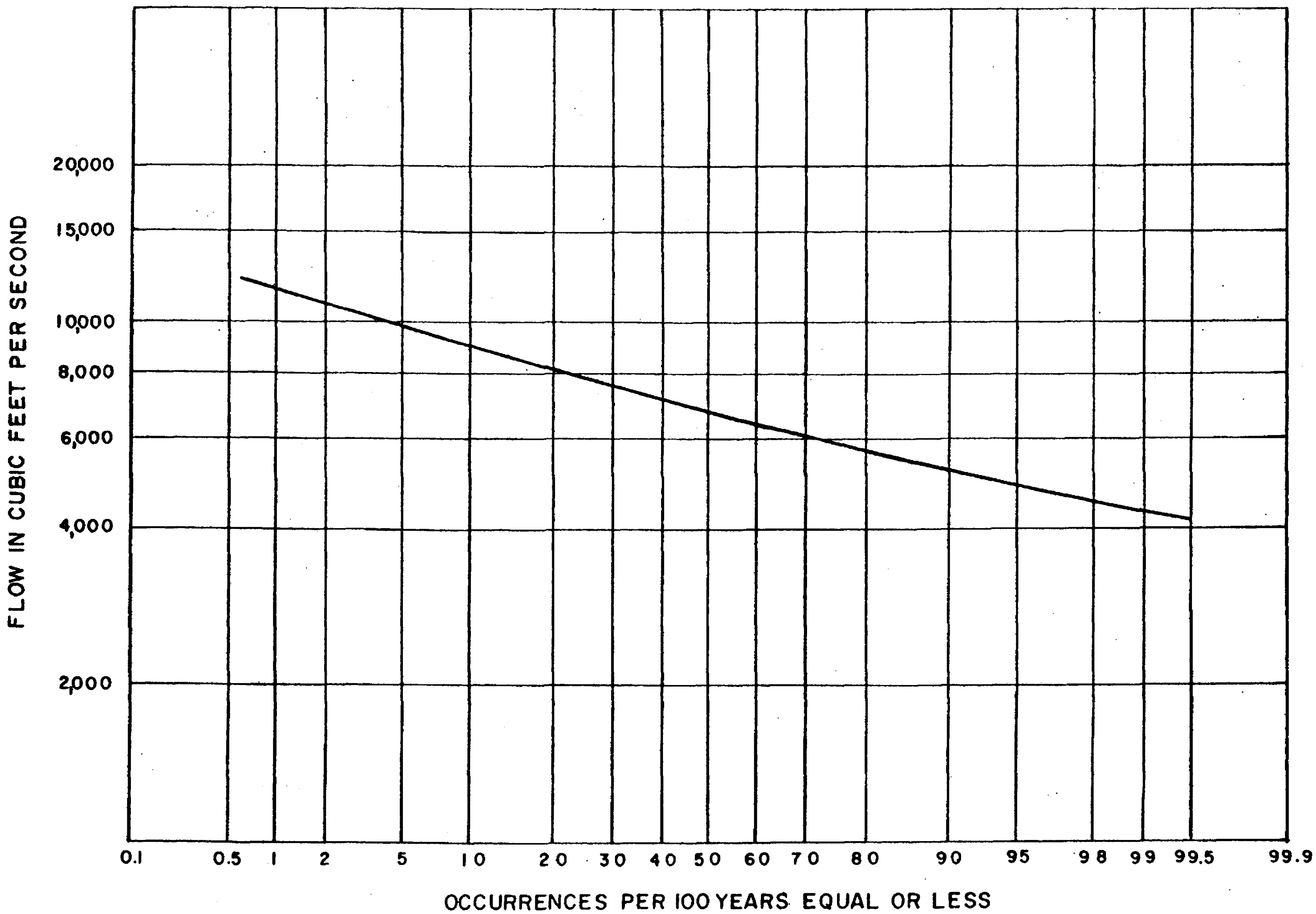


FIGURE 2.2-10
AVERAGE ANNUAL X/Q(SEC/M^3) AT BEAVER VALLEY, GROUND LEVEL RELEASE (BASED ON 9/6/70-9/5/71 DATA)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



LOWEST CONTINUOUS 7-DAY FLOWS

FIGURE 2.3-1
DROUGHT FREQUENCY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

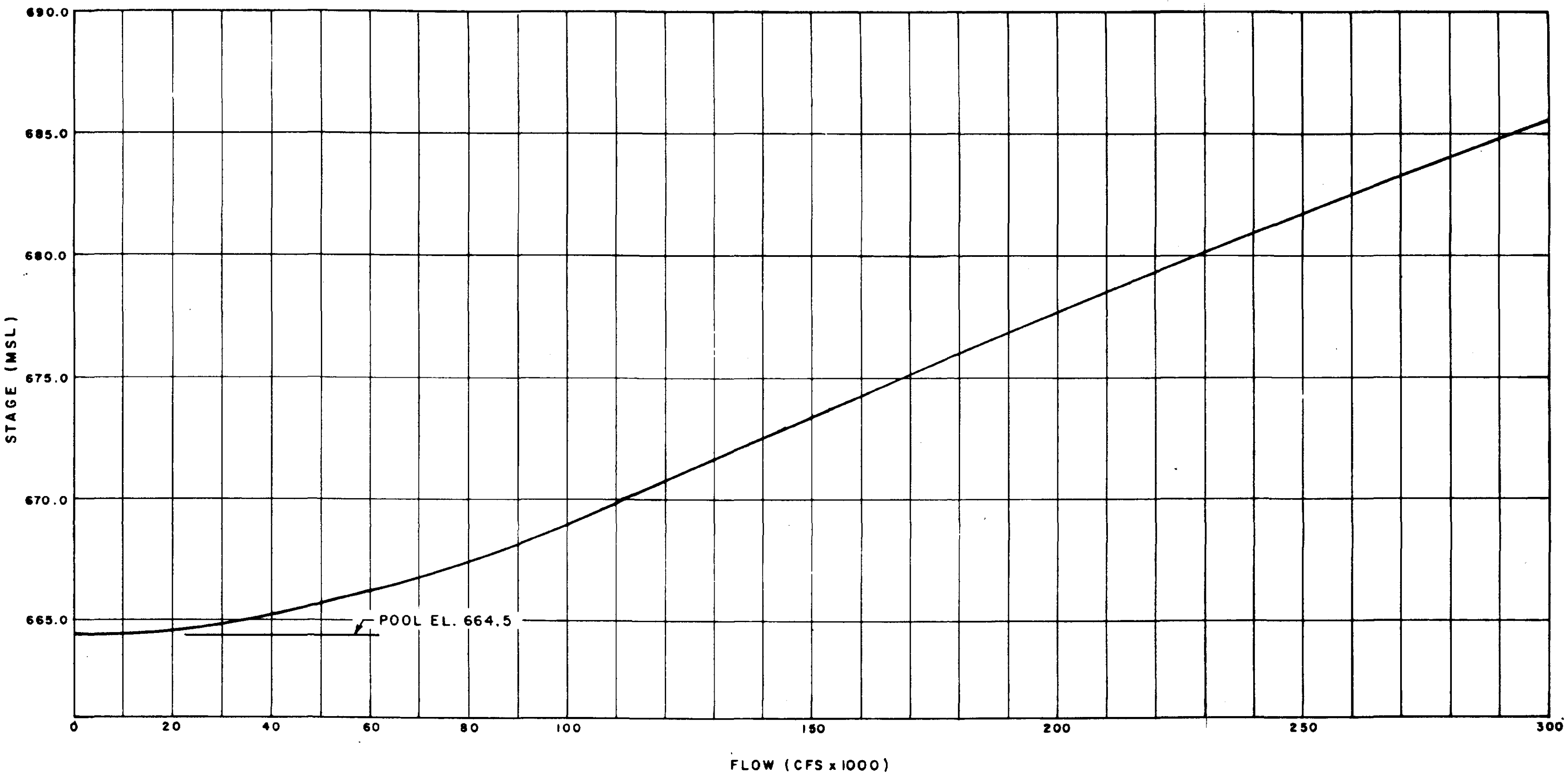


FIGURE 2.3-2
FLOW - STAGE RELATION AT SITE
OHIO RIVER - 34.8
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

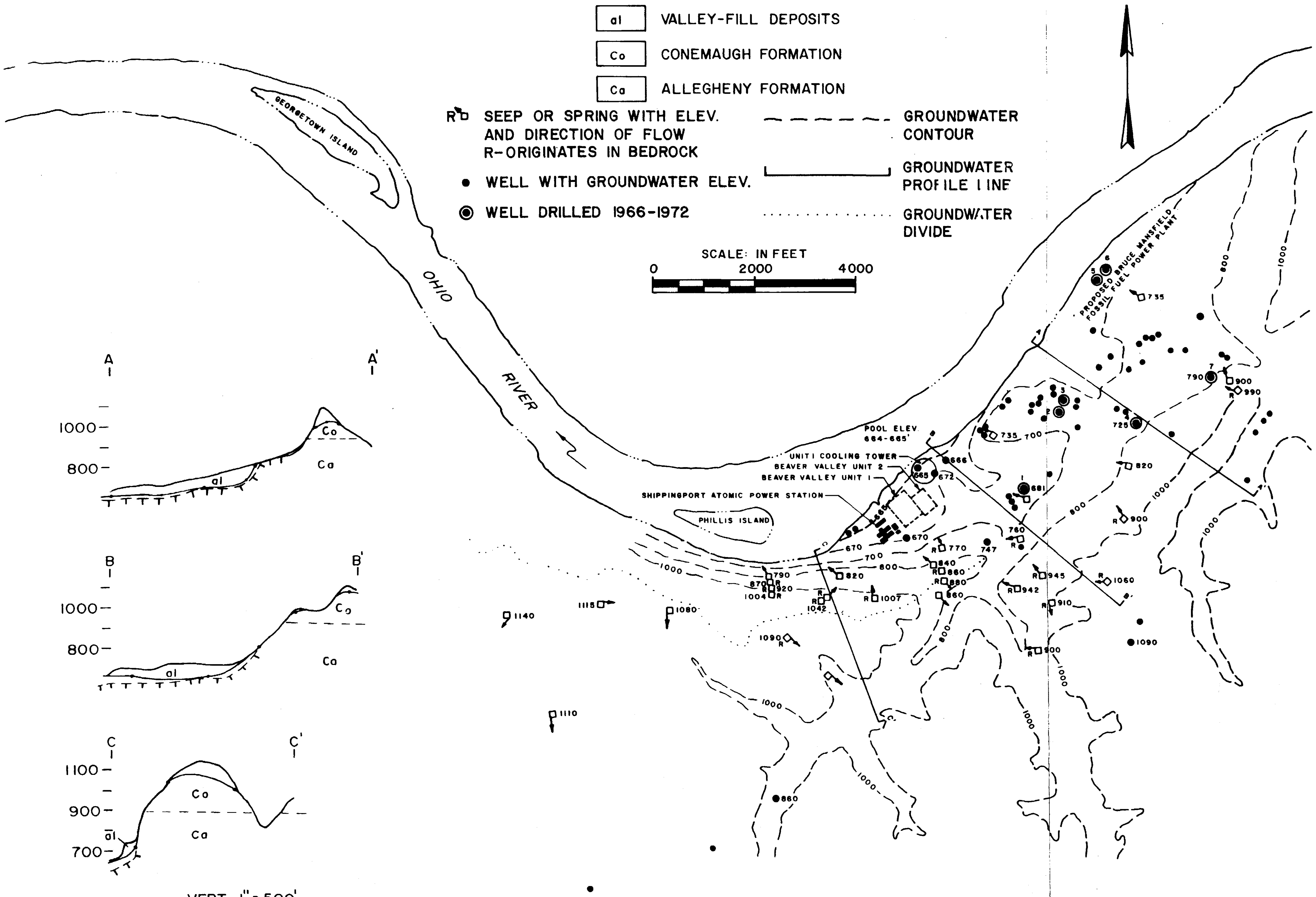


FIGURE 2.3-3
REGIONAL GROUNDWATER MAP
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

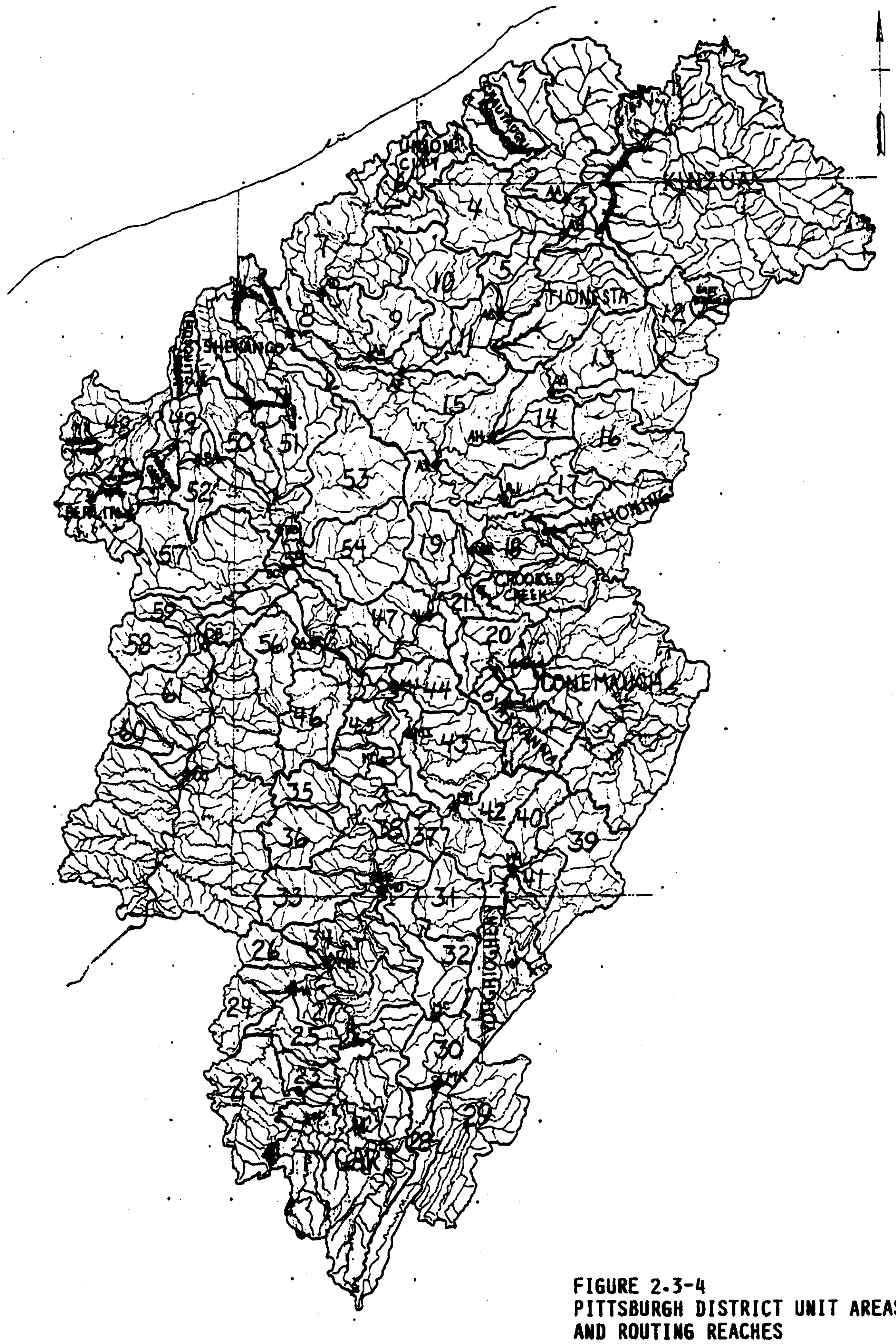


FIGURE 2.3-4
PITTSBURGH DISTRICT UNIT AREAS
AND ROUTING REACHES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

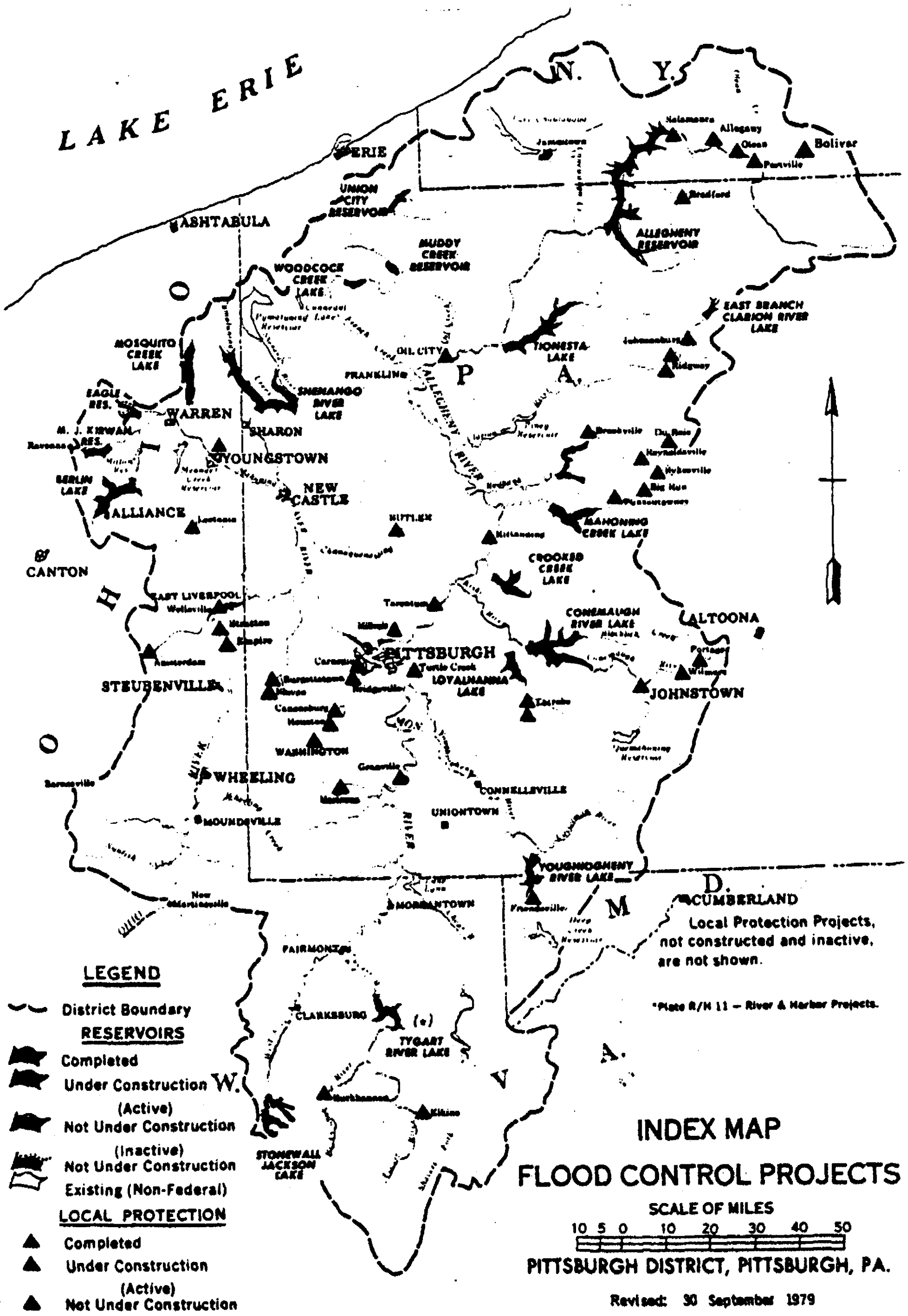


FIGURE 2.3-5
INDEX MAP
FLOOD CONTROL PROJECTS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

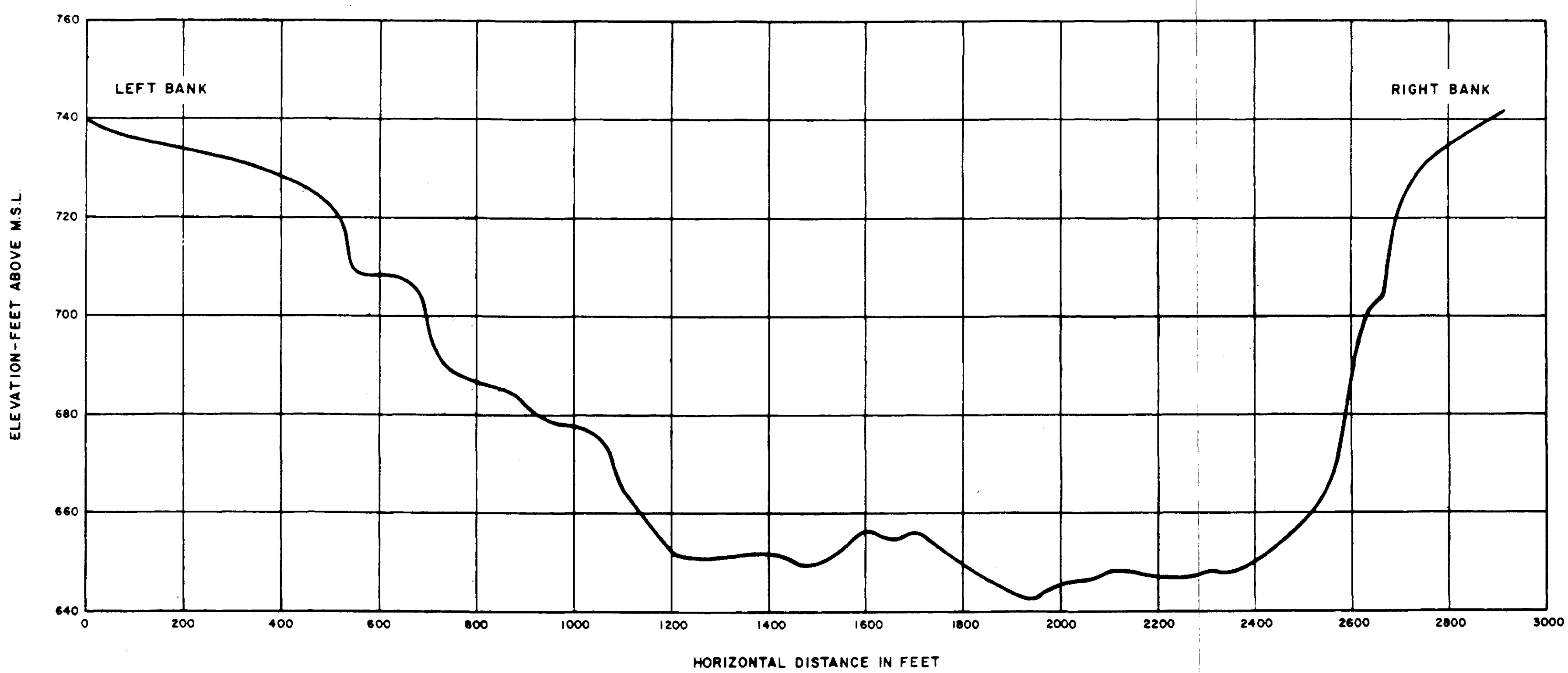


FIGURE 2.3-6
OHIO RIVER AT SHIPPINGPORT INTAKE
CROSS SECTION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

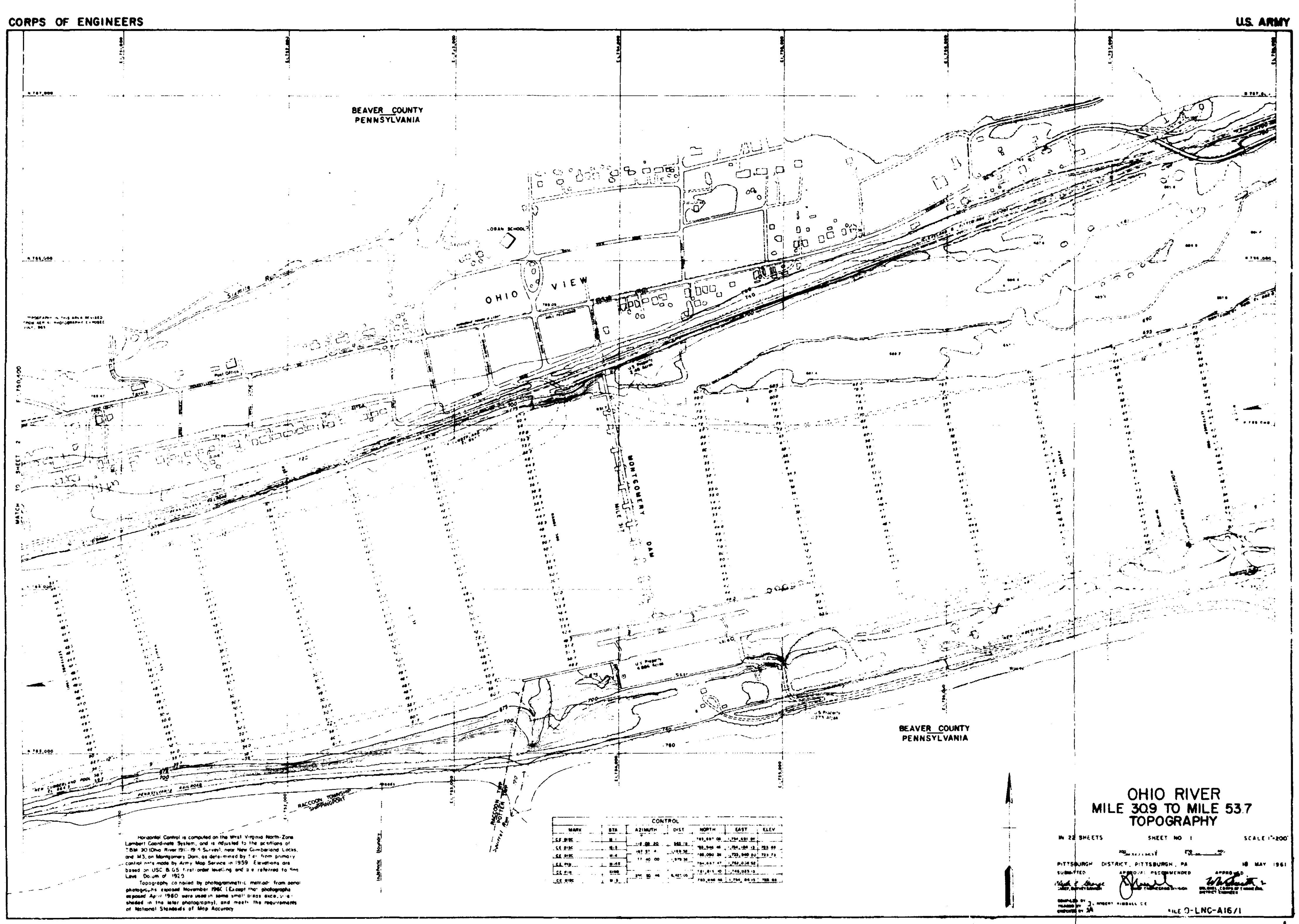


FIGURE 2.3-7
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

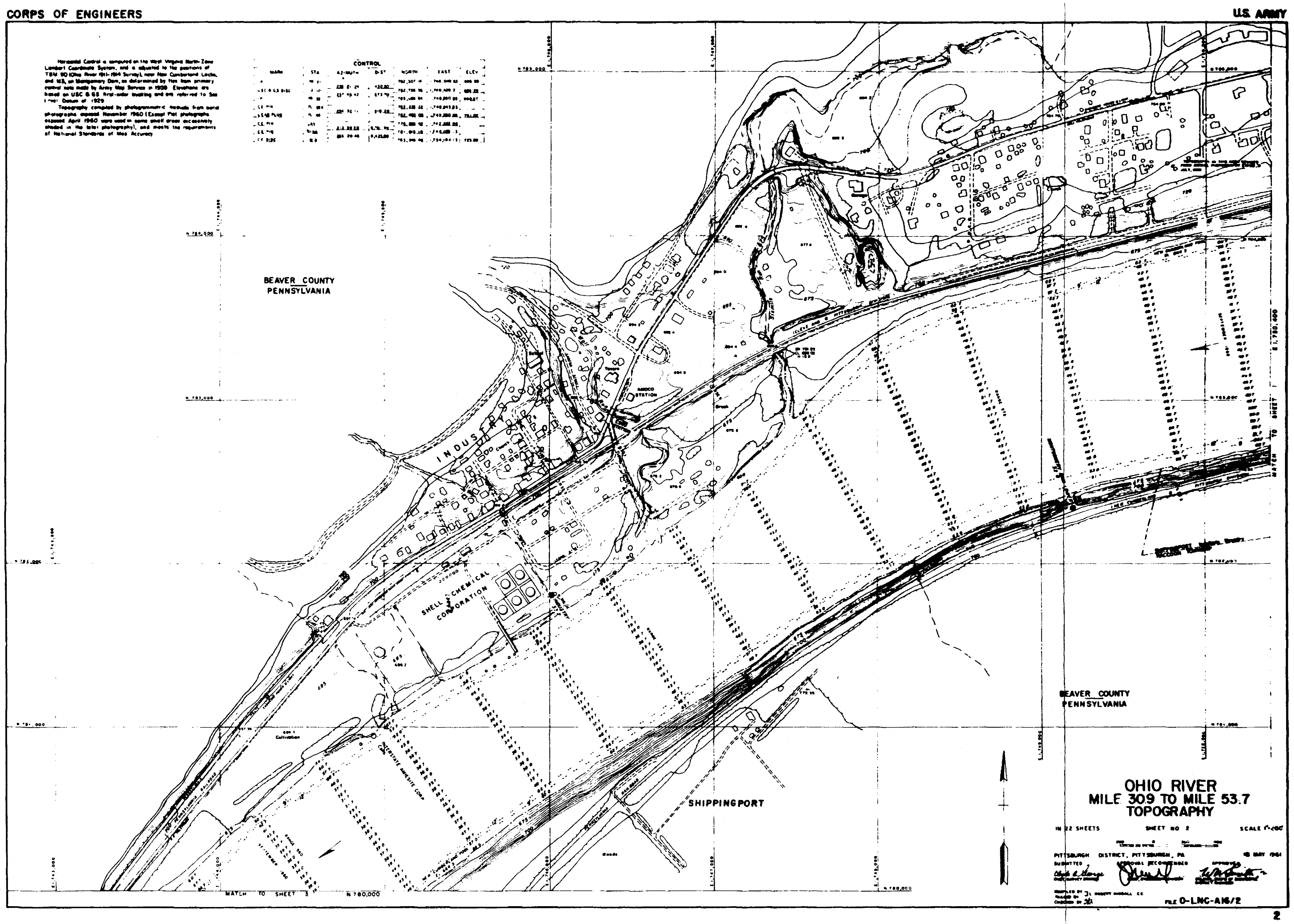


FIGURE 2.3-8
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

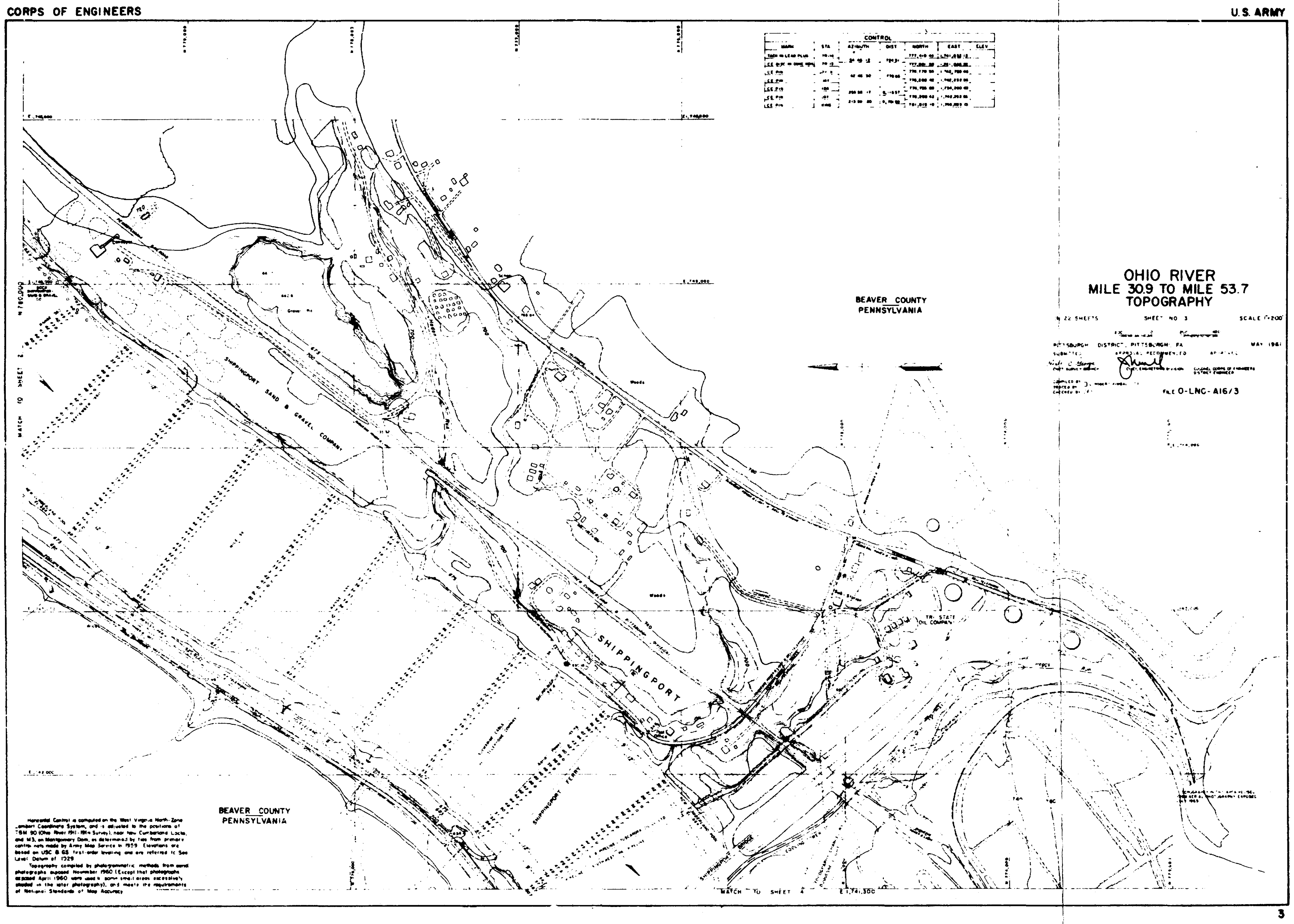


FIGURE 2.3-9
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

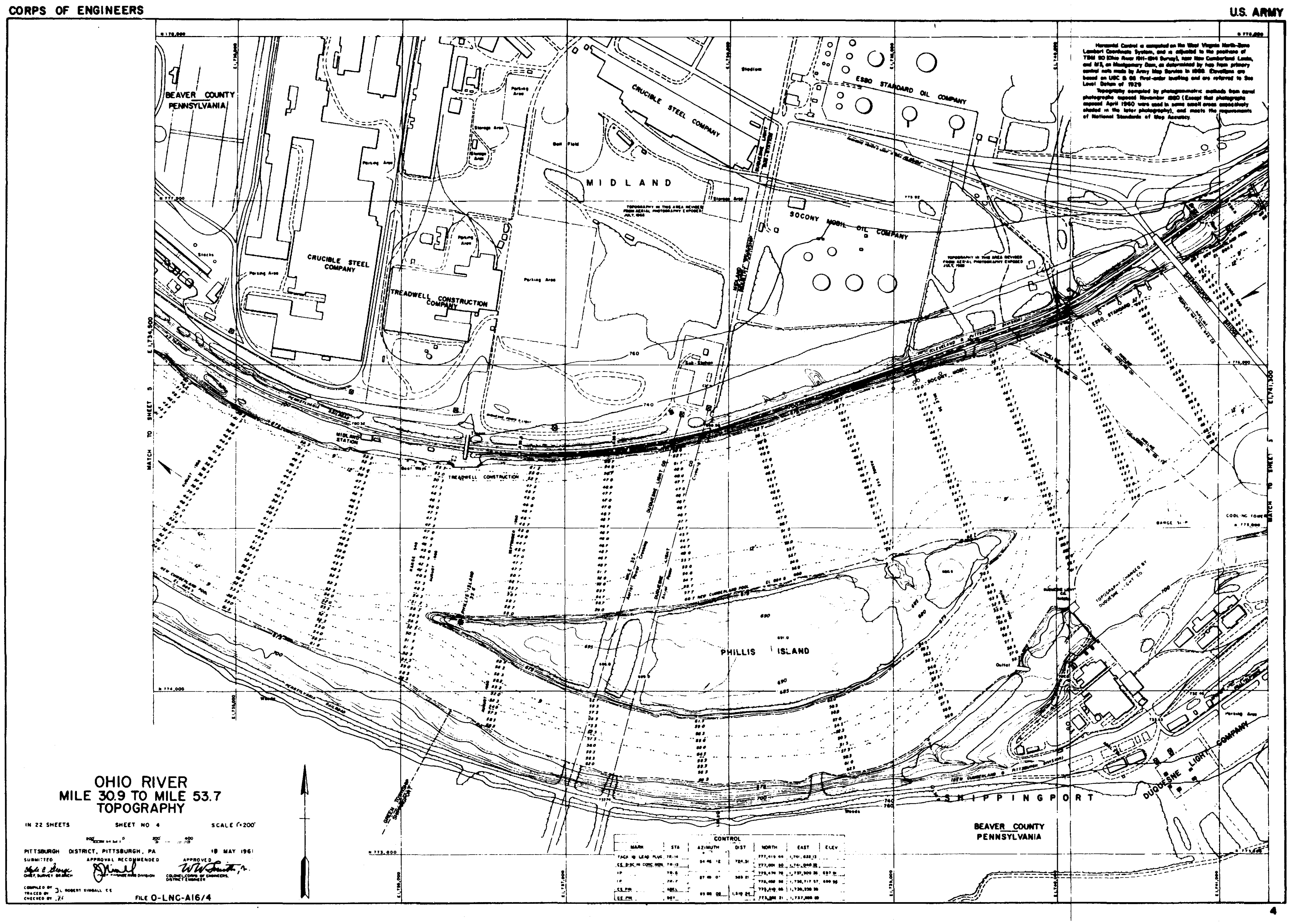
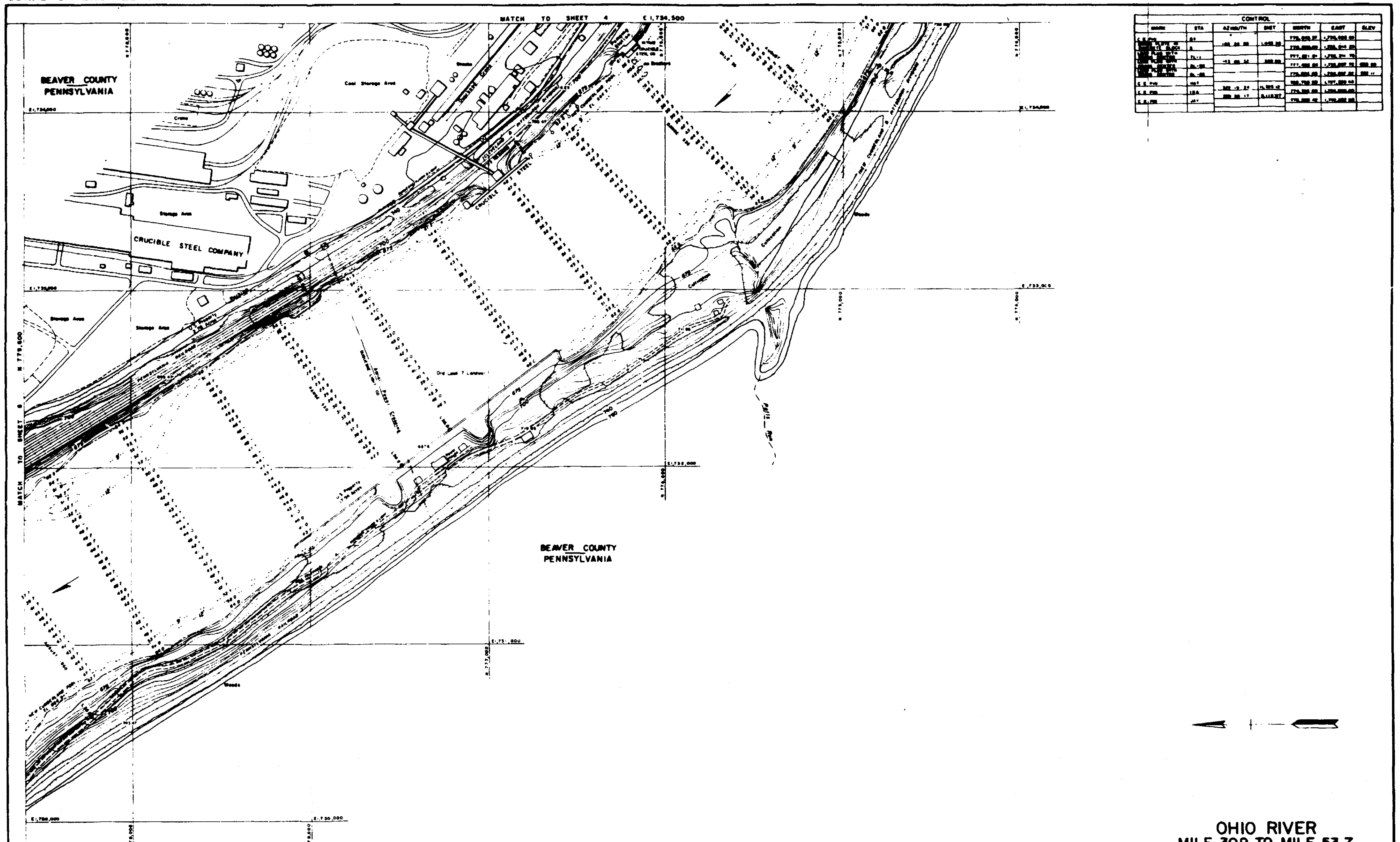


FIGURE 2.3-10
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CORPS OF ENGINEERS U.S. ARMY



Horizontal Control is computed on the West Virginia North-Zone Lambert Coordinate System, and is adjusted to the positions of TBM 90 (Ohio River 1911-1914 Survey), near New Cumberland Locks, and M3, on Montgomery Dam, as determined by ties from primary control nets made by Army Map Service in 1958. Elevations are based on USC & GS first-order levelling and are referred to Sea Level Datum of 1929.

Topography compiled by photogrammetric methods from aerial photographs exposed November 1960 (Except that photographs exposed April 1960 were used in some small areas excessively shaded in the later photography), and meets the requirements of National Standards of Map Accuracy.

OHIO RIVER
MILE 30.9 TO MILE 53.7
TOPOGRAPHY

IN 22 SHEETS SHEET NO 5 SCALE 1"=200'

PITTSBURGH DISTRICT, PITTSBURGH, PA

SUBMITTED APPROVAL RECOMMENDED APPROVED

FILE O-LNC-A16/5

5

FIGURE 2.3-11
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

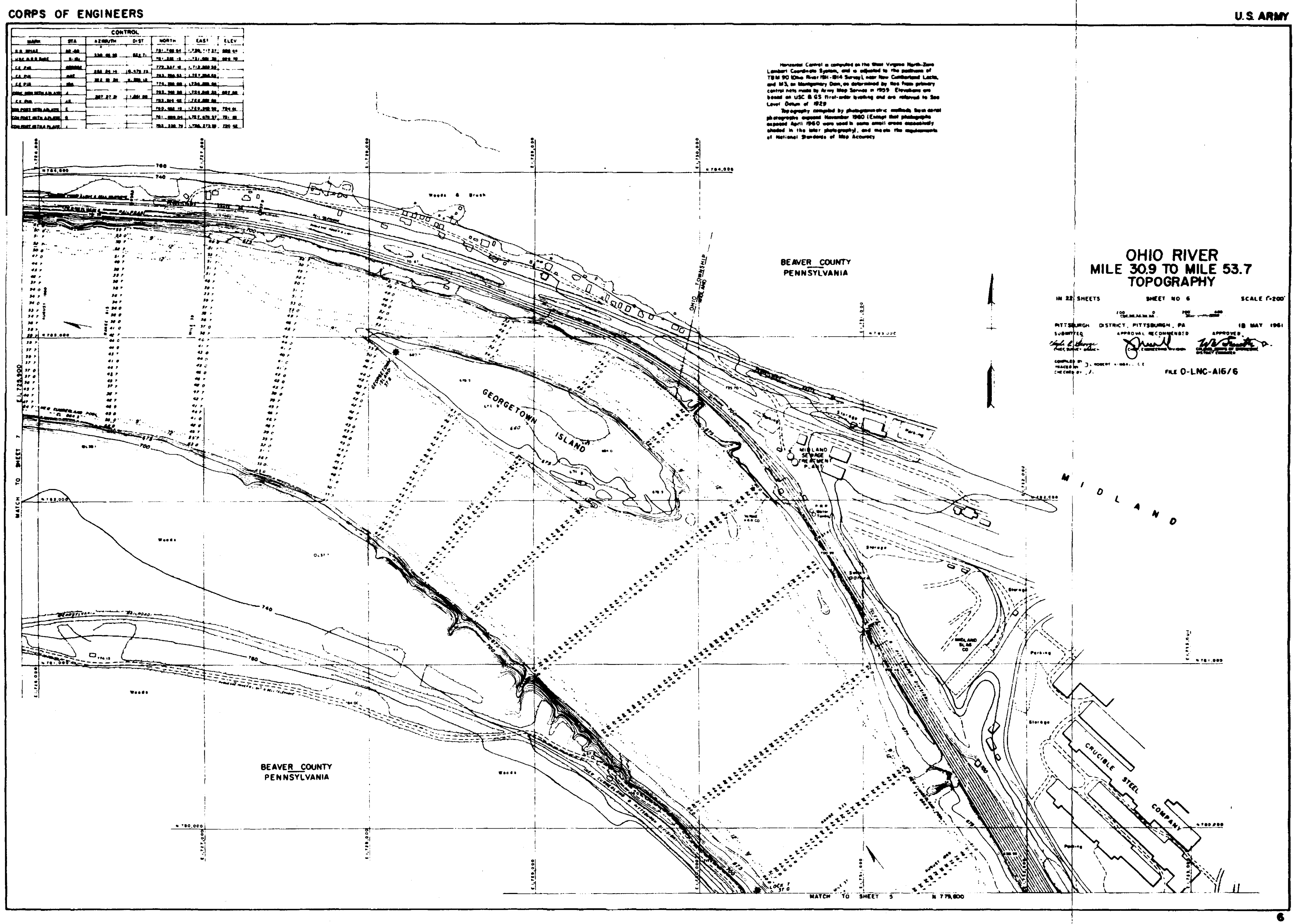


FIGURE 2.3-12
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

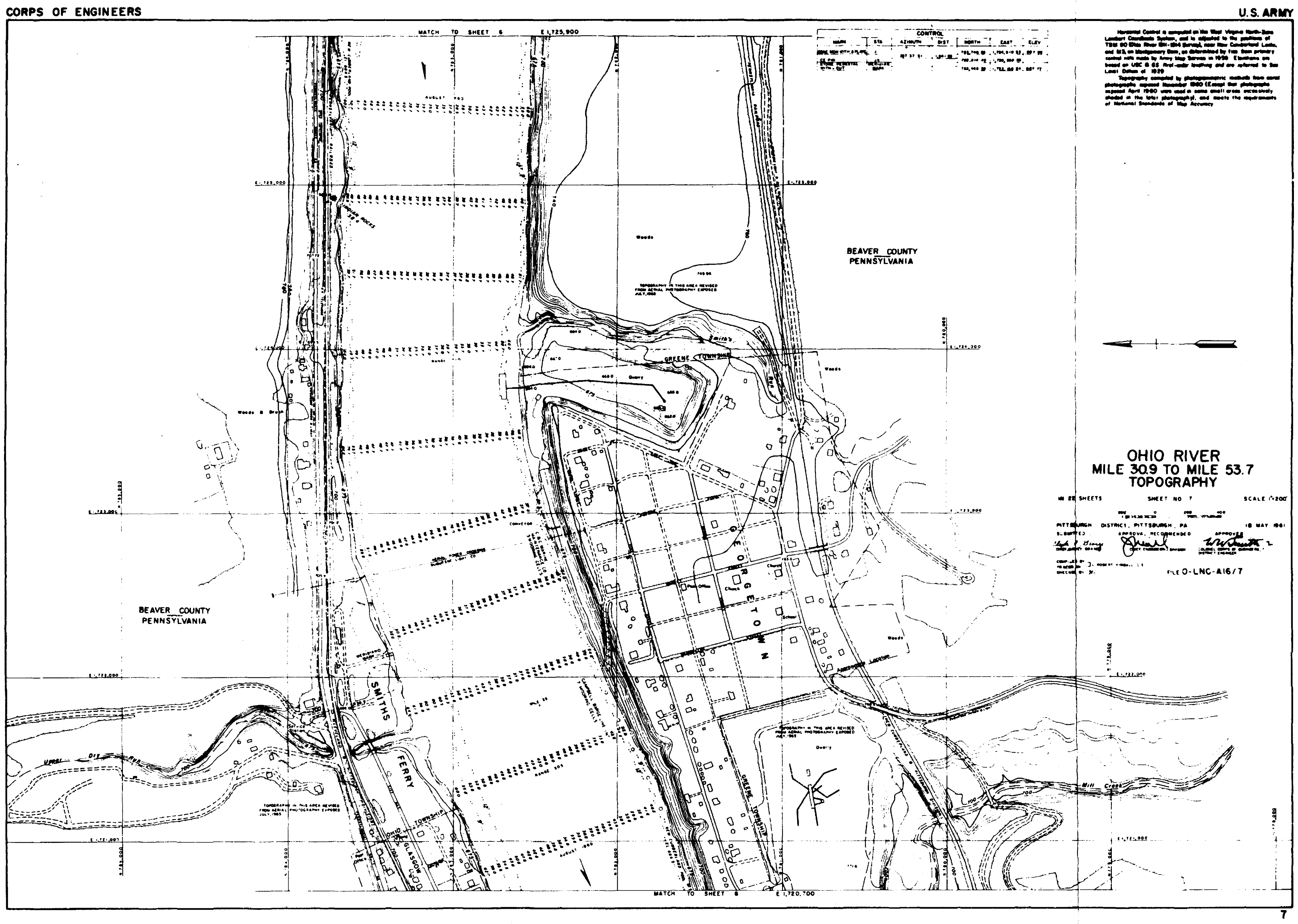


FIGURE 2.3-13
OHIO RIVER (MILE 30.9 TO MILE 53.7)
TOPOGRAPHY SH 7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

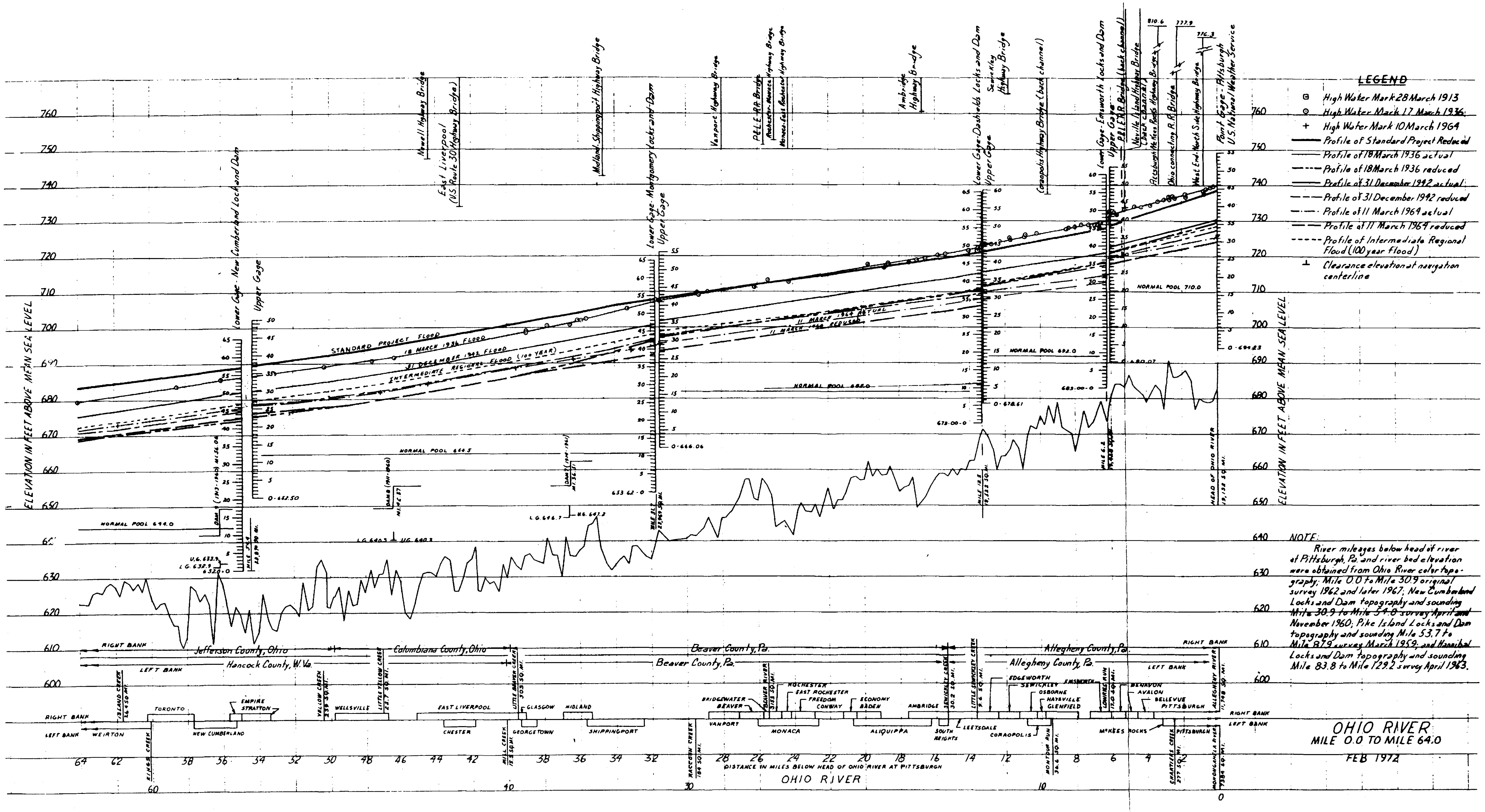
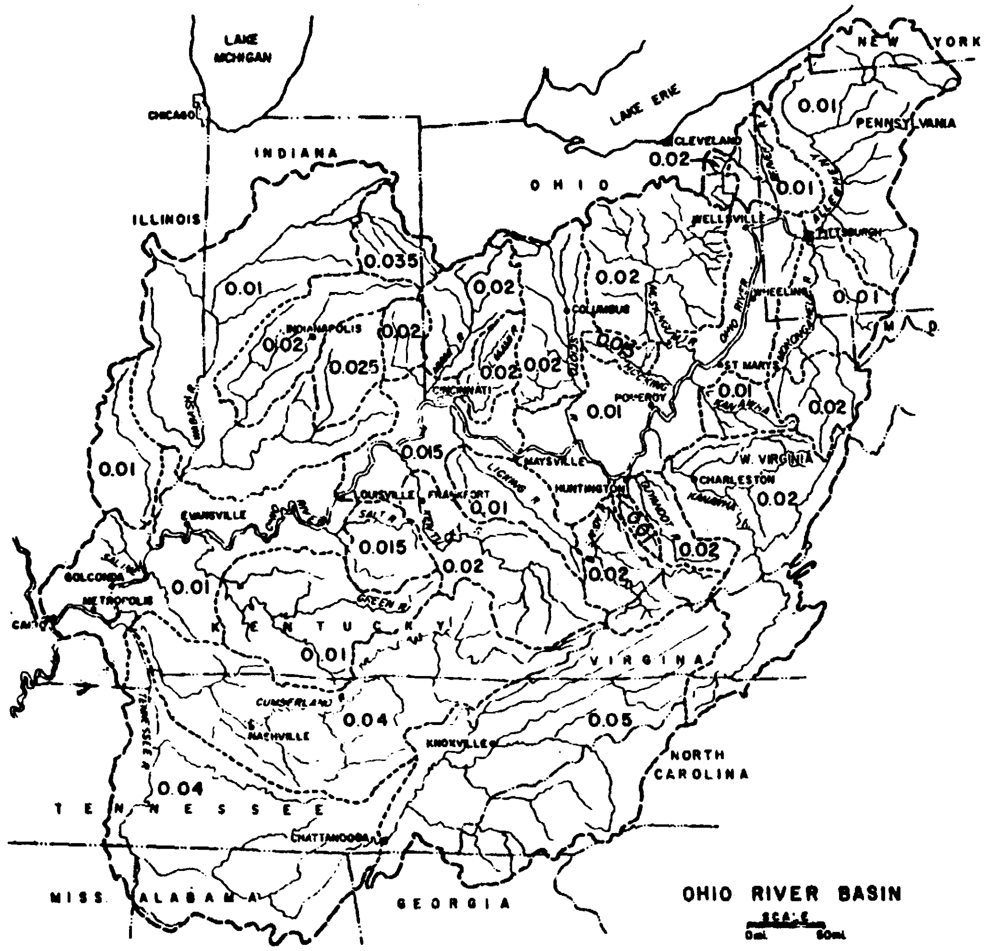


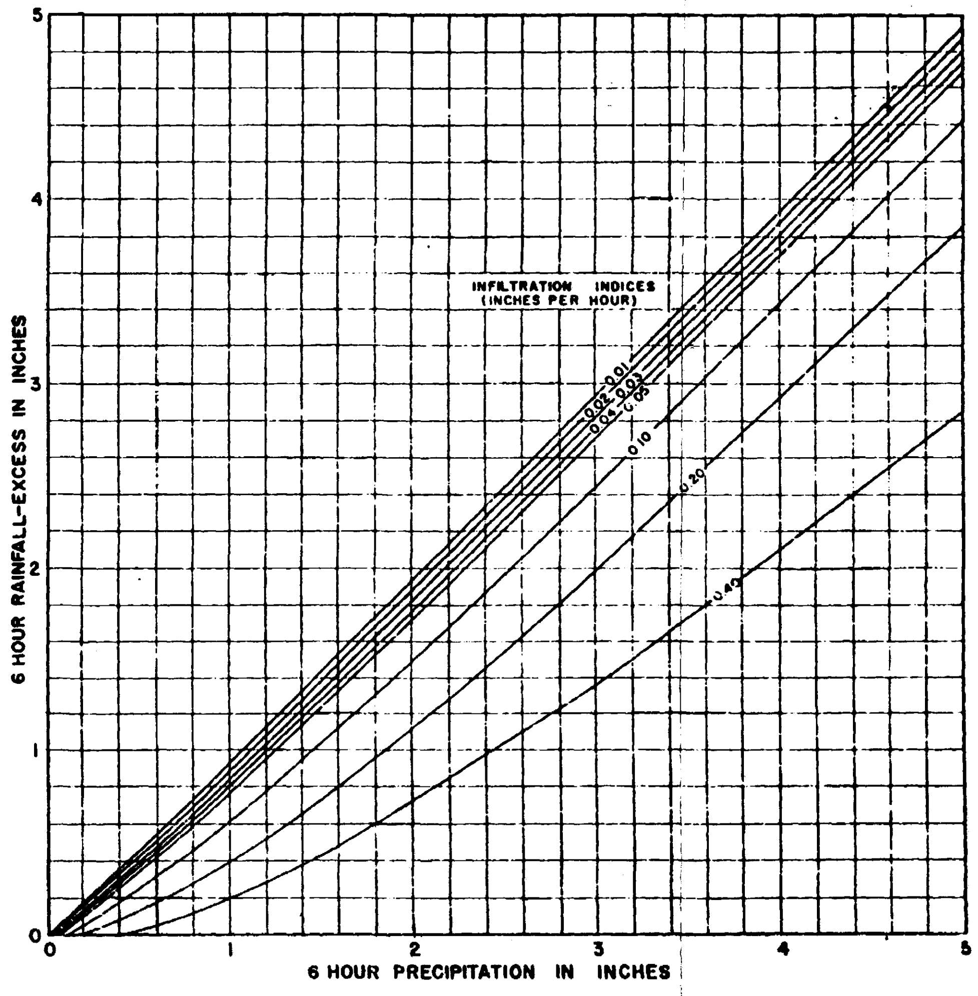
FIGURE 2.3-14
HISTORIC HIGH WATER MARKS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

OHIO RIVER PROJECT FLOOD STUDY

INFILTRATION INDICES AND BASE FLOWS



INFILTRATION INDICES



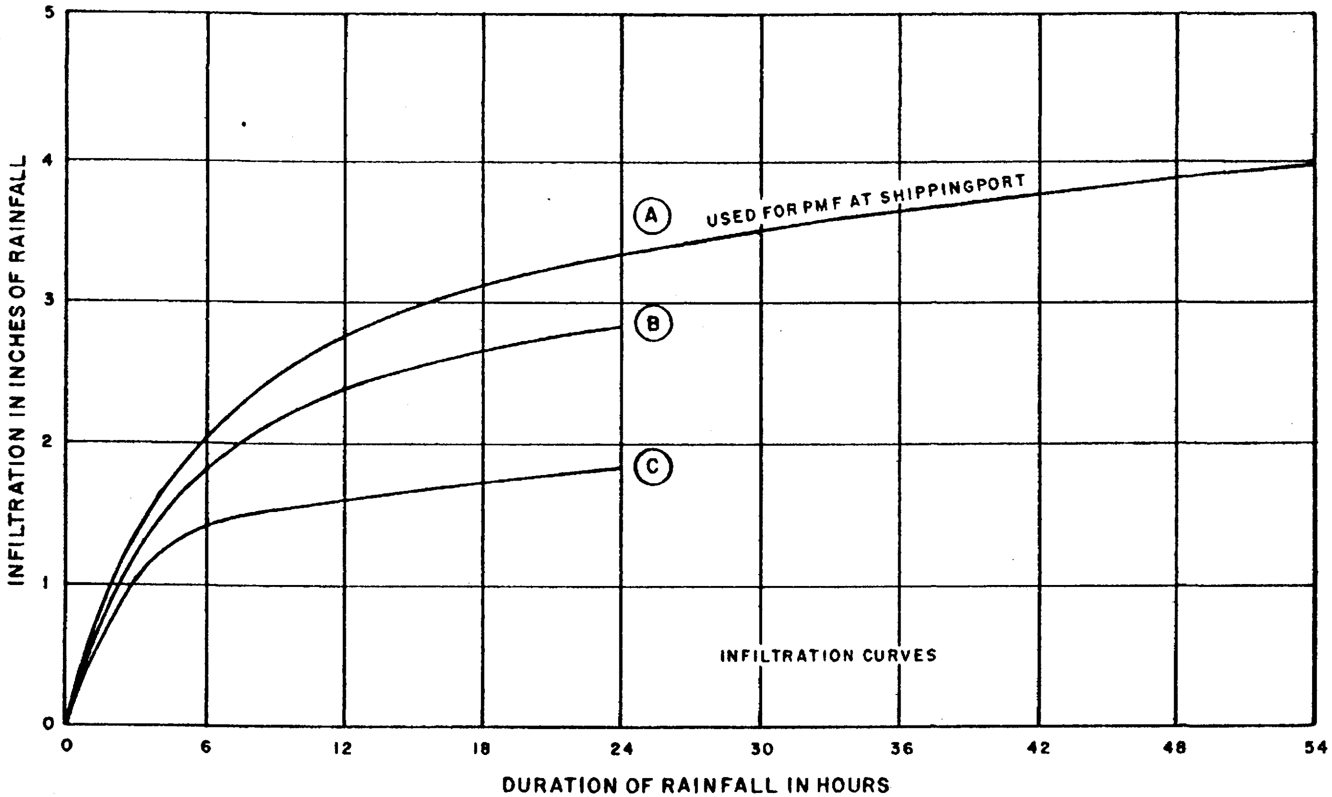
RAINFALL EXCESS CURVES

BASE FLOWS IN C.F.S.

STATION	DRAINAGE AREA SQ. MI.	JAN. JULY	FEB. MAR. JUNE	APR. MAY	SEPT. OCT. NOV.	AUG. DEC.	STATION	DRAINAGE AREA SQ. MI.	JAN. JULY	FEB. MAR. JUNE	APR. MAY	SEPT. OCT. NOV.	AUG. DEC.
PITTSBURGH, PA.	19,100	7,800	8,900	10,000	5,600	6,700	MAYSVILLE, KY.	70,130	26,600	30,000	34,000	19,000	22,600
WELLSVILLE, O.	23,500	9,300	10,700	12,000	6,700	8,000	CINCINNATI, O.	76,580	29,000	33,000	37,000	20,600	24,600
WHEELING, W.VA.	24,660	10,000	11,500	13,000	7,400	8,700	LOUISVILLE, KY.	91,170	32,700	38,000	43,000	24,000	28,600
ST. MARYS, W.VA.	26,850	11,000	12,400	14,000	8,000	9,400	EVANSVILLE, IND.	107,050	38,000	43,500	49,000	27,000	32,600
POMEROY, O.	40,500	15,400	18,700	21,000	11,700	14,000	GOLCONDA, ILL.	143,660	51,000	59,000	65,000	36,000	43,300
HUNTINGTON, W.VA.	55,600	22,000	25,000	28,000	15,600	18,700	METROPOLIS, ILL.	202,760	70,000	80,000	90,000	50,000	60,000

FIGURE 2.3-15
PRECIPITATION VS. EXCESS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



(A) LOSSES

54-60 HOURS - 0.06"
60-66 HOURS - 0.05"
66-72 HOURS - 0.04"

(A) SUMMER STORM - BELOW NORMAL RAINFALL ANTECEDENT CONDITIONS

(B) FALL STORM - HURRICANE HAZEL (OCTOBER 1954)

(C) SUMMER STORM - ABOVE NORMAL RAINFALL ANTECEDENT CONDITIONS

NOTE:
INFILTRATION CURVES BASED ON COMPUTATIONS USING RAINFALL AND RUNOFF FOR THE WOODCOCK CREEK BASIN.

FIGURE 2.3-16
RAINFALL DURATION VS. INFILTRATION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

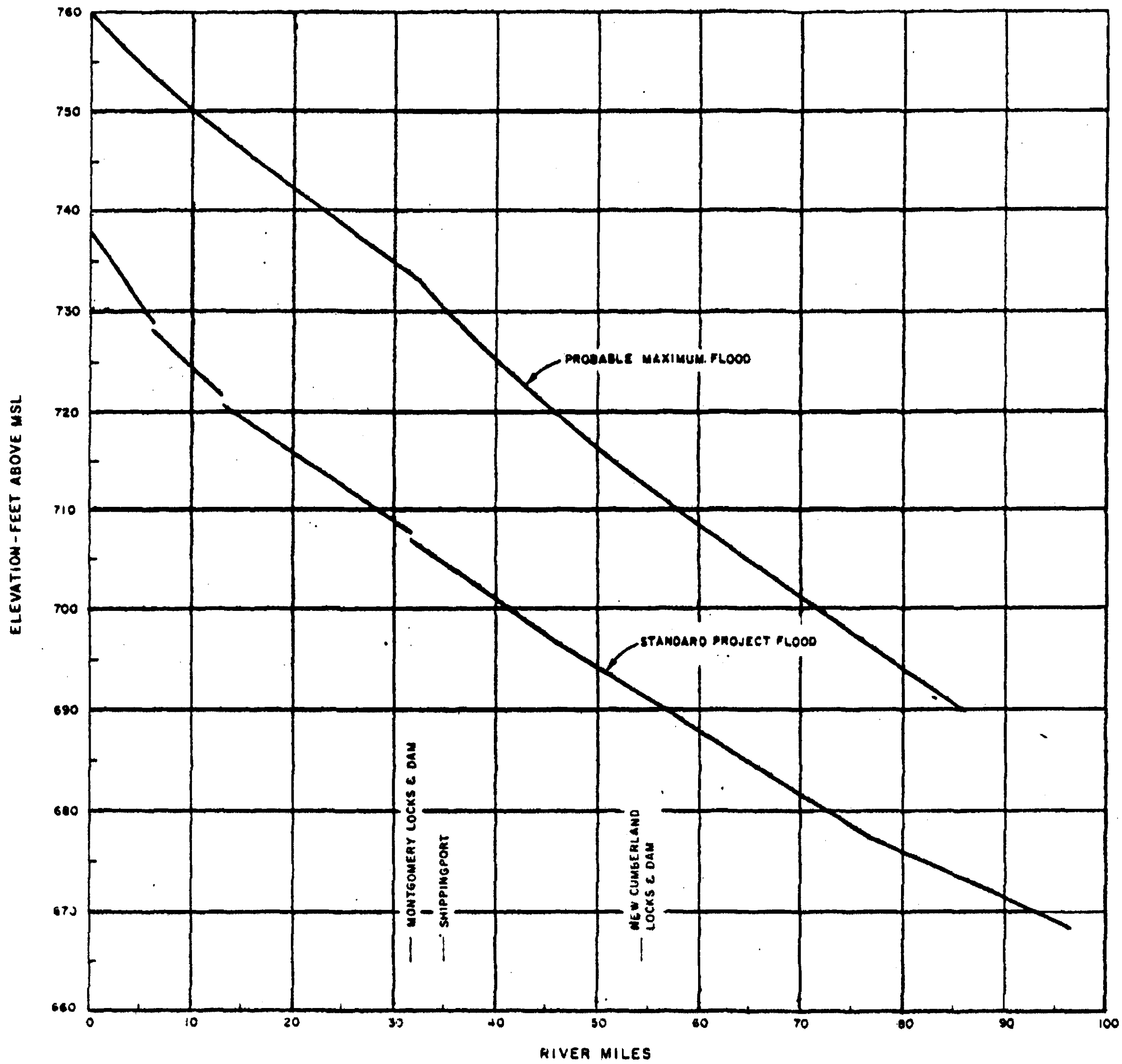


FIGURE 2.3-17
OHIO RIVER PROFILES FOR PMF AND SPF
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

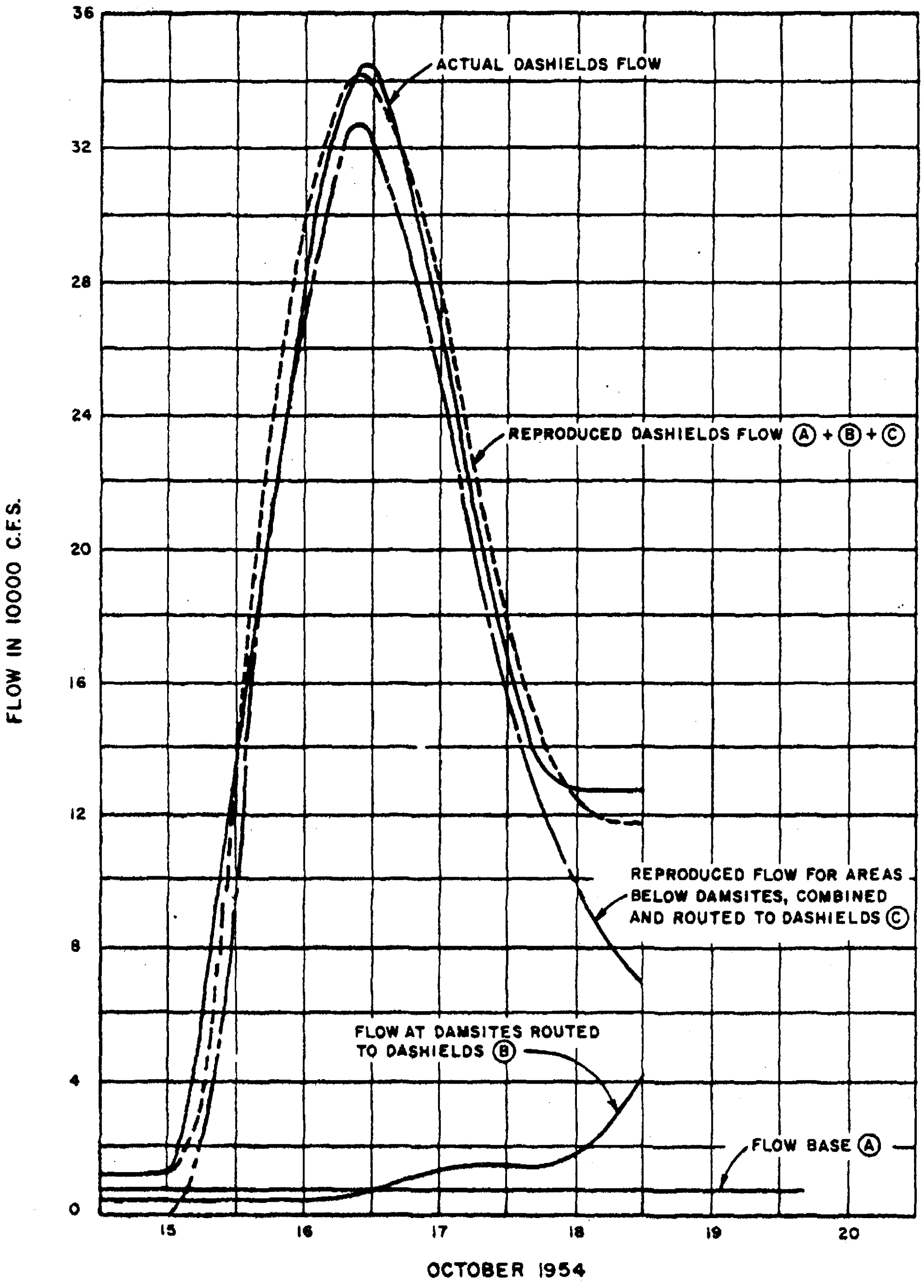


FIGURE 2.3-18
OHIO RIVER AT DASHIELDS LOCKS & DAM
COMPARISON OF ACTUAL AND REPRODUCED
OCTOBER 1954 FLOODS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

Removed in Accordance with RIS 2015-17

FIGURE 2.3-19
KINZUA DAM - TYPICAL CROSS SECTION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

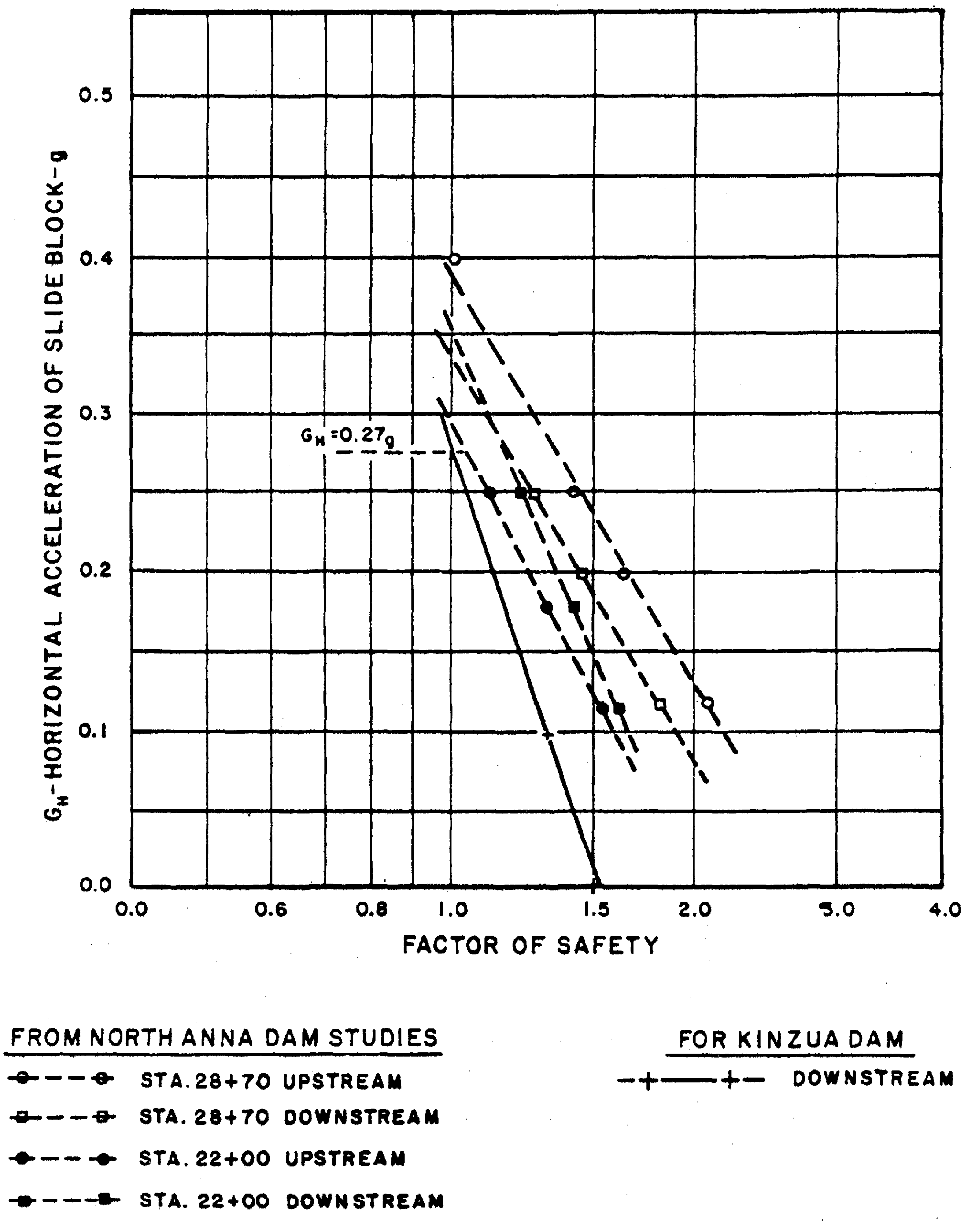


FIGURE 2.3-20
HORIZONTAL ACCELERATION OF SLIDE BLOCK VERSUS FACTOR OF SAFETY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

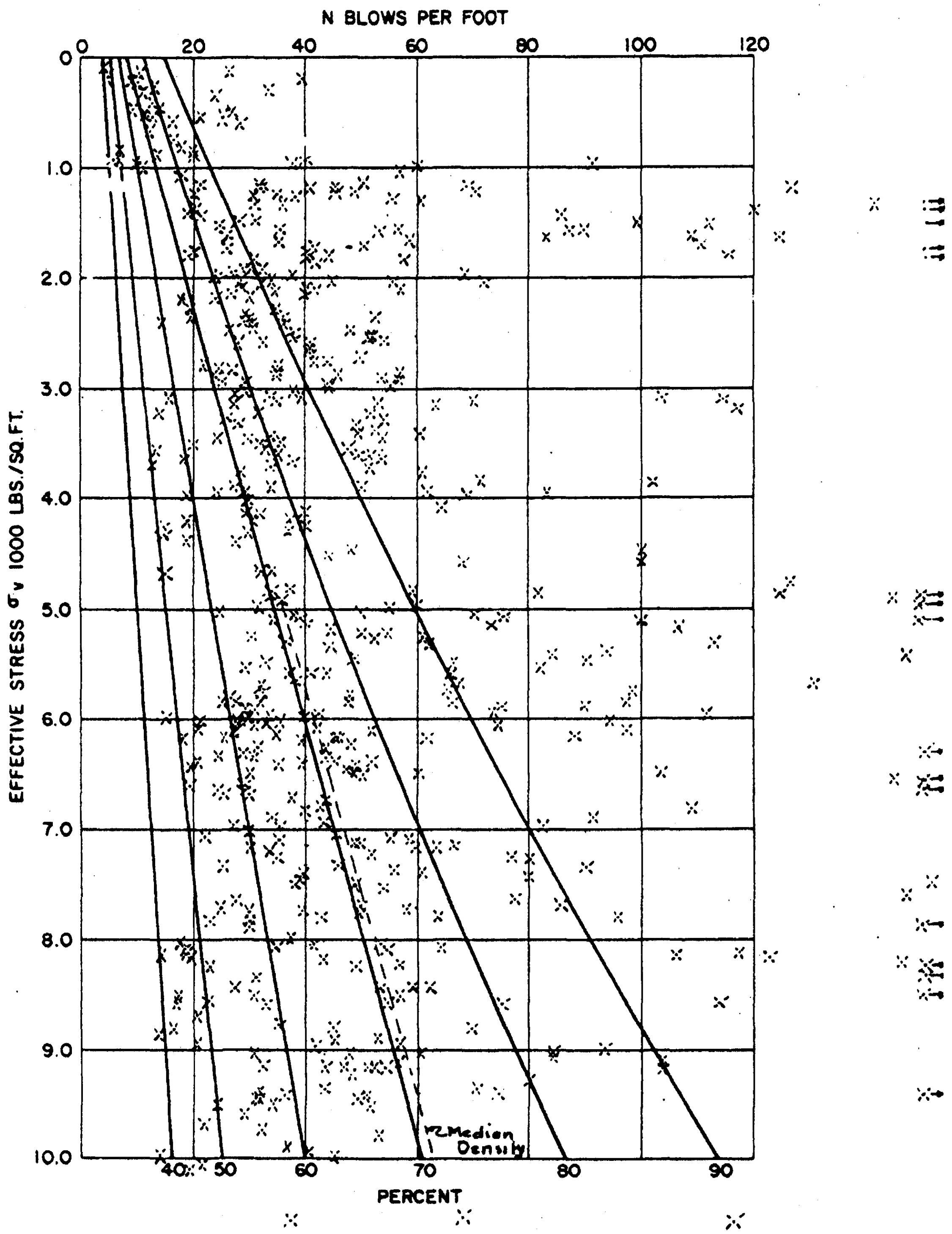


FIGURE 2.3-21
RELATIVE DENSITY FROM
STANDARD PENETRATION TESTS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

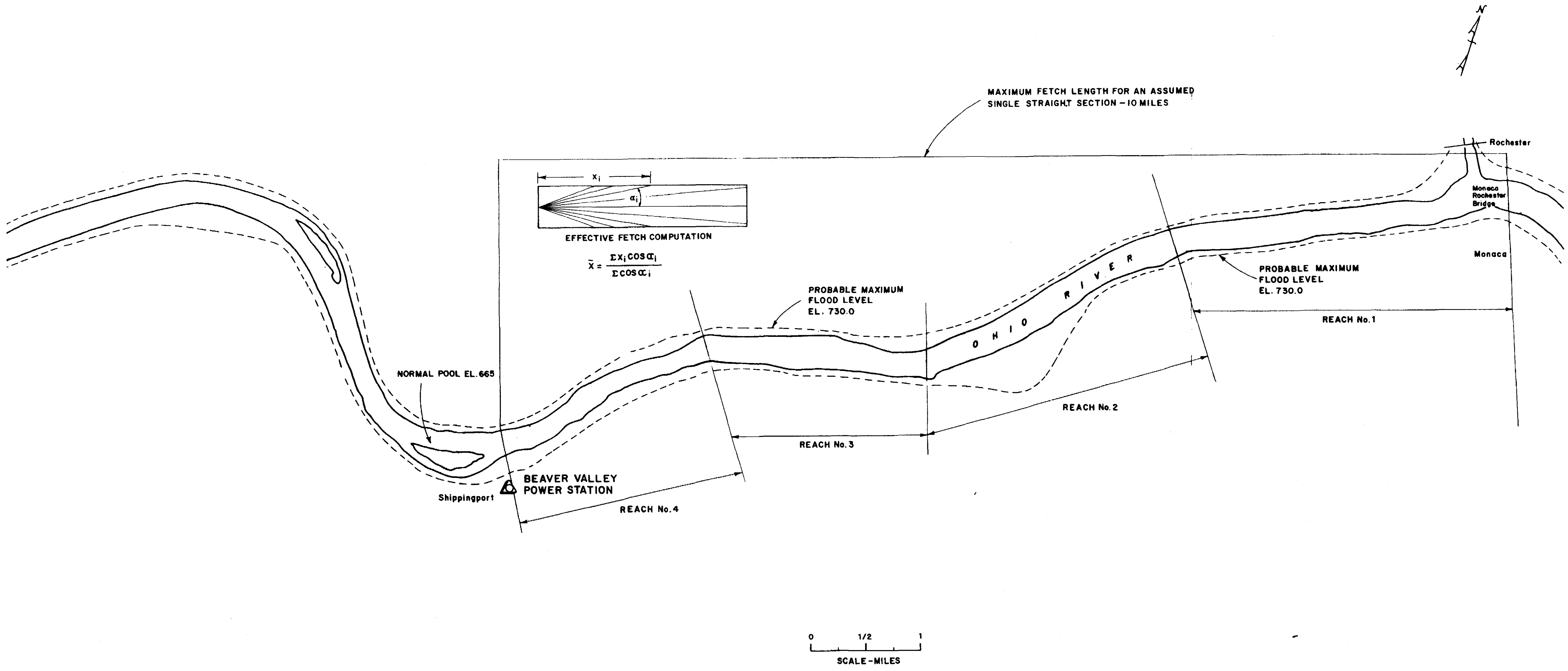


FIGURE 2.3-22
RIVER CONFIGURATION - WIND WAVE STUDY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

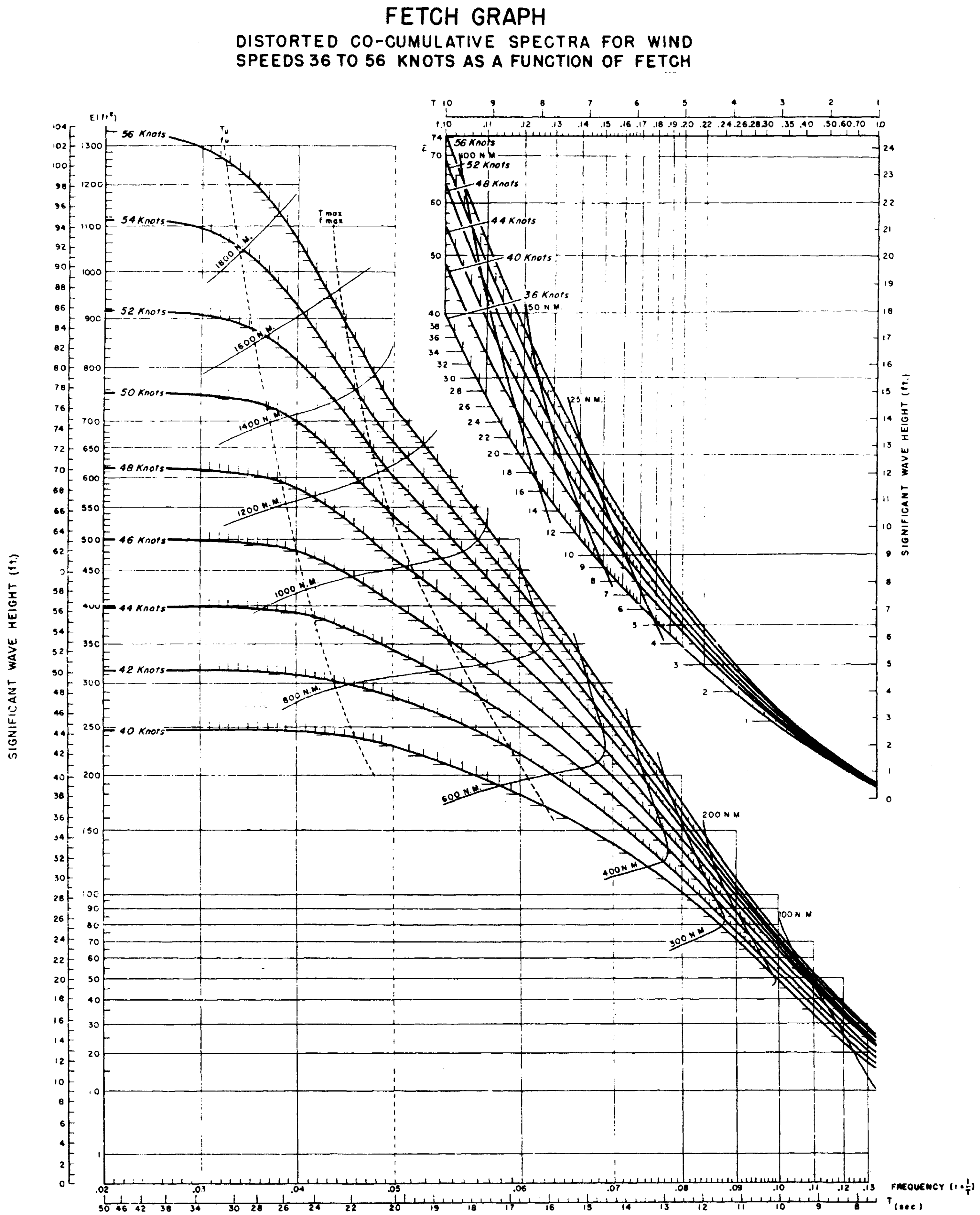
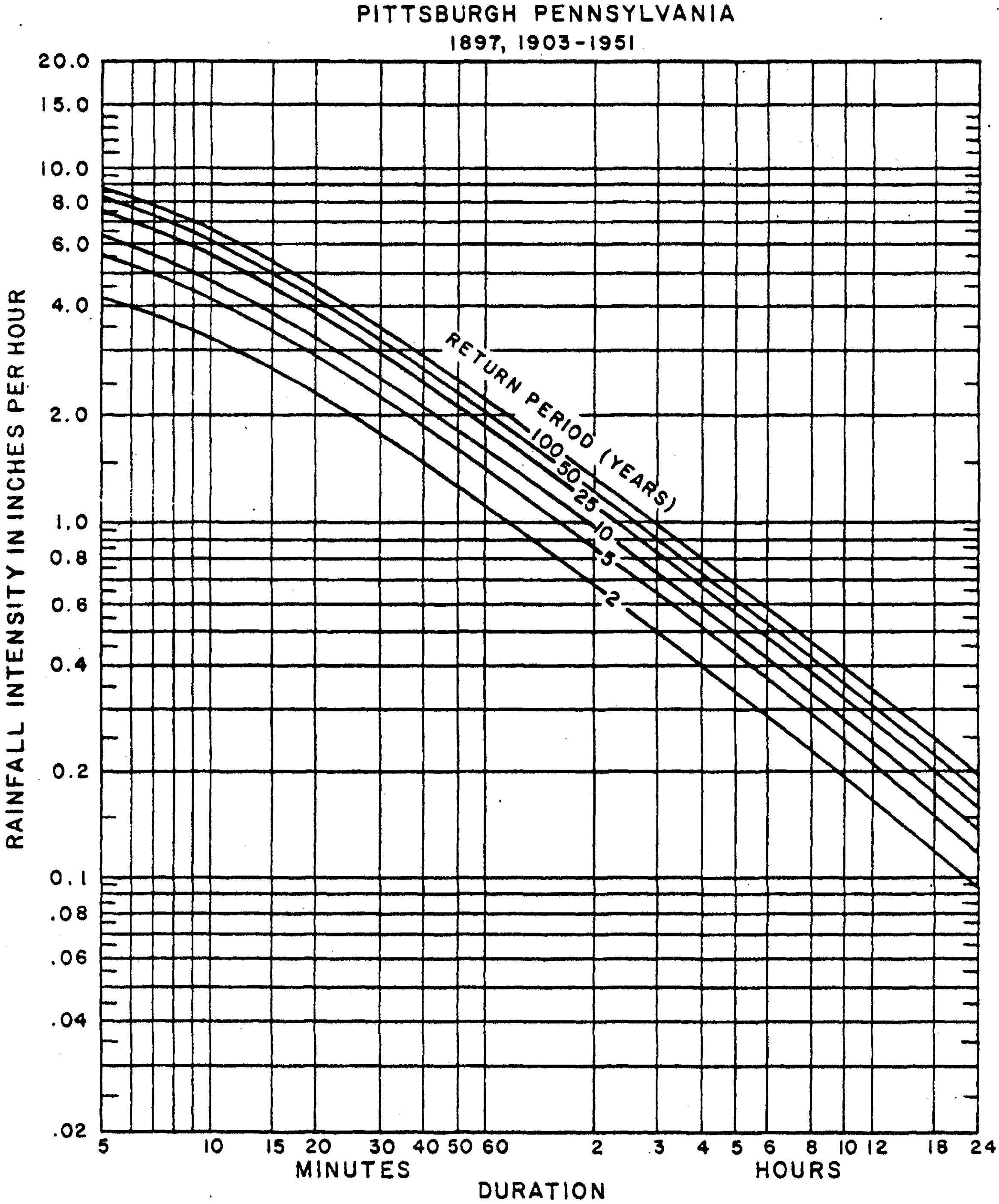


FIGURE 2.3-23
FETCH GRAPH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



NOTE:
FREQUENCY ANALYSIS BY METHOD OF EXTREME VALUES, AFTER GUMBEL

FIGURE 2.3-24
RAINFALL INTENSITY - DURATION - FREQUENCY CURVES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

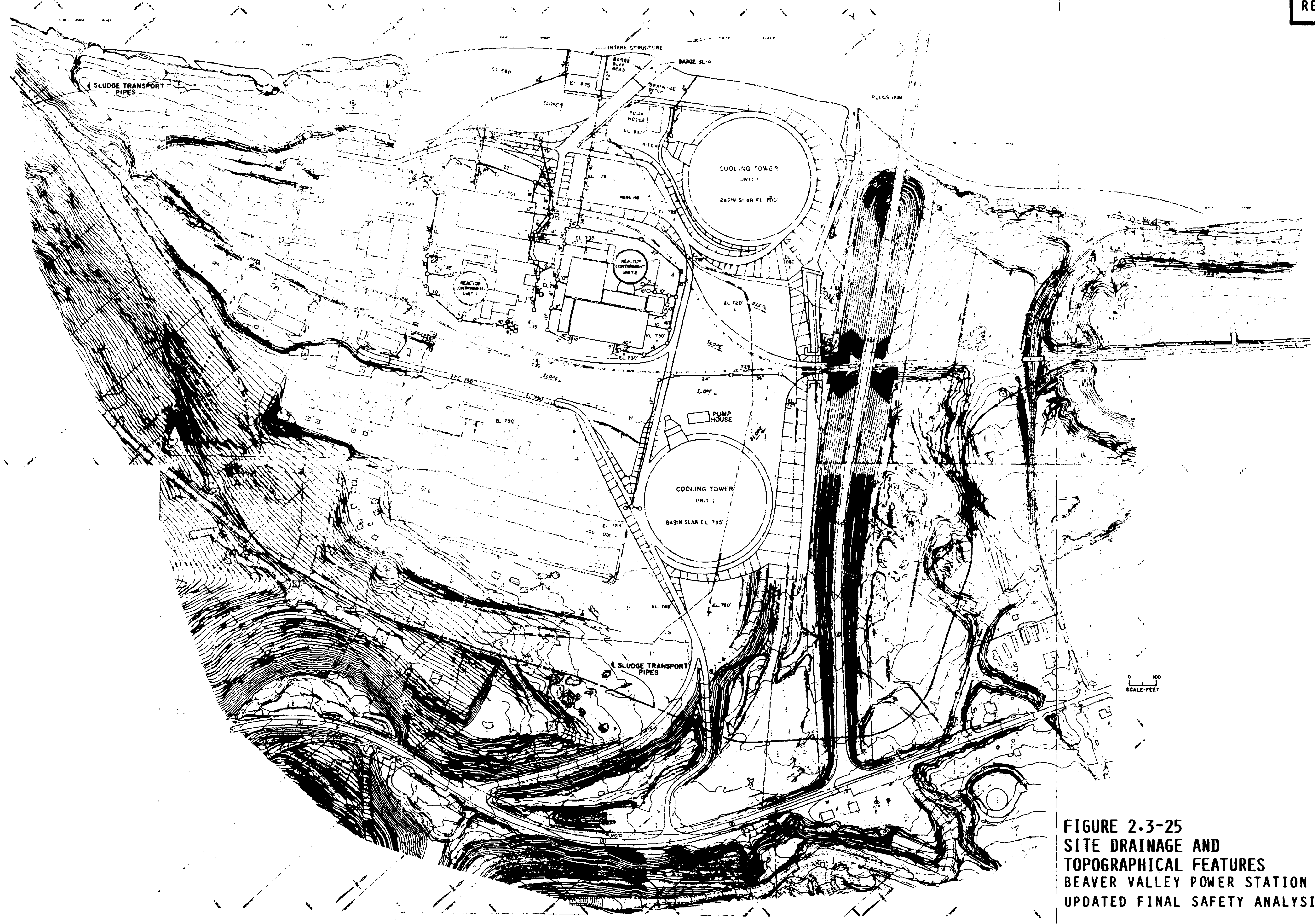


FIGURE 2.3-25
SITE DRAINAGE AND
TOPOGRAPHICAL FEATURES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

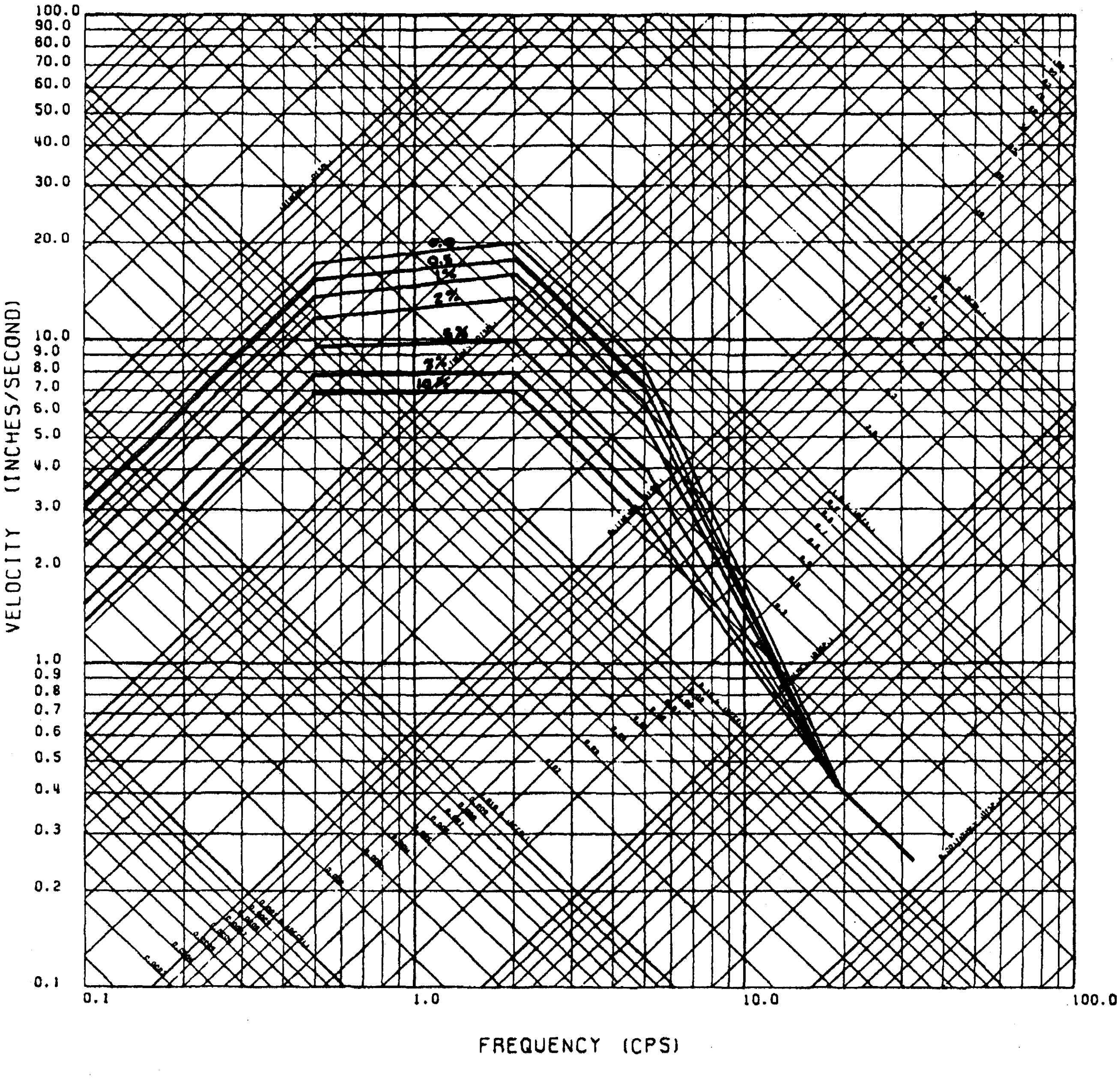


FIGURE 2.5-1
RESPONSE SPECTRA DBE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

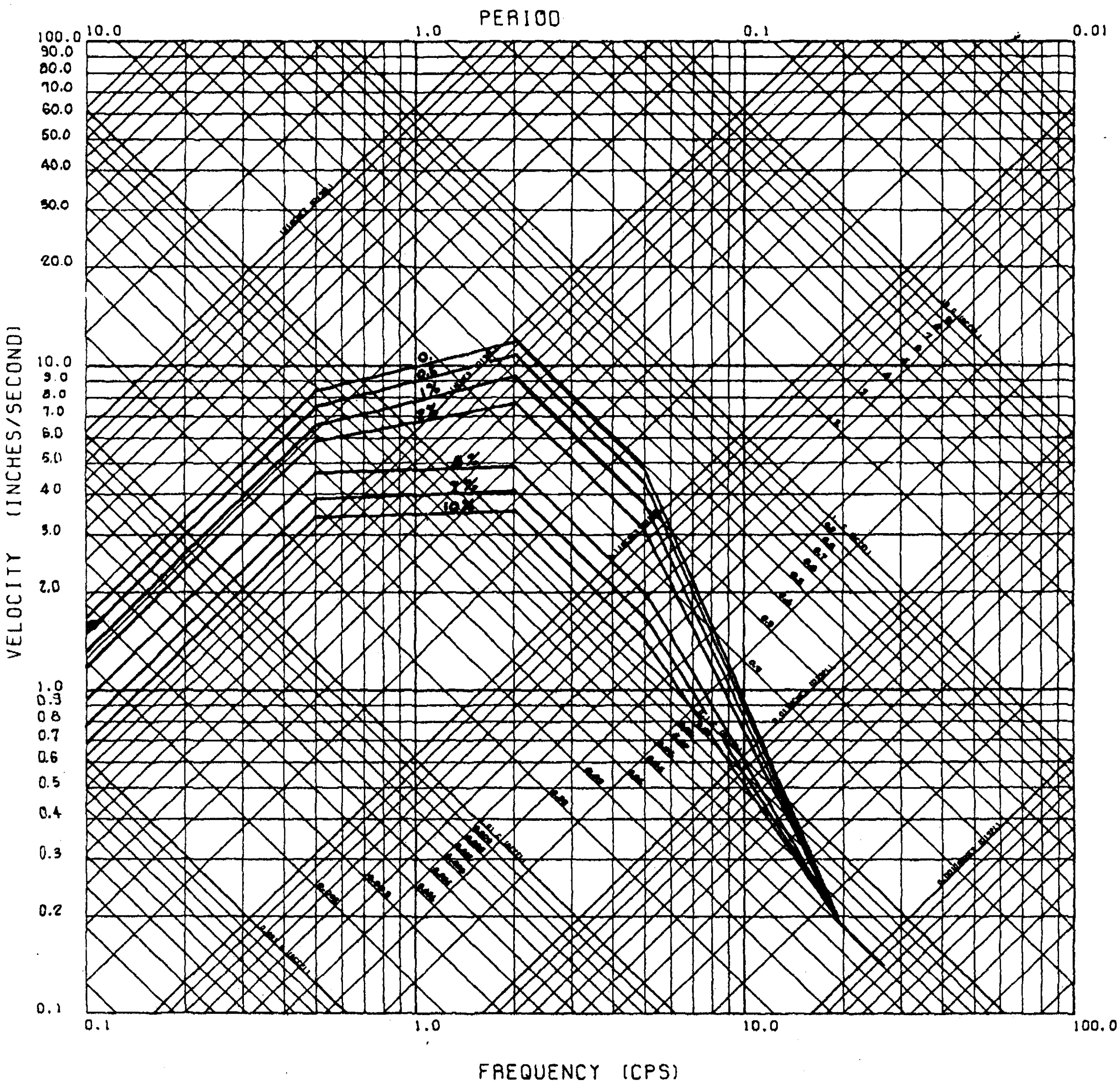
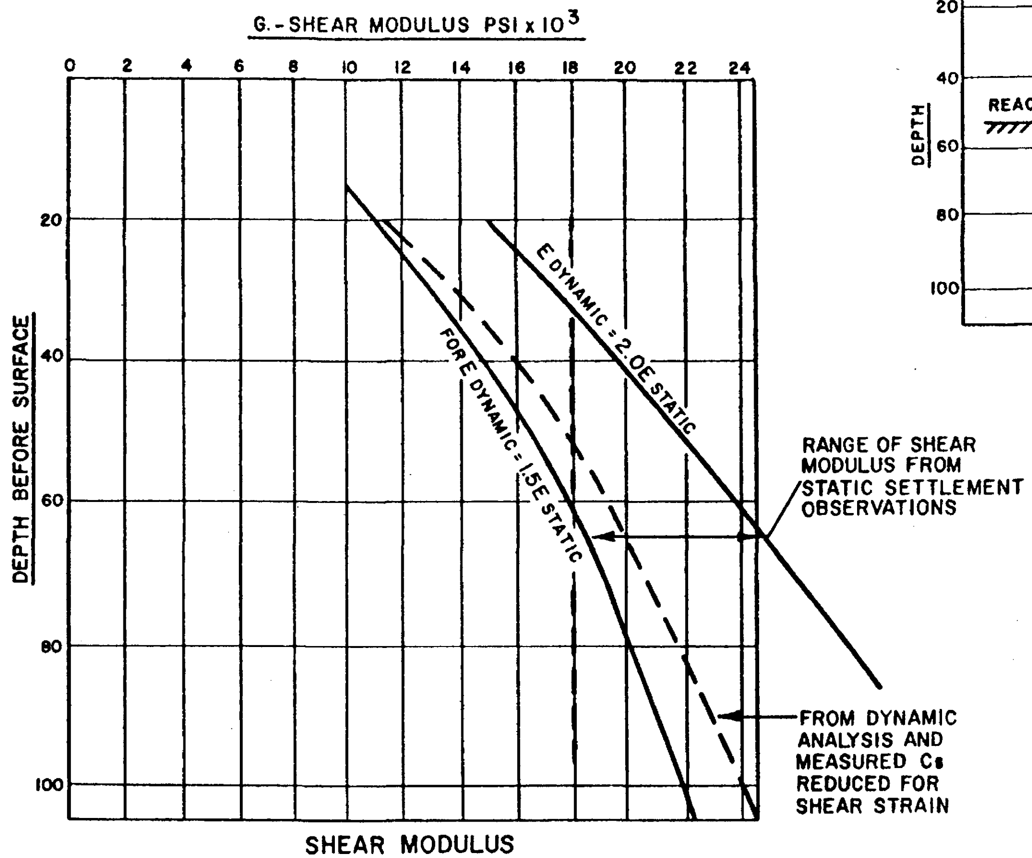


FIGURE 2.5-2
RESPONSE SPECTRA OBE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



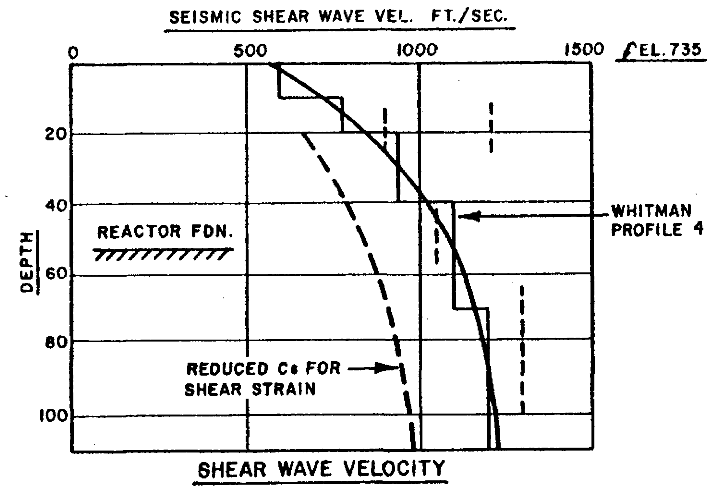


FIGURE 2.5-3
SHEAR MODULI
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

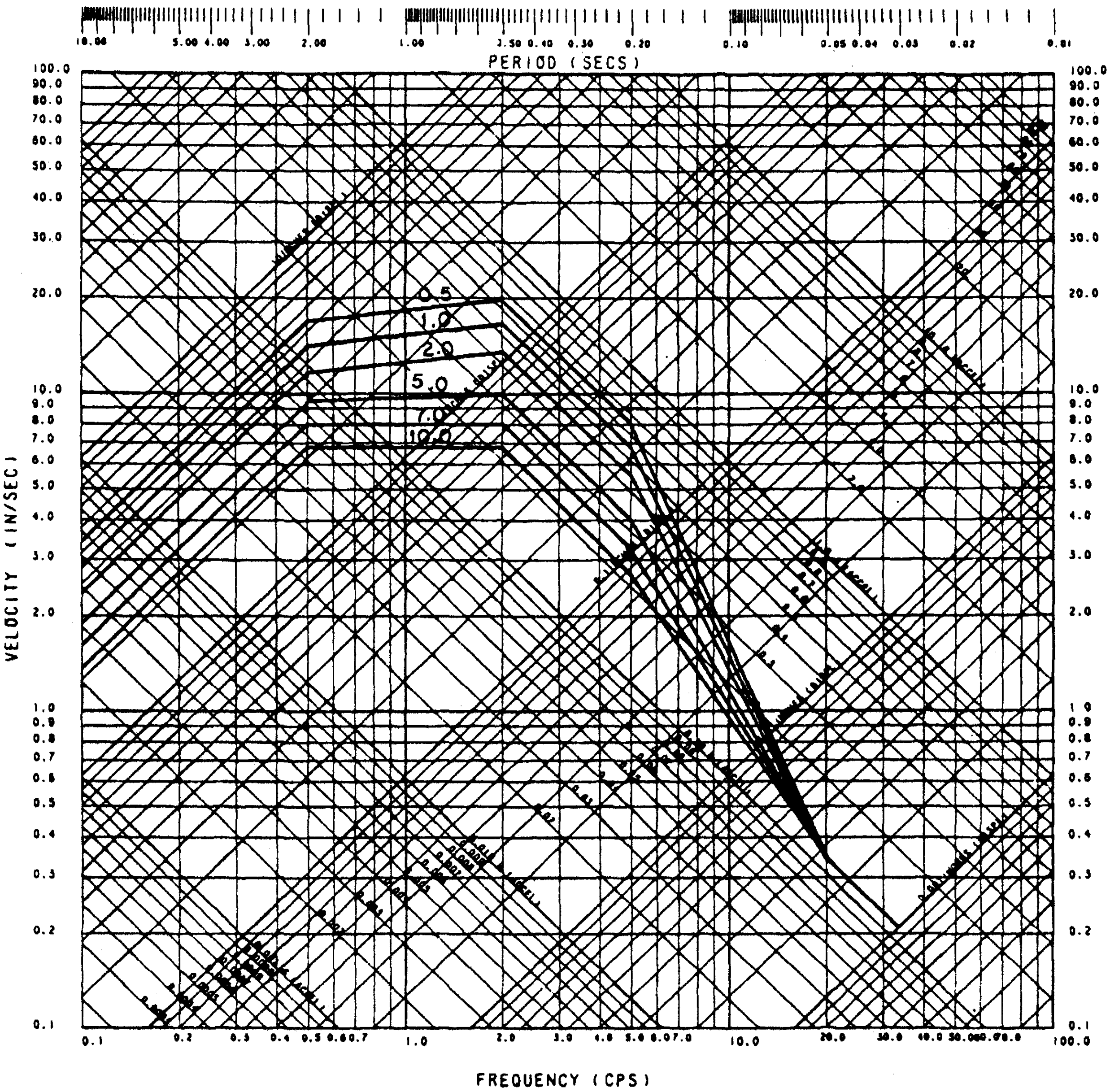


FIGURE 2.5-4
RESPONSE SPECTRA 0.125g DBE
(BASED ON SOIL-STRUCTURE
INTERACTION METHODOLOGY)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

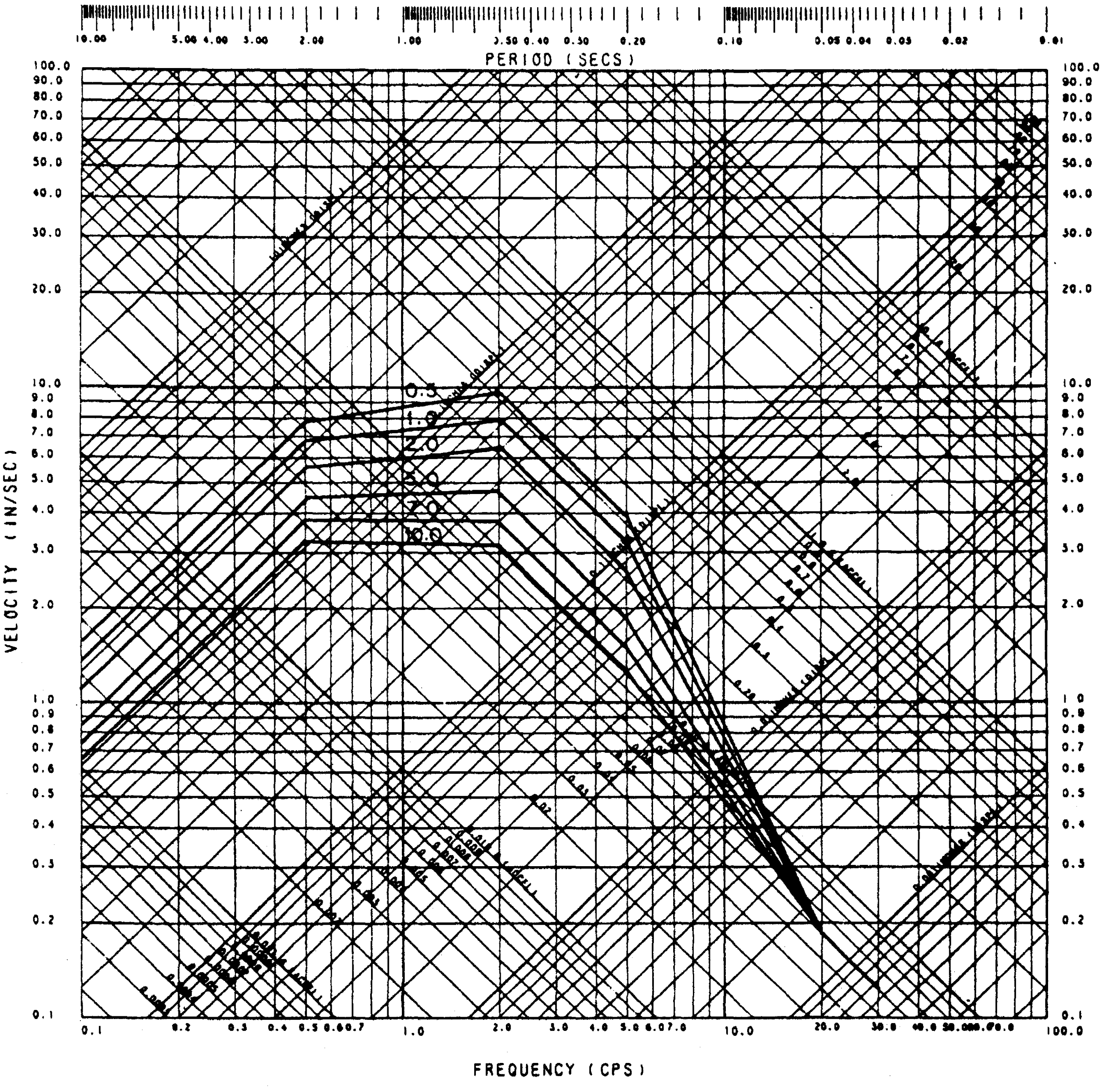


FIGURE 2.5-5
RESPONSE SPECTRA 0.06g OBE
(BASED ON SOIL-STRUCTURE
INTERACTION METHODOLOGY)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

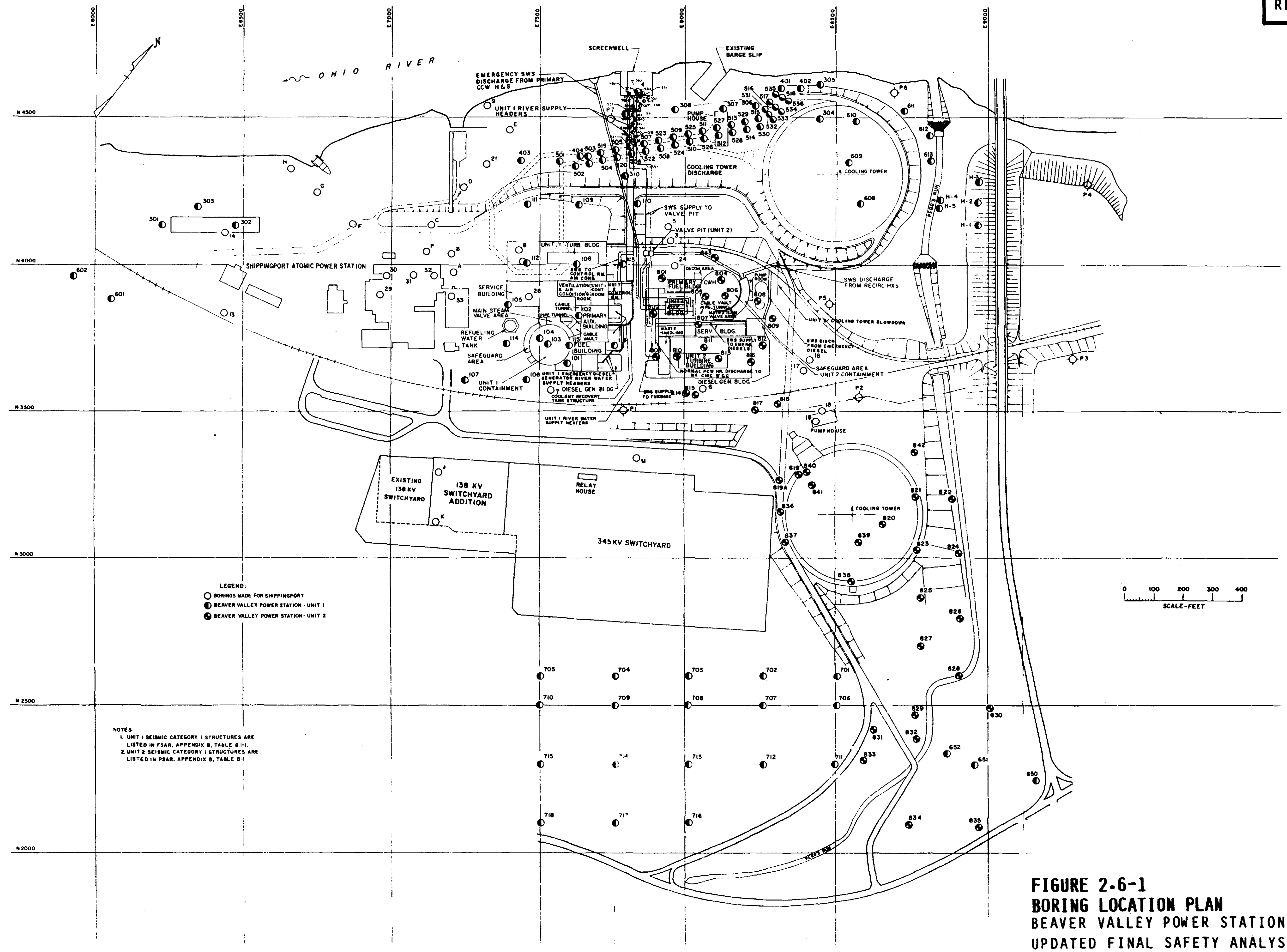


FIGURE 2.6-1
BORING LOCATION PLAN
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY

SH 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. No. 11700 BORING No. 101
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.4'
DATE DRILLED 3-15-68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E.B. M.S.
SUMMARY OF BORING

GROUND EL. 735.4' BORING NO. 101

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
	FILL-SLAB, CLAY, GRAVEL				
	BROWN FINE MEDIUM SAND, TRACE OF CLAY, DAMP	SS1	13		FINE SAND, TRACE OF CLAY AND COARSE SAND AND SMALL GRAVEL, MEDIUM BROWN
730					
	BROWN CLAYEY FINE, MEDIUM, COARSE SAND AND GRAVEL	SS2	8		MEDIUM SAND, SOME CLAY AND GRAVEL, WELL GRADED, SUBROUNDED, MEDIUM BROWN
		SS3	17		SAME AS SS2, MORE GRAVEL
720					
		SS4	15		SAME AS SS3
	BROWN FINE, COARSE SAND AND GRAVEL, TRACE OF CLAY COMPACT DAMP	SS5	37		SAME AS SS3
710					
		SS6	40		SAME AS SS3
		SS7	42		SAME AS SS3
700		SS8	15		SAME AS SS3, BUT SMALLER GRAVEL
		SS9	27		SAME AS SS8
690		SS10	51		SAME AS SS8
		SS11	37		SAME AS SS8
680		SS12	157		SAME AS SS8

BORING NO. 101(CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
680	BROWN FINE, COARSE SAND AND GRAVEL, TRACE OF CLAY COMPACT DAMP				
		SS13	29		SAME AS SS8, GRAVEL IS WEATHERED
670		SS14	18		SAME AS ABOVE, BROKEN GRAVEL SHOWS SANDSTONE
				72 ▽	
		SS15	25		SAME AS ABOVE
660		SS16	27		MORE SILTY-CLAYEY
		SS17	30		SAME AS ABOVE
650	GRAY SILTY FINE, COARSE SAND AND GRAVEL, SANDSTONE FRAGMENTS, MOIST	SS18	26		SAME AS ABOVE WITH PIECES OF BLUE GRAY SANDSTONE, AND SOME STRATIFIED RUSTY SAND
	BROWN FINE, COARSE SAND	SS19	41		FINE TO MEDIUM SAND, SLIGHT SILT, UNIFORM, SUBROUNDED, BROWN-RUSTY
640	COMPACT GRAY SILTY FINE, COARSE SAND AND GRAVEL, SHALE SANDSTONE FRAGMENT	SS20	69		FINE TO COARSE SAND, SILTY, SOME SUBROUNDED GRAVEL, WELL GRADED, ISOLATED COAL INCLUSIONS, BROWN-RUSTY
		SS21	107		WEATHERED SANDSTONE, FRAGMENTS OF DIFFERENT COLORS, WEAK, NOT IN PLACE
630		SS22	98		SAME BUT MOSTLY BLUE-GRAY SANDSTONE, WEAK
	GRAY SHALE WEATHERED	SS23	100/2"		DARK GRAY SHALE, SLIGHTLY SANDY, THINLY LAMINATED, HORIZONTAL
	HARD GRAY SHALE				UNIFORM SOUND DARK GRAY SHALE
		NX	100%		108'.7"-112'5" RECOVERY IN PIECES ... 0.5-1.5" PARTINGS ON FOLIATION. FOLIATION HORIZONTAL OR ALMOST
620		NX	100%		112'.5"-118.7 SAME BUT BREAKS IN 1"-4" PIECES, TWO THIN (1/2") COAL SEAMS SMOOTH FEELING
					118'.7"-123'.7" SAME BUT BREAKS TO 6" PIECES
		NX	100%		
610		NX	100%		SAME ROCK ON PARTINGS TRACES OF SHELLS, LEAVES OF PLANTS AND FINE DISSEMINATED PYRITE FILMS. WATER LEVELS AT 20'10" AT COMPLETION OF BORING

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL.

REV. 0 (1/82)

FIGURE 2.6-2
LOG OF BORING 101
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

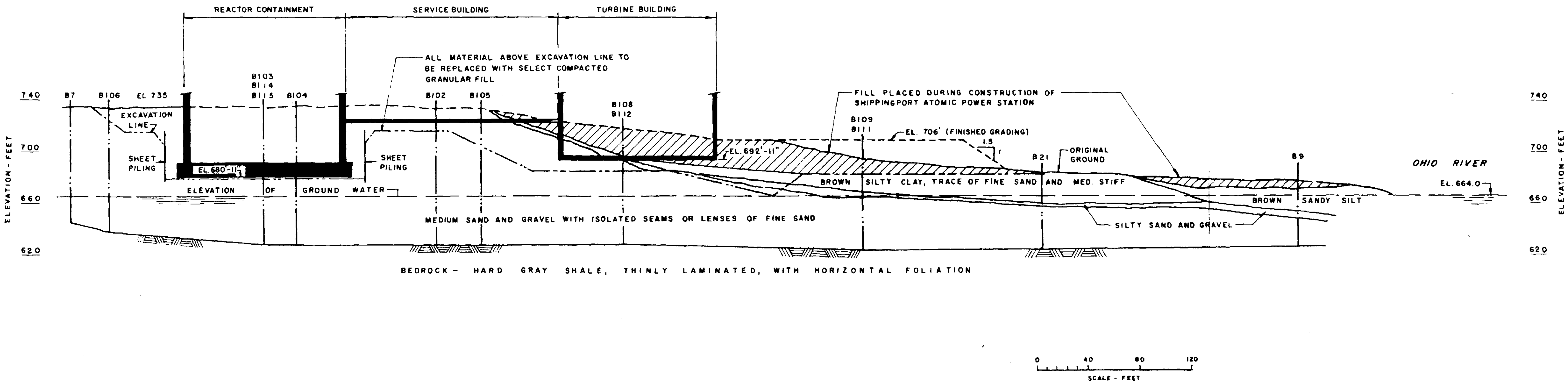


FIGURE 2.6-3
TYPICAL SUBSURFACE SECTION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

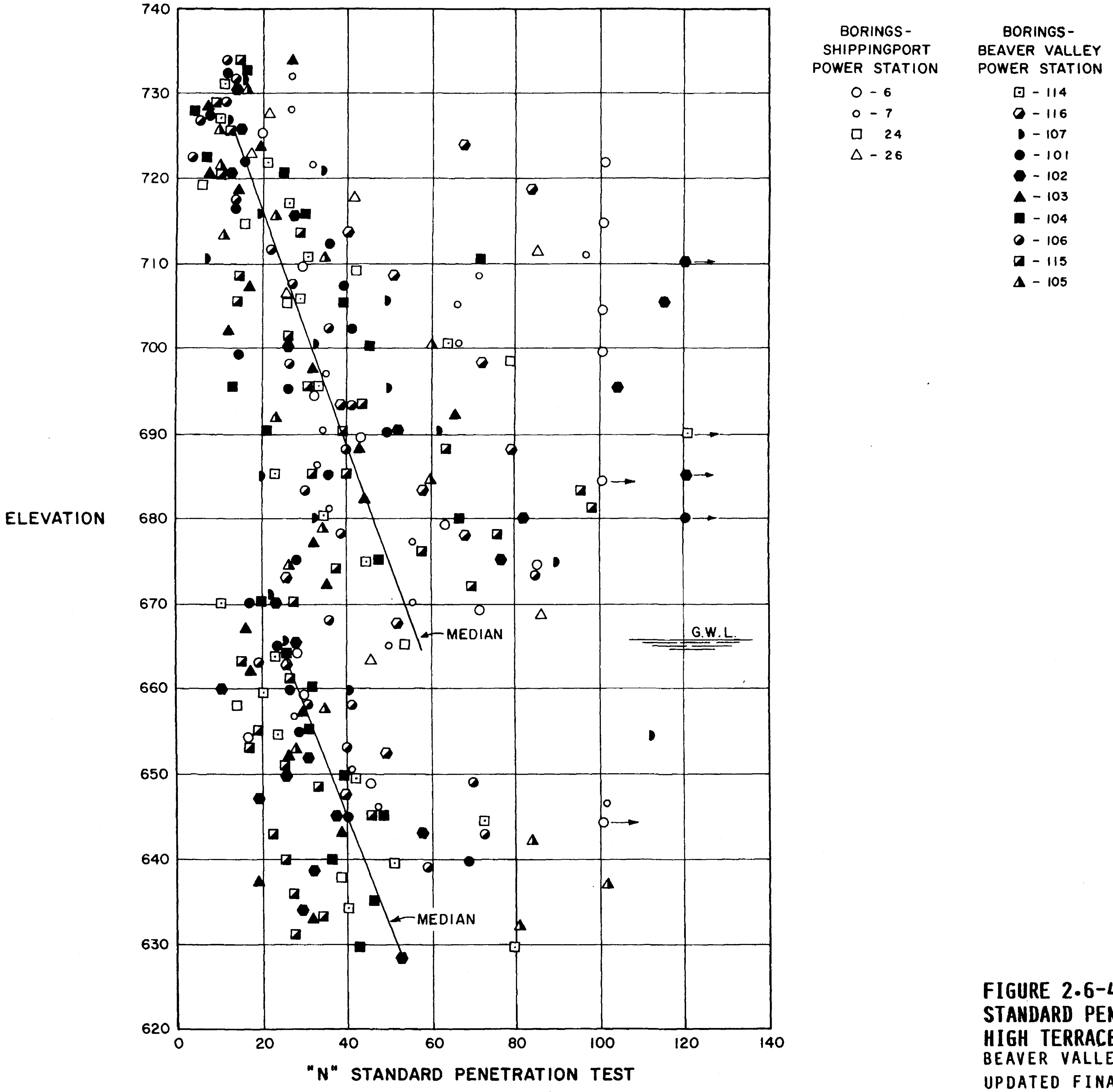
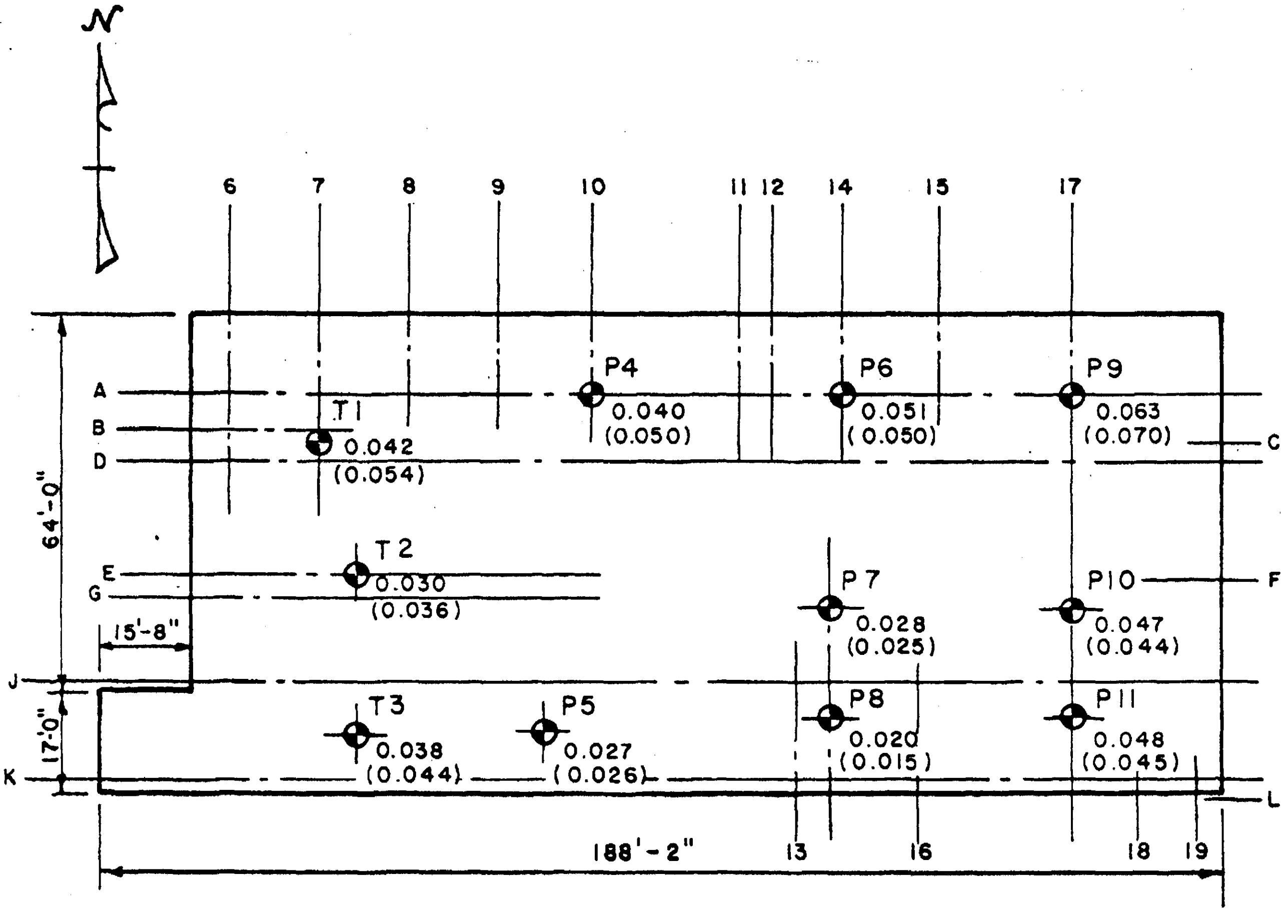


FIGURE 2.6-4
STANDARD PENETRATION TEST RESULTS - HIGH TERRACE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



PLAN-TURBINE ROOM

NOTES:

- INDICATES LOCATION OF SETTLEMENT POINT.
- NUMBERS SHOWN BESIDE SETTLEMENT POINT DENOTE SETTLEMENT IN FEET.
- CONSTRUCTION OF TURBINE ROOM BEGAN IN SEPT, 1955.
- TOP NUMBER INDICATES SETTLEMENT IN FEET RECORDED IN DECEMBER, 1956.
- LOWER NUMBER IN PARENTHESIS INDICATES SETTLEMENT RECORDED IN AUGUST, 1957.

FIGURE 2.6-5
RECORDED SETTLEMENTS OF TURBINE ROOM IN THE SHIPPINGPORT ATOMIC POWER STATION

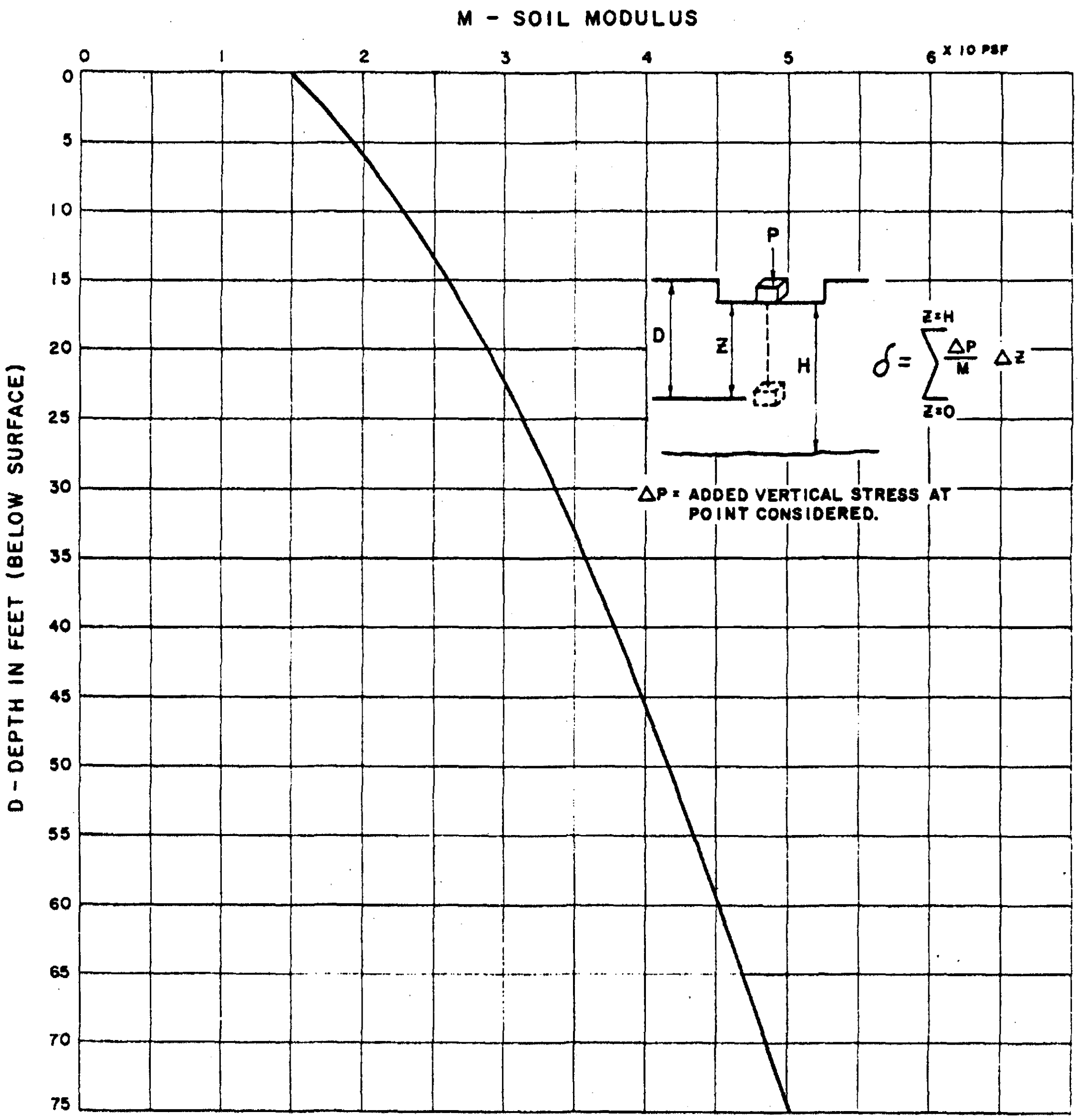


FIGURE 2.6-6
MODULUS OF FOUNDATION DEFORMATION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

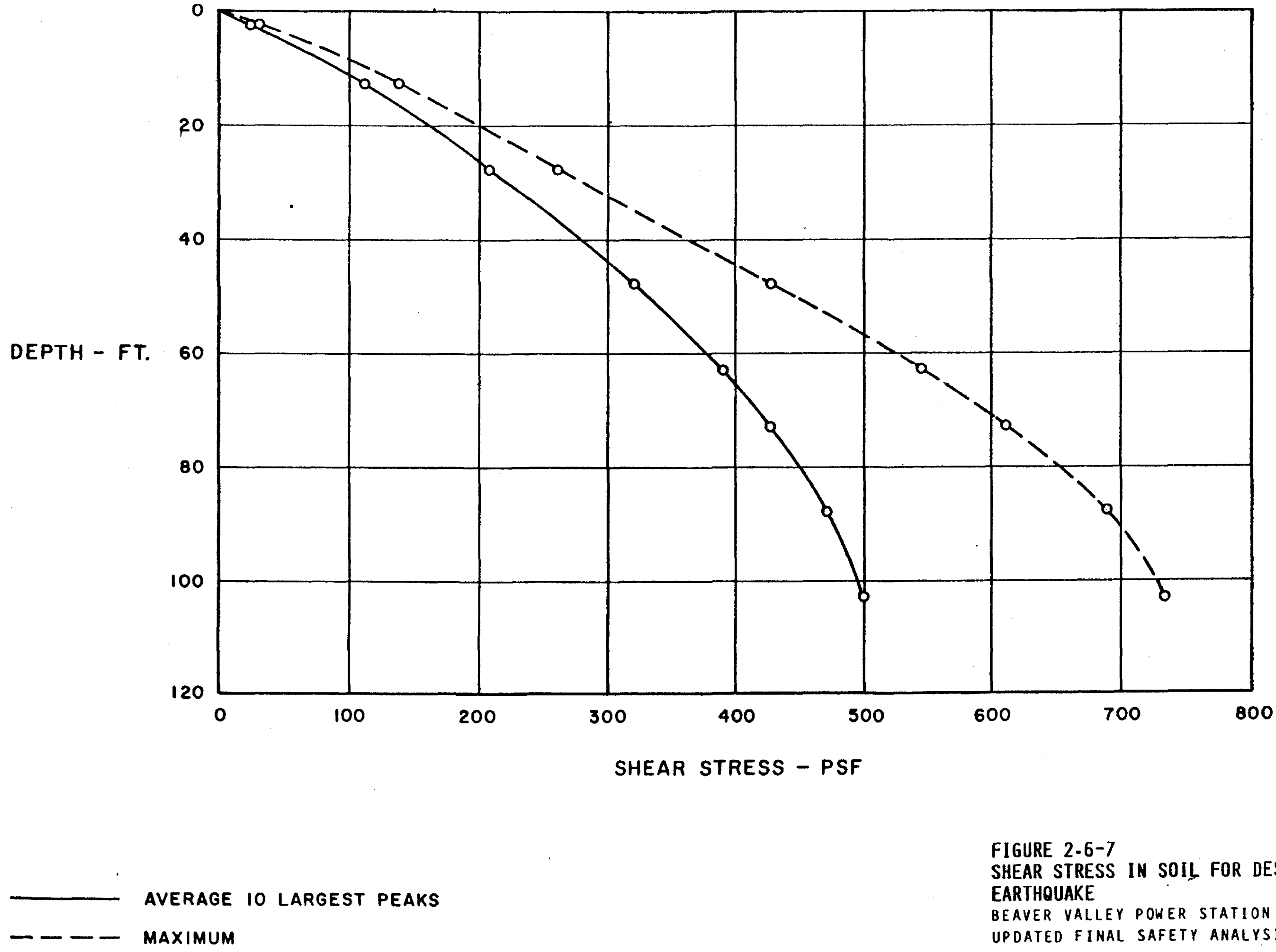


FIGURE 2.6-7
SHEAR STRESS IN SOIL FOR DESIGN EARTHQUAKE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

COMPUTED SINGLE PEAK VALUES OF ALPHA

Z DEPTH	$\frac{Z'-Z}{Z'}$	-SINGLE PEAK DYALS	SHEAR STRESS FOR $t = a x m$	ALPHA SINGLE PEAK
20	.81	200	300	0.667
40	.62	370	600	0.62
60	.41	520	900	0.58
80	.23	660	1,200	0.55
100	.05	730	1,500	0.49

Z'=105' (735 to 630 AT REACTOR) = DEPTH OF OVERBURDEN
a= MAX SURF. ACCELERATION-SINGLE PEAK= 0.125g

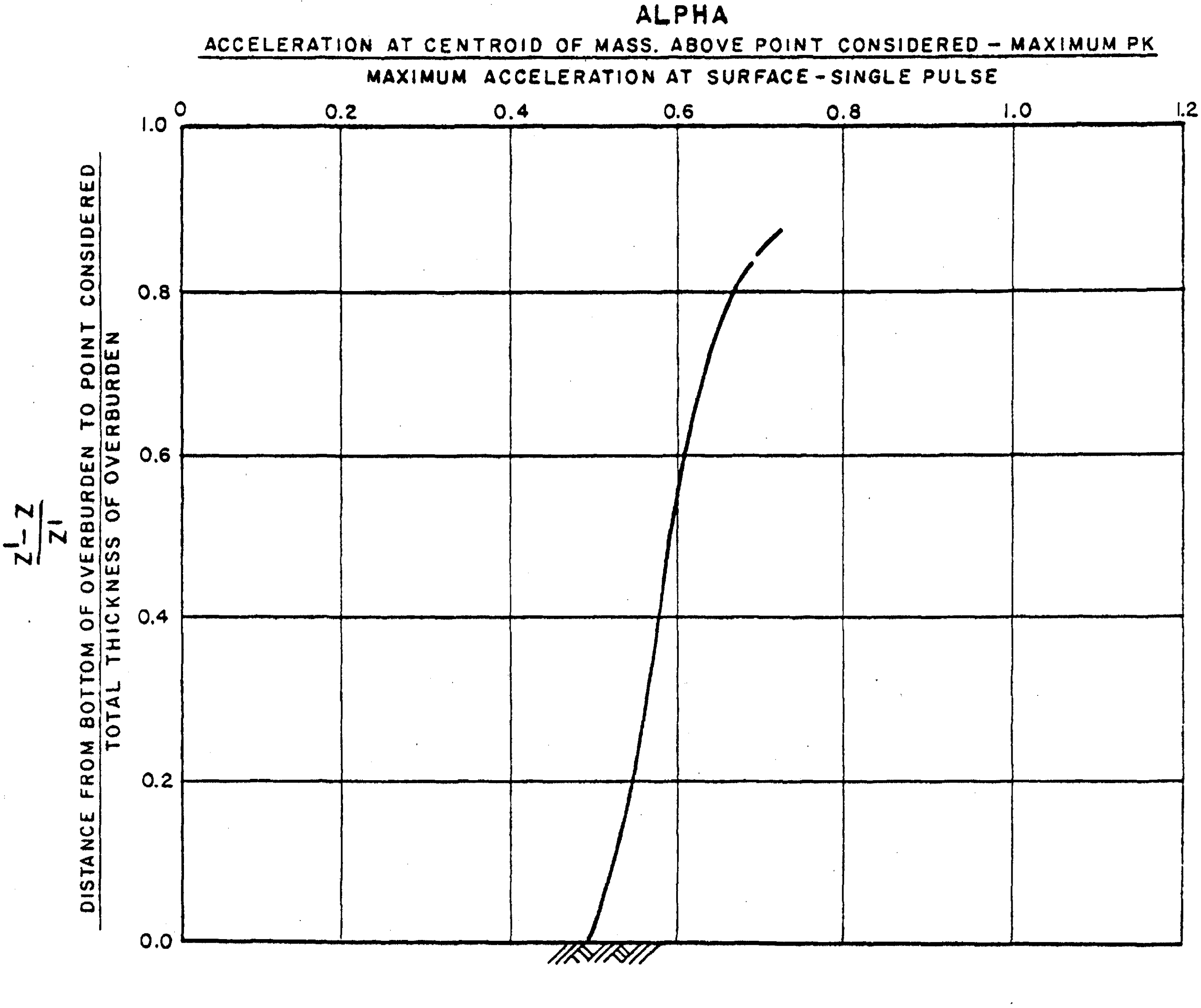
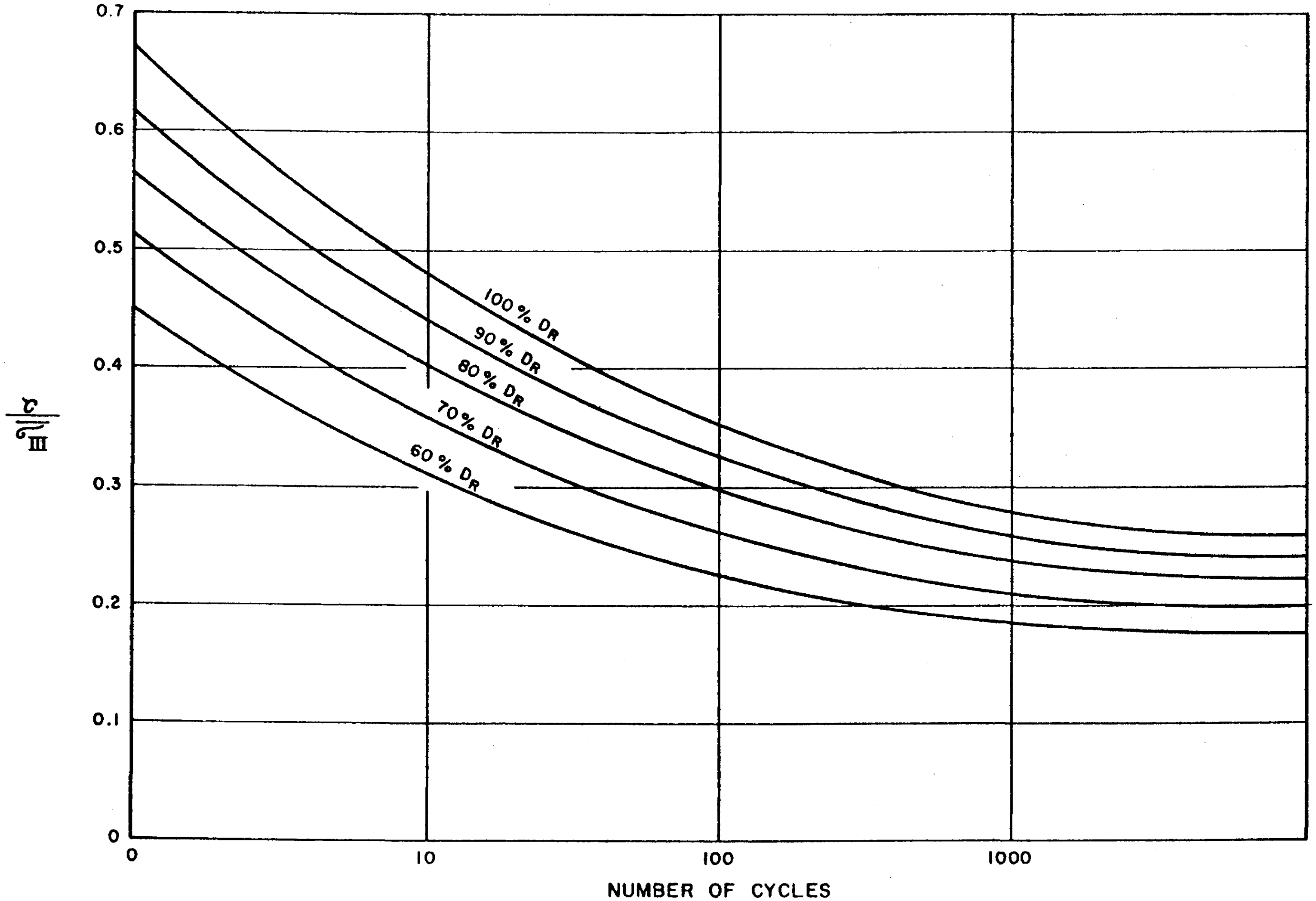


FIGURE 2.6-8
VARIATION OF ALPHA WITH DEPTH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



After Seed for Sacramento River Sand

D_R = Relative Density

FIGURE 2.6-9
DYNAMIC TRIAXIAL TEST DATA

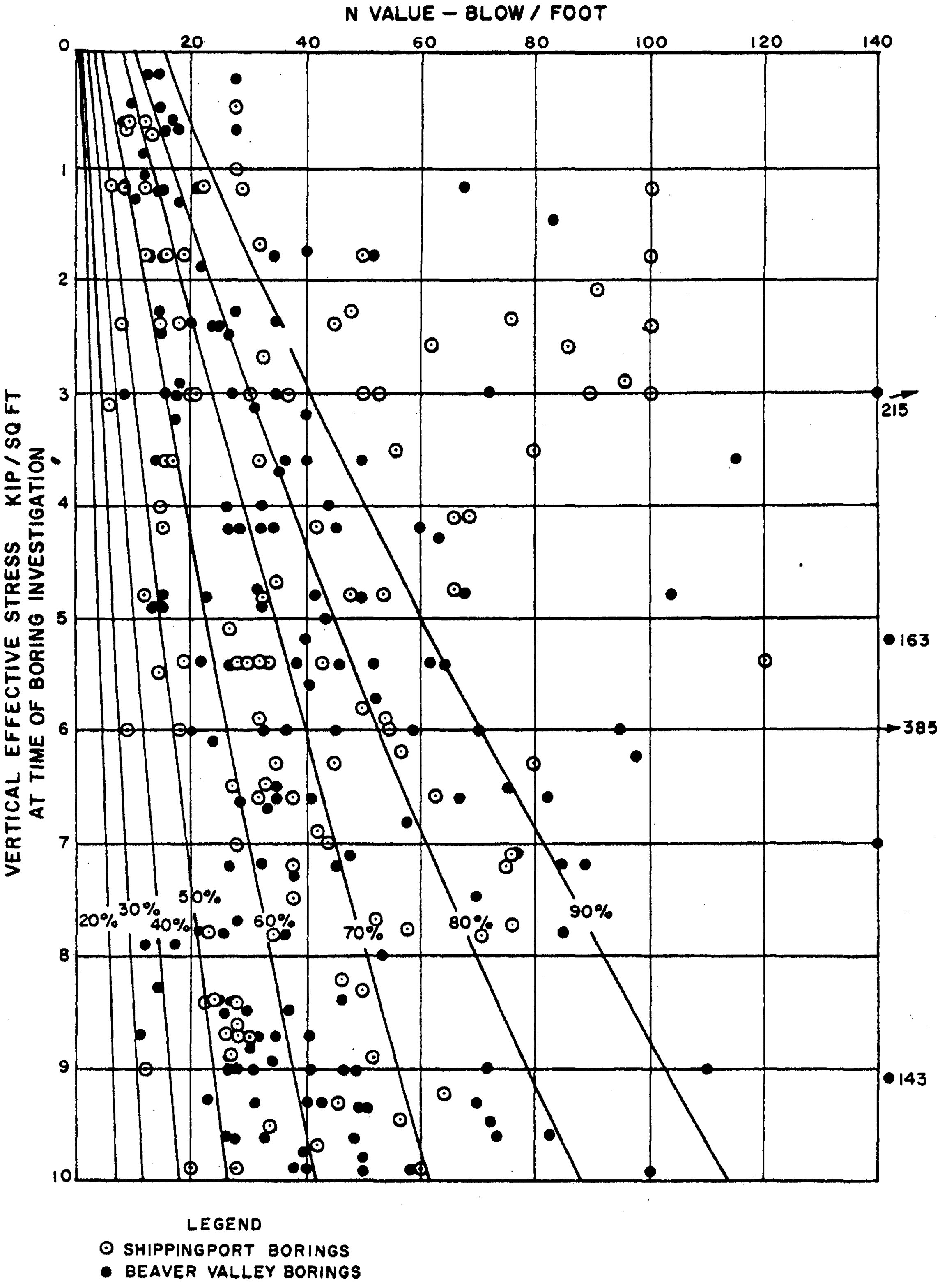


FIGURE 2.6-10
CORRELATION OF BLOW COUNT AND
RELATIVE DENSITY FOR SAND & GRAVEL
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

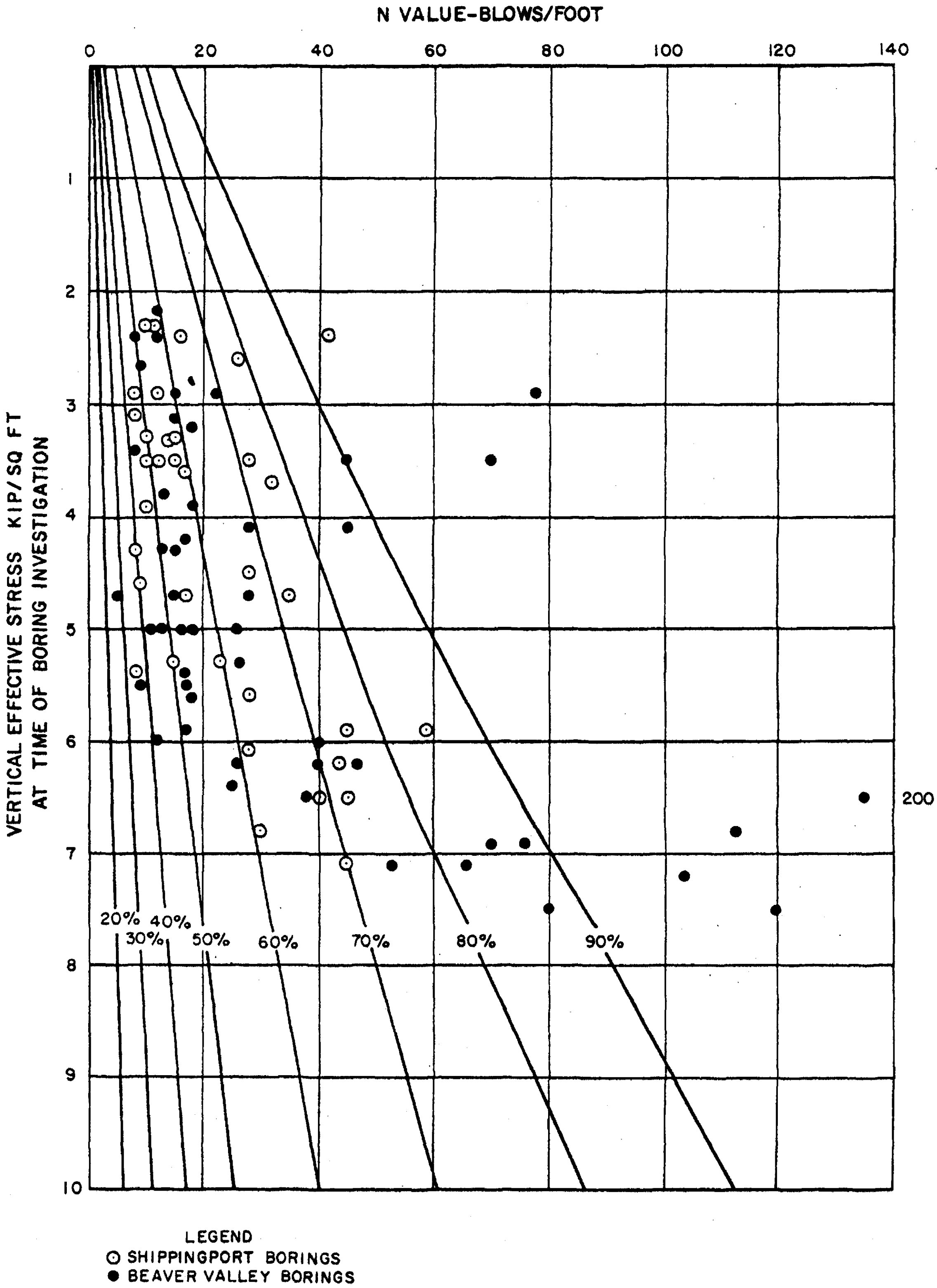


FIGURE 2.6-11
CORRELATION OF BLOW COUNT AND RELATIVE DENSITY FOR INTERMEDIATE BENCH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

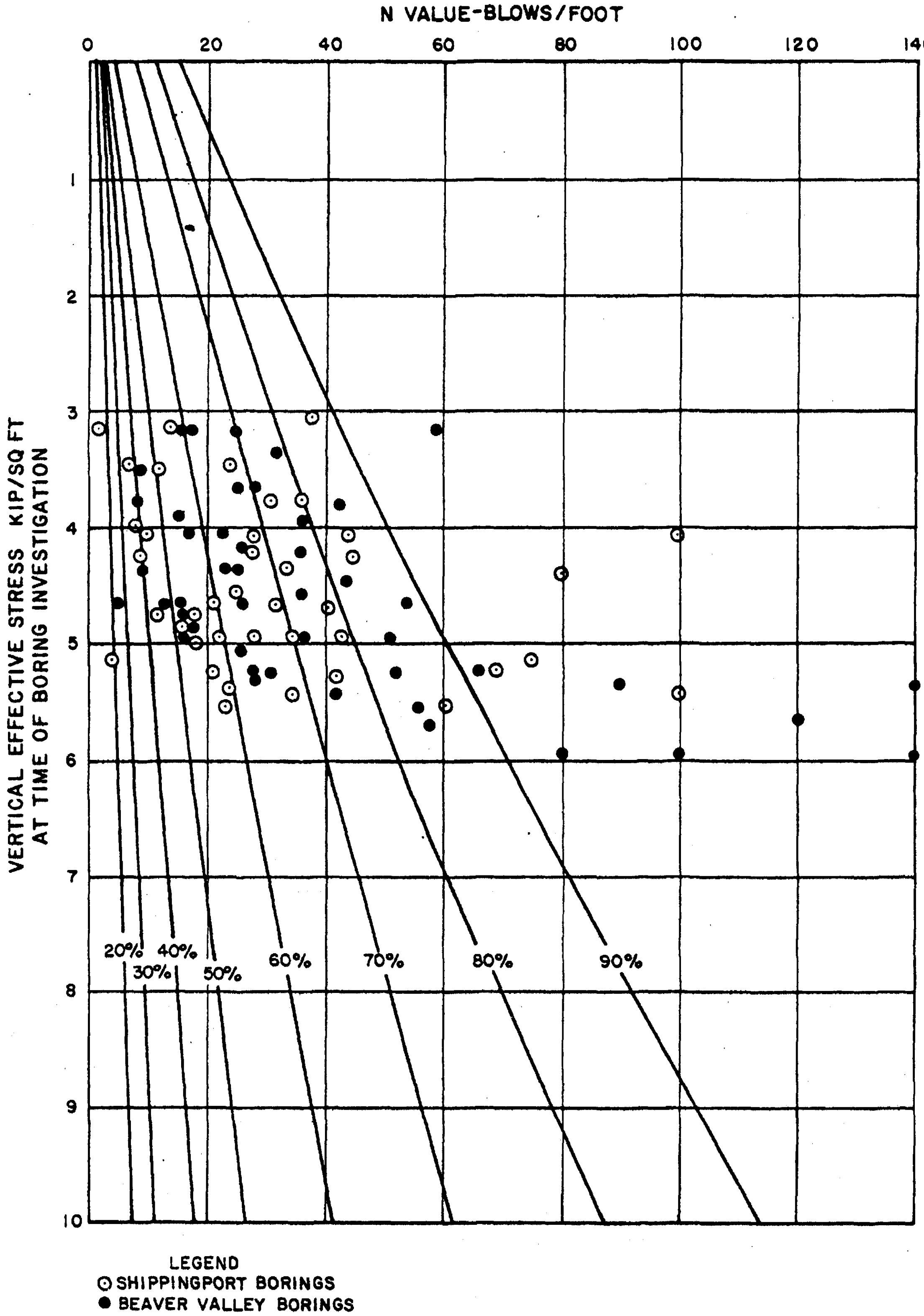


FIGURE 2.6-12
CORRELATION OF BLOW COUNT AND RELATIVE DENSITY FOR LOW LEVEN BENCH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

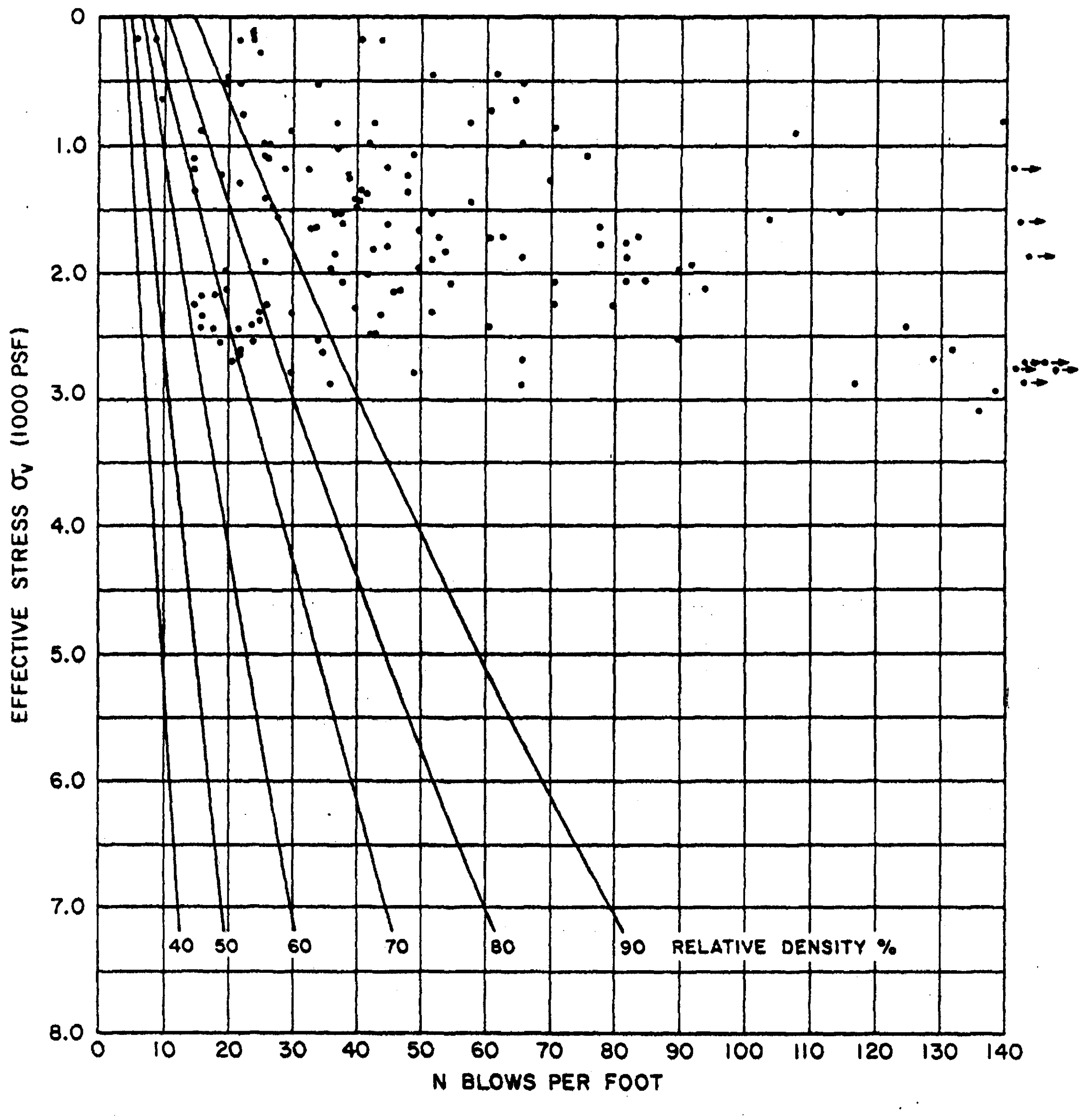


FIGURE 2.6-13
RELATIVE DENSITY FROM STANDARD PENETRATION TESTS ALONG CIRCULATING WATER LINES AFTER DENSIFICATION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

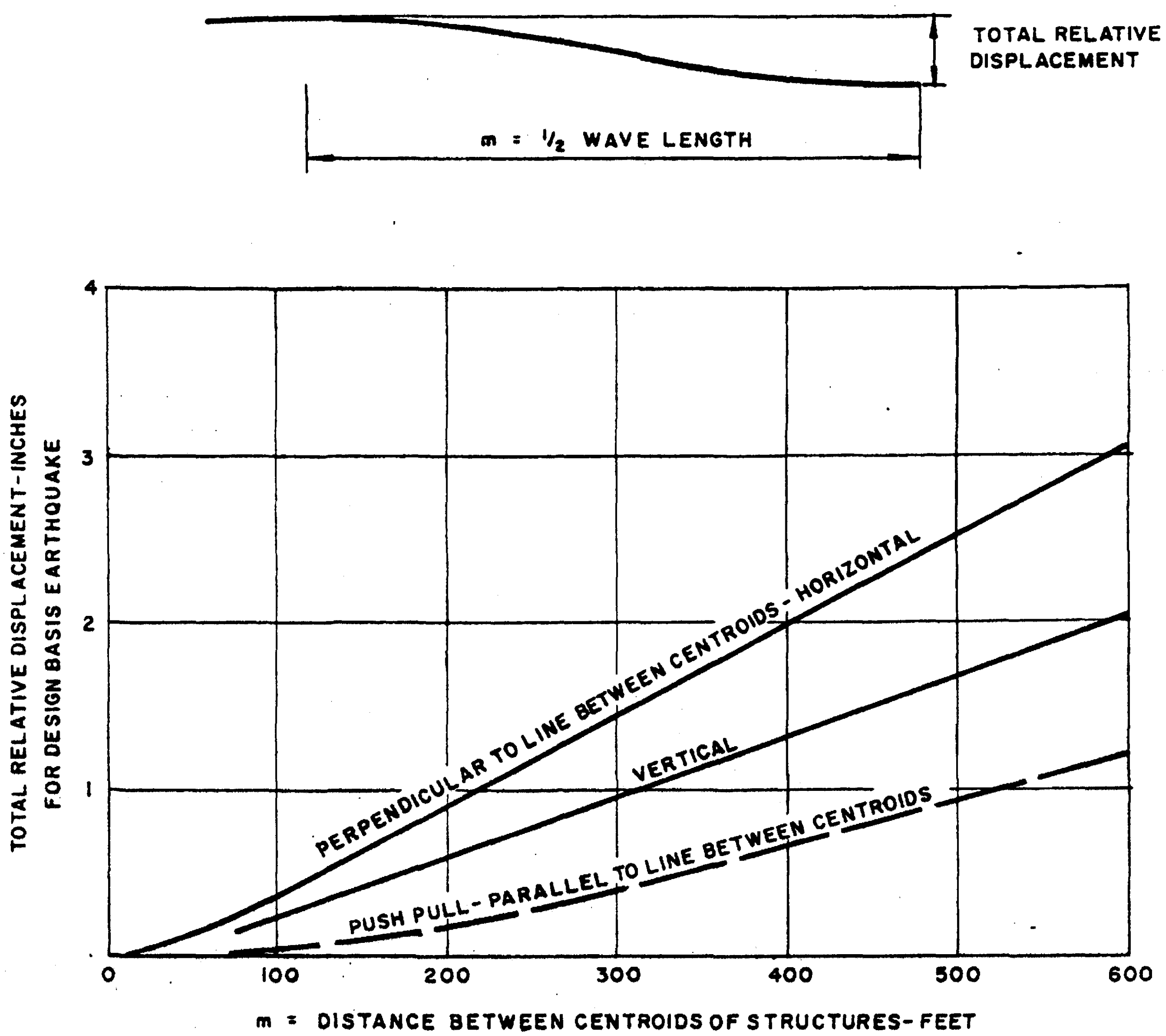


FIGURE 2.6-14
TOTAL RELATIVE DISPLACEMENT IN INCHES
FOR DESIGN BASIS EARTHQUAKE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

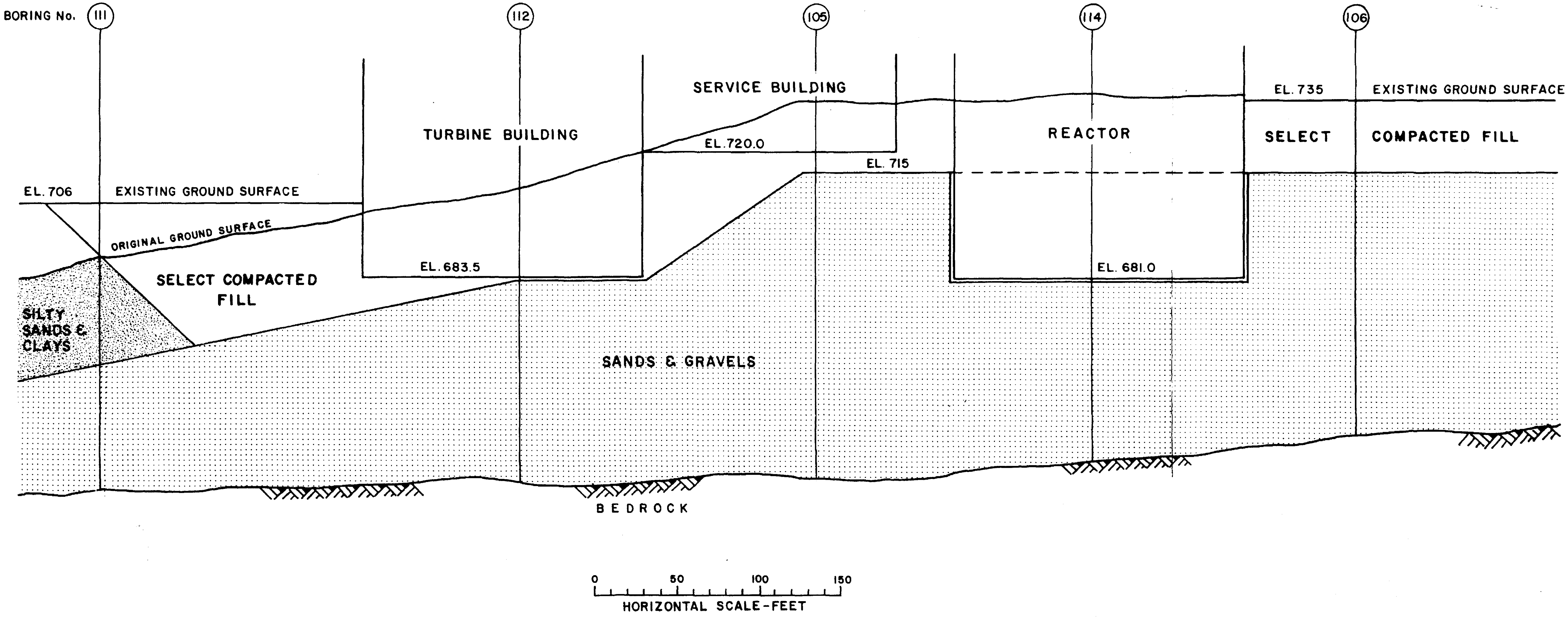


FIGURE 2.6-15
SOIL PROFILE - TURBINE, SERVICE AND CONTAINMENT BUILDINGS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

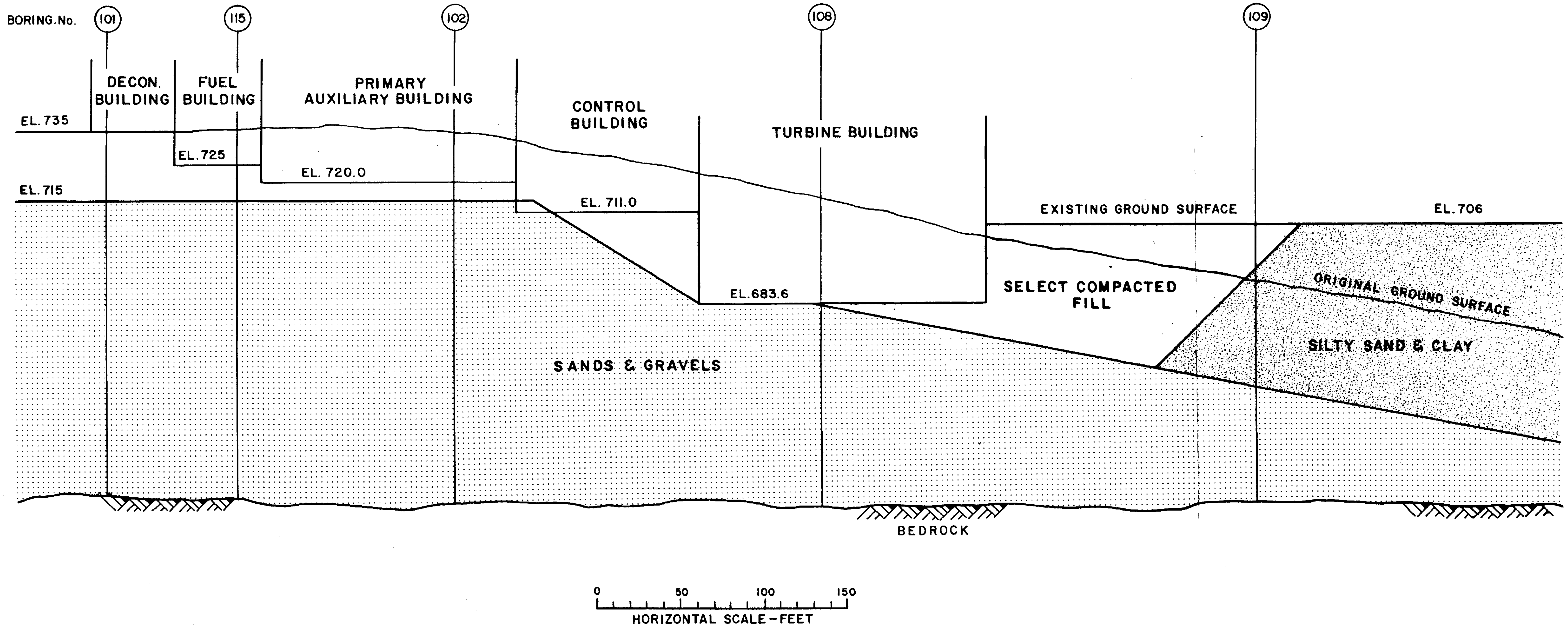


FIGURE 2.6-16
SOIL PROFILE DECONTAMINATION, FUEL, PRIMARY AUXILIARY, CONTROL AND TURBINE BUILDINGS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

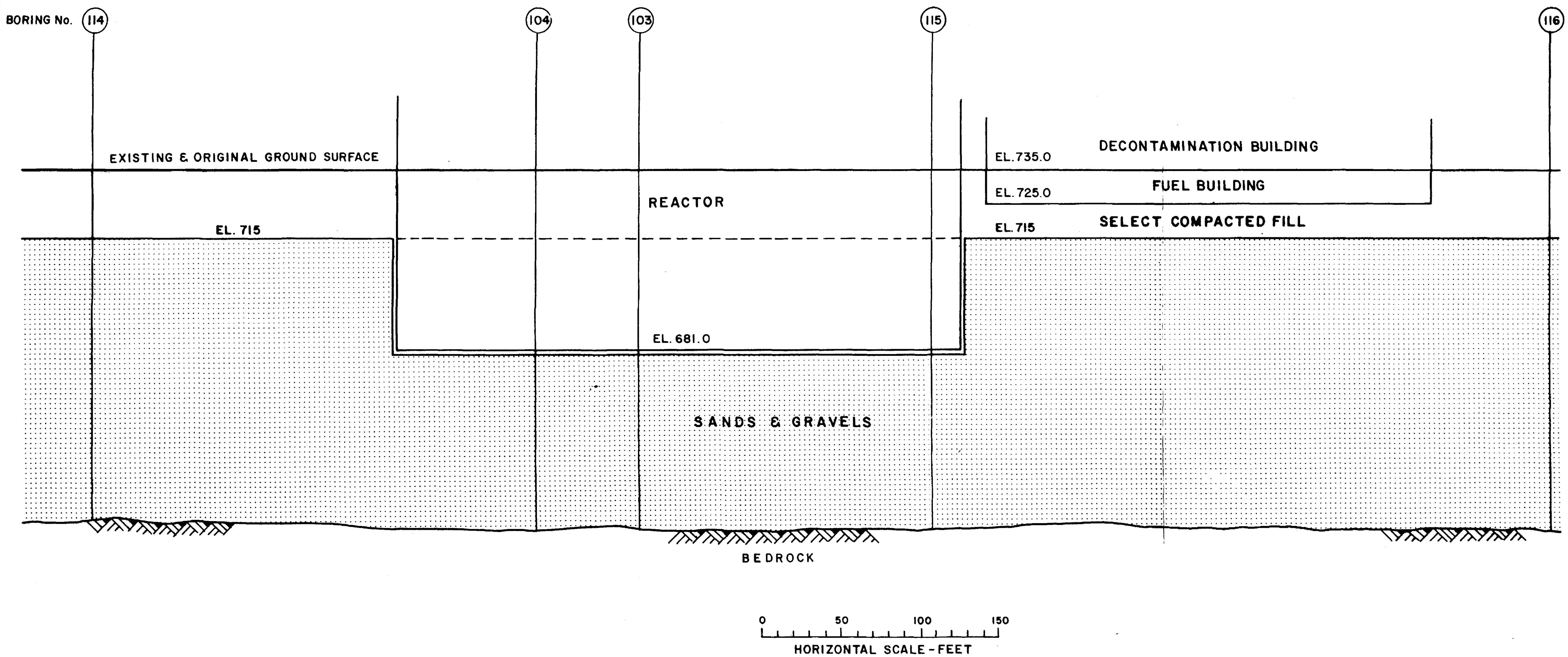
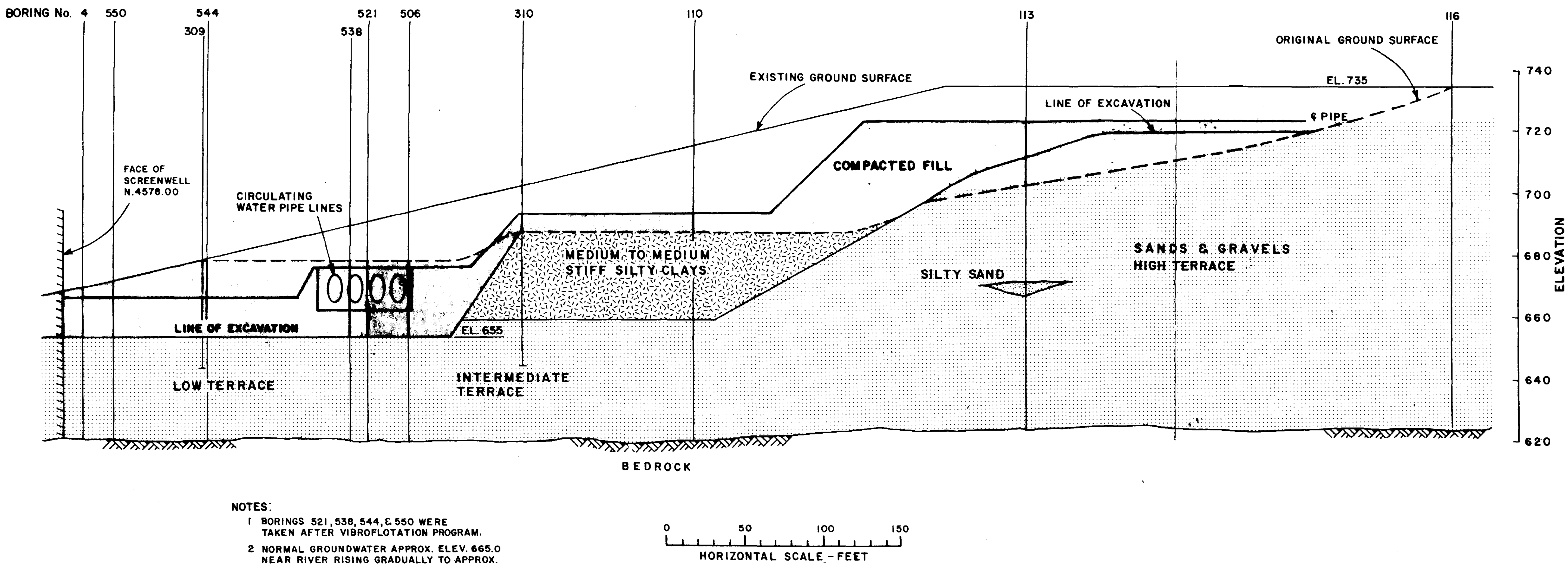


FIGURE 2.6-17
SOIL PROFILE - CONTAINMENT, DECONTAMINATION AND FUEL BUILDINGS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



NOTES:

1 BORINGS 521, 538, 544, & 550 WERE TAKEN AFTER VIBROFLOTATION PROGRAM.

2 NORMAL GROUNDWATER APPROX. ELEV. 665.0 NEAR RIVER RISING GRADUALLY TO APPROX. ELEV. 668.0 IN PLANT AREA.

FIGURE 2.6-18
SOIL PROFILE ALONG RIVER WATER PIPELINES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

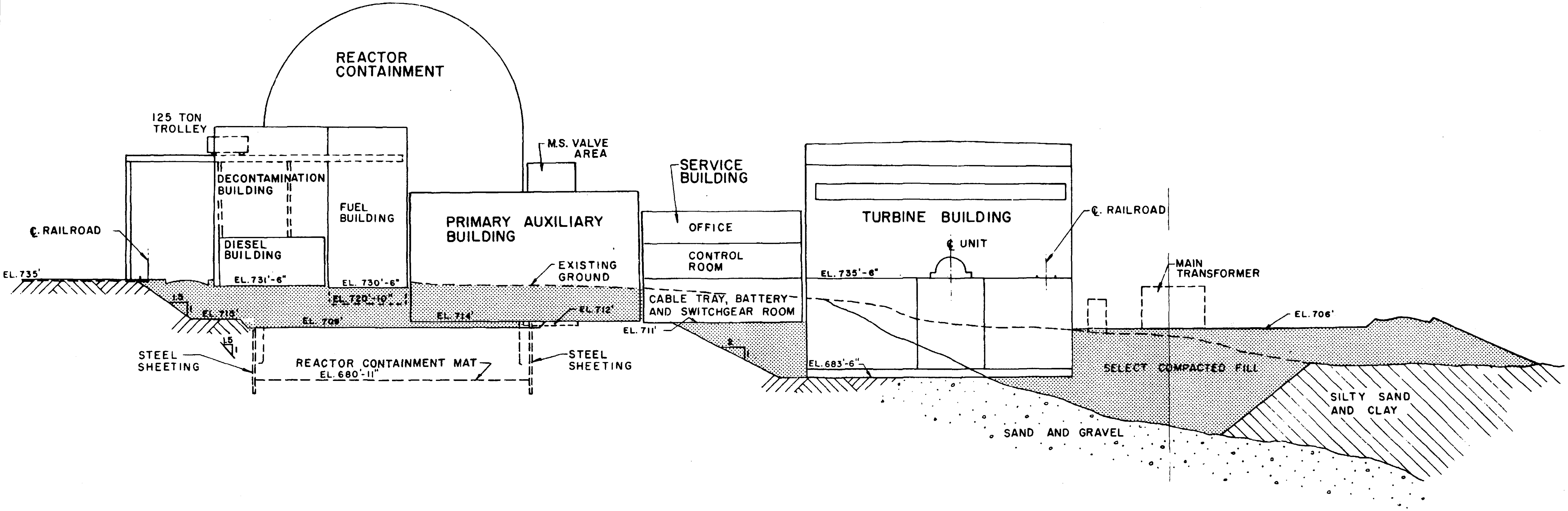


FIGURE 2.7-1
TYPICAL SECTION SHOWING EXCAVATION AND COMPACTED FILL
BEAVER VALLEY POWER STATION UNIT NO. 1
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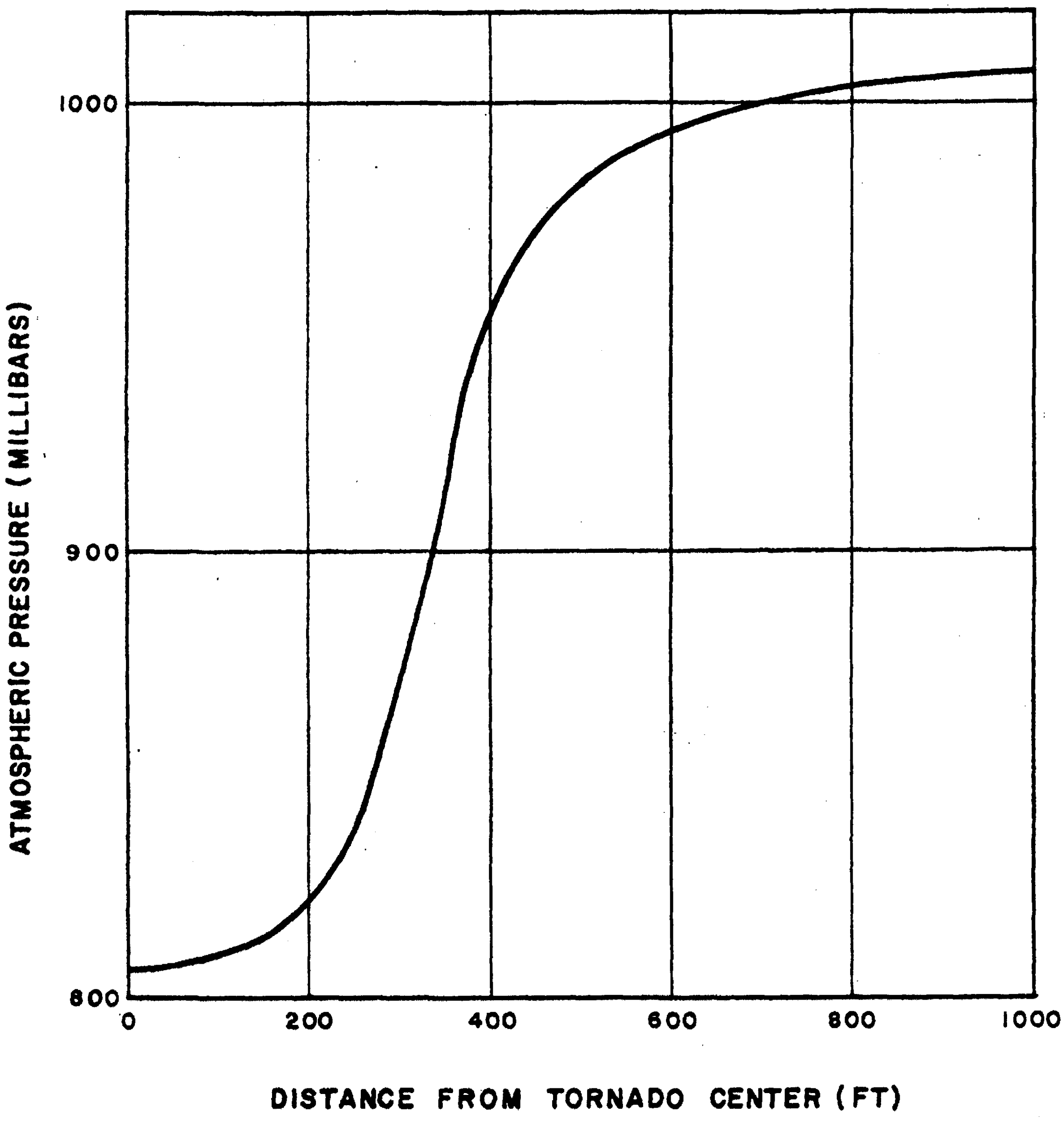
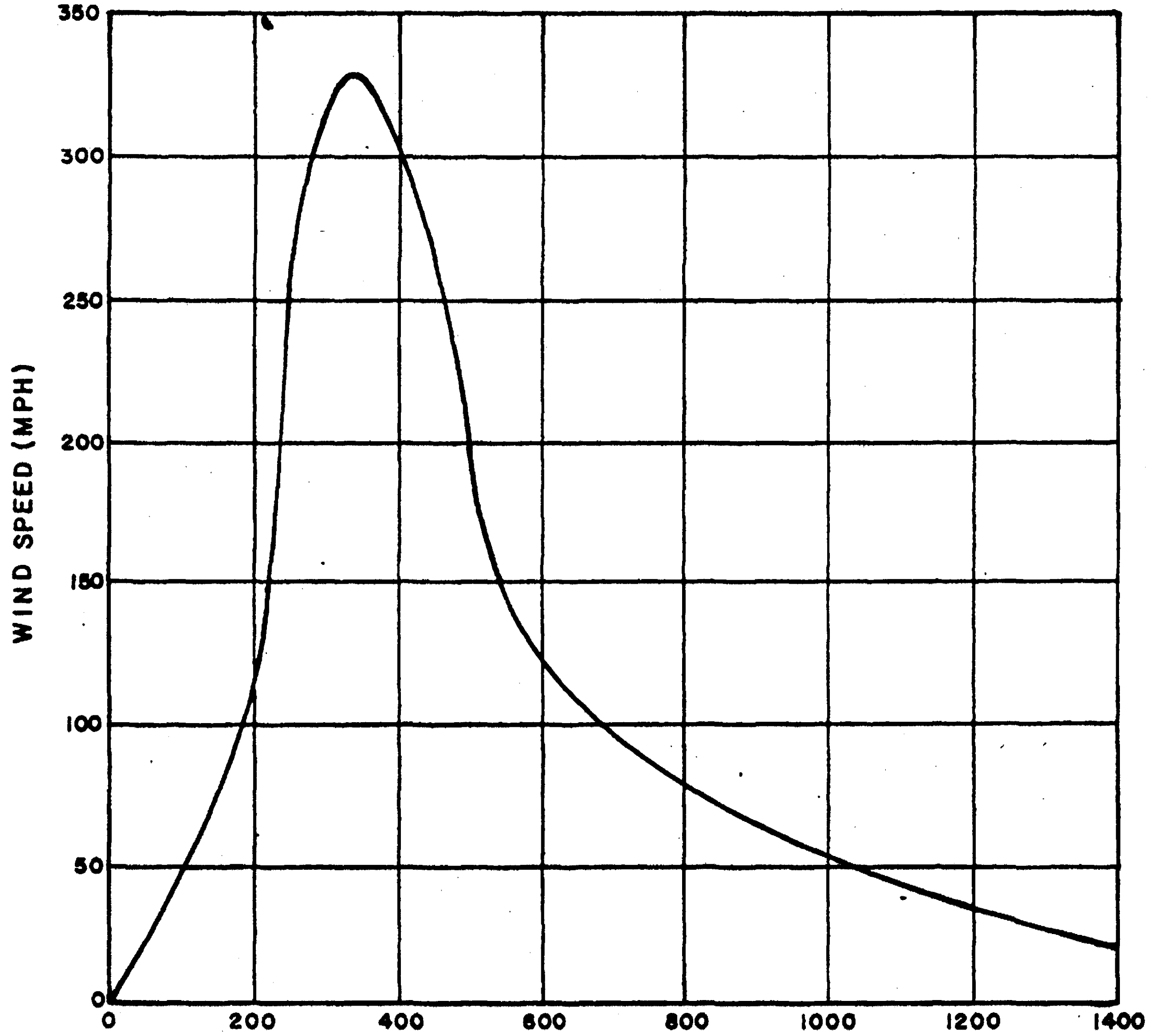


BASED ON NORMALIZATION OF THE APRIL 2, 1957 DALLES TORNADO TO DESIGN TORNADO SIZE AND INTENSITY

1 ATMOSPHERE = 14.7 LB/IN= 1013.25 MILLIBARS

FIGURE 2.7-2
GROUND LEVEL PRESSURE VARIATION
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



DISTANCE FROM TORNADO CENTER (FT) AT GROUND

BASED ON PRESSURE DISTRIBUTION OF FIG. RESPONSE 3.1-1

$$V = \left[\frac{r g}{\rho} \frac{\delta p}{\delta r} \right]^{1/2}$$

WHERE V = WIND SPEED

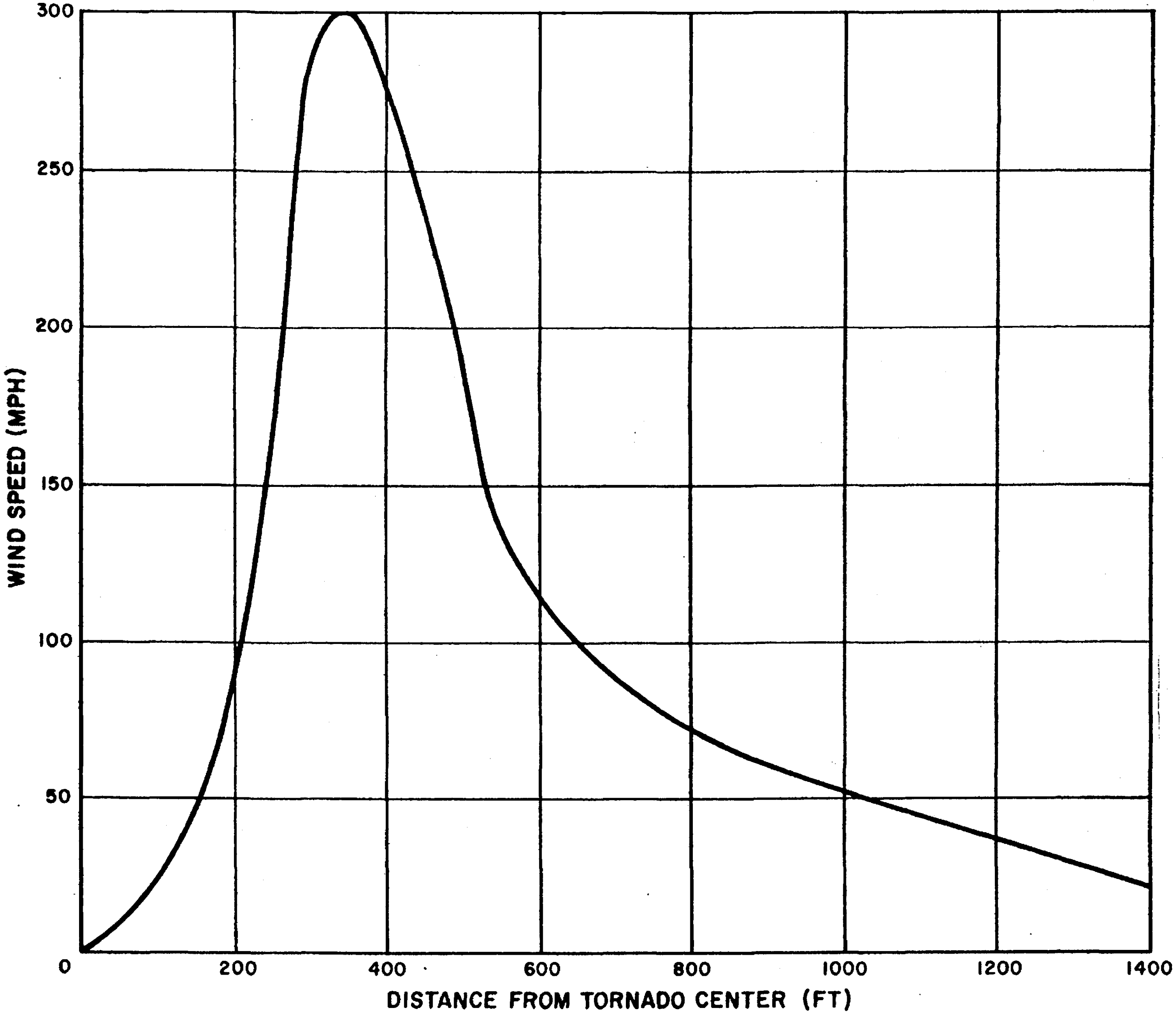
r = DISTANCE FROM TORNADO CENTER

g = GRAVITATIONAL ACCELERATION

p = ATMOSPHERIC PRESSURE

ρ = AIR DENSITY

FIGURE 2.7-3
PRESSURE DISTRIBUTION BASE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



NOTE:
BASED ON FIGURE 2.7-3
NORMALIZED TO 300 MPH MAX WIND

FIGURE 2.7-4
PRESSURE DISTRIBUTION DESIGN
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

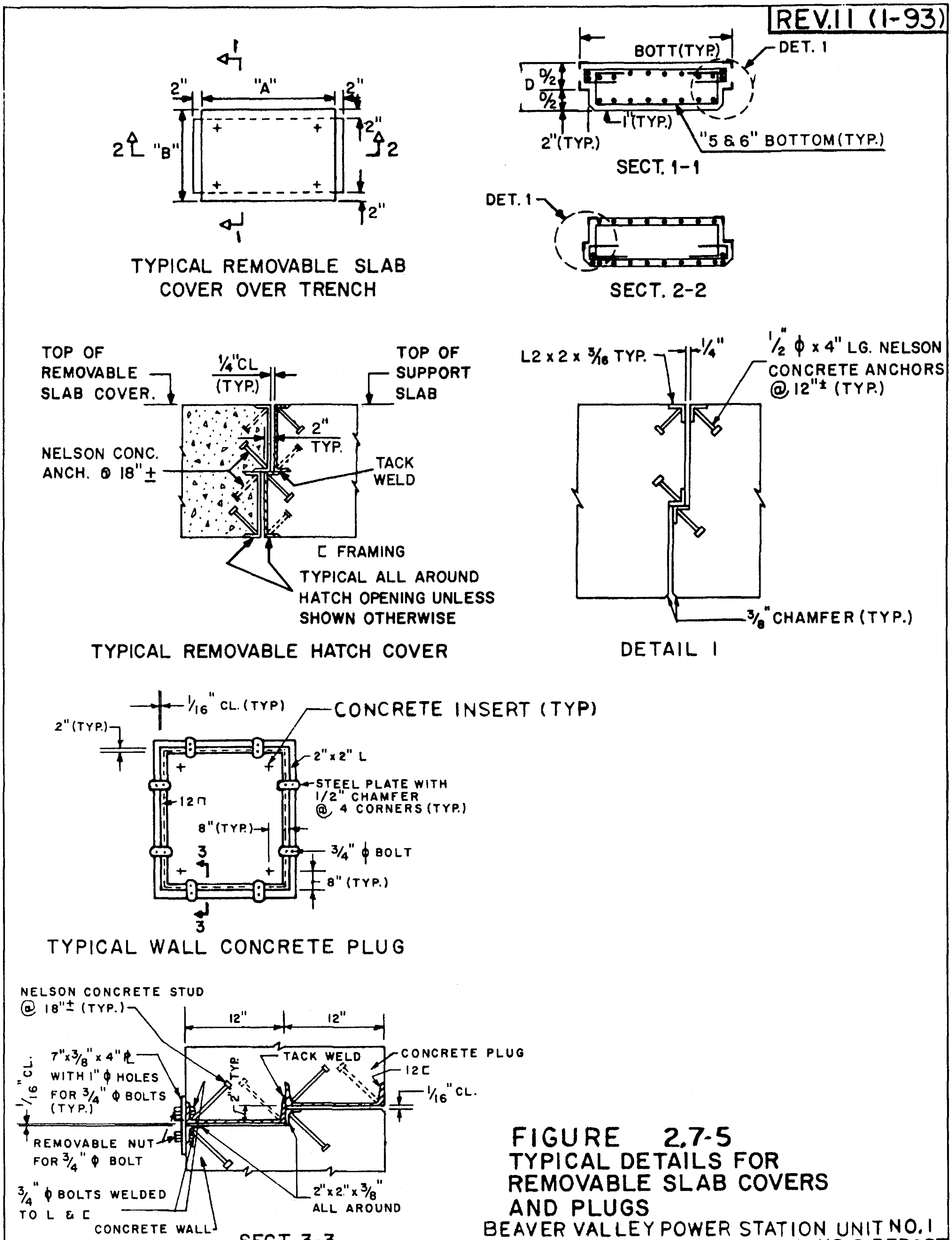
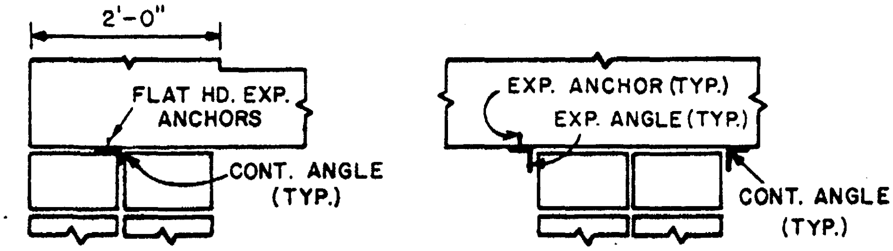
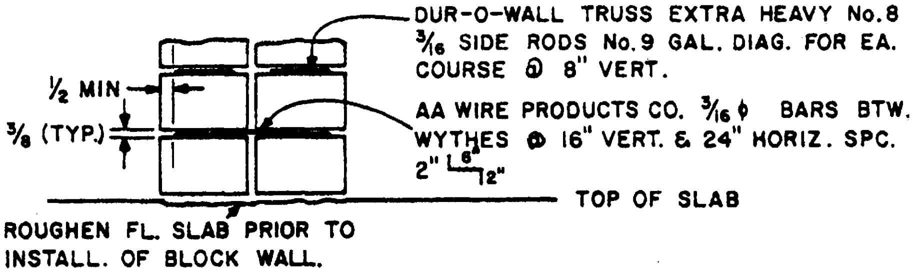


FIGURE 2.7-5
TYPICAL DETAILS FOR REMOVABLE SLAB COVERS AND PLUGS

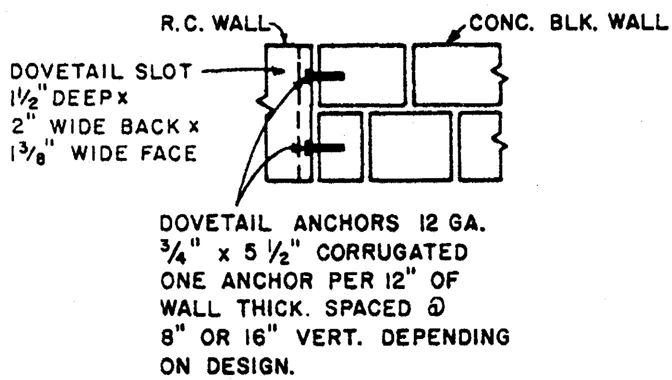
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



HEAD SUPPORT DETAIL



TYPICAL REINFORCING DETAIL, ELEVATION



TYPICAL REINFORCING DETAIL, PLAN

FIGURE 2.7-6
TYPICAL DETAIL BLOCK WALL
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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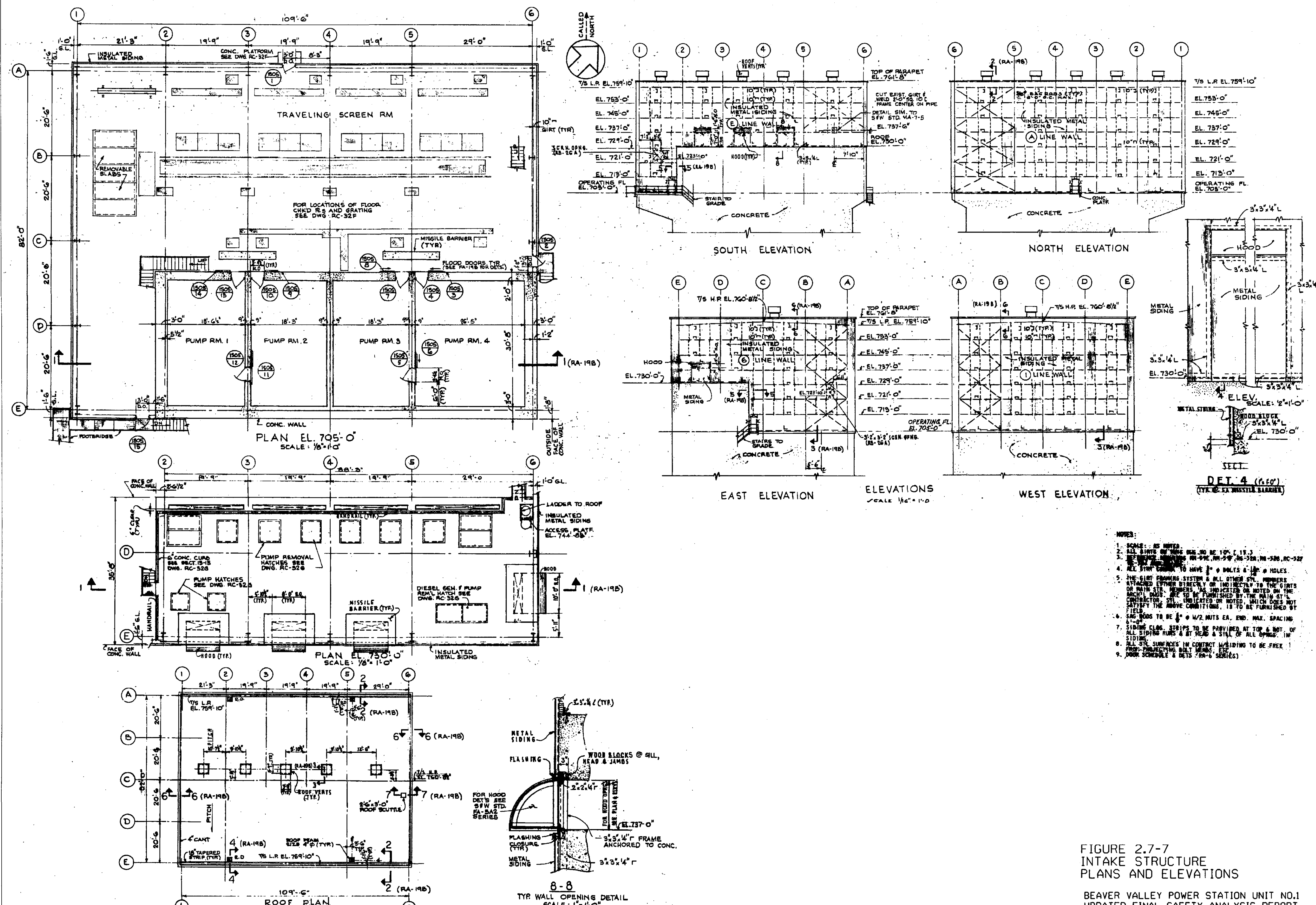

FIGURE 2.7-7
INTAKE STRUCTURE
PLANS AND ELEVATIONS

BEAVER VALLEY POWER STATION UNIT NO.1
UPDATED FINAL SAFETY ANALYSIS REPORT

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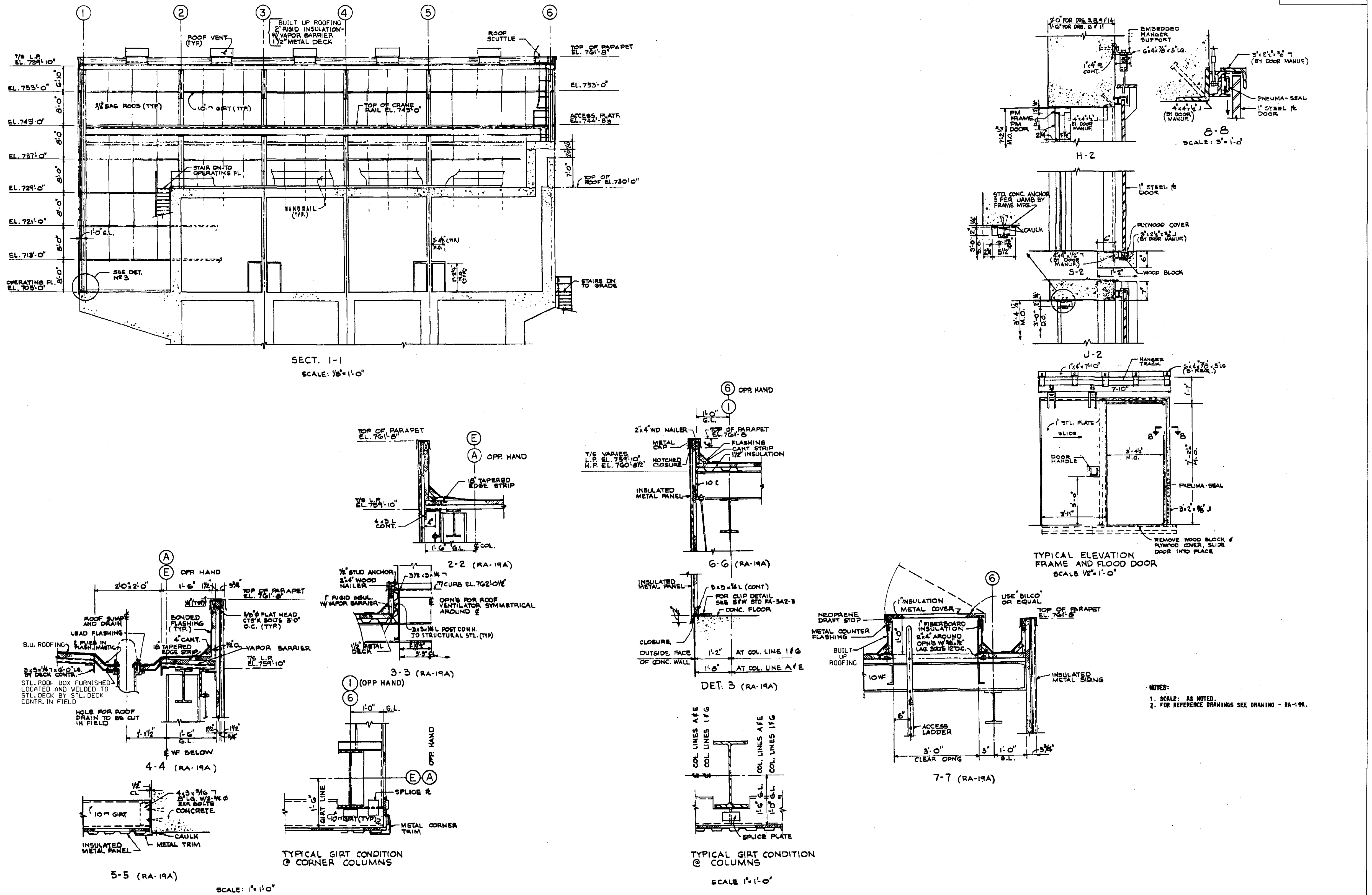

FIGURE 2.7-8
INTAKE STRUCTURE WALL
SECTIONS AND DETAILS

BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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FIGURE 2.7-9
STATION ARRANGEMENT - EL. 713'-6"
BEAVER VALLEY POWER STATION UNIT NO.
UPDATED FINAL SAFETY ANALYSIS REPORT

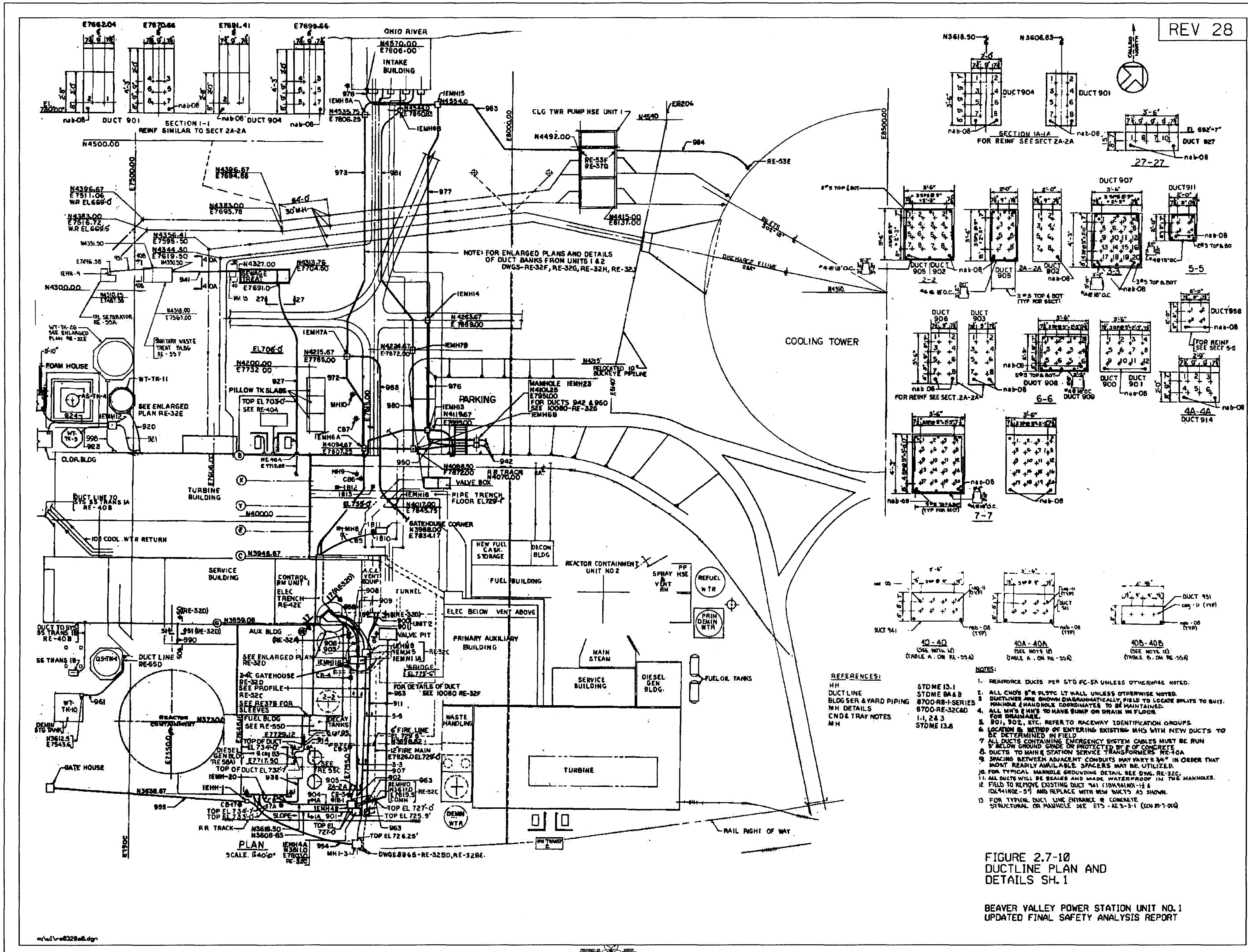

FIGURE 2.7-10
DUCTLINE PLAN AND DETAILS SH. 1

BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV 28

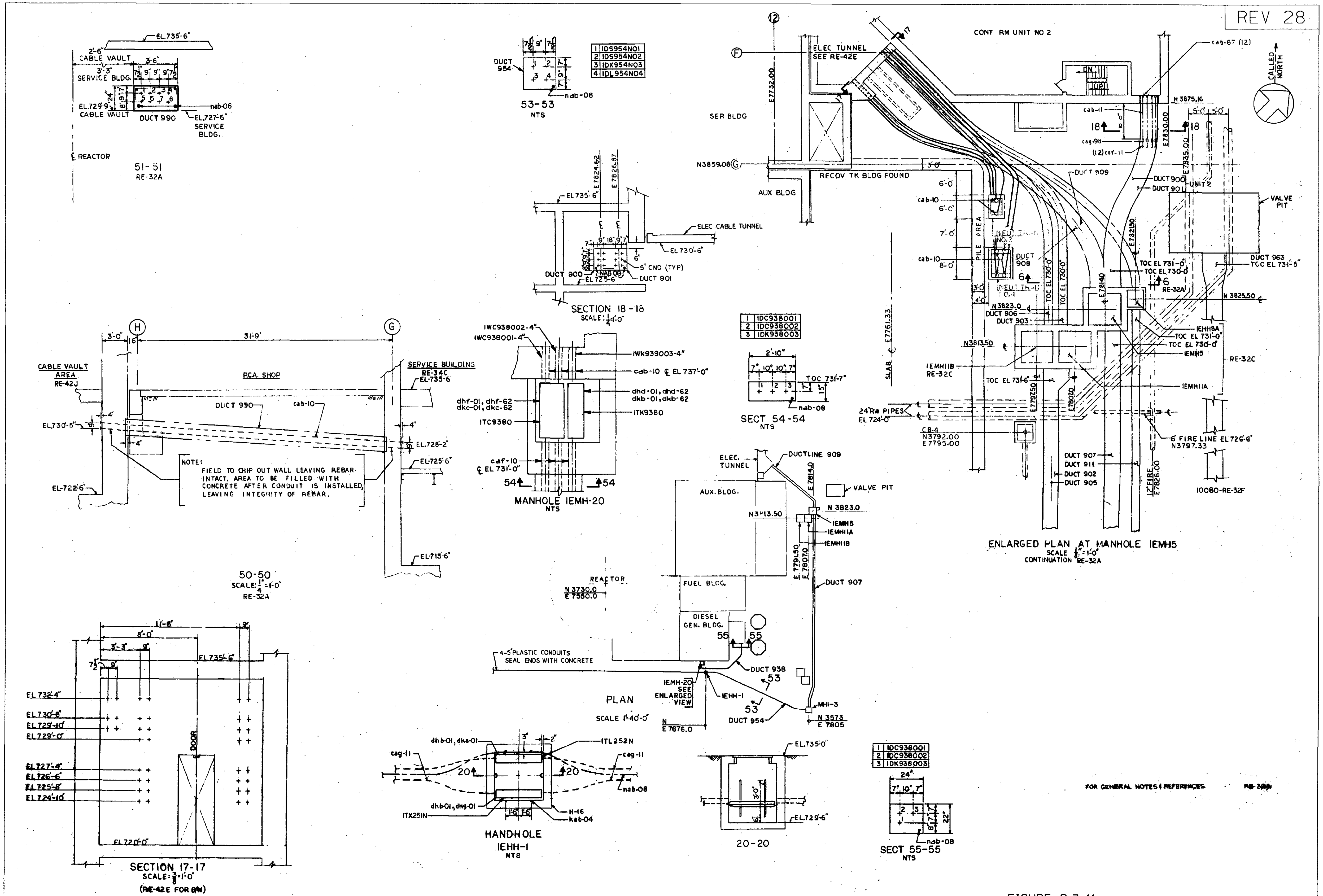

FIGURE 2.7-11
PLAN AND SECTIONS DUCTLINES
SOUTH OF CONTROL ROOM

BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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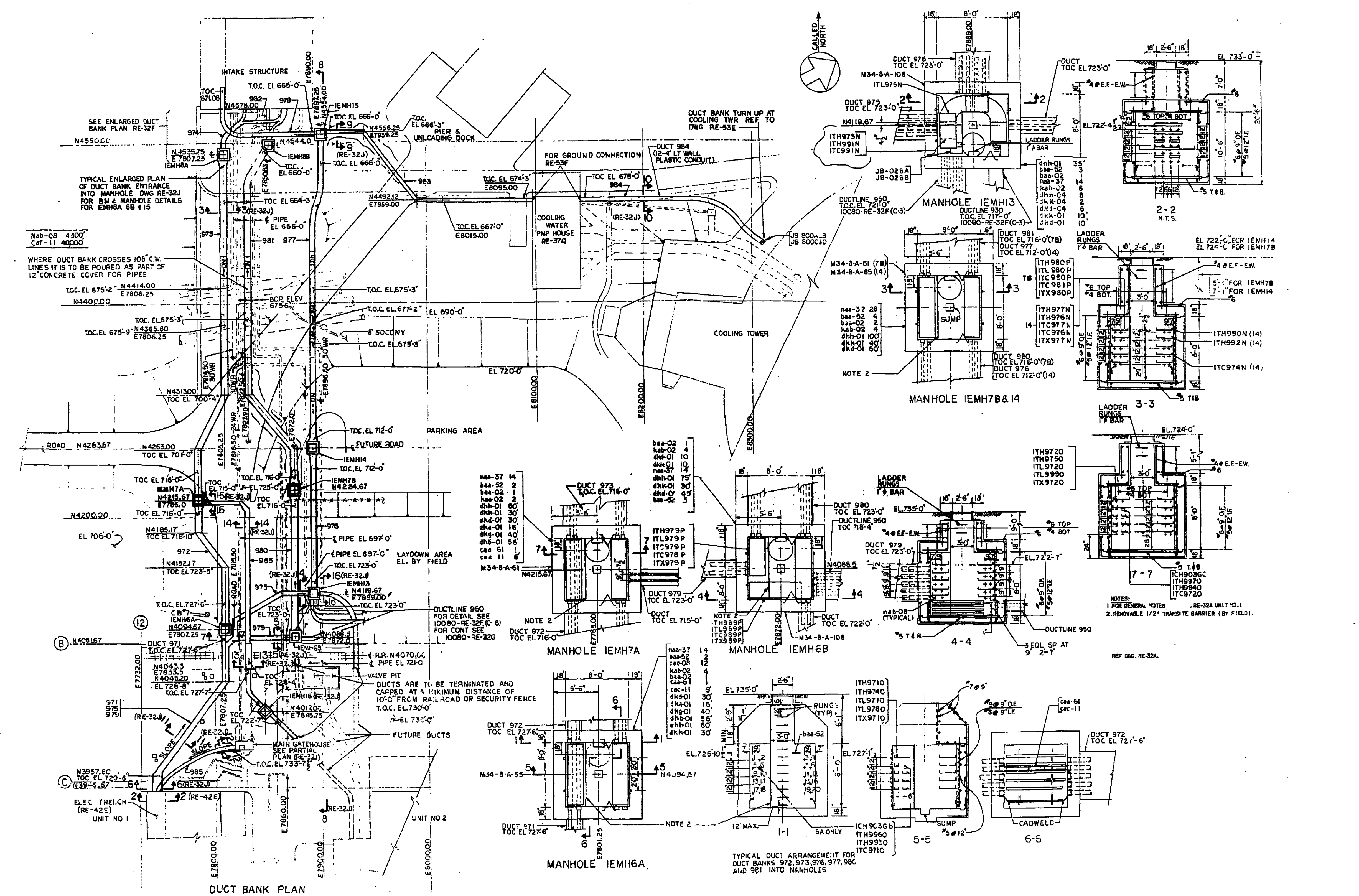

FIGURE 2.7-12
ELECTRICAL DUCT LINES
PLANS AND SECTIONS

BEAVER VALLEY POWER STATION UNIT NO.1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV 28

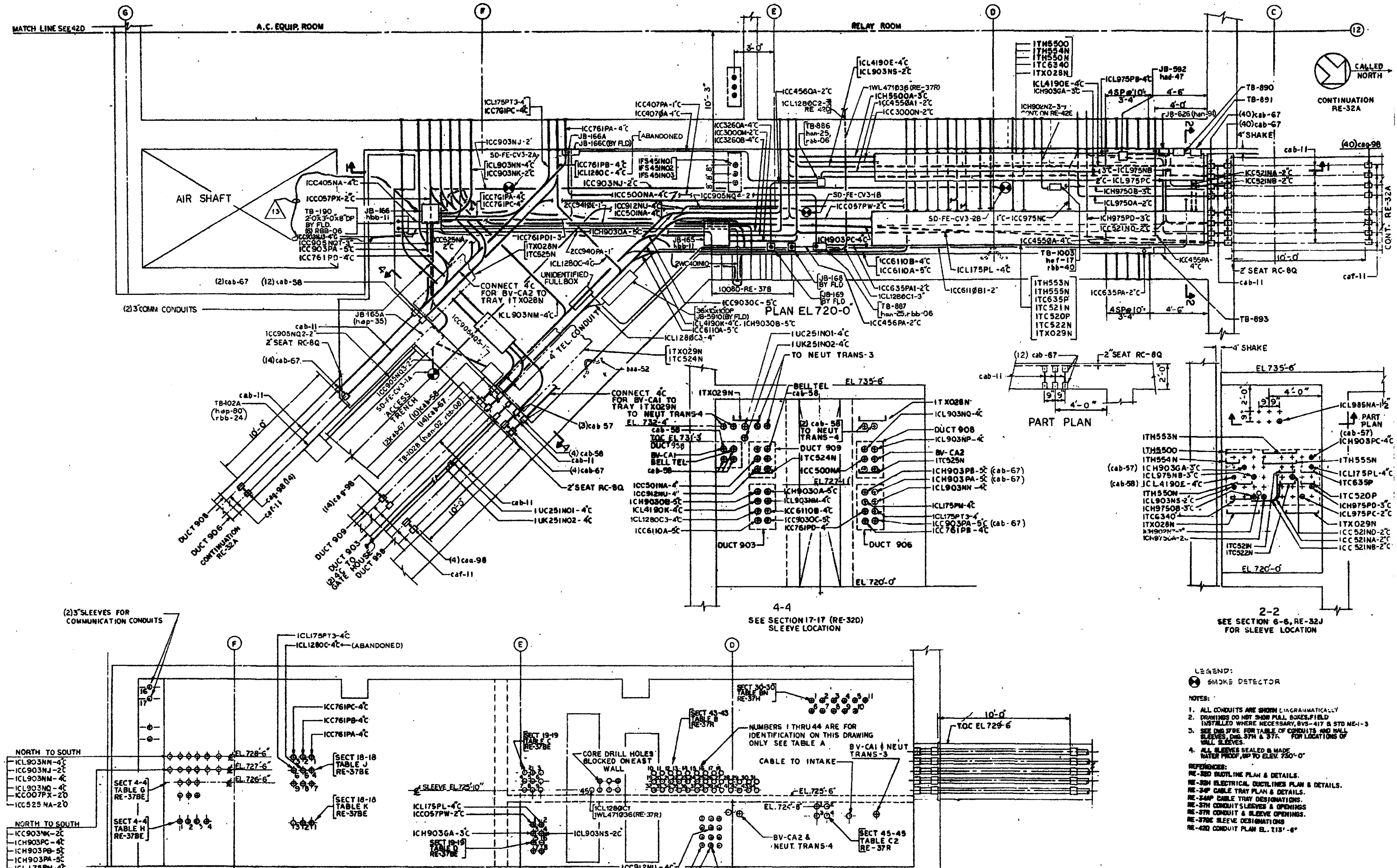

TABLE A

1	ICC3260B – 4C	11	ICC195NA – 4C	21	ICH554NE – 3C	31	ICC6480A – 3C	41	ICC051PA – 3C
2	ICH5500A – 3C	12	ICC195NB – 4C	22	ICC522ND – 3C	32	ICC6110A – 5C	42	ICC3270B – 4C
3	ICC3260A – 4C	13	ICH550NB – 4C	23	ICH555NA – 4C	33	ICH553NA – 4C	43	ICL985NA – 1½C
4	ICH9030A – 5C	14	ICH553NC – 4C	24	ICH555NB – 4C	34	ICH550ND – 4C	44	ICH907NZ – 3C
5	ICC3000N – 2C	15	ICH553ND – 4C	25	ICH554NF – 3C	35	ICC522NF – 4C	45	
6	ICC3000M – 2C	16	ICH555ND – 4C	26	ICC410NB – 4C	36	ICC522NC – 4C	46	
7	ICH9030B – 5C	17	ICC410NA – 4C	27	ICC410NC – 4C	37	ICC522NE – 2C	47	
8	ICL4190K – 4C	18	ICC410ND – 4C	28	ICX601NA – 4C	38	ICC522NB – 4C	48	
9	ICL4190E – 4C	19	ICC6110B – 4C	29	ICC3270A – 3C	39	ICH555NC – 4C	49	
10	ICH553NB – 4C	20	ICC522NA – 4C	30	SPARE – 2C	40	ICH553NE – 4C		

ICL808NA – 1½C
TIED TO ICL280C1-3" ICL280C2-3"

LEGEND:
SMOKE DETECTOR

NOTES:

1. ALL CONDUITS ARE SHOWN DIAGRAMMATICALLY
2. DRAWINGS DO NOT SHOW PULL BOXES. FIELD INSTALLED WHERE NECESSARY, BVS-417 & STD ME-1-3
3. SEE DWG 37BE FOR TABLE OF CONDUITS AND WALL SLEEVES, DWG. 37H & 37R FOR LOCATIONS OF WALL SLEEVES.
4. ALL SLEEVES SEALED & MADE WATER PROOF, UP TO ELEV. 730'-0"

REFERENCES:
RE-32D DUCTLINE PLAN & DETAILS.
RE-32H ELECTRICAL DUCTLINES PLAN & DETAILS.
RE-34P CABLE TRAY PLAN & DETAILS.
RE-34AP CABLE TRAY DESIGNATIONS.
RE-37H CONDUIT SLEEVES & OPENINGS
RE-37R CONDUIT & SLEEVE OPENINGS.
RE-37BE SLEEVE DESIGNATIONS
RE-42D CONDUIT PLAN EL. 713'-6"

FIGURE 2.7-13
CONDUIT PLAN
ELECTRICAL TUNNEL
EL. 720'-0"

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UPDATED FINAL SAFETY ANALYSIS REPORT

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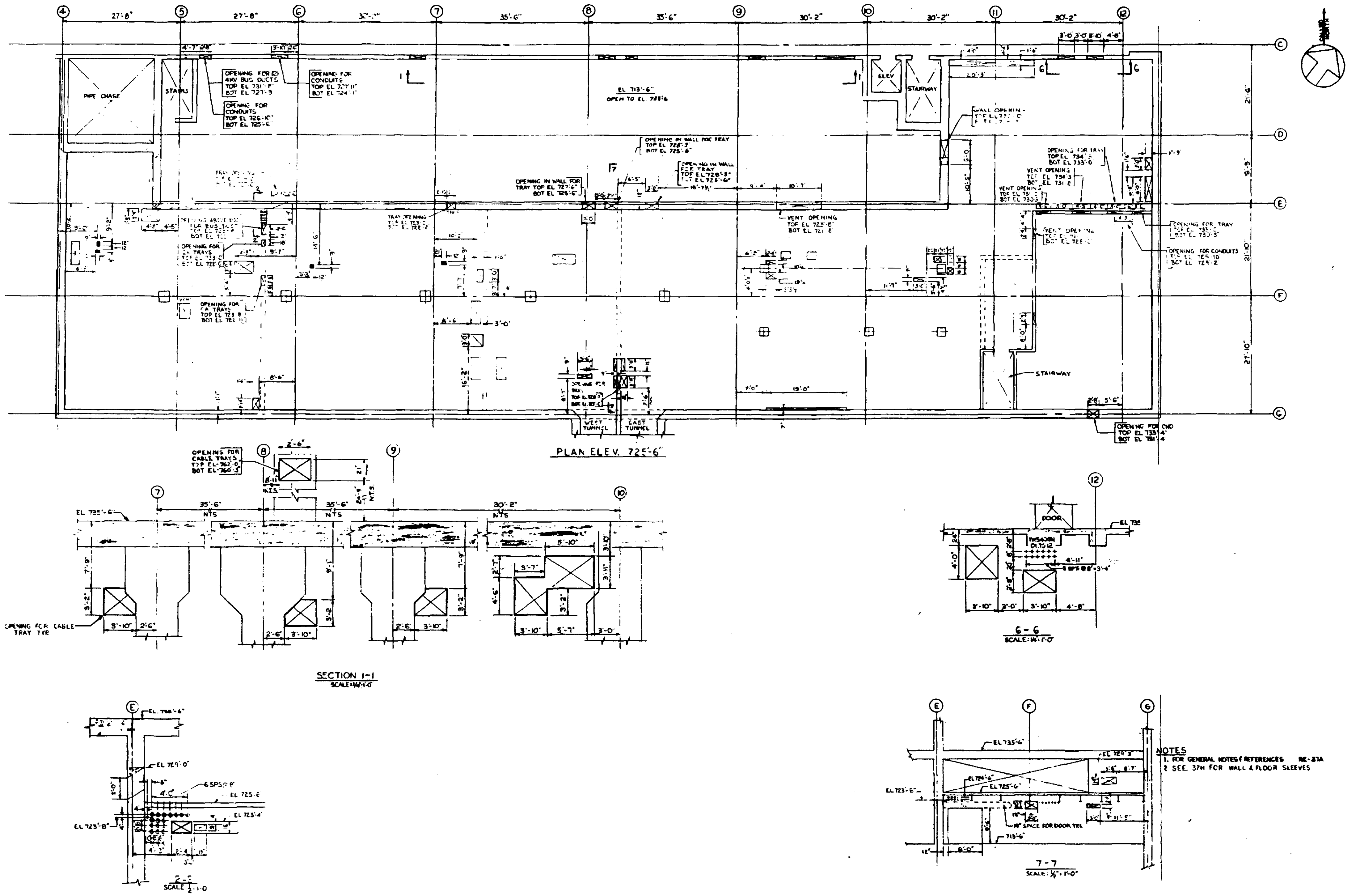
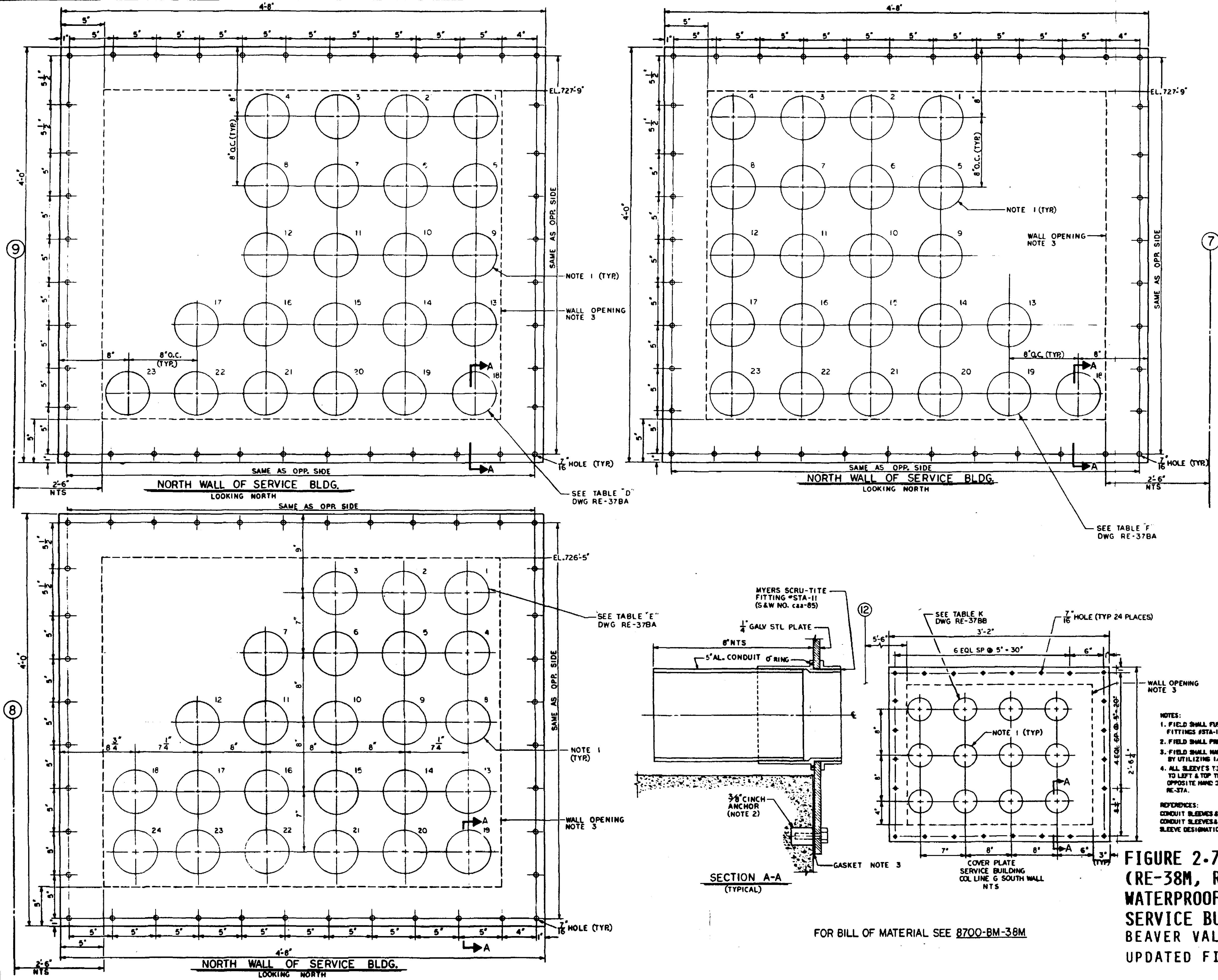


FIGURE 2.7-14
(RE-37E, REV. 7)
CONDUIT SLEEVES & OPENINGS
SERVICE BUILDING
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



NOTES:

1. FIELD SHALL FURNISH AND INSTALL 5" MYERS SCRU-TITE FITTINGS #STA-11. HOLE SIZE AS REQUIRED.
2. FIELD SHALL PROVIDE 3/8" CINCH ANCHORS.
3. FIELD SHALL MAKE WALL OPENINGS WATERPROOF BY UTILIZING 1/16" THK. NEOPRENE GASKET AND DUCT-SEAL.
4. ALL SLEEVES TO BE NUMBERED FROM RIGHT TO LEFT & TOP TO BOTTOM FROM POINT OF OBSERVER. OPPOSITE HAND OF SLEEVE OPENING - TURBINE BLDG.- RE-37A.

REFERENCES:

CONDUIT SLEEVES & WALL OPENINGS-TURBINE BLDG-RE-37A
CONDUIT SLEEVES & WALL OPENINGS-SERVICE BLDG-RE-37E
SLEEVE DESIGNATIONS, TURBINE BLDG-RE-37BA.

FOR BILL OF MATERIAL SEE 8700-BM-38M

FIGURE 2.7-15
(RE-38M, REV. 3)
WATERPROOFING PLATES
SERVICE BUILDING
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

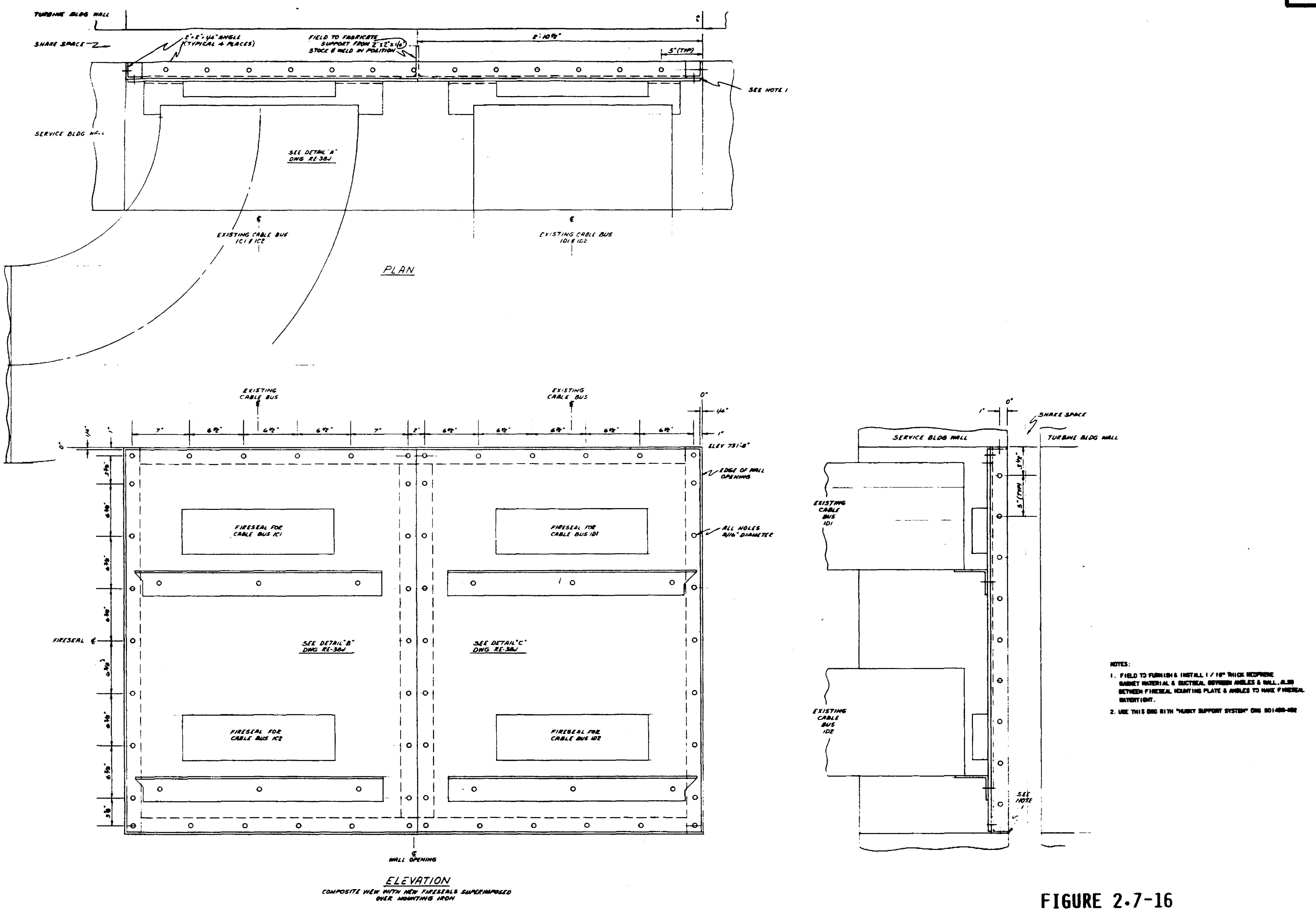


FIGURE 2.7-16
(RE-38H, REV. 2)
CABLE BUS INSTALLATION DETAILS
BEAVER VALLEY POWER STATION UNIT NO. 1
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FIGURE 2.7-17

PENETRATION SEALS
ELEV. 713'-6'

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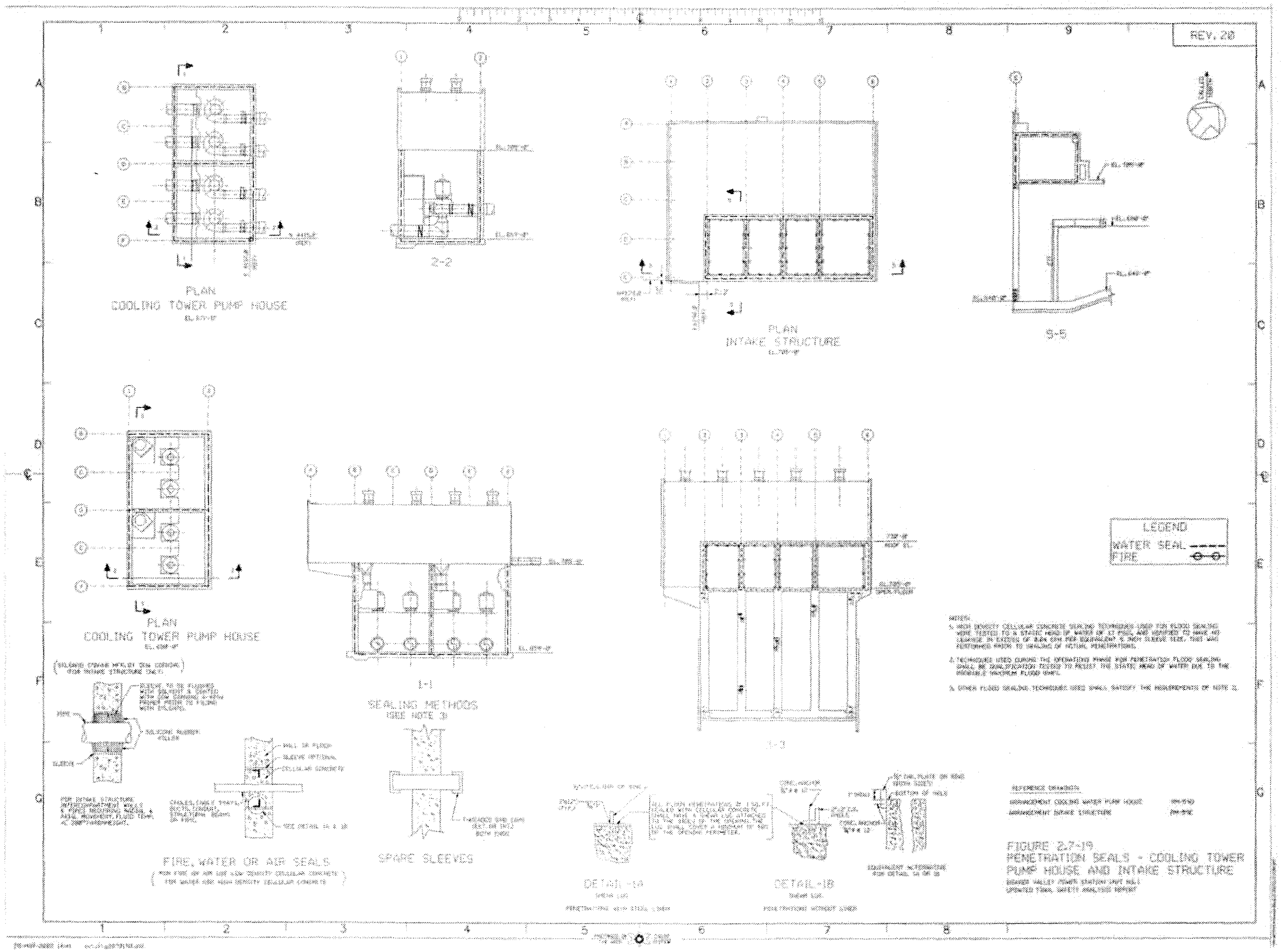
FIGURE 2.7-18

PENETRATION SEALS
ELEV. 735'-6"



REV. 20
PLAN
COOLING TOWER PUMP HOUSE
2-2
PLAN
INTAKE STRUCTURE
5-5
PLAN
COOLING TOWER PUMP HOUSE
1-1
SEALING METHODS
(SEE NOTE 3)
3-3
LEGEND
WATER SEAL
FIRE
FIRE, WATER OR AIR SEALS
SPARE SLEEVES
DETAIL-1A
DETAIL-1B
FIGURE 2.7-19
PENETRATION SEALS - COOLING TOWER
PUMP HOUSE AND INTAKE STRUCTURE

REV 28

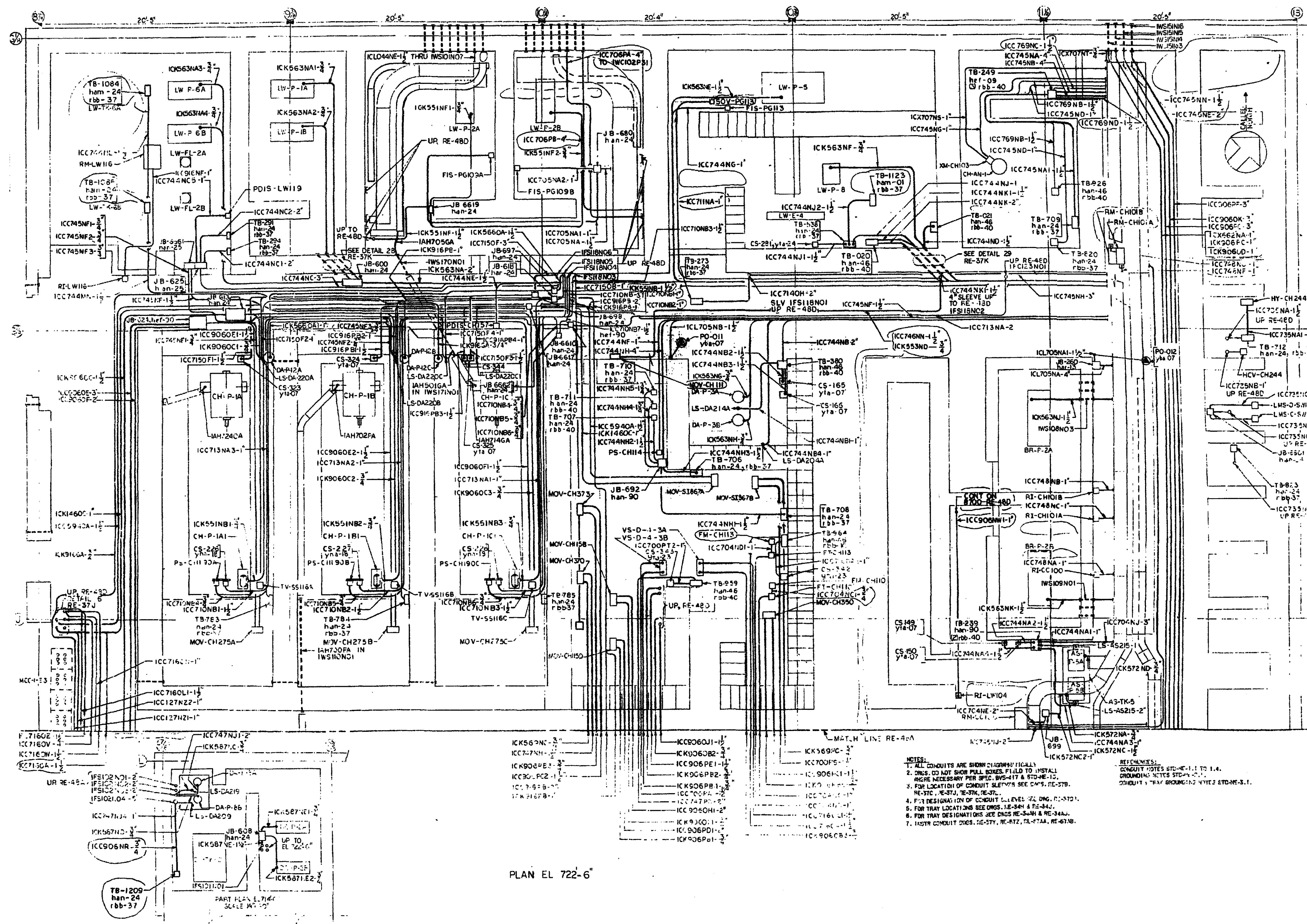


FIGURE 2.7-20
CONDUIT PLAN AUX.
BUILDING SH. 2

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UPDATED FINAL SAFETY ANALYSIS REPORT

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REV. 28

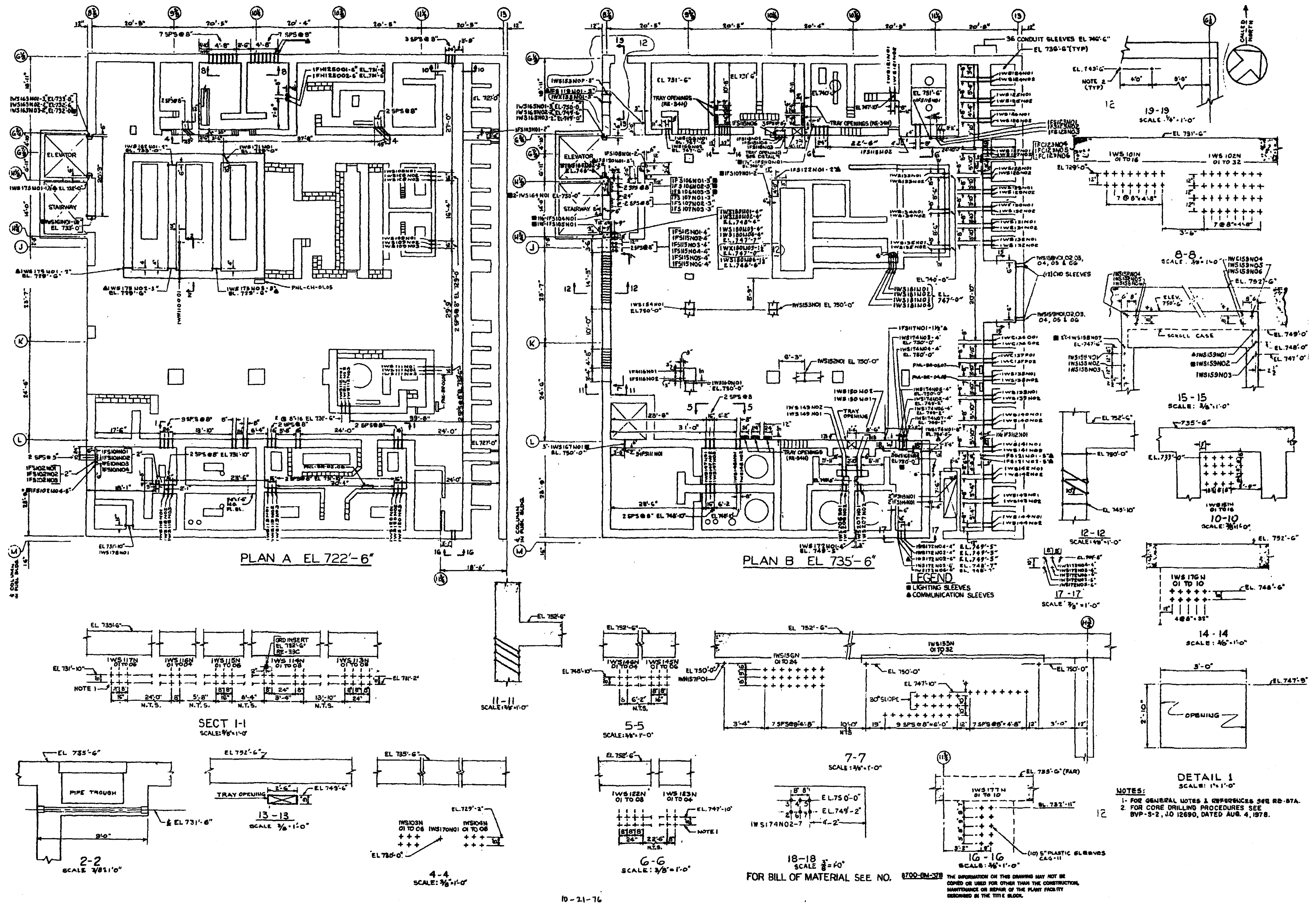

FIGURE 2.7-21
CONDUIT SLEEVES & OPENINGS
AUXILIARY BLDG. SH. 1

BEAVER VALLEY POWER STATION UNIT NO.1
UPDATED FINAL SAFETY ANALYSIS REPORT

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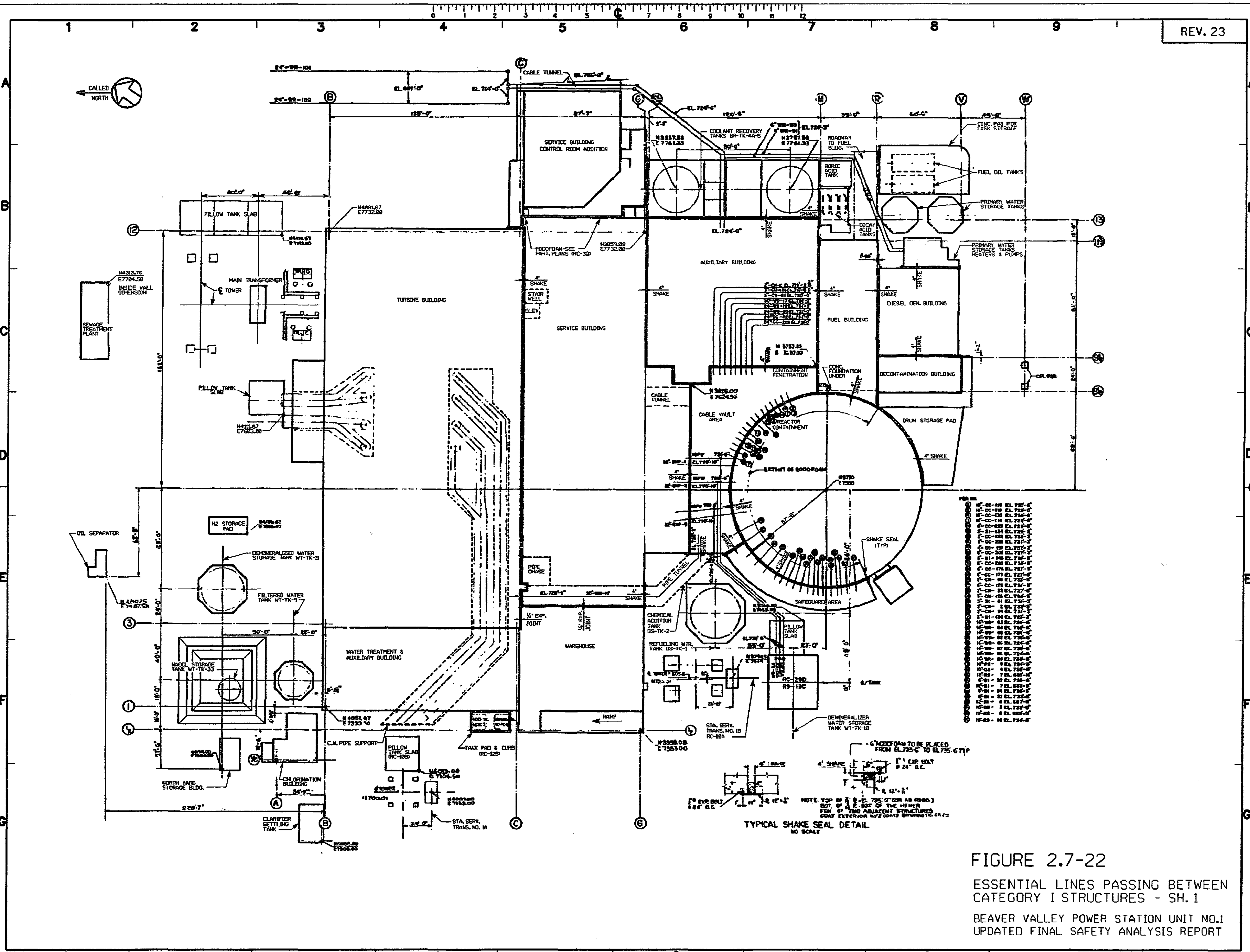

FIGURE 2.7-22

ESSENTIAL LINES PASSING BETWEEN CATEGORY I STRUCTURES - SH. 1

BEAVER VALLEY POWER STATION UNIT NO.1
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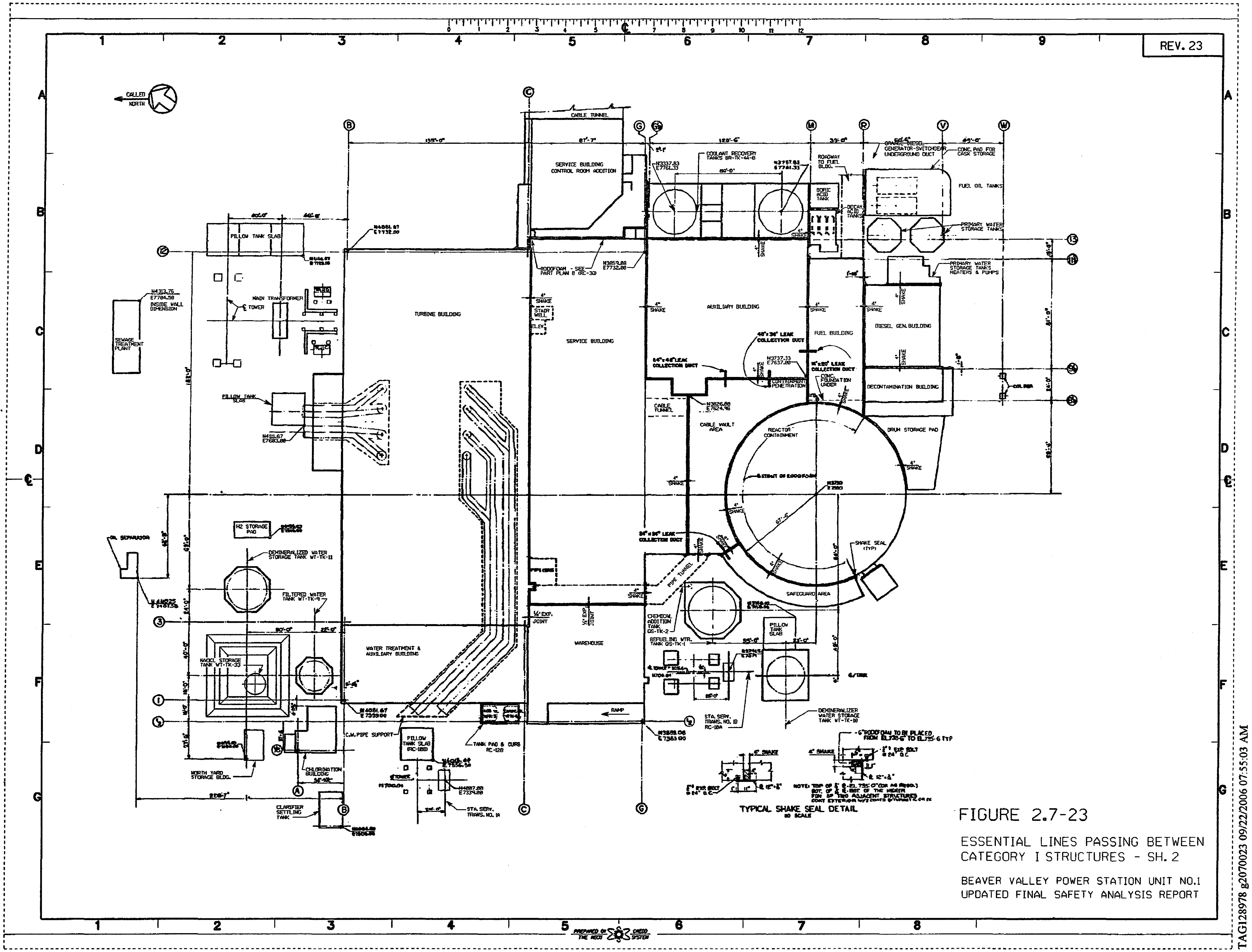

FIGURE 2.7-23

ESSENTIAL LINES PASSING BETWEEN CATEGORY I STRUCTURES - SH. 2

BEAVER VALLEY POWER STATION UNIT NO.1
UPDATED FINAL SAFETY ANALYSIS REPORT

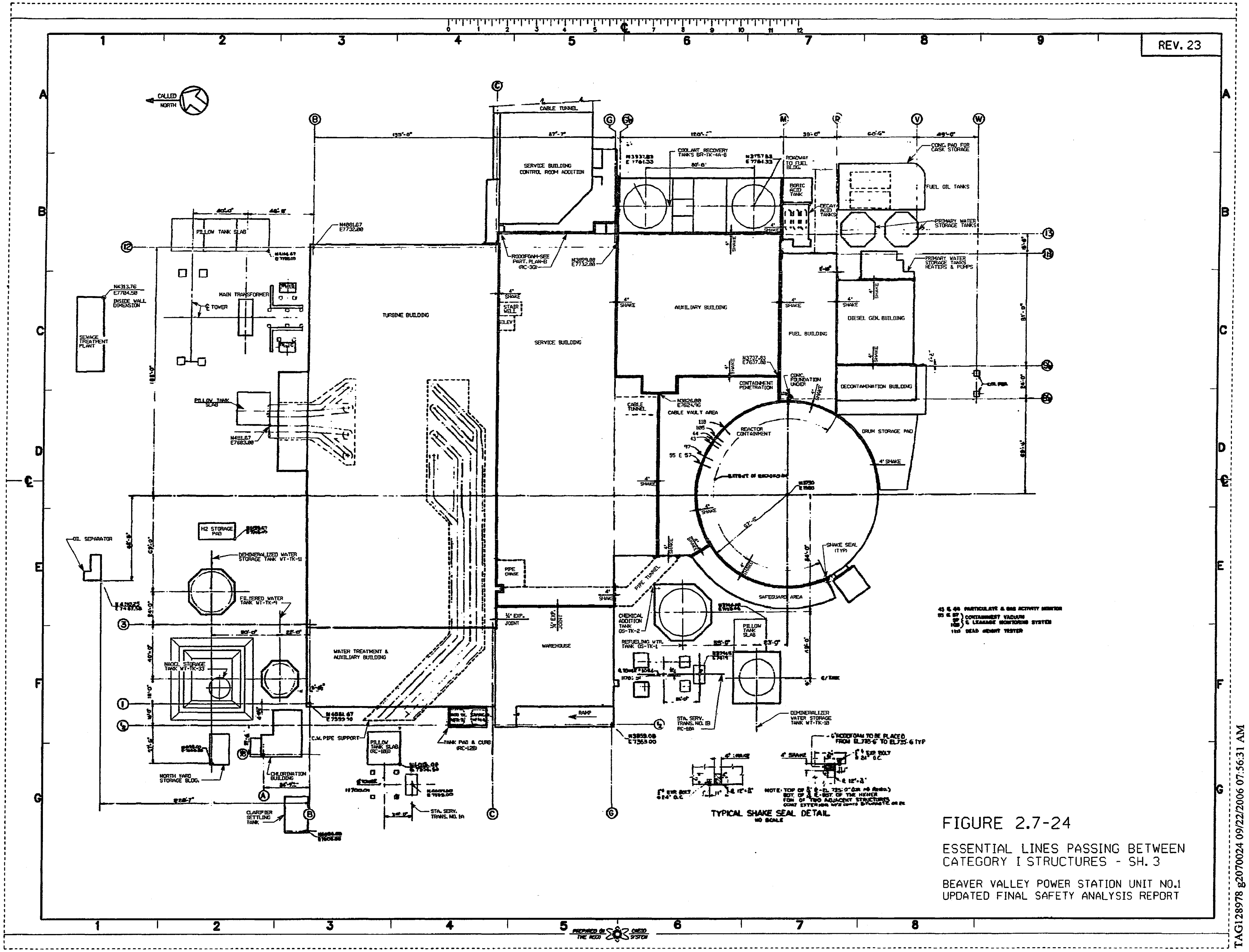

FIGURE 2.7-24

ESSENTIAL LINES PASSING BETWEEN CATEGORY I STRUCTURES - SH. 3

BEAVER VALLEY POWER STATION UNIT NO.1
UPDATED FINAL SAFETY ANALYSIS REPORT

[redacted]

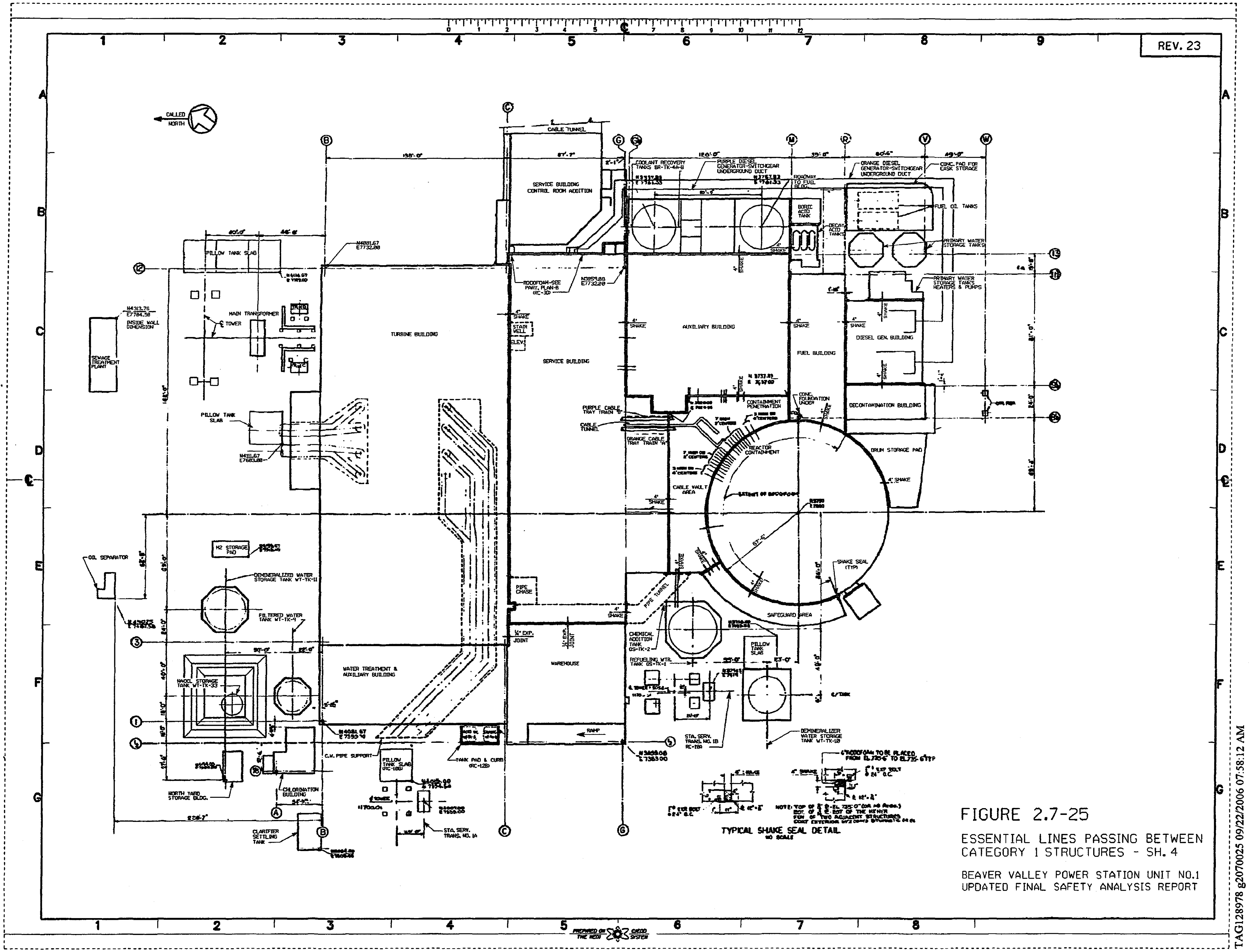

FIGURE 2.7-25

ESSENTIAL LINES PASSING BETWEEN CATEGORY 1 STRUCTURES - SH. 4

BEAVER VALLEY POWER STATION UNIT NO.1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2A

THE METEOROLOGICAL PROGRAM

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

ENVIRONMENTAL SAFEGUARDS DIVISION

NUS CORPORATION

ROCKVILLE, MARYLAND

Appendix 2A includes the first annual and second annual reports of the meteorological program at the Beaver Valley Power Station which began in September of 1969. The first annual report, Appendix 2A.1, summarizes the meteorological data collected over a year period from September 5, 1969 to September 9, 1970, while the second annual report, Appendix 2A.2, summarizes the meteorological data collected over a year period from September 5, 1970 to September 5, 1971. Both sets of data were analyzed to develop parameters appropriate to dispersion estimates for the design basis accident and for evaluation of the average dispersion conditions which would govern normal gaseous releases from the Beaver Valley Power Station.

The design basis accident meteorological conditions obtained by analysis of the first year of data were Pasquill Type "F" and 0.9 m/sec wind speed while the design basis accident meteorological conditions obtained by analysis of the second year data were Pasquill Type "F" and 0.84 m/sec wind speed.

The First and Second Annual Meteorological Reports were retyped/reformatted as part of the update of the FSAR.

Appendix 2A.3 contains the current report for the Meteorological Program.

APPENDIX 2A.1

FIRST ANNUAL REPORT
THE METEOROLOGICAL PROGRAM

AT THE

BEAVER VALLEY POWER STATION

September 5, 1969 - September 5, 1970

Report Date: September, 1971

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

ENVIRONMENTAL SAFEGUARDS DIVISION

NUS CORPORATION

ROCKVILLE, MARYLAND

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LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION AND SUMMARY

This report summarizes meteorological data collected at the Beaver Valley site over a year period extending from September 5, 1969 through September 5, 1970. The data were analyzed to develop parameters appropriate to dispersion estimates for the design basis accident and for evaluation of the average dispersion conditions which would govern normal gaseous releases from the Beaver Valley Power Station.

II. SITE METEOROLOGICAL PROGRAM

On April 19, 1969, the following equipment was installed on the Beaver Valley meteorological tower:

Bendix-Friez aerovanes with six-bladed propellers at the 50-and 150-foot levels and Bendix-Friez recorders

Packard-Bell wind sensors (Model WS-101), at the 50-foot level and Esterline Angus recorders

NUS Wind Variance Computer.

Due to a delay in vendor deliver, the Bristol temperature system, consisting of resistance temperature bulbs with Packard-Bell aspirated shields at the 50- and 150-foot levels, and multi-point Bristol recorder, was not installed until September 5, 1969. At this time, the Foxboro dew cell was also installed. All meteorological sensors were placed on booms on a tower located approximately 250 meters from the center of the reactor building for the Beaver Valley Station. This location assured good exposure for the wind sensors. Figure 2A.1-1 shows the approximate location of the meteorological tower relative to the containment building, though most of the indicated trees have since been cleared.

The particular Bendix-Friez wind system chosen is rugged, yet has the lowest threshold, approximately two miles-per-hour, of any such equipment. The supplementary Packard-Bell wind system with a threshold of 0.7 miles-per-hour was particularly intended to help analyze wind and temperature statistics under low wind speed conditions.

Due to the delay in installation of temperature sensors, data and analyses are being reported for the time period September 5, 1969 through September 5, 1970. The recovery rate of the site data for these 52 weeks is presented in Table 2A.1-1, and is considered satisfactory for an accurate representation of the site conditions.

Instrument performance was generally satisfactory during the one-year period from September 5, 1969 to September 5, 1970. The only significant instrument problem was the incorrect factory calibration of the Packard-Bell wind speed system. As a result, the Packard-Bell instruments yielded anomalously low wind speeds, when compared with the Bendix-Friez instruments known to be in correct calibration. During the winter, a few days of Packard-Bell data were lost when the sensors "froze". Most of the data loss from the Packard-Bell instruments resulted from short-term "painting" of the wind recorded. Unfortunately, this occurrence is inherent in the Packard-Bell and other sensors which have a significant "dead-band".

Operation of the Bendix-Friez instruments was quite good. The only malfunction occurred with the 150-foot recorder, which encountered difficulty with the pen-switching mechanism for a one-week period. Otherwise, the loss of Bendix data occurred solely from short-term inking problems and in transmittal to NUS Corporation from the site. No malfunctions with the Bristol temperature system were observed; the only data loss resulted from occasional inking difficulties.

The Foxboro dew cell was installed to gather data in support of the cooling towers; reduction of the dew cell data has not been completed at this time.

III. DATA REDUCTION

Data records from the wind sensors and the temperature and dew cell recorders were forwarded to NUS for reduction and analysis. Wind data were obtained both from the strip charts and the Variance Computer; however, because of greater data availability from the former, as well as possible questions as to interpretation of the latter, primary reliance has been placed in the report upon the strip chart data.

Wind records were examined and hourly data extracted representing wind speed and direction averages and wind direction range. Range was determined from the two second-most extreme gusts. These data were taken for the two levels of Bendix-Friez sensors and the Packard-Bell equipment at the 50-foot level. Temperature measurements for the 50- and the 150-foot levels were recorded hourly, as were dew point data for the 50-foot level.

The data were entered on punched cards and processed to yield the data summaries presented and discussed in a later section.

IV. SITE METEOROLOGICAL DATA ANALYSIS

A. Wind Roses and Speeds

Based on Bendix-Friez data from the 50-foot level, Figures 2A.1-2, 2A.1-3, 2A.1-4, 2A.1-5, and 2A.1-6 show the distribution of wind directions for four seasons and the annual distribution. It is noted that in spring the winds from the northwest quadrant prevail. In summer, the wind directions from south-southeast to south-southwest predominate, along with a secondary maximum of winds from northwest. A season of transition, autumn, shows relatively high frequencies of winds from the west, west-northwest, and northwest, with a secondary maximum of winds from the south. This pattern of prevailing winds probably reflects both the large-scale wind flow from the meteorological pressure systems and the local channeling effect of the valley. During the winter, winds from the northwest quadrant are dominant; the effect of the valley in channeling is evident in the high frequencies of winds from the north-northwest and northwest. As a result of the seasonal patterns, the annual wind roses exhibit a high frequency of winds from the northwest quadrant and from southerly directions. A similar distribution of wind directions, shown in Figure 2A.1-7, is found with the 150-foot wind sensors.

Table 2A.1-2 shows the seasonal and annual distribution of wind speeds for both the 50-foot and 150-foot levels, based on the Bendix-Friez data. Speeds are determined over 15-minute averaging periods. It is noted that the season of highest wind speed is winter; whereas, the lowest wind speeds occur in summer. The average annual value of 5.5 miles-per-hour at the 50-foot level is higher than the 3-mile-per-hour value found by the Weather Bureau during the two-year site meteorological program conducted in Shippingport from 1955 through 1957. The annual figure of 2.5 percent "calm" found by the Beaver Valley meteorological program compares with 8.5 percent found by the Weather Bureau from 1955 to 1957. About two-thirds of the calms noted by the applicant occurred during the night; thus, if daytime calms are excluded, the overall frequency of calms is only 1.6 percent of all observations. The overall occurrence of calms as measured by the Packard-Bell instrument is only 0.4 percent. It is expected that the frequency of calms would be less as measured by the Packard-Bell than with the Bendix instrument because of the lower threshold and greater sensitivity of the Packard-Bell instrument. For these reasons, it was suspected that the Packard-Bell wind instruments yielded an annual average wind speed of 4.5 miles-per-hour, a value lower than the 5.6 miles-per-hour average found with the Bendix-Friez. During a preventive maintenance and instrument calibration trip, it was found that the Packard-Bell wind sensors and translator has been incorrectly calibrated at the factory, which led to these lower wind speeds. At that time, the Packard-Bell equipment was properly calibrated. The Bendix-Friez instrumentation remained in correct calibration during the complete period. Figure 2A.1-8 shows the wind speed distribution at the Beaver Valley site, based on the Bendix instrument. The median wind speed is noted to be 4.7 miles-per-hour; thus, when the median is compared to the mean wind speed, it is obvious that the distribution of the wind speeds is somewhat skewed toward the lower values.

B. Atmospheric Stability

In the context of this report, atmospheric stability refers to the degree of turbulence present in the atmosphere. An "unstable" atmosphere is turbulent and results in good diffusion of waste gases injected into the atmosphere, whereas, a "stable" atmosphere is relatively nonturbulent and results in poor diffusion. "Neutral" stability refers to an intermediate condition.

Two basic methods of inferring atmospheric dispersion capability are generally available; the first is based on wind fluctuations; the second on temperature lapse rate. The first method uses a sensitive wind vane, preferably one which is free to move in both vertical and horizontal directions (a "bivane") to measure fluctuations in wind direction in both planes, thus providing a measure of $\sigma\theta$ and $\sigma\psi$, the standard deviations of horizontal and vertical wind direction fluctuations, respectively. However, bivanes are not sufficiently rugged to provide the reliable data recovery over long time periods necessary for long-term diffusion climatology programs. Several systems have been developed which determine the horizontal variance ($\sigma\theta^2$) from standard (horizontal only) wind direction sensors, and which can be related to atmospheric stability.

The second method is the classical categorization of atmospheric stability based on vertical temperature structure, from which inferences of vertical diffusivity can be made. This method, of course, does not indicate diffusivity directly, nor does it account for differences in turbulence that may be introduced by surface roughness features.

In view of the availability of both horizontal wind fluctuations, vertical temperature difference data, and the significance of dispersion conditions in the design basis accident considerations, both measures of atmospheric stability were combined to provide the best estimates of horizontal and vertical plume dispersion.

Using the 50-foot level Bendix-Friez data, horizontal stability based on seven classes of $\sigma\theta$ was determined, according to the classification scheme in Table 2A.1-3, from the range in horizontal wind direction over a 15-minute time period, based on methods presented by Slade(1) using the "second gust" range described earlier. This procedure is illustrated (in Figure 2A.1-9) for some typical atmospheric conditions (arrows indicate the range of wind direction). If winds are "calm" or "non-steady", then the occurrence is classified as Pasquill B stability during the day, and Pasquill E at night, as suggested by Slade(2).

Values of $\sigma\theta$ from the Bendix-Friez instrumentation can be questioned as to whether they are representative of the real wind fluctuations. This was tested by comparing $\sigma\theta$ values determined by the Bendix-Friez sensor with those from the more sensitive Packard-Bell sensor at the same level. Table 2A.1-4 shows that when using a sampling time of 15 minutes, the distributions of horizontal stability classes estimated from both Bendix-Friez and Packard-Bell data at the 50-foot level agree very closely for all stability categories. Therefore, the horizontal variance data based on Bendix-Friez wind observations are felt to be representative of actual atmospheric conditions.

To determine the joint frequency distribution of vertical temperature difference and horizontal variance, all individual 15-minute time periods for which wind speed, $\sigma\theta$, and temperature difference data were available were processed by the NUS computer code, AMET, which computes the joint frequency of $\sigma\theta$ and temperature classes for given wind speed groups and for all wind speeds. Six wind speed groups were enumerated: Class 1 includes all wind speeds greater than or equal to 0.5 miles-per-hour and less than 1.5 miles-per-hour; Classes 2, 3, 4, and 5 are defined analogously for 2, 3, 4, and 5-miles-per-hour mean values; Class 6 includes all wind speeds greater than 5.5 miles-per-hour. Calms are not treated in the AMET code, but, as mentioned previously, occurred only in 2.5 percent of the observations by the Bendix-Friez sensor and 0.4 percent by the Packard-Bell unit. Computer summary pages of this joint frequency distribution listing are attached as an appendix to this report.

C. Lapse Rate Stability Classification

In order to determine the dispersion parameters for the two-hour design basis accident, meteorological conditions are chosen for which calculated doses would not be exceeded more than 5 percent of the time. In order to select these based jointly on $\sigma\theta$ and lapse rate, vertical dispersion parameters are needed based on temperature difference corresponding to those established using the horizontal variance classification presented above. Seventeen vertical temperature difference classes were arbitrarily defined for the purpose of categorizing these observations.

In order to classify vertical dispersion parameters based on the lapse rate, a number of references in the literature were examined, including the stability classification defined for Cape Kennedy and Vandenberg Air Force Base and presented in Table 2A.1-5[(3)]. The most complete vertical stability classification system found in the literature is that used at the National Reactor Testing Station[(4)] as presented in Table 2A.1-6. It was noted that none of these classification systems define a “G” stability, however. Therefore, in the lapse rate stability classification system chosen, the "G" interval has been defined in accordance with the range of a "large inversion", as presented by Holland in Meteorology and Atomic Energy[(5)]. The ranges used are presented in Table 2A.1-7.

V. DETERMINATION OF DESIGN BASIS ACCIDENT METEOROLOGICAL CONDITIONS

Using the seven horizontal stability classes (A-G) and seven vertical stability classes (A-G) and the corresponding σ_y and σ_z values, as presented in Meteorology and Atomic Energy[(6),] a computer code was used to determine the combinations of vertical and horizontal stability classes and wind speeds which result in a calculated χ/Q value larger than any designated value at the site boundary distance of 610 meters. These 23 possible conditions are shown in Table 2A.1-8 ranked in order from the highest to the lowest values of χ/Q. These calculations of χ/Q do not include a building wake effect, since the objective was to find the meteorological conditions of stability and wind speed upon which the building wake correction is normally imposed for the design basis accident.

Due to the somewhat lower wind speeds, the 50-foot wind data are more conservative than those measured at the 150-foot level and the former were, therefore, used with the temperature difference measurements. A conservative analysis also includes the total calms, both daytime and nighttime, as found by the less responsive Bendix-Friez speed sensors to meet the 5 percent criterion. On this basis, the total occurrence of calms is 2.5 percent. If the joint frequency data in Table 2A.1-8 are examined, for a χ/Q value equalled or exceeded 2.5 percent of the time (5 percent less 2.5 percent calm), a value of 1.5×10^{-3} sec/m^3 is obtained. Thus, F and 0.9 m per sec are the appropriate design basis accident meteorological conditions for the period of the accident on this conservative basis.

VI. ANNUAL AVERAGE RELEASE METEOROLOGY

The annual average χ/Q for an elevated release is calculated according to the following equation:

$$\chi / Q = \left(\frac{2}{\pi}\right)^{1/2} \frac{8}{\pi}\frac{1}{X} \sum_{i=1}^{7} \frac{F_i \; f_i}{\sigma_{z_i} \; u_i} \left[\exp \frac{-(Z-H)^2}{2\sigma_{z_i} \; 2} + \exp \frac{-(Z+H)^2}{2\sigma_{z_i} \; 2} \right]$$

Where:

χ	=	distance (m)
I/u_i	=	average reciprocal wind speed for sector of interest, sec per m^3
σ_Z	=	vertical diffusion parameter for stability class i (m) i
F_i	=	fraction of time stability class i occurs
H	=	height of stack (m)
z	=	vertical height above valley floor(m)
f_i	=	fraction of time wind direction is in sector of interest for stability class i

In calculating χ/Q, σ_{z_i} has been estimated from Pasquill stability curves[(7)]; (F_i) (f_i) is based on the categorization of temperature difference previously discussed and found in Table 2A.1-7. (The value of σ_z for G stability is defined as the σ_z for Class F, divided by $(2.5)^{1/2}$.

For an elevated release of normal process gases, the highest ground level annual average χ/Q occurs at a distance of 2500 feet from the reactor centerline, at an elevation of 47 meters above the valley floor. This χ/Q is equal to 1.0×10^{-5} sec per m^3. At the nearest site boundaries, each of which is 610 meters from the reactor containment, the annual average ground level χ/Qs for an elevated release are as follows:

Northeast boundary	1.3×10^{-7} sec/m^3
East-northeast boundary	1.1×10^{-7} sec/m^3
East-southeast boundary	2.0×10^{-7} sec/m^3

WINDVANE computer outputs giving the raw data from which these calculations are made are given in the appendix to this report.

It should be noted that the χ/Qs at the nearest site boundaries are all less than the χ/Q at the 2500-foot point. Figure 2A.1-10 contains isopleths of the ground level annual average χ/Q for an elevated release.

References

1. Slade, D. H., Meteorology and Atomic Energy, United States Atomic Energy Commission, Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 1968, p. 47.

2. Slade. D. H., "Dispersion Estimates from Pollutant Releases of a Few Seconds to 8 Hours in Duration", U.S. Weather Bureau, Washington, DC, 1965, p. 15.

3. Haugen, D. A. and J. J. Fuquay, The Ocean Breeze and Dry Gulch Diffusion Programs, Vol. I, USAEC Report HW-78435 (Report AFCRL-63-791 (I)), Air Force Cambridge Research Laboratories and Hanford Atomic Products Operation, 1963.

4. Start, George E. and Markee, Earl H., "Relative Dose Factors from Long-Period Point Source Emissions of Atmospheric Pollutants", Proceedings USAEC Meteorological Information Meeting, 1967, p. 63.

5. United States Department of Commerce Weather Bureau, Meteorology and Atomic Energy, 1955, p. 54.

6. Slade, D. H., Meteorology and Atomic Energy, pp. 408-409.

7. Ibid., p. 409.

TABLES FOR APPENDIX 2A.1

TABLE 2A.1-1

SUMMARY OF DATA COLLECTION
September 5, 1969 September 5, 1970

Instrument	Level	Recovery Rate (%)
BendixFriez	50 feet	85
BendixFriez	150 feet	80
PackardBell	50 feet	75
Bristol Temperature	50 feet	98
Bristol Temperature	150 feet	98

TABLE 2A.1-2

AVERAGE WIND SPEED SUMMARY (mph)

	Bendix 50 foot	Bendix 150 foot
Spring	5.7	6.4
Summer	4.2	4.1*
Fall	5.4	6.4
Winter	7.2	7.9
Annual Average	5.6	

* It is doubtful that the average wind speed at 150 foot is actually lower than that for the 50 foot level during summer; rather it is believed that, within the accuracy of the calculations, there is no significant difference between the two levels.

TABLE 2A.1-3

STABILITY CATEGORIES

Stability Type	Range of Standard Deviation	Turbulence Type
A = Extremely Unstable	$\sigma\theta \geq 22.5°$	High Atmospheric Turbulence
B = Unstable	$22.5 > \sigma\theta \geq 17.5$	High Atmospheric Turbulence
C = Slightly Unstable	$17.5 > \sigma\theta \geq 12.5$	High Atmospheric Turbulence
D = Neutral	$12.5 > \sigma\theta \geq 7.5$	Moderate Atmospheric Turbulence
E = Slightly Stable	$7.5 > \sigma\theta \geq 3.8$	Low Atmospheric Turbulence
F = Stable	$3.8 > \sigma\theta \geq 1.3$	Low Atmospheric Turbulence
G = Extremely Stable	$\sigma\theta < 1.3$	Low Atmospheric Turbulence

TABLE 2A.1-4

STABILITY DISTRIBUTION BASED ON WIND VARIANCE

		σθ Class						
Instrument	Level (ft)	A	B	C	D	E	F	G
		% Of Total Observations						
BendixFriez	50	13.2	14.5	28.3	30.2	11.7	1.9	0.2
	150	9.3	12.5	25.2	36.8	14.0	2.0	0.1
PackardBell	50	12.6	14.6	27.5	34.5	9.8	0.9	0.0

TABLE 2A.1-5

OCEAN BREEZE AND DRY GULCH STABILITY CLASSIFICATION

WT = temperature at 54 ft. minus temperature at 6 ft.

Category	Range of Vertical Temperature Difference (F)
Very Unstable	WT F -3.0 F
Moderately Unstable	-3.0 F WT F 0.0 F
Moderately Stable	0 F WT F 3.0 F
Very Stable	WT J 3.0 F

TABLE 2A.1-6

NATIONAL REACTOR TESTING STATION STABILITY CLASSIFICATION

Category	Range of Vertical Temperature Gradient (F/100 Ft)
A	-1.1 or less
B	-0.5 to -1.0
C	-0.1 to -0.4
D	0.0 to 0.4
E	0.5 to 1.0
F	1.1 or greater

TABLE 2A.1-7

CLASSIFICATION OF PASQUILL STABILITY CLASS
BASED ON LAPSE RATE

Category	Range of Vertical Temperature Gradient (F/1000 ft.)
A Very Unstable	WT F -16
B Moderately Unstable	-16 F WT F -13
C Slightly Unstable	-13 F WT F -7
D Neutral	-7 F WT F -1
E Slightly Stable	-1 F WT F 11
F Moderately Stable	11 F WT F 20
G Very Stable	WT J 20

TABLE 2A.1-8

JOINT FREQUENCY DATA
Sept. 5, 1969 - Sept. 5, 1970

50 Ft. Level Wind Data 50 & 150 Ft. Level Temp. Site Boundary: 610 Meters

Wind Speed (m/sec)	Ordered Horiz.	Condition Vert.	χ/Q (sec/m^3)	"Effective F" & Wind Speed (m/sec)	Frequency %	Cum. Frequency %
0.45	G	G	7.5×10^{-3}	0.18	.01	.01
0.45	F	G			.08	.09
0.45	G	F			.02	.11
0.90	G	G			.05	.16
0.45	E	G			.18	.34
0.45	F	F			.08	.42
0.45	G	E			.05	.47
0.45	D	G	2.5×10^{-3}	0.52	.25	.72
1.35	G	G			0.00	.72
0.90	F	G			.18	.90
0.90	G	F			.03	.93
0.45	G	D			.00	.93
0.45	E	F			.18	1.11
1.80	G	G			.00	1.11
0.45	F	E			.24	1.35
0.90	E	G			.67	2.02
0.45	C	G			.11	2.13
0.45	D	F			.20	2.33
1.35	F	G			.07	2.40
1.35	G	F			.00	2.40
2.25	G	G			.00	2.40
0.90	F	F			.21	2.61
0.90	G	E	1.5×10^{-3}	0.90	.00	2.61
			1.3×10^{-2}	1.00		

APPENDIX -

STABILITY AND WIND SPEED AND DIRECTION

SUMMARIES

SEASON INDEX=1 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

HOURLY TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION TOTAL NO. OF OBS = 1848

Hour	In Percent of Total OBS							In Percent of Hourly OBS						
Index	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	0.00	0.00	0.00	.22	2.76	.60	.70	0.00	0.00	0.00	5.06	64.56	13.92	16.46
2	.05	0.00	0.00	.11	2.81	.54	.76	1.27	0.00	0.00	2.53	65.82	12.66	17.72
3	0.00	0.00	.05	0.00	3.14	.27	.81	0.00	0.00	1.27	0.00	73.42	6.33	18.99
4	.05	0.00	.05	0.00	2.81	.49	.92	1.25	0.00	1.25	0.00	65.00	11.25	21.25
5	.05	0.00	.11	.16	2.76	.60	.60	1.27	0.00	2.53	3.80	64.56	13.92	13.92
6	0.00	0.00	0.00	.16	2.92	.43	.76	0.00	0.00	0.00	3.80	68.35	10.13	17.72
7	.11	.05	0.00	.11	3.03	.49	.38	2.60	1.30	0.00	2.60	72.73	11.69	9.09
8	.11	0.00	.05	.38	3.08	.22	.32	2.60	0.00	1.30	9.09	74.03	5.19	7.79
9	.05	.22	0.00	.54	2.92	.05	.22	1.35	5.41	0.00	13.51	72.97	1.35	5.41
10	.05	.05	.05	.54	3.03	.05	.11	1.39	1.39	1.39	13.89	77.78	1.39	2.78
11	0.00	.05	0.00	.65	3.08	.05	.11	0.00	1.37	0.00	16.44	78.08	1.37	2.74
12	.05	0.00	.16	.49	3.35	0.00	0.00	1.33	0.00	4.00	12.00	82.65	0.00	0.00
13	0.00	.05	.22	.65	3.19	0.00	0.00	0.00	1.32	5.26	15.79	77.63	0.00	0.00
14	0.00	0.00	.27	.76	3.14	0.00	0.00	0.00	0.00	6.49	18.18	75.32	0.00	0.00
15	.05	.05	.38	.81	2.87	0.00	0.00	1.30	1.30	9.09	19.48	68.83	0.00	0.00
16	0.00	.16	.27	.65	3.08	0.00	0.00	0.00	3.90	6.49	15.58	74.03	0.00	0.00
17	0.00	0.00	.16	.87	3.14	0.00	0.00	0.00	0.00	3.90	20.78	75.32	0.00	0.00
18	0.00	0.00	.22	.54	3.35	.05	0.00	0.00	0.00	5.19	12.99	80.52	1.30	0.00
19	0.00	0.00	0.00	.49	3.57	0.00	.11	0.00	0.00	0.00	11.69	85.71	0.00	2.60
20	0.00	0.00	.11	.27	3.30	.27	.27	0.00	0.00	2.56	6.41	78.21	6.41	6.41
21	0.00	0.00	.05	.16	2.87	.43	.70	0.00	0.00	1.28	3.85	67.95	10.26	16.67
22	.05	0.00	0.00	.16	2.60	.43	.87	1.32	0.00	0.00	3.95	63.16	10.53	21.05
23	.05	0.00	.05	.05	2.81	.27	.92	1.30	0.00	1.30	1.30	67.53	6.49	22.08
24	0.00	0.00	.05	.05	2.81	.43	.87	0.00	0.00	1.28	1.28	66.67	10.26	20.51

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION (IN PERCENT OF TOTAL OBS.)

Index	1	2	3	4	5	6	7
	.70	.65	2.27	8.82	72.46	5.68	9.42

AVERAGE WIND SPEED FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN MPH)

Index	1	2	3	4	5	6	7
Speed	4.8	4.8	7.3	6.9	6.3	2.6	2.8

WIND ROSE FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN PERCENT OF EACH INDEX TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	23.08	15.38	7.69	7.69	0.00	7.69	7.69	7.69	0.00	7.69	15.38	0.00	0.00	0.00	0.00
2	0.00	0.00	8.33	0.00	0.00	0.00	16.67	8.33	0.00	0.00	0.00	0.00	0.00	8.33	16.67	0.00	41.67
3	2.38	0.00	2.38	4.76	7.14	2.38	7.14	11.90	11.90	4.76	4.76	9.52	4.76	19.05	7.14	0.00	0.00
4	5.52	2.45	5.52	3.68	4.29	5.52	4.91	3.68	1.84	1.23	2.45	5.52	13.50	21.47	7.98	10.43	0.00
5	2.99	3.96	2.91	6.87	7.77	7.77	3.73	3.96	2.69	2.69	3.21	5.83	14.56	14.56	5.45	8.36	2.69
6	.95	0.00	0.00	.95	5.71	13.33	11.43	14.29	18.10	14.29	5.71	7.62	2.86	2.86	0.00	1.90	0.00
7	1.15	0.00	.57	1.15	6.90	8.62	5.17	16.67	20.69	18.39	5.75	5.75	4.02	2.30	.57	2.30	0.00

SEASON INDEX=1 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.
TOTAL NO. OF OBS = 1848

GROSS WIND ROSE (IN PERCENT OF TOTAL (OBS)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
	2.87	3.08	2.92	5.68	7.20	7.79	4.55	5.95	5.41	4.76	3.52	5.95	12.50	13.31	4.98	7.31	2.22
Speed	5.2	5.3	5.4	5.2	5.3	4.6	3.3	3.2	3.0	2.9	3.8	5.0	8.5	9.2	8.6	6.8	0.0

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION FOR EACH WIND DIRECTION (IN PERCENT OF DIRECTION TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	5.56	1.90	.75	.69	0.00	.91	1.00	1.14	0.00	.91	.87	0.00	0.00	0.00	0.00
2	0.00	0.00	1.85	0.00	0.00	0.00	2.38	.91	0.00	0.00	0.00	0.00	0.00	.41	2.17	0.00	12.20
3	1.89	0.00	1.85	1.90	2.26	.69	3.57	4.55	5.00	2.27	3.08	3.64	.87	3.25	3.26	0.00	0.00
4	16.98	7.02	16.67	5.71	5.26	6.25	9.52	5.45	3.00	2.27	6.15	8.18	9.52	14.23	14.13	12.59	0.00
5	75.47	92.98	72.22	87.62	78.20	72.22	59.52	48.18	36.00	40.91	66.15	70.91	84.42	79.27	79.35	82.96	87.80
6	1.89	0.00	0.00	.95	4.51	9.72	14.29	13.64	19.00	17.05	9.23	7.27	1.30	1.22	0.00	1.48	0.00
7	3.77	0.00	1.85	1.90	9.02	10.42	10.71	26.36	36.00	36.36	15.38	9.09	3.03	1.63	1.09	2.96	0.00

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION IN PERCENT OF TOTAL OBS.

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	.16	.11	.05	.05	0.00	.05	.05	.05	0.00	.05	.11	0.00	0.00	0.00	0.00
2	0.00	0.00	.05	0.00	0.00	0.00	.11	.05	0.00	0.00	0.00	0.00	0.00	.05	.11	0.00	.27
3	.05	0.00	.05	.11	.16	.05	.16	.27	.27	.11	.11	.22	.11	.43	.16	0.00	0.00
4	.49	.22	.49	.32	.38	.49	.43	.32	.16	.11	.22	.49	1.19	1.89	.70	.92	0.00
5	2.16	2.87	2.11	4.98	5.63	5.63	2.71	2.87	1.95	1.95	2.33	4.22	10.55	10.55	3.95	6.06	1.95
6	.05	0.00	0.00	.05	.32	.76	.65	.81	1.03	.81	.32	.43	.16	.16	0.00	.11	0.00
7	.11	0.00	.05	.11	.65	.81	.49	1.57	1.95	1.73	.54	.54	.38	.22	.05	.22	0.00

AVERAGE WIND SPEED (INVERSE WEIGHTED) BY INDEX AND DIRECTION (IN MPH)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0.00	0.00	3.16	4.50	5.00	3.00	0.00	4.00	1.00	1.00	0.00	4.00	11.00	0.00	0.00	0.00
2	0.00	0.00	6.00	0.00	0.00	0.00	5.83	5.00	0.00	0.00	0.00	0.00	0.00	14.00	9.10	0.00
3	13.00	0.00	9.00	5.00	5.11	10.00	6.90	4.99	3.87	1.33	6.46	4.57	14.48	8.19	7.46	0.00
4	4.81	4.28	4.97	4.75	5.21	2.99	3.60	5.01	2.67	1.67	3.31	6.44	5.52	7.66	6.17	6.05
5	3.41	3.83	3.94	4.09	4.22	3.34	2.06	2.33	2.34	2.25	3.01	3.64	6.63	6.89	6.16	5.05
6	1.00	0.00	0.00	2.00	2.57	2.55	2.18	1.88	1.93	1.91	2.88	2.46	3.00	1.00	0.00	1.75
7	6.00	0.00	5.00	1.33	1.90	3.35	1.86	2.00	2.37	2.23	1.18	1.58	2.67	1.60	2.00	1.89

(AVERAGE INVERSE SPEED)

1	0.00	0.00	.32	.22	.20	.33	0.00	.25	1.00	1.00	0.00	.25	.09	0.00	0.00	0.00
2	0.00	0.00	.17	0.00	0.00	0.00	.17	.20	0.00	0.00	0.00	0.00	0.00	.07	.11	0.00
3	.08	0.00	.11	.20	.20	.10	.14	.20	.26	.75	.15	.22	.07	.12	.13	0.00
4	.21	.23	.20	.21	.19	.33	.28	.20	.38	.60	.30	.16	.18	.13	.16	.17
5	.29	.26	.25	.24	.24	.30	.49	.43	.43	.44	.33	.27	.15	.15	.16	.20
6	1.00	0.00	0.00	.50	.39	.39	.46	.53	.52	.52	.35	.41	.33	1.00	0.00	.57
7	.17	0.00	.20	.75	.53	.30	.54	.50	.42	.45	.85	.63	.37	.63	.50	.53

SEASON INDEX=2 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

HOURLY TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION TOTAL NO. OF OBS = 1515

Hour	In Percent of Total OBS							In Percent of Hourly OBS						
Index	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	.07	0.00	0.00	.13	1.52	.92	1.58	1.56	0.00	0.00	3.13	35.94	21.88	37.50
2	0.00	0.00	0.00	.13	1.98	1.12	.99	0.00	0.00	0.00	3.13	46.88	26.56	23.44
3	0.00	0.00	0.00	.07	1.91	1.19	1.06	0.00	0.00	0.00	1.56	45.31	28.13	25.00
4	0.00	0.00	0.00	0.00	1.91	1.52	.79	0.00	0.00	0.00	0.00	45.31	35.94	18.75
5	0.00	0.00	0.00	0.00	2.05	1.58	.59	0.00	0.00	0.00	0.00	48.44	37.50	14.06
6	0.00	0.00	0.00	.07	2.31	1.06	.79	0.00	0.00	0.00	1.56	54.69	25.00	18.75
7	0.00	0.00	0.00	.20	2.51	.92	.59	0.00	0.00	0.00	4.69	59.38	21.88	14.06
8	0.00	0.00	0.00	.53	3.17	.40	.07	0.00	0.00	0.00	12.70	76.19	9.52	1.59
9	0.00	.86	.40	1.25	1.58	0.00	0.00	0.00	20.97	9.68	30.65	38.71	0.00	0.00
10	.07	.33	.73	1.65	1.25	0.00	0.00	1.64	8.20	18.03	40.98	31.15	0.00	0.00
11	0.00	.07	.66	2.18	1.12	.07	0.00	0.00	1.61	16.13	53.23	27.42	1.61	0.00
12	0.00	.20	1.19	1.91	.53	.07	.07	0.00	5.00	30.00	48.32	13.33	1.67	1.67
13	.07	.07	.92	2.05	.92	0.00	0.00	1.64	1.64	22.95	50.82	22.95	0.00	0.00
14	.07	.33	1.32	2.05	.26	0.00	0.00	1.64	8.20	32.79	50.82	6.56	0.00	0.00
15	.07	.20	1.25	1.91	.53	0.00	.07	1.64	4.92	31.15	47.54	13.11	0.00	1.64
16	0.00	.07	1.39	1.98	.79	0.00	0.00	0.00	1.56	32.81	46.88	18.75	0.00	0.00
17	0.00	.07	1.06	2.38	.73	0.00	0.00	0.00	1.56	25.00	56.25	17.19	0.00	0.00
18	0.00	.07	.46	2.38	1.25	.07	0.00	0.00	1.56	10.94	56.25	29.69	1.56	0.00
19	0.00	0.00	.07	1.91	2.24	0.00	0.00	0.00	0.00	1.56	45.31	53.13	0.00	0.00
20	0.00	0.00	0.00	.59	3.04	.26	.33	0.00	0.00	0.00	14.06	71.88	6.25	7.81
21	0.00	0.00	0.00	.26	1.85	.66	1.45	0.00	0.00	0.00	6.25	43.75	15.63	34.38
22	0.00	0.00	0.00	.13	1.91	.73	1.45	0.00	0.00	0.00	3.13	45.31	17.19	34.38
23	0.00	0.00	0.00	0.00	1.65	1.12	1.45	0.00	0.00	0.00	0.00	39.06	26.56	34.38
24	0.00	0.00	0.00	.07	1.72	1.06	1.39	0.00	0.00	0.00	1.56	40.63	25.00	32.81

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION (IN PERCENT OF TOTAL OBS.)

Index	1	2	3	4	5	6	7
	.33	2.24	9.44	23.83	38.75	12.74	12.67

AVERAGE WIND SPEED FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN MPH)

Index	1	2	3	4	5	6	7
Speed	4.4	2.3	5.8	5.3	3.7	3.1	3.1

WIND ROSE FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN PERCENT OF EACH INDEX TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	20.00	0.00	0.00	0.00	20.00	20.00	0.00	20.00	0.00
2	0.00	2.94	11.76	11.76	0.00	0.00	0.00	0.00	2.94	0.00	0.00	2.94	5.88	2.94	5.88	2.94	50.00
3	7.69	7.69	13.29	6.29	4.90	5.59	1.40	3.50	2.80	2.80	2.80	2.80	6.29	16.78	12.59	2.80	0.00
4	6.37	7.20	3.60	4.71	4.71	5.54	3.05	3.05	2.77	5.26	3.32	7.20	8.31	19.67	6.37	8.86	0.00
5	3.58	1.87	1.19	3.07	3.75	8.35	10.56	13.97	9.20	5.28	5.45	4.60	8.01	8.35	3.41	3.75	5.62
6	.52	0.00	0.00	.52	.52	3.63	8.29	24.87	34.20	18.13	5.18	2.59	.52	.52	.52	0.00	0.00
7	0.00	0.00	0.00	0.00	3.13	3.65	3.13	15.63	50.52	19.27	2.60	1.04	0.00	0.00	.52	.52	0.00

SEASON INDEX=2 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.
TOTAL NO. OF OBS = 1515

GROSS WIND ROSE (IN PERCENT OF TOTAL (OBS)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
	3.70	3.23	2.84	3.23	3.50	6.01	6.47	11.62	15.38	8.32	4.16	4.29	5.94	9.70	4.29	4.03	3.30
Speed	5.3	5.0	4.5	3.5	3.4	4.0	3.6	3.1	3.1	2.8	3.0	4.2	5.8	7.0	6.4	5.0	0.0

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION FOR EACH WIND DIRECTION (IN PERCENT OF DIRECTION TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.00	.43	0.00	0.00	0.00	1.11	.68	0.00	1.64	0.00
2	0.00	2.04	9.30	8.16	0.00	0.00	0.00	0.00	.43	0.00	0.00	1.54	2.22	.68	3.08	1.64	34.00
3	19.64	22.45	44.19	18.37	13.21	8.79	2.04	2.84	1.72	3.17	6.35	6.15	10.00	16.33	27.69	6.56	0.00
4	41.07	53.06	30.23	34.69	32.08	21.98	11.22	6.25	4.29	15.08	19.05	40.00	33.33	48.30	35.38	52.46	0.00
5	37.50	22.45	16.28	36.73	41.51	53.85	63.27	46.59	23.18	24.60	50.79	41.54	52.22	33.33	30.77	36.07	66.00
6	1.79	0.00	0.00	2.04	1.89	7.69	16.33	27.27	28.33	27.78	15.87	7.69	1.11	.68	1.54	0.00	0.00
7	0.00	0.00	0.00	0.00	11.32	7.69	6.12	17.05	41.63	29.37	7.94	3.08	0.00	0.00	1.54	1.64	0.00

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION IN PERCENT OF TOTAL OBS.

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	0.00	0.00	0.00	0.00	.07	0.00	.07	0.00	0.00	0.00	.07	.07	0.00	.07	0.00
2	0.00	.07	.26	.26	0.00	0.00	0.00	0.00	.07	0.00	0.00	.07	.13	.07	.13	.07	1.12
3	.73	.73	1.25	.59	.46	.53	.13	.33	.26	.26	.26	.26	.59	1.58	1.19	.26	0.00
4	1.52	1.72	.86	1.12	1.12	1.32	.73	.73	.66	1.25	.79	1.72	1.98	4.69	1.52	2.11	0.00
5	1.39	.73	.46	1.19	1.45	3.23	4.09	5.41	3.56	2.05	2.11	1.78	3.10	3.23	1.32	1.45	2.18
6	.07	0.00	0.00	.07	.07	.46	1.06	3.17	4.36	2.31	.66	.33	.07	.07	.07	0.00	0.00
7	0.00	0.00	0.00	0.00	.40	.46	.40	1.98	6.40	2.44	.33	.13	0.00	0.00	.07	.07	0.00

AVERAGE WIND SPEED (INVERSE WEIGHTED) BY INDEX AND DIRECTION (IN MPH)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	2.00	0.00	0.00	0.00	3.00	4.00	0.00	1.00
2	0.00	10.00	4.10	5.51	0.00	0.00	0.00	0.00	5.00	0.00	0.00	2.00	1.33	4.00	4.20	2.00
3	5.12	4.26	4.51	3.80	4.02	5.24	3.43	4.48	4.44	4.00	3.69	5.05	7.32	5.56	4.33	3.12
4	4.15	4.21	3.48	2.37	2.67	3.57	5.14	3.24	2.86	2.70	2.75	3.30	5.47	5.81	5.12	3.99
5	4.20	3.39	2.01	2.17	2.11	2.62	2.42	2.37	2.54	1.92	2.52	3.49	3.83	4.97	3.18	3.06
6	2.00	0.00	0.00	2.00	2.00	3.02	2.58	2.75	2.71	2.19	1.86	2.73	3.00	7.00	15.00	0.00
7	0.00	0.00	0.00	0.00	2.86	3.50	1.85	2.74	2.58	2.23	2.86	1.71	0.00	0.00	5.00	7.00

(AVERAGE INVERSE SPEED)

1	0.00	0.00	0.00	0.00	0.00	0.00	.08	0.00	.50	0.00	0.00	0.00	.33	.25	0.00	1.00
2	0.00	.10	.24	.18	0.00	0.00	0.00	0.00	.20	0.00	0.00	.50	.75	.25	.24	.50
3	.20	.23	.22	.26	.25	.19	.29	.22	.22	.25	.27	.20	.14	.18	.23	.32
4	.24	.24	.29	.42	.37	.28	.19	.31	.35	.37	.36	.30	.18	.17	.20	.25
5	.24	.29	.50	.46	.47	.38	.41	.42	.39	.52	.40	.29	.26	.20	.31	.33
6	.50	0.00	0.00	.50	.50	.33	.39	.36	.37	.46	.54	.37	.33	.14	.07	0.00
7	0.00	0.00	0.00	0.00	.35	.29	.54	.36	.39	.45	.35	.58	0.00	0.00	.20	.14

SEASON INDEX=3 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

HOURLY TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION TOTAL NO. OF OBS = 1952

Hour	In Percent of Total OBS							In Percent of Hourly OBS						
Index	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	0.00	0.00	0.00	.10	2.61	1.08	.41	0.00	0.00	0.00	2.44	62.20	25.61	9.76
2	0.00	0.00	0.00	.05	2.77	.67	.77	0.00	0.00	0.00	1.20	65.06	15.66	18.07
3	0.00	0.00	0.00	.10	2.77	.87	.51	0.00	0.00	0.00	2.41	65.06	20.48	12.05
4	0.00	0.00	0.00	.10	2.56	1.08	.51	0.00	0.00	0.00	2.41	60.24	25.30	12.05
5	0.00	0.00	0.00	.05	2.72	.77	.67	0.00	0.00	0.00	1.22	64.63	18.29	15.85
6	0.00	0.00	.10	.10	2.92	.61	.46	0.00	0.00	2.44	2.44	69.51	14.63	10.98
7	0.00	0.00	0.00	0.00	2.97	.82	.36	0.00	0.00	0.00	0.00	71.60	19.75	8.64
8	0.00	0.00	.05	.31	2.87	.67	.26	0.00	0.00	1.23	7.41	69.14	16.05	6.17
9	0.00	.41	0.00	.20	3.38	.05	.10	0.00	9.88	0.00	4.94	81.48	1.23	2.47
10	.05	.20	.10	.77	2.77	.05	.05	1.28	5.13	2.56	19.23	69.23	1.28	1.28
11	0.00	.31	.20	.77	2.72	0.00	.10	0.00	7.50	5.00	18.75	66.25	0.00	2.50
12	.05	.10	.10	.87	2.72	0.00	.05	1.32	2.63	2.63	22.37	69.74	0.00	1.32
13	.05	.05	.20	.92	2.77	0.00	0.00	1.28	1.28	5.13	23.08	69.23	0.00	0.00
14	0.00	0.00	.10	1.69	2.36	0.00	0.00	0.00	0.00	2.47	40.74	56.79	0.00	0.00
15	0.00	0.00	.36	1.13	2.56	.10	0.00	0.00	0.00	8.64	27.16	61.73	2.47	0.00
16	.05	.10	.05	1.18	2.77	0.00	0.00	1.23	2.47	1.23	28.40	66.67	0.00	0.00
17	0.00	.26	.10	.92	2.77	.10	0.00	0.00	6.17	2.47	22.22	66.67	2.47	0.00
18	0.00	0.00	.10	.61	2.92	.15	.20	0.00	0.00	2.56	15.38	73.08	3.85	5.13
19	0.00	0.00	0.00	.05	2.77	.41	1.02	0.00	0.00	0.00	1.20	65.06	9.64	24.10
20	0.00	0.00	.05	.10	2.46	.56	1.02	0.00	0.00	1.22	2.44	58.54	13.41	24.39
21	0.00	0.00	0.00	.05	2.61	.51	1.13	0.00	0.00	0.00	1.19	60.71	11.90	26.19
22	0.00	0.00	0.00	.20	2.15	.87	1.02	0.00	0.00	0.00	4.82	50.60	20.48	24.10
23	0.00	.05	0.00	.05	2.51	.61	1.08	0.00	1.19	0.00	1.19	58.32	14.29	25.00
24	0.00	0.00	0.00	.15	2.56	.72	.87	0.00	0.00	0.00	3.57	59.52	16.66	20.24

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION (IN PERCENT OF TOTAL OBS.)

Index	1	2	3	4	5	6	7
	.20	1.49	1.54	10.50	64.96	10.71	10.60

AVERAGE WIND SPEED FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN MPH)

Index	1	2	3	4	5	6	7
Speed	9.8	.3	6.0	7.6	5.8	3.6	3.3

WIND ROSE FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN PERCENT OF EACH INDEX TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	25.00	0.00	25.00	25.00	0.00	0.00
2	0.00	0.00	0.00	3.45	0.00	0.00	3.45	0.00	0.00	0.00	3.45	0.00	0.00	0.00	0.00	0.00	89.66
3	6.67	13.33	3.33	6.67	6.67	6.67	23.33	0.00	3.33	0.00	3.33	3.33	6.67	3.33	10.00	3.33	0.00
4	2.44	2.93	4.39	2.44	6.83	7.80	2.93	3.41	1.95	2.44	3.90	8.78	16.59	17.56	10.24	5.37	0.00
5	1.58	1.42	1.34	2.76	4.73	5.99	7.57	9.15	3.94	3.23	5.13	14.27	13.49	8.75	4.81	7.18	4.65
6	.96	0.00	.48	3.35	6.70	12.44	16.75	22.97	15.31	6.70	2.39	5.26	2.87	.96	1.44	1.44	0.00
7	.48	.48	1.45	3.38	6.28	6.76	14.98	24.15	22.71	13.53	1.93	.97	1.45	.48	.48	.48	0.00

SEASON INDEX=3 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.
TOTAL NO. OF OBS = 1952

GROSS WIND ROSE (IN PERCENT OF TOTAL (OBS)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
	1.54	1.49	1.59	2.92	5.28	6.86	9.02	11.32	6.86	4.51	4.35	10.96	11.07	7.79	4.61	5.48	4.35
Speed	5.1	4.7	4.8	3.8	4.2	4.6	3.7	3.6	3.1	2.9	3.9	6.6	9.0	10.4	8.8	6.4	0.0

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION FOR EACH WIND DIRECTION (IN PERCENT OF DIRECTION TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	.47	0.00	.66	1.11	0.00	0.00
2	0.00	0.00	0.00	1.75	0.00	0.00	.57	0.00	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	30.59
3	6.67	13.79	3.23	3.51	1.94	1.49	3.98	0.00	.75	0.00	1.18	.47	.93	.66	3.33	.93	0.00
4	16.67	20.69	29.03	8.77	13.59	11.94	3.41	3.17	2.99	5.68	9.41	8.41	15.74	23.68	23.33	10.28	0.00
5	66.67	62.07	54.84	61.40	58.25	56.72	54.55	52.49	37.31	46.59	76.47	84.58	79.17	73.03	67.78	85.05	69.41
6	6.67	0.00	3.23	12.28	13.59	19.40	19.89	21.72	23.88	15.91	5.88	5.14	2.78	1.32	3.33	2.80	0.00
7	3.33	3.45	9.68	12.28	12.62	10.45	17.61	22.62	35.07	31.82	4.71	.93	1.39	.66	1.11	.93	0.00

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION IN PERCENT OF TOTAL OBS.

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.05	.05	0.00	.05	.05	0.00	0.00
2	0.00	0.00	0.00	.05	0.00	0.00	.05	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00	0.00	1.33
3	.10	.20	.05	.10	.10	.10	.36	0.00	.05	0.00	.05	.05	.10	.05	.15	.05	0.00
4	.26	.31	.46	.26	.72	.82	.31	.36	.20	.26	.41	.92	1.74	1.84	1.08	.56	0.00
5	1.02	.92	.87	1.79	3.07	3.89	4.92	5.94	2.56	2.10	3.33	9.27	8.76	5.69	3.13	4.66	3.02
6	.10	0.00	.05	.36	.72	1.33	1.79	2.46	1.64	.72	.26	.56	.31	.10	.15	.15	0.00
7	.05	.05	.15	.36	.67	.72	1.59	2.56	2.41	1.43	.20	.10	.15	.05	.05	.05	0.00

AVERAGE WIND SPEED (INVERSE WEIGHTED) BY INDEX AND DIRECTION (IN MPH)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	12.00	0.00	6.00	16.00	0.00
2	0.00	0.00	0.00	6.00	0.00	0.00	2.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
3	3.00	5.33	6.00	3.43	5.09	1.71	4.89	0.00	7.00	0.00	2.00	4.00	7.06	14.00	8.18	7.00
4	3.28	5.14	4.42	4.47	4.95	4.11	5.88	2.88	5.27	2.94	4.29	5.07	7.25	9.45	7.57	4.99
5	2.97	3.26	3.31	2.86	3.14	3.52	2.53	2.64	2.22	2.29	2.80	4.71	6.37	7.41	6.73	4.74
6	3.11	0.00	4.00	3.44	2.85	2.76	3.26	2.92	2.13	1.89	2.26	3.76	4.62	9.26	10.00	3.18
7	8.00	5.00	3.60	3.11	3.25	2.49	2.94	3.23	2.33	2.17	1.85	5.45	5.53	7.00	8.00	2.00

(AVERAGE INVERSE SPEED)

1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.20	.08	0.00	.17	.06	0.00
2	0.00	0.00	0.00	.17	0.00	0.00	.50	0.00	0.00	0.00	.50	0.00	0.00	0.00	0.00	0.00
3	.33	.19	.17	.29	.20	.58	.20	0.00	.14	0.00	.50	.25	.14	.07	.12	.14
4	.31	.19	.23	.22	.20	.24	.17	.35	.19	.34	.23	.20	.14	.11	.13	.20
5	.34	.31	.30	.35	.32	.28	.39	.38	.45	.44	.36	.21	.16	.13	.15	.21
6	.32	0.00	.25	.29	.35	.36	.31	.34	.47	.53	.44	.27	.22	.11	.10	.31
7	.13	.20	.28	.32	.31	.40	.34	.31	.43	.46	.54	.18	.18	.14	.13	.50

SEASON INDEX=4 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

HOURLY TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION TOTAL NO. OF OBS = 1908

Hour	In Percent of Total OBS							In Percent of Hourly OBS						
Index	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	0.00	0.00	0.00	.05	3.35	.52	.31	0.00	0.00	0.00	1.23	79.01	12.35	7.41
2	0.00	0.00	0.00	0.00	3.62	.37	.26	0.00	0.00	0.00	0.00	85.19	8.64	6.17
3	0.00	0.00	0.00	.05	3.41	.26	.47	0.00	0.00	0.00	1.25	81.25	6.25	11.25
4	0.00	0.00	0.00	.10	3.30	.42	.37	0.00	0.00	0.00	2.50	78.75	10.00	8.75
5	0.00	0.00	0.00	.16	3.67	.10	.26	0.00	0.00	0.00	3.75	87.50	2.50	6.25
6	0.00	0.00	0.00	.10	3.25	.58	.21	0.00	0.00	0.00	2.53	78.48	13.92	5.06
7	0.00	0.00	0.00	.10	3.51	.21	.21	0.00	0.00	0.00	2.60	87.01	5.19	5.19
8	0.00	0.00	.05	.16	3.51	.10	.10	0.00	0.00	1.33	4.00	89.33	2.67	2.67
9	0.00	.10	0.00	.16	3.56	.05	.10	0.00	2.63	0.00	3.95	89.47	1.32	2.63
10	.05	0.00	.05	.31	3.35	0.00	.10	1.35	0.00	1.35	8.11	86.49	0.00	2.70
11	.05	0.00	.05	.52	3.35	0.00	0.00	1.32	0.00	1.32	13.16	84.21	0.00	0.00
12	0.00	.05	0.00	.84	3.14	.10	0.00	0.00	1.27	0.00	20.25	75.95	2.53	0.00
13	.05	0.00	0.00	.47	3.56	0.00	.05	1.27	0.00	0.00	11.39	86.08	0.00	1.27
14	0.00	0.00	0.00	.89	3.30	0.00	0.00	0.00	0.00	0.00	21.25	78.75	0.00	0.00
15	0.00	.05	.05	.58	3.56	0.00	0.00	0.00	1.23	1.23	13.58	83.95	0.00	0.00
16	0.00	.05	0.00	.42	3.77	0.00	0.00	0.00	1.23	0.00	9.88	88.89	0.00	0.00
17	0.00	.05	.05	.21	3.88	.05	0.00	0.00	1.23	1.23	4.94	91.36	1.23	0.00
18	0.00	0.00	0.00	.05	3.62	.31	.26	0.00	0.00	0.00	1.23	85.19	7.41	6.17
19	0.00	0.00	0.00	.10	3.25	.42	.47	0.00	0.00	0.00	2.47	76.54	9.88	11.11
20	0.00	0.00	0.00	.16	3.30	.37	.42	0.00	0.00	0.00	3.70	77.78	8.64	9.88
21	.05	0.00	0.00	.05	3.56	.26	.31	1.23	0.00	0.00	1.23	83.95	6.17	7.41
22	0.00	0.00	0.00	.05	3.41	.52	.26	0.00	0.00	0.00	1.23	80.25	12.35	6.17
23	0.00	0.00	0.00	0.00	3.46	.52	.31	0.00	0.00	0.00	0.00	80.49	12.20	7.32
24	0.00	0.00	0.00	.10	3.35	.52	.26	0.00	0.00	0.00	2.47	79.01	12.35	6.17

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION (IN PERCENT OF TOTAL OBS.)

Index	1	2	3	4	5	6	7
	.21	.31	.26	5.66	83.07	5.71	4.77

AVERAGE WIND SPEED FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN MPH)

Index	1	2	3	4	5	6	7
Speed	4.5	2.0	9.0	10.3	7.4	3.5	3.6

WIND ROSE FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN PERCENT OF EACH INDEX TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	25.00	0.00	0.00	0.00	25.00	25.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.67	0.00	0.00	0.00	83.33
3	20.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	20.00	20.00	0.00	0.00	0.00	20.00	0.00	0.00
4	.93	.93	4.63	3.70	1.85	3.70	.93	0.00	0.00	.93	2.78	6.48	21.30	30.56	18.52	2.78	0.00
5	1.39	.57	1.58	3.47	6.69	4.29	3.72	3.72	3.22	3.09	4.10	11.29	24.73	17.85	5.05	5.11	.13
6	0.00	0.00	.92	1.83	8.26	17.43	15.60	28.44	12.84	5.50	.92	3.67	1.83	1.83	.92	0.00	0.00
7	1.10	0.00	0.00	7.69	12.09	12.09	16.48	15.38	18.68	3.30	2.20	3.30	5.49	2.20	0.00	0.00	0.00

SEASON INDEX=4 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.
TOTAL NO. OF OBS = 1908

GROSS WIND ROSE (IN PERCENT OF TOTAL (OBS)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
	1.31	.52	1.68	3.56	6.71	5.35	4.87	5.56	4.30	3.14	3.77	10.12	22.22	16.77	5.35	4.40	.37
Speed	6.1	5.0	3.8	4.1	5.2	4.2	3.3	3.2	3.4	3.6	4.4	6.0	9.2	11.4	10.9	8.0	0.0

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION FOR EACH WIND DIRECTION (IN PERCENT OF DIRECTION TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	3.13	0.00	0.00	0.00	1.08	.94	0.00	0.00	0.00	0.00	.24	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.24	0.00	0.00	0.00	71.43
3	4.00	0.00	0.00	0.00	0.00	0.00	0.00	.94	0.00	1.67	1.39	0.00	0.00	0.00	.98	0.00	0.00
4	4.00	10.00	15.63	5.88	1.56	3.92	1.08	0.00	0.00	1.67	4.17	3.63	5.42	10.31	19.61	3.57	0.00
5	88.00	90.00	78.13	80.88	82.81	66.67	63.44	55.66	62.20	81.67	90.28	92.75	92.45	88.44	78.43	96.43	28.57
6	0.00	0.00	3.13	2.94	7.03	18.63	18.28	29.25	17.07	10.00	1.39	2.07	.47	.62	.98	0.00	0.00
7	4.00	0.00	0.00	10.29	8.59	10.78	16.13	13.21	20.73	5.00	2.78	1.55	1.18	.62	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION IN PERCENT OF TOTAL OBS.

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	.05	0.00	0.00	0.00	.05	.05	0.00	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.05	0.00	0.00	0.00	.26
3	.05	0.00	0.00	0.00	0.00	0.00	0.00	.05	0.00	.05	.05	0.00	0.00	0.00	.05	0.00	0.00
4	.05	.05	.26	.21	.10	.21	.05	0.00	0.00	.05	.16	.37	1.21	1.73	1.05	.16	0.00
5	1.15	.47	1.31	2.88	5.56	3.56	3.09	3.09	2.67	2.57	3.41	9.38	20.55	14.83	4.19	4.25	.10
6	0.00	0.00	.05	.10	.47	1.00	.89	1.62	.73	.31	.05	.21	.10	.10	.05	0.00	0.00
7	.05	0.00	0.00	.37	.58	.58	.79	.73	.89	.16	.10	.16	.26	.10	0.00	0.00	0.00

AVERAGE WIND SPEED (INVERSE WEIGHTED) BY INDEX AND DIRECTION (IN MPH)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0.00	0.00	4.00	0.00	0.00	0.00	6.00	3.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00
3	12.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	7.00	8.00	0.00	0.00	0.00	14.00	0.00
4	1.00	6.00	3.75	3.12	6.00	7.16	3.00	0.00	0.00	7.00	5.68	5.51	10.16	11.64	9.48	7.58
5	3.14	4.54	2.67	3.48	3.24	2.78	2.74	2.83	2.69	2.55	3.59	4.33	7.27	8.83	8.33	5.20
6	0.00	0.00	1.00	2.40	2.93	2.86	2.03	2.34	2.48	2.79	3.00	4.75	7.50	10.00	13.00	0.00
7	2.00	0.00	0.00	2.56	4.13	2.66	2.28	2.60	2.91	1.89	3.75	2.57	3.70	1.85	0.00	0.00

(AVERAGE INVERSE SPEED)

1	0.00	0.00	.25	0.00	0.00	0.00	.17	.33	0.00	0.00	0.00	0.00	.20	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	0.00	0.00	0.00
3	.08	0.00	0.00	0.00	0.00	0.00	0.00	.25	0.00	.14	.13	0.00	0.00	0.00	.07	0.00
4	1.00	.17	.27	.32	.17	.14	.33	0.00	0.00	.14	.18	.18	.10	.09	.11	.13
5	.32	.22	.37	.29	.31	.36	.36	.35	.37	.39	.28	.23	.14	.11	.12	.19
6	0.00	0.00	1.00	.42	.34	.35	.49	.43	.40	.36	.33	.21	.13	.10	.08	0.00
7	.50	0.00	0.00	.39	.24	.38	.44	.38	.34	.53	.27	.39	.27	.54	0.00	0.00

ANNUAL AVERAGE 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

HOURLY TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION TOTAL NO. OF OBS = 7223

Hour	In Percent of Total OBS							In Percent of Hourly OBS						
Index	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1	.01	0.00	0.00	.12	2.62	.78	.71	.33	0.00	0.00	2.94	61.76	18.30	16.66
2	.01	0.00	0.00	.07	2.84	.65	.68	.33	0.00	0.00	1.63	66.78	15.31	15.96
3	0.00	0.00	.01	.06	2.85	.62	.69	0.00	0.00	.33	1.31	67.32	14.71	16.34
4	.01	0.00	.01	.06	2.69	.84	.64	.33	0.00	.33	1.30	63.19	19.87	14.98
5	.01	0.00	.03	.10	2.84	.72	.53	.33	0.00	.66	2.30	67.21	17.05	12.46
6	0.00	0.00	.03	.11	2.88	.65	.54	0.00	0.00	.66	2.63	68.42	15.46	12.83
7	.03	.01	0.00	.10	3.03	.60	.37	.67	.33	0.00	2.34	73.24	14.38	9.03
8	.03	0.00	.04	.33	3.16	.35	.19	.68	0.00	1.01	8.11	77.03	8.45	4.73
9	.01	.37	.08	.50	2.94	.04	.11	.34	9.22	2.05	12.29	72.35	1.02	2.73
10	.06	.14	.21	.78	2.67	.03	.07	1.40	3.51	5.26	19.65	67.72	.70	1.75
11	.01	.11	.21	.97	2.64	.03	.06	.34	2.75	5.15	24.05	65.64	.69	1.37
12	.03	.08	.32	.98	2.53	.04	.03	.69	2.07	7.93	24.48	63.10	1.03	.69
13	.04	.04	.30	.97	2.70	0.00	.01	1.02	1.02	7.48	23.81	66.33	0.00	.34
14	.01	.07	.37	1.32	2.37	0.00	0.00	.33	1.67	9.03	31.77	57.19	0.00	0.00
15	.03	.07	.47	1.07	2.48	.03	.01	.67	1.67	11.33	25.66	59.66	.67	.33
16	.01	.10	.37	1.01	2.70	0.00	0.00	.33	2.31	8.91	24.09	64.36	0.00	0.00
17	0.00	.10	.30	1.02	2.73	.04	0.00	0.00	2.31	7.26	24.42	65.02	.99	0.00
18	0.00	.01	.18	.82	2.87	.15	.12	0.00	.33	4.33	19.66	69.00	3.67	3.00
19	0.00	0.00	.01	.57	2.99	.22	.43	0.00	0.00	.33	13.44	70.82	5.25	10.16
20	0.00	0.00	.04	.26	3.02	.37	.53	0.00	0.00	.98	6.23	71.48	8.85	12.46
21	.01	0.00	.01	.12	2.77	.46	.87	.33	0.00	.33	2.93	65.15	10.75	20.52
22	.01	0.00	0.00	.14	2.55	.64	.87	.33	0.00	0.00	3.29	60.53	15.13	20.72
23	.01	.01	.01	.03	2.66	.61	.91	.33	.33	.33	.65	62.54	14.33	21.50
24	0.00	0.00	.01	.10	2.66	.66	.82	0.00	0.00	.33	2.28	62.54	15.64	19.22

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION (IN PERCENT OF TOTAL OBS.)

Index	1	2	3	4	5	6	7
	.36	1.12	3.05	11.59	66.16	8.53	9.19

AVERAGE WIND SPEED FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN MPH)

Index	1	2	3	4	5	6	7
Speed	5.5	1.9	6.2	6.8	6.2	3.3	3.2

WIND ROSE FOR EACH TEMP. LAPSE RATE STABILITY INDEX (IN PERCENT OF EACH INDEX TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	15.38	7.69	3.85	3.85	7.69	7.69	7.69	3.85	3.85	7.69	15.38	7.69	3.85	3.85	0.00
2	0.00	1.23	6.17	6.17	0.00	0.00	3.70	1.23	1.23	0.00	1.23	1.23	3.70	2.47	4.94	1.23	65.43
3	6.82	6.82	9.55	5.91	5.45	5.00	5.45	5.00	4.55	3.18	3.64	4.09	5.91	15.00	11.36	2.27	0.00
4	4.54	4.42	4.30	3.82	4.78	5.85	3.11	2.87	2.03	3.23	3.23	7.17	13.02	20.91	9.20	7.53	0.00
5	2.16	1.90	1.84	4.18	6.11	6.21	5.59	6.49	4.00	3.29	4.29	9.73	16.84	13.35	4.90	6.40	2.72
6	.65	0.00	.32	1.79	4.87	10.71	12.99	23.05	21.27	11.36	3.57	4.55	1.95	1.30	.81	.81	0.00
7	.60	.15	.60	2.41	6.33	7.08	9.19	18.52	29.67	15.06	3.16	2.56	2.26	1.05	.45	.90	0.00

ANNUAL AVERAGE 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.
TOTAL NO. OF OBS = 7223

GROSS WIND ROSE (IN PERCENT OF TOTAL (OBS)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
	2.27	2.01	2.22	3.86	5.77	6.52	6.24	8.49	7.60	5.01	3.95	8.06	13.30	11.98	4.83	5.36	2.53
Speed	5.4	5.1	4.7	4.3	4.8	4.4	3.5	3.3	3.1	3.0	3.8	5.8	8.7	9.9	8.9	6.7	0.0

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION FOR EACH WIND DIRECTION (IN PERCENT OF DIRECTION TOTAL)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	2.50	.72	.24	.21	.44	.33	.36	.28	.35	.34	.42	.23	.29	.26	0.00
2	0.00	.69	3.13	1.79	0.00	0.00	.67	.16	.18	0.00	.35	.17	.31	.23	1.15	.26	28.96
3	9.15	10.34	13.12	4.66	2.88	2.34	2.66	1.79	1.82	1.93	2.81	1.55	1.35	3.82	7.16	1.29	0.00
4	23.17	25.52	22.50	11.47	9.59	10.40	5.76	3.92	3.10	7.46	9.47	10.31	11.34	20.23	22.06	16.28	0.00
5	62.80	62.76	55.00	71.68	70.02	63.06	59.20	50.57	34.79	43.37	71.93	79.90	83.77	73.76	67.05	79.06	71.04
6	2.44	0.00	1.25	3.94	7.19	14.01	17.74	23.16	23.86	19.34	7.72	4.81	1.25	.92	1.43	1.29	0.00
7	2.44	.69	2.50	5.73	10.07	9.98	13.53	20.07	35.88	27.62	7.37	2.92	1.56	.81	.86	1.55	0.00

TEMP. LAPSE RATE STABILITY INDEX DISTRIBUTION IN PERCENT OF TOTAL OBS.

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N	Calm
1	0.00	0.00	.06	.03	.01	.01	.03	.03	.03	.01	.01	.03	.06	.03	.01	.01	0.00
2	0.00	.01	.07	.07	0.00	0.00	.04	.01	.01	0.00	.01	.01	.04	.03	.06	.01	.73
3	.21	.21	.29	.18	.17	.15	.17	.15	.14	.10	.11	.12	.18	.46	.35	.07	0.00
4	.53	.51	.50	.44	.55	.68	.36	.33	.24	.37	.37	.83	1.51	2.42	1.07	.87	0.00
5	1.43	1.26	1.22	2.77	4.04	4.11	3.70	4.29	2.64	2.17	2.84	6.44	11.14	8.83	3.24	4.24	1.80
6	.06	0.00	.03	.15	.42	.91	1.11	1.97	1.81	.97	.30	.39	.17	.11	.07	.07	0.00
7	.06	.01	.06	.22	.58	.65	.84	1.70	2.73	1.38	.29	.24	.21	.10	.04	.08	0.00

AVERAGE WIND SPEED (INVERSE WEIGHTED) BY INDEX AND DIRECTION (IN MPH)

Index	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0.00	0.00	3.33	4.50	5.00	3.00	8.00	3.43	1.33	1.00	5.00	6.00	5.59	4.80	16.00	1.00
2	0.00	10.00	4.38	5.60	0.00	0.00	3.56	5.00	5.00	0.00	2.00	2.00	1.89	6.22	5.75	2.00
3	5.04	4.50	4.68	3.88	4.41	3.94	4.90	4.64	4.28	2.65	3.96	4.69	7.88	6.15	5.01	3.51
4	3.82	4.38	4.04	2.95	3.68	3.75	4.55	3.42	3.16	2.68	3.39	4.26	6.64	7.47	6.71	4.69
5	3.38	3.70	3.16	3.40	3.36	3.10	2.44	2.54	2.44	2.26	3.00	4.27	6.57	7.49	6.36	4.77
6	1.87	0.00	1.60	2.84	2.77	2.76	2.60	2.57	2.39	2.10	2.20	3.16	4.14	2.25	11.27	2.40
7	4.17	5.00	3.87	2.47	2.79	2.89	2.42	2.66	2.50	2.20	1.62	1.88	3.32	1.88	3.64	2.18

(AVERAGE INVERSE SPEED)

1	0.00	0.00	.30	.22	.20	.33	.12	.29	.75	1.00	.20	.17	.18	.21	.06	1.00
2	0.00	.10	.23	.18	0.00	0.00	.28	.20	.20	0.00	.50	.50	.53	.16	.17	.50
3	.20	.22	.21	.26	.23	.25	.20	.22	.23	.38	.25	.21	.13	.16	.20	.29
4	.26	.23	.25	.34	.27	.27	.22	.29	.32	.37	.30	.23	.15	.13	.15	.21
5	.30	.27	.32	.29	.30	.32	.41	.39	.41	.44	.33	.23	.15	.13	.16	.21
6	.54	0.00	.63	.35	.36	.36	.39	.39	.42	.48	.45	.32	.24	.44	.09	.42
7	.24	.29	.26	.41	.36	.35	.41	.38	.40	.45	.62	.53	.30	.53	.27	.46

ANNUAL AVERAGE 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

CHI/Q FOR RELEASE HEIGHT OF 4.7000E+01 METERS (IN SEC PER CU METER)

DIST, M	NNE	NE	ENE	E	ESE	SE	SSE	S
2.0000E+02	4.2793E-09	6.0607E-09	6.0743E-08	3.0882E-08	1.0551E-08	1.5073E-08	2.2502E-08	2.5287E-08
4.0000E+02	5.8457E-08	6.3189E-08	1.2081E-07	9.0736E-08	6.0165E-08	6.6807E-08	6.6273E-08	5.9663E-08
6.0000E+02	1.0968E-07	1.0436E-07	1.4372E-07	1.4875E-07	1.4408E-07	1.6246E-07	1.3591E-07	1.4336E-07
8.0000E+02	1.5374E-07	1.3687E-07	1.6823E-07	2.2400E-07	2.6337E-07	2.9622E-07	2.7423E-07	3.0335E-07
1.2000E+03	1.8422E-07	1.5645E-07	1.8150E-07	2.9293E-07	3.8486E-07	4.3294E-07	4.3565E-07	4.9215E-07
1.6000E+03	1.7542E-07	1.4612E-07	1.6749E-07	2.8920E-07	3.9410E-07	4.4658E-07	4.6362E-07	5.3189E-07
2.4000E+03	1.3765E-07	1.1212E-07	1.2832E-07	2.3425E-07	3.3041E-07	3.8166E-07	4.0841E-07	4.8230E-07
3.2000E+03	1.0591E-07	8.4984E-08	9.7661E-08	1.8287E-07	2.6302E-07	3.0914E-07	3.3620E-07	4.0644E-07
4.0000E+03	8.3330E-08	6.6099E-08	7.6324E-08	1.4521E-07	2.1179E-07	2.5237E-07	2.7750E-07	3.4183E-07
4.8000E+03	6.7294E-08	5.2885E-08	6.1352E-08	1.1813E-07	1.7424E-07	2.0984E-07	2.3274E-07	2.9118E-07
5.6000E+03	5.5626E-08	4.3374E-08	5.0542E-08	9.8305E-08	1.4640E-07	1.7775E-07	1.9860E-07	2.5182E-07
6.4000E+03	4.6897E-08	3.6322E-08	4.2502E-08	8.3414E-08	1.2529E-07	1.5307E-07	1.7214E-07	2.2085E-07
7.2000E+03	4.0198E-08	3.0950E-08	3.6358E-08	7.1950E-08	1.0891E-07	1.3371E-07	1.5125E-07	1.9607E-07
8.0000E+03	3.4939E-08	2.6760E-08	3.1552E-08	6.2922E-08	9.5917E-08	1.1821E-07	1.3443E-07	1.7590E-07
8.8000E+03	3.0729E-08	2.3424E-08	2.7715E-08	5.5672E-08	8.5415E-08	1.0558E-07	1.2066E-07	1.5921E-07
9.6000E+03	2.7302E-08	2.0722E-08	2.4599E-08	4.9748E-08	7.6781E-08	9.5129E-08	1.0922E-07	1.4519E-07
1.0400E+04	2.4469E-08	1.8500E-08	2.2028E-08	4.4835E-08	6.9578E-08	8.6366E-08	9.9572E-08	1.3327E-07
1.1200E+04	2.2098E-08	1.6647E-08	1.9879E-08	4.0707E-08	6.3491E-08	7.8929E-08	9.1349E-08	1.2302E-07
1.2000E+04	2.0091E-08	1.5085E-08	1.8063E-08	3.7197E-08	5.8289E-08	7.2550E-08	8.4266E-08	1.1412E-07
1.2800E+04	1.8374E-08	1.3754E-08	1.6511E-08	3.4184E-08	5.3799E-08	6.7028E-08	7.8109E-08	1.0632E-07
1.4400E+04	1.5604E-08	1.1617E-08	1.4010E-08	2.9292E-08	4.6461E-08	5.7969E-08	6.7952E-08	9.3331E-08
1.5200E+04	1.4475E-08	1.0750E-08	1.2992E-08	2.7286E-08	4.3431E-08	5.4217E-08	6.3722E-08	8.7867E-08
1.6000E+04	1.3479E-08	9.9875E-09	1.2095E-08	2.5511E-08	4.0736E-08	5.0875E-08	5.9943E-08	8.2956E-08
1.6800E+04	1.2596E-08	9.3130E-09	1.1300E-08	2.3929E-08	3.8327E-08	4.7884E-08	5.6548E-08	7.8521E-08
1.7600E+04	1.1808E-08	8.7129E-09	1.0591E-08	2.2513E-08	3.6163E-08	4.5192E-08	5.3485E-08	7.4498E-08
1.8400E+04	1.1102E-08	8.1763E-09	9.9558E-09	2.1239E-08	3.4208E-08	4.2759E-08	5.0708E-08	7.0835E-08
1.9200E+04	1.0467E-08	7.6943E-09	9.3841E-09	2.0088E-08	3.2436E-08	4.0551E-08	4.8181E-08	6.7485E-08
2.0000E+04	9.8918E-09	7.2594E-09	8.8673E-09	1.9044E-08	3.0822E-08	3.8540E-08	4.5873E-08	6.4413E-08
2.0800E+04	9.3701E-09	6.8655E-09	8.3984E-09	1.8093E-08	2.9348E-08	3.6701E-08	4.3757E-08	6.1587E-08
2.1600E+04	8.8948E-09	6.5074E-09	7.9714E-09	1.7223E-08	2.7997E-08	3.5015E-08	4.1813E-08	5.8978E-08
2.2400E+04	8.4605E-09	6.1807E-09	7.5813E-09	1.6426E-08	2.6754E-08	3.3463E-08	4.0020E-08	5.6564E-08
2.3200E+04	8.0622E-09	5.8817E-09	7.2237E-09	1.5693E-08	2.5609E-08	3.2032E-08	3.8362E-08	5.4325E-08
2.4000E+04	7.6961E-09	5.6073E-09	6.8949E-09	1.5018E-08	2.4549E-08	3.0708E-08	3.6826E-08	5.2243E-08
5.0000E+04	2.9337E-09	2.0910E-09	2.6241E-09	5.9722E-09	1.0044E-08	1.2558E-08	1.5382E-08	2.2399E-08
1.0000E+05	1.3610E-09	9.6914E-10	1.2134E-09	2.7577E-09	4.6229E-09	5.8092E-09	7.0962E-09	1.0243E-08

ANNUAL AVERAGE 13 MO. DATA 1 DUQUESNE - BEAVER VALLEY - (9/5/69 - 9/5/70) REL. HT 150 FT.

CHI/Q FOR RELEASE HEIGHT OF 4.7000E+01 METERS (IN SEC PER CU METER)

DIST, M	SSW	SW	WSW	W	WNW	NW	NNW	N
2.0000E+02	5.5631E-08	3.6960E-08	1.5877E-08	2.0158E-08	4.6173E-08	2.5611E-08	1.8083E-08	4.1553E-08
4.0000E+02	7.0732E-08	7.0347E-08	5.5429E-08	6.6166E-08	9.4125E-08	1.2751E-07	1.0491E-07	6.8222E-08
6.0000E+02	1.1481E-07	1.3367E-07	1.1485E-07	1.6964E-07	2.0138E-07	2.5035E-07	1.5705E-07	1.3843E-07
8.0000E+02	2.1204E-07	2.2716E-07	2.0577E-07	3.2198E-07	3.6891E-07	3.7406E-07	2.0121E-07	2.3066E-07
1.2000E+03	3.3066E-07	3.2518E-07	3.0038E-07	4.7718E-07	5.3890E-07	4.7159E-07	2.2887E-07	3.1501E-07
1.6000E+03	3.5978E-07	3.3847E-07	3.0836E-07	4.8888E-07	5.4822E-07	4.5682E-07	2.1409E-07	3.1345E-07
2.4000E+03	3.3618E-07	2.9850E-07	2.5985E-07	4.0767E-07	4.5163E-07	3.6248E-07	1.6493E-07	2.5386E-07
3.2000E+03	2.9153E-07	2.4923E-07	2.0771E-07	3.2239E-07	3.5347E-07	2.7965E-07	1.2540E-07	1.9740E-07
4.0000E+03	2.5165E-07	2.0918E-07	1.6781E-07	2.5788E-07	2.8025E-07	2.2014E-07	9.7786E-08	1.5601E-07
4.8000E+03	2.1978E-07	1.7858E-07	1.3845E-07	2.1076E-07	2.2725E-07	1.7777E-07	7.8409E-08	1.2629E-07
5.6000E+03	1.9472E-07	1.5518E-07	1.1661E-07	1.7590E-07	1.8833E-07	1.4693E-07	6.4437E-08	1.0455E-07
6.4000E+03	1.7479E-07	1.3697E-07	1.0002E-07	1.4953E-07	1.5907E-07	1.2388E-07	5.4061E-08	8.8242E-08
7.2000E+03	1.5864E-07	1.2248E-07	8.7106E-08	1.2912E-07	1.3654E-07	1.0619E-07	4.6146E-08	7.5712E-08
8.0000E+03	1.4528E-07	1.1070E-07	7.6849E-08	1.1298E-07	1.1882E-07	9.2318E-08	3.9965E-08	6.5867E-08
8.8000E+03	1.3402E-07	1.0095E-07	6.8541E-08	9.9988E-08	1.0461E-07	8.1217E-08	3.5039E-08	5.7982E-08
9.6000E+03	1.2438E-07	9.2733E-08	6.1700E-08	8.9348E-08	9.3032E-08	7.2182E-08	3.1043E-08	5.1559E-08
1.0400E+04	1.1602E-07	8.5713E-08	5.5984E-08	8.0509E-08	8.3456E-08	6.4718E-08	2.7753E-08	4.6249E-08
1.1200E+04	1.0868E-07	7.9643E-08	5.1146E-08	7.3074E-08	7.5433E-08	5.8472E-08	2.5007E-08	4.1801E-08
1.2000E+04	1.0219E-07	7.4338E-08	4.7006E-08	6.6749E-08	6.8637E-08	5.3183E-08	2.2689E-08	3.8035E-08
1.2800E+04	9.6385E-08	6.9661E-08	4.3429E-08	6.1315E-08	6.2821E-08	4.8660E-08	2.0712E-08	3.4812E-08
1.4400E+04	8.6457E-08	6.1789E-08	3.7570E-08	5.2492E-08	5.3429E-08	4.1361E-08	1.7533E-08	2.9608E-08
1.5200E+04	8.2174E-08	5.8445E-08	3.5147E-08	4.8874E-08	4.9598E-08	3.8385E-08	1.6241E-08	2.7486E-08
1.6000E+04	7.8265E-08	5.5420E-08	3.2990E-08	4.5671E-08	4.6218E-08	3.5761E-08	1.5104E-08	2.5613E-08
1.6800E+04	7.4683E-08	5.2671E-08	3.1060E-08	4.2820E-08	4.3219E-08	3.3432E-08	1.4096E-08	2.3951E-08
1.7600E+04	7.1389E-08	5.0163E-08	2.9324E-08	4.0267E-08	4.0542E-08	3.1354E-08	1.3200E-08	2.2468E-08
1.8400E+04	6.8351E-08	4.7866E-08	2.7755E-08	3.7972E-08	3.8141E-08	2.9492E-08	1.2397E-08	2.1138E-08
1.9200E+04	6.5540E-08	4.5754E-08	2.6331E-08	3.5898E-08	3.5979E-08	2.7814E-08	1.1676E-08	1.9940E-08
2.0000E+04	6.2932E-08	4.3807E-08	2.5033E-08	3.4017E-08	3.4023E-08	2.6297E-08	1.1024E-08	1.8856E-08
2.0800E+04	6.0507E-08	4.2007E-08	2.3847E-08	3.2305E-08	3.2247E-08	2.4919E-08	1.0434E-08	1.7872E-08
2.1600E+04	5.8247E-08	4.0338E-08	2.2760E-08	3.0741E-08	3.0629E-08	2.3664E-08	9.8961E-09	1.6975E-08
2.2400E+04	5.6136E-08	3.8786E-08	2.1759E-08	2.9307E-08	2.9149E-08	2.2516E-08	9.4055E-09	1.6154E-08
2.3200E+04	5.4160E-08	3.7341E-08	2.0835E-08	2.7989E-08	2.7792E-08	2.1464E-08	8.9562E-09	1.5402E-08
2.4000E+04	5.2307E-08	3.5991E-08	1.9980E-08	2.6775E-08	2.6543E-08	2.0496E-08	8.5435E-09	1.4710E-08
5.0000E+04	2.3832E-08	1.5941E-08	8.2209E-09	1.0597E-08	1.0244E-08	7.8656E-09	3.2203E-09	5.6684E-09
1.0000E+05	1.0607E-08	7.1459E-09	3.7809E-09	4.9392E-09	4.8080E-09	3.6504E-09	1.4924E-09	2.6437E-09

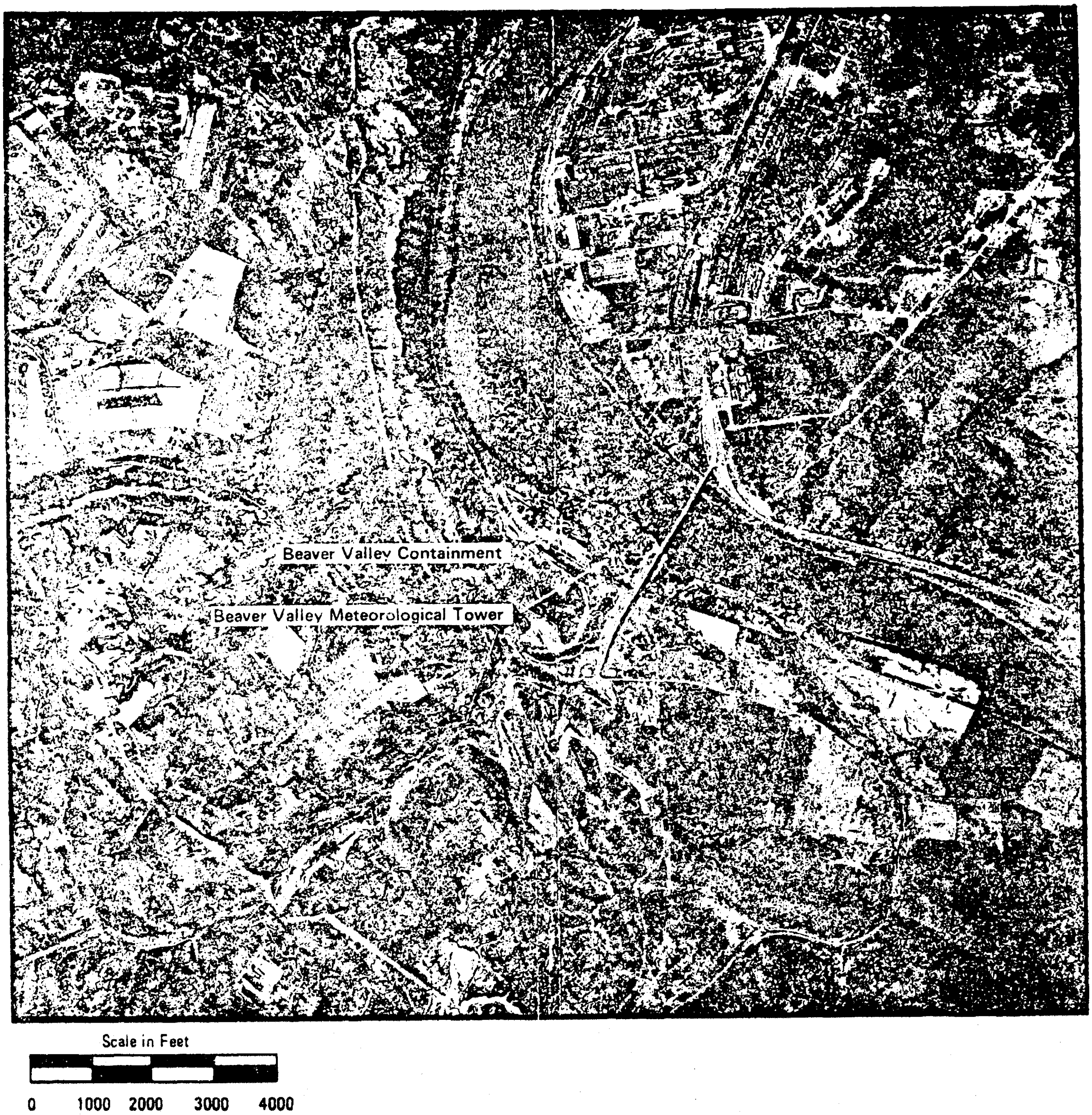

Figure 1 – SITE PLAN

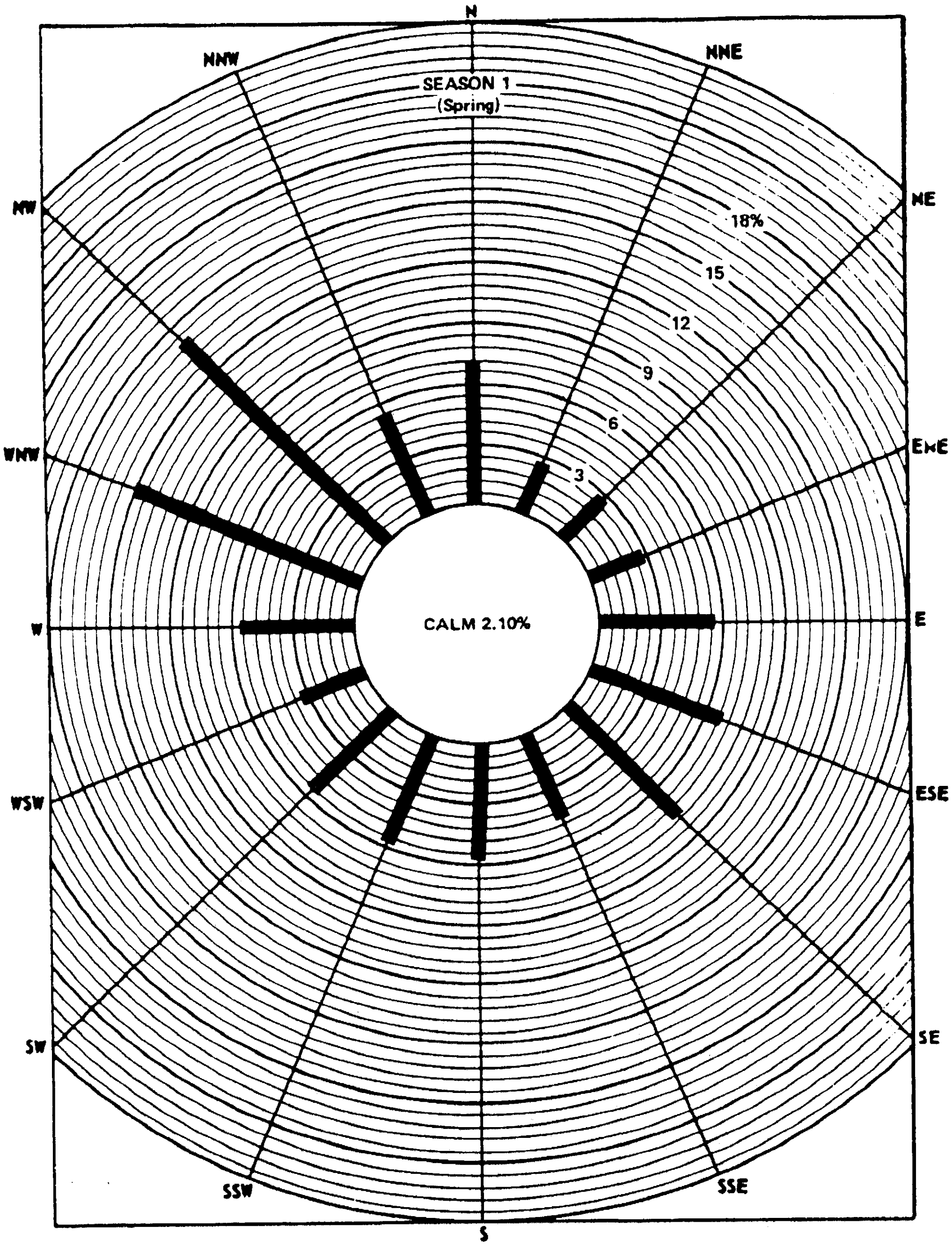

FIGURE 2
GROSS WIND ROSE
BEAVER VALLEY SITE
50 FT. LEVEL

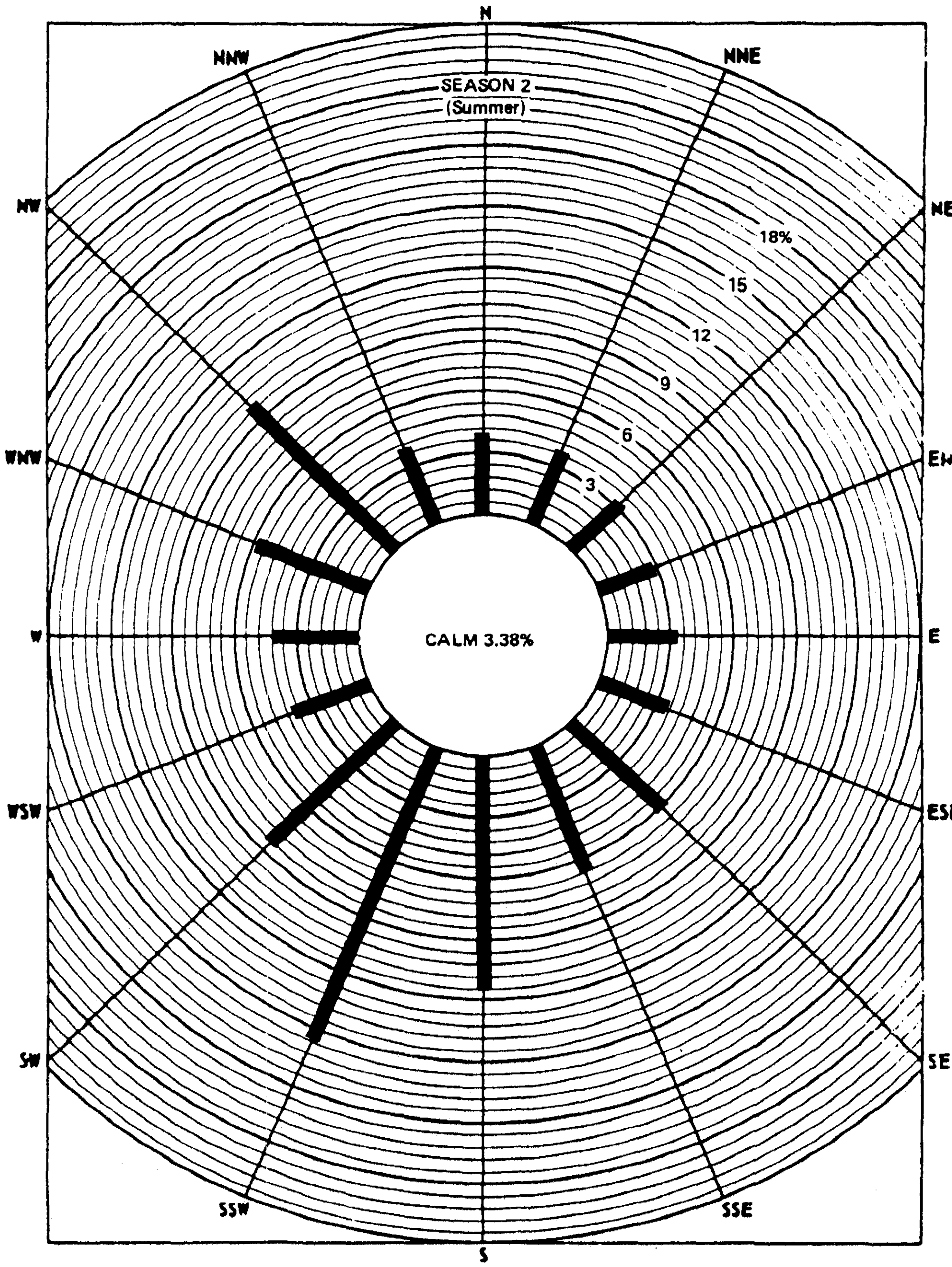

FIGURE 3
GROSS WIND ROSE
BEAVER VALLEY SITE
50 FT. LEVEL

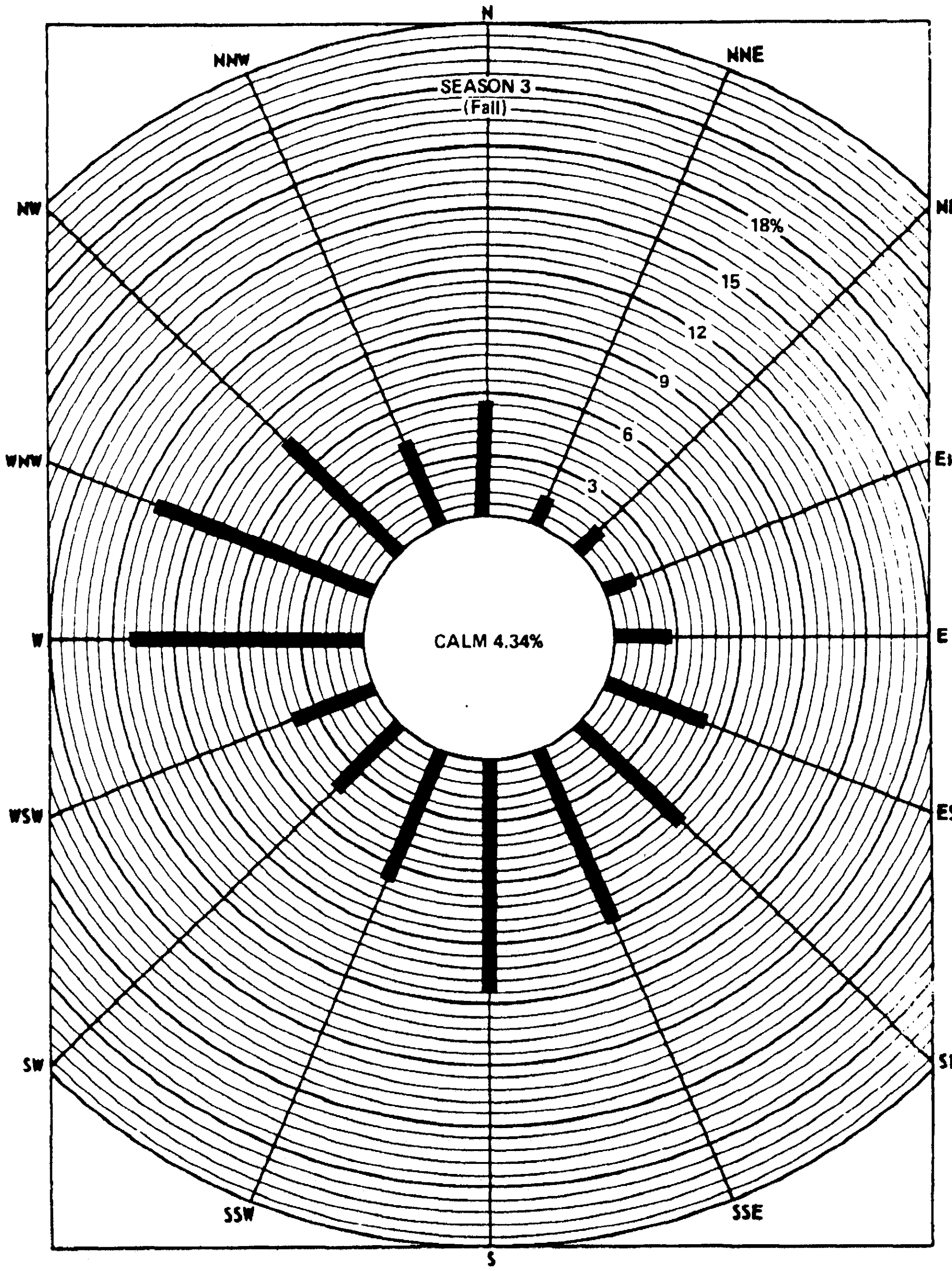

FIGURE 4
GROSS WIND ROSE
BEAVER VALLEY SITE
50 FT. LEVEL

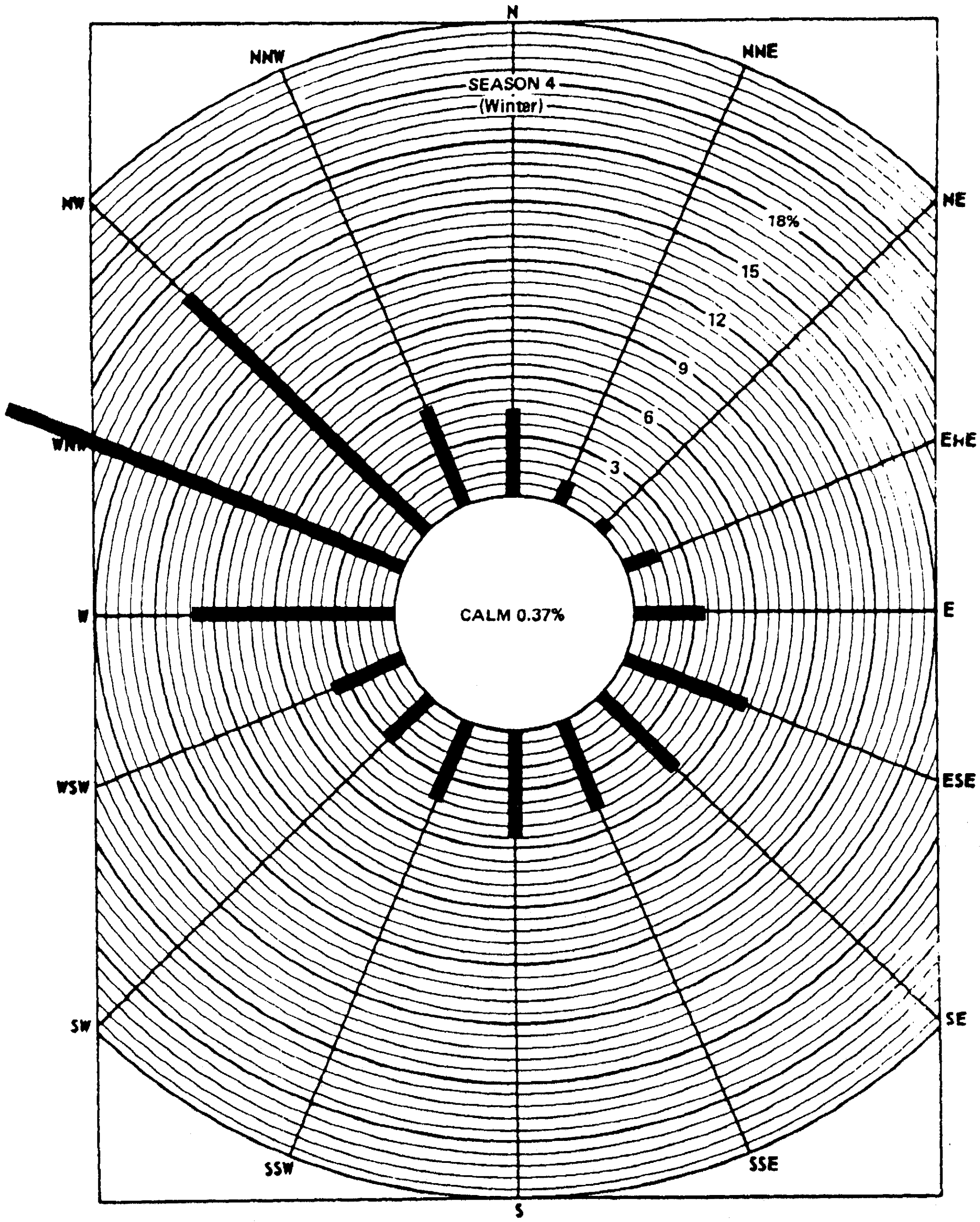

FIGURE 5
GROSS WIND ROSE
BEAVER VALLEY SITE
50 FT. LEVEL

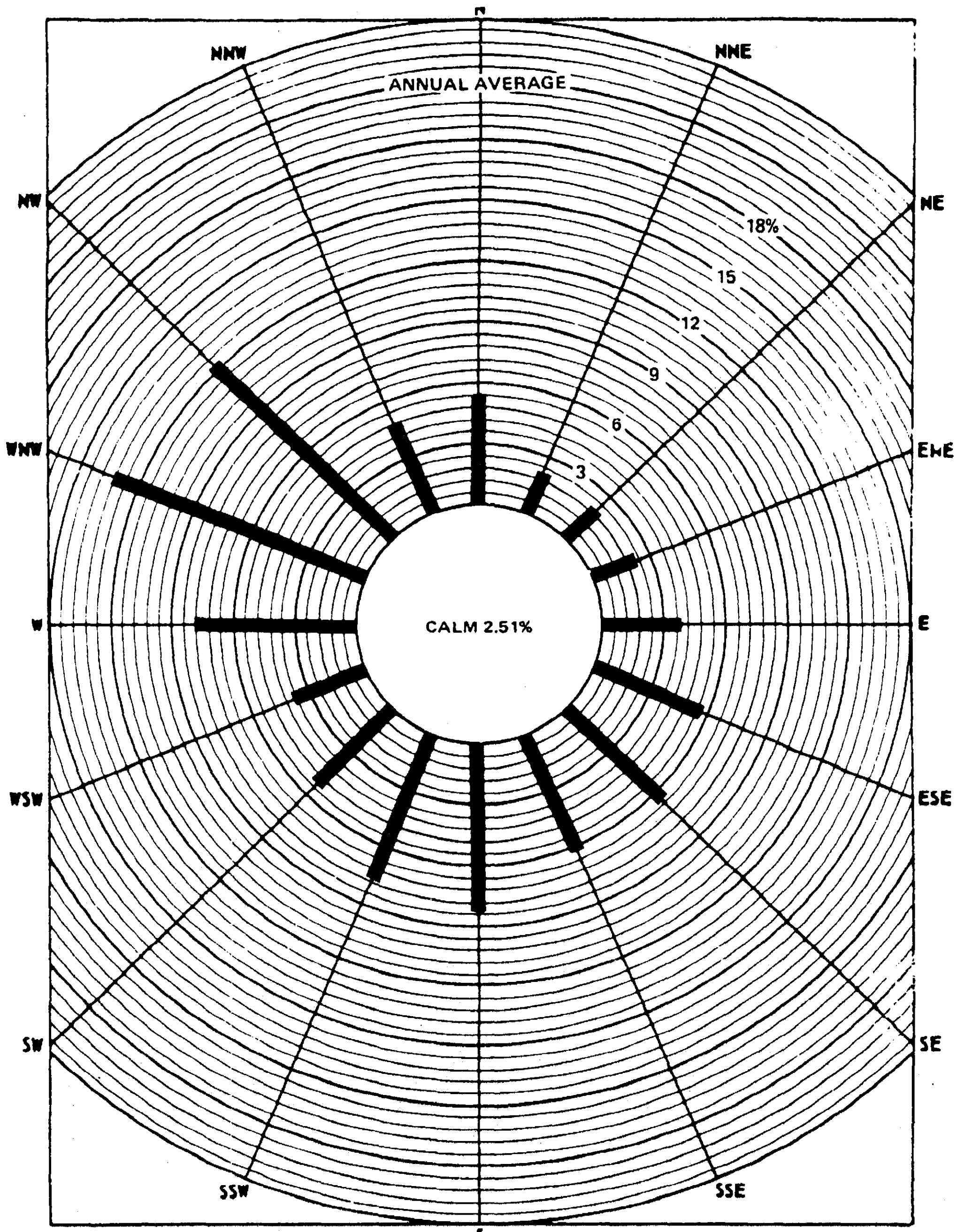

FIGURE 6
GROSS WIND ROSE
BEAVER VALLEY SITE
50 FT. LEVEL

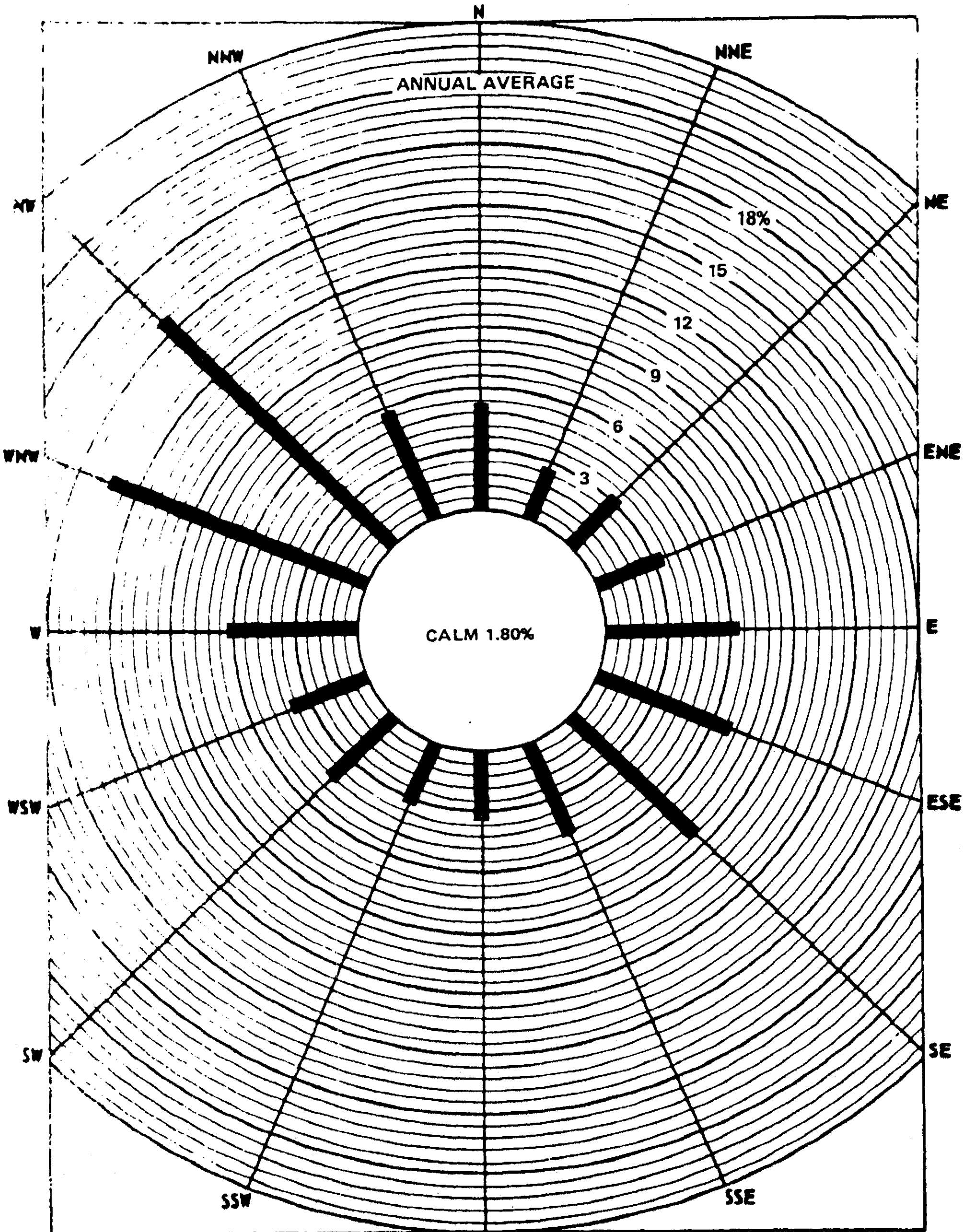

FIGURE 7
GROSS WIND ROSE
BEAVER VALLEY SITE
150 FT. LEVEL

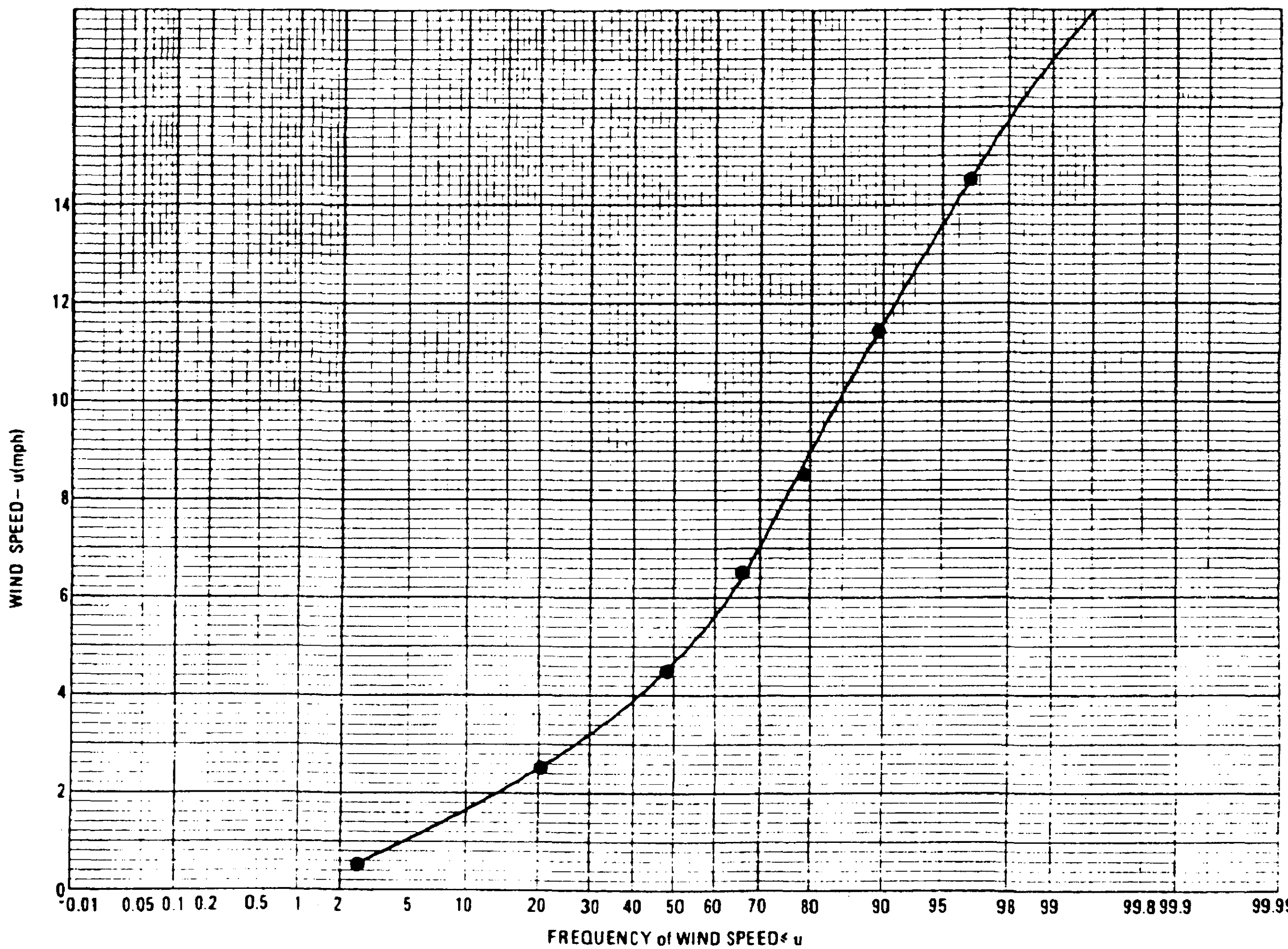

FIGURE 8

WIND SPEED DISTRIBUTION

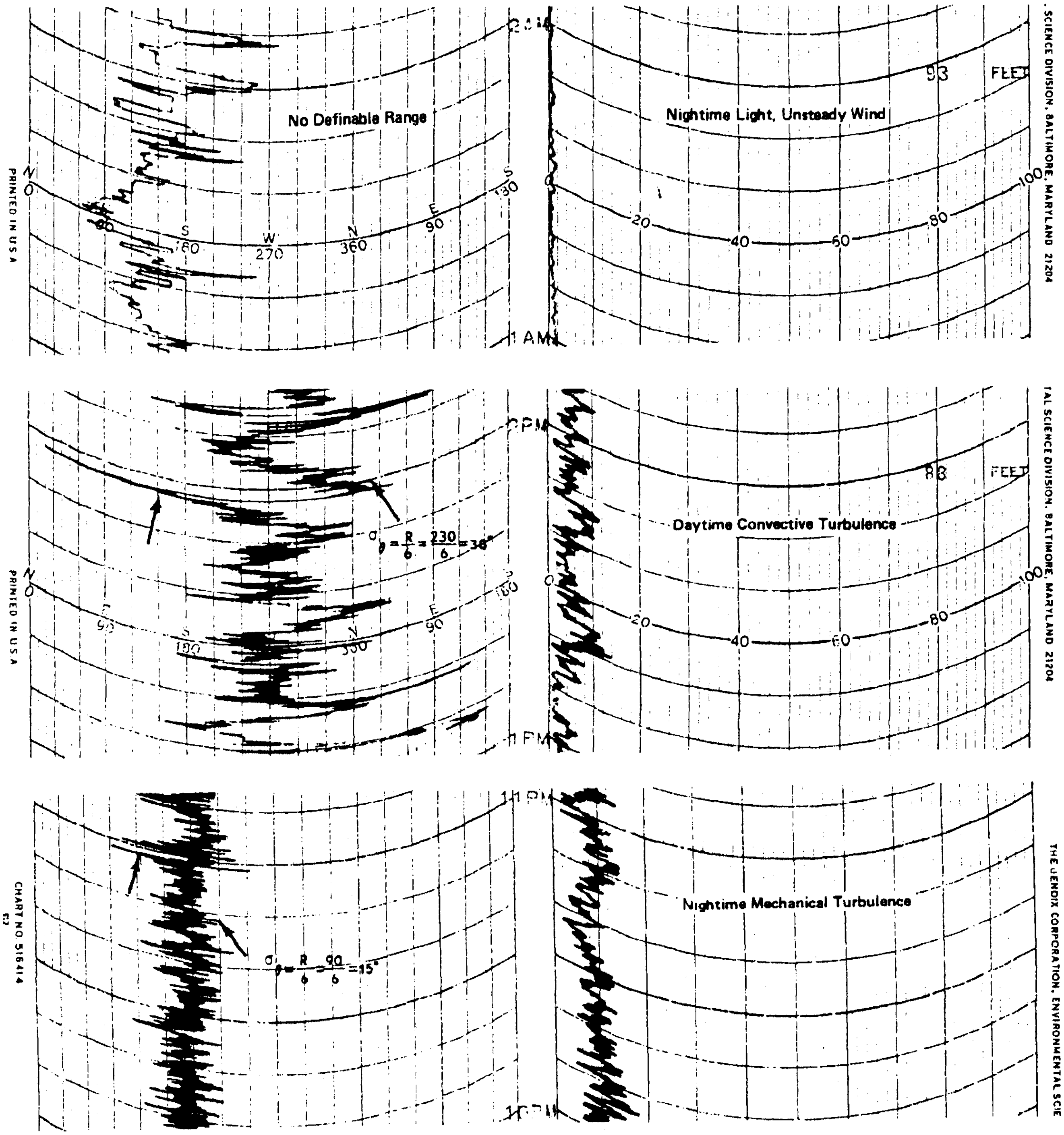

Figure 9

ESTIMATION OF σ_θ FROM WIND DIRECTION RANGE

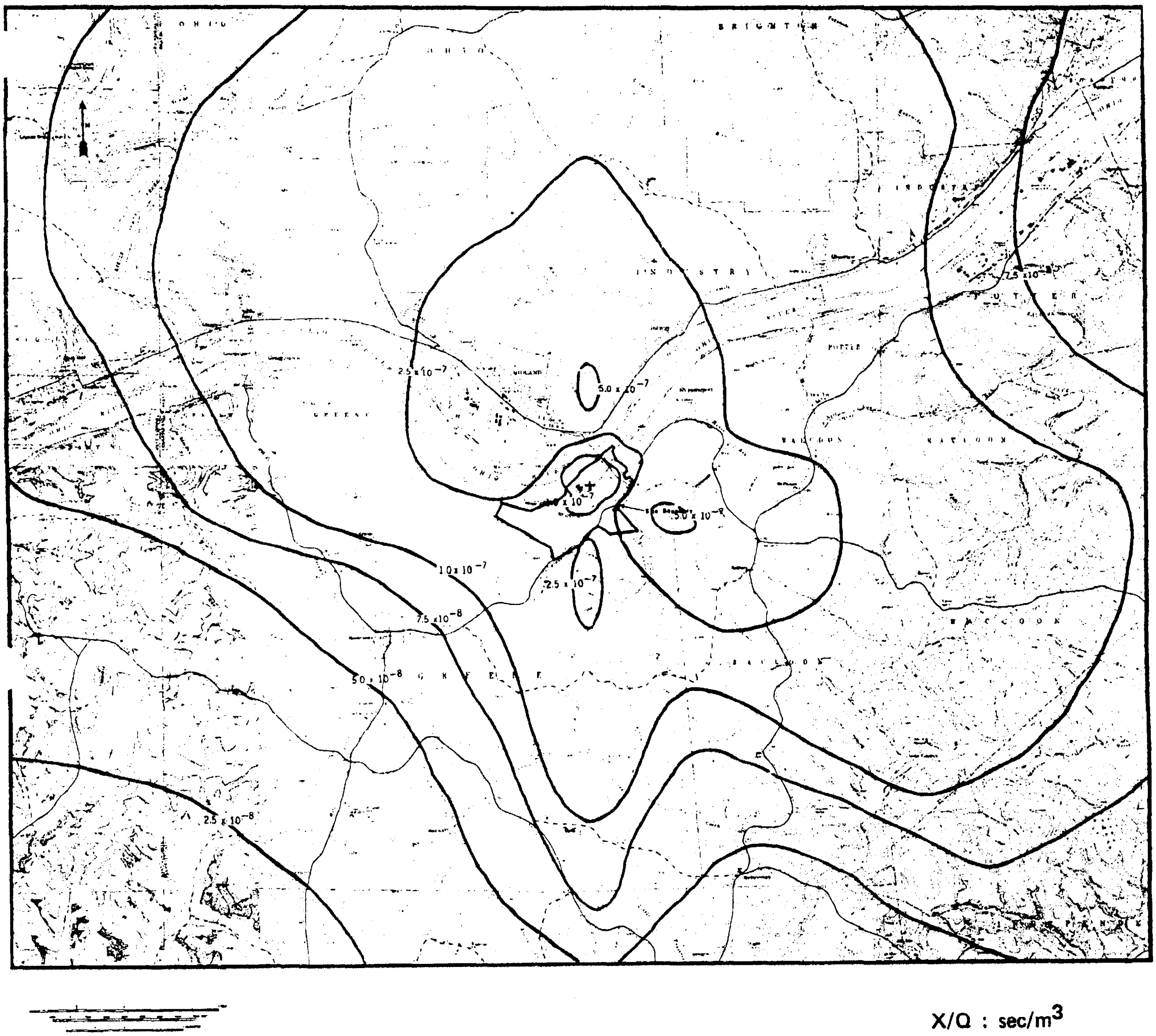

Fig. 10 ANNUAL AVERAGE X/Q s
BEAVER VALLEY POWER STATION

APPENDIX 2A.2

SECOND ANNUAL REPORT

THE METEOROLOGICAL PROGRAM

AT THE

BEAVER VALLEY POWER STATION

September 5, 1970 - September 5, 1971

Report Date: April, 1972

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

ENVIRONMENTAL SAFEGUARDS DIVISION

NUS CORPORATION

ROCKVILLE, MARYLAND

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I. INTRODUCTION AND SUMMARY

This second annual report summarizes meteorological data collected at the Beaver Valley site over a year period extending from September 5, 1970 through September 5, 1971. The data was analyzed to develop parameters appropriate to dispersion estimates for the design basis accident, and for evaluation of the average dispersion conditions which would govern normal gaseous releases from the Beaver Valley Power Station.

II. SITE METEOROLOGICAL PROGRAM

On April 19, 1969, the following equipment was installed on the Beaver Valley meteorological tower:

Bendix-Friez aerovanes with six-bladed propellers at the 50 and 150 foot levels and Bendix-Friez recorders

Packard-Bell wind sensors (Models WS-101), at the 50 foot level and Esterline Angus recorders

NUS Wind Variance Computer

Due to a delay in vendor delivery, the Bristol temperature system, consisting of resistance temperature bulbs with Packard-Bell aspirated shields at the 50 and 150 foot levels, and multi-point Bristol recorder, was not installed until September 5, 1969. At this time, the Foxboro dew cell was also installed. All meteorological sensors were placed on booms on a tower located approximately 250 meters from the center of the Unit 1 containment structure. Although this location originally assured good exposure for the wind sensors the erection of offices, buildings and warehouses in the vicinity of the tower may have affected the wind speed data during the period September 5, 1970 through the present. An analysis of this question is presented in the section, "Site Meteorological Data Analysis". Figure 2A.1-1 shows the approximate location of the meteorological tower relative to the containment structure, though most of the indicated trees have since been cleared as construction has proceeded.

The particular Bendix-Friez wind system chosen is rugged, yet has the lowest threshold, approximately 2 mph, of any such equipment. The supplementary Packard-Bell wind system with a threshold of 0.7 mph was particularly intended to help analyze wind and temperature statistics under low wind speed conditions.

The recovery rate of the site data for these 52 weeks is presented in Table 2A.2-1, and is considered satisfactory for an accurate representation of the site conditions.

Instrument performance was generally satisfactory during the one year period from September 5, 1970 to September 5, 1971. The primary instrument problems were with wind speed and direction transmitter of the Packard-Bell wind speed system whose respective failures resulted in a considerable amount of down time while replacement components were ordered.

Other data loss from the Packard-Bell instrument resulted from the short-term "painting" of the wind recorder. Unfortunately, this characteristic is inherent in the Packard-Bell and other sensors which have a significant "dead band."

Operation of the Bendix-Friez instruments was quite good. The only malfunction occurred with the 150 foot recorder. Otherwise, the loss of Bendix data occurred solely from short-term inking problems, and in transmittal to NUS Corporation from the site. No malfunctions with the Bristol temperature system were observed; the only data loss resulted from occasional inking difficulties.

The Foxboro dew cell was installed to gather data in support of the cooling towers; reduction of the dew cell data has shown that good dew-point data is available from April 2, 1970 through the remainder of this report period. Prior to April 1970 it appears that the dust from the construction site and corrosion interfered with the proper operation of the lithium chloride solution; the problem was solved by having a local representative of NUS Corporation clean the sensor on a weekly basis.

III. DATA REDUCTION

Data records from the wind sensors and the temperature and dew cell recorders were forwarded to NUS for reduction and analysis. Wind data were obtained both from the strip charts and the Variance Computer; however, in order to be consistent with analyses presented in the first annual report,[(1)] the results presented in this report are based upon the strip chart data.

Wind records were examined and hourly data extracted representing wind speed and direction averages and wind direction range. Range was determined from the two second-most extreme gusts. This data was taken for the two levels of Bendix-Friez sensors and the Packard-Bell equipment at the 50 foot level. Temperature measurements for the 50 and 150 foot levels were recorded hourly, as were dew point data for the 50 foot level.

The data was entered on punched cards and processed to yield the data summaries presented and discussed in the following sections.

IV. SITE METEOROLOGICAL DATA ANALYSIS

A. Wind Roses and Speeds

Based on Bendix-Friex data from the 50 foot level, Figures 2A.2-2, 2A.2-3, 2A.2-4, 2A.2-5, and 2A.2-6. show the distribution of wind directions for the four seasons (Season 1: March through May, Season 2: June through August, Season 3: September through November, and Season 4: December through February) and the annual distribution. It is noted that in spring the winds from the northwest quadrant prevail. In summer, the wind directions from south-southeast to south-southwest predominate, along with a secondary maximum of winds from west-northwest. A season of transition, autumn, shows relatively high frequencies of winds from the south to southeast with a secondary maximum of winds from northwest. This pattern of prevailing winds probably reflects both the large scale wind flow from meteorological pressure systems. During the winter, winds from the northwest quadrant are dominant; the effect of the valley in channeling is evident in the high frequencies of winds from the north-northwest and northwest. As a result of the seasonal patterns, the annual wind roses exhibit a high frequency of winds from the northwest quadrant and from southerly directions. The distribution of wind directions at the 150 foot level, shown in Figure 2A.2-7, is somewhat more uniform, though still with prevailing winds from the northwest quadrant.

Table 2A.2-2 shows the seasonal and annual average wind speeds for the 50 foot level based on both the Bendix-Friez and Packard-Bell data and the 150 foot level based on the Bendix data; these values are compared with those found previously. Speeds are determined over 15 minute averaging periods. It is noted that the season of highest wind speed is winter; whereas, the lowest wind speeds occur in summer. The average annual value of 4.7 mph at the 50 foot level is higher than the 3 mph value found by the Weather Bureau during the two-year site meteorological program conducted in Shippingport from 1955-1957 but lower than the annual average wind speed 5.5 mph found by the Bendix instruments during the previous year. The annual figure of 2.4 percent "calm" found by the Beaver Valley meteorological program compares with 8.5 percent found by the Weather Bureau from 1955-1957 and 2.5 percent noted during first year of the Beaver Valley meteorological program. Again, about two-thirds of the calms noted by the applicant occurred during the night; thus, if daytime calms are excluded, the overall frequency of calms is only 1.5 percent of all observations. The overall occurrence of calms as measured by the Packard-Bell instrument is only 2.5 percent. It is expected that the frequency of calms would be less as measured by the Packard-Bell than with the Bendix instrument because of the lower threshold and greater sensitivity of the Packard-Bell instrument.

The somewhat lower average wind speed found at both the 50 and 150 foot levels during the period 1970-1971 compared to the period 1969-1970 was noted and investigated. Inasmuch as there was considerable construction activity upon the site, including 15-20 feet high urrounding the meteorological tower, it was decided to investigate whether or not this reduction in wind speed was likely to be attributable to the construction.

The wind directions which were thought to be potentially affected by the presence of these temporary structures in the vicinity of the meteorological tower were from the north-northwest, northeast, southeast, south, southwest, west-southwest, west, west-northwest, northwest and north-northwest. Before performing a detailed analysis, however, it was decided to ascertain whether the wind speed reduction could be attributed to natural yearly variations of the synoptic meteorology. Thus in Table 2A.2-3 the average monthly wind speeds at Greater Pittsburgh Airport are presented from September 1969 through August 1971. It can be concluded that seasonally, as well as monthly, the gradient wind speeds were not lower during the period September 1970-August 1971 compared to September 1969-August 1970, with the exception of the summer season. However, this season will not be included in subsequent analysis inasmuch as substantial building construction around the meteorological tower during the summer of 1970 and the objective is to compare the seasonal winds before and after this period. Thus in comparing the gradient wind speeds during fall 1969 and fall 1970, and winter 1970 and winter 1971 and spring 1970 and 1971, there was no naturally occurring wind speed reduction during these periods at Greater Pittsburgh Airport.

Thus it would appear that site construction of buildings and alteration of air flows has resulted in somewhat lower site wind speeds. Such an effect would be expected to be more prominent with respect to the 50 foot wind measurements than with respect to the 150 foot wind measurements. This appears to be the case in examining the gross seasonal average wind speeds but is further examined qualitatively at both levels by comparing the number of the ten wind directions (defined above) which have seasonally reduced wind speeds during the period September 1970-August 1971 compared to the period September 1969-August 1970. The seasonal wind speeds for each wind direction for both the 50 and 150 foot levels are presented in Table 2A.2-4 for these time periods. From this data the number of wind directions having higher, lower or similar wind speeds in the year following the building erection is compiled in Table 2A.2-5 for both the 50 and 150 foot levels. It is apparent that the effect is more pronounced at the lower level.

Figure 2A.2-8 shows the wind speed distribution at the Beaver Valley site based on the Bendix instrument at the 50 foot level. The median wind speeds are noted to be 3.7 and 4.7 mph, respectively; thus when the medians are compared to the mean wind speeds, it is obvious that the distribution of wind speeds is somewhat skewed towards the lower values.

The longest observed wind directional persistence was for 24 hours from the north under slightly stable conditions. A persistence wind rose is presented in Figure 2A.2-9; a persistence probability plot is presented in Figure 2A.2-10.

B. Dew Point Data

As mentioned previously, essentially 100 percent dew point data recovery has been obtained since April 1, 1969, through the date of issue of this report, (April 1972). Thus approximately one year of site dew point is available for subsequent cooling tower effects analyses. Throughout the period a considerable amount of quality control was applied to the field data collection; the NUS representative who cleaned the dew cell data on a weekly basis also measured the ambient dew point temperature by using a sling psychrometer and the appropriate psychometric charts; the Foxboro dew cell values on the chart were almost always within 1.0 of the measured psychometric values.

A comparison of dew point data taken at Greater Pittsburgh Airport with that taken at the Beaver Valley site shows that the dew points recorded on site are generally about 4 higher than those at the airport.

C. Atmospheric Stability

In the context of this report, atmospheric stability refers to the degree of turbulence present in the atmosphere. An "unstable" atmosphere is turbulent and results in good diffusion of waste gases injected into the atmosphere, whereas a "stable" atmosphere is relatively non-turbulent and results in poor diffusion. "Neutral" stability refers to an intermediate condition.

Two basic methods of inferring atmospheric dispersion capability are generally available; the first is based on wind fluctuations; the second on temperature lapse rate. The first method uses a sensitive wind vane, preferably one which is free to move in both vertical and horizontal directions (a "bivane") to measure fluctuations in the wind direction in both planes, thus providing a measure of $S\theta$ and $S\varnothing$, the standard deviations of horizontal and vertical wind direction fluctuations, respectively. However, bivanes are not sufficiently rugged to provide the reliable data recovery over long time periods necessary for long-term diffusion climatology programs. Several systems have been developed which determine the horizontal variance $(S\theta)^2$ from standard (horizontal only) wind direction sensors, and which can be related to atmospheric stability.

The second method is the classical categorization of atmospheric stability based on vertical temperature structure, from which inferences of vertical diffusivity can be made. This method of course does not indicate diffusivity directly, nor does it account for differences in turbulence that may be introduced by surface roughness features.

In view of the availability of both horizontal wind fluctuations, and vertical temperature difference data, and the significance of dispersion conditions in the design basis accident considerations, both measures of atmospheric stability were combined to provide the best estimates of horizontal and vertical plume dispersion.

Using the 50 foot level Bendix-Friez data, horizontal stability based on seven classes of Sθ was determined, according to the classification scheme in Table 2A.2-6, from the range in horizontal wind direction over a 15 minute time period, based on methods presented by Slade[2] using the "second gust" range described earlier. This procedure is illustrated in Figure 2A.2-11 for some typical atmospheric conditions (arrows indicate the range of wind direction). If winds are "calm" or "non-steady" then the occurrence is classified as Pasquill B stability during the day and Pasquill E at night, as suggested by Slade.[3]

To determine the joint frequency distribution of vertical temperature difference and horizontal variance all individual 15 minute time periods for which wind speed, Sθ, and temperature difference data were available were processed by the NUS computer code AMET which computes the joint frequency of Sθ and temperature classes for given wind speed groups and for all wind speeds. Nine wind speed groups were defined as listed and tabulated in the Appendix. Calms are not treated in the AMET code but as mentioned previously, occurred in 2.4 percent of the observations by the Bendix-Friez sensor and 0.25 percent by the Packard-Bell unit.

D. Lapse Rate Stability Classification

In order to determine the dispersion parameters for the 2-hour design basis accident, meteorological conditions are chosen for which calculated doses would not be exceeded more than 5 percent of the time. In order to select these based jointly on Sθ and lapse rate, vertical dispersion parameters are needed based on temperature difference corresponding to those established using the horizontal variance classification presented above. Seventeen vertical temperature difference classes were arbitrarily defined for the purpose of categorizing these observations.

In order to classify vertical dispersion parameters based on the lapse rate, a number of references in the literature were examined including the stability classification defined for Cape Kennedy and Vandenberg Air Force Base and presented in Table 2A.2-7[4]. The most complete vertical stability classification system found in the literature is that used at the National Reactor Testing Station[5] as presented in Table 2A.2-8. It was noted that none of these classification systems define a "G" stability, however.

Therefore, in the lapse rate stability classification system chosen, the "G" interval has been defined in accordance with the range of a "large inversion," as presented by Holland in Meteorology and Atomic Energy.[6] The ranges used are presented in Table 2A.2-9.

V. DETERMINATION OF DESIGN BASIS ACCIDENT AND EXTENDED RELEASE METEOROLOGICAL CONDITIONS

Using the seven horizontal stability classes (A-G) and seven vertical stability classes (A-G) and the corresponding Sy and Sz values as presented in Meteorology and Atomic Energy[7], a computer code was used to determine the combinations of vertical and horizontal stability classes and wind speeds which result in a calculated χ/Q value such that its frequency when added to the frequency of calms (2.4 percent) would not occur more than 5 percent of the time at the site boundary. These calculations of χ/Q do not include a building wake effect since the objective was to find the meteorological conditions of stability and wind speed upon which the building wake correction is normally imposed, for the design basis accident. Thus the following equation is used for determination of the ordered values of χ/Q and the equivalent stability and wind speed conditions:

$$\chi/Q = I/(3.14*SY*SZ*u) \qquad (1)$$

A. Design Basis Accident Meteorology for Unit 1

For unit number one, for the 0-2 hour period following the accident the design basis accident meteorology has been computed for a ground level release at the containment to a receptor at the nearest site boundary, 610 meters. A very conservative analysis includes the total calms, both daytime and nighttime, as found by the less responsive Bendix-Friez speed sensors to meet the 5 percent criterion. On this basis, the total occurrence of calms is 2.4 percent. Thus 5 percent less the 2.4 percent calms yields 2.6 percent, the percentage of time during which the design basis meteorological conditions may be exceeded. Thus from Table 2A.2-10, Joint Frequency Data, it is noted that 2.11 x 10^{-3} sec/m^3 is the χ/Q exceeded 2.6 percent of the time; thus the equivalent design basis meteorological conditions corresponding to this value at 610 meters are Pasquill stability class "F" and wind speed 0.64 m/sec.

A somewhat less conservative analysis would include only the 1.5 percent nighttime calms measured by the Bendix instrument; on this basis the χ/Q exceeded 3.5 percent of the time is 1.83 x 10^{-3} sec/m^3; the design basis meteorological conditions are "F" and 0.73 m/sec. Finally, a more realistic analysis would include only the calms found by the more responsive Packard-Bell wind sensors. Whether or not all such calms (20 percent) or only the nighttime calms (.08 percent) are included, the resultant found from Table 2A.2-10 is 1.62 x 10^{-3} sec/m^3; the equivalent design basis meteorological conditions are stability class "F" and 0.84 m/sec. These latter values are included in Table 2A.2-11, Design Basis Accident and Extended Release Meteorological Conditions, as being the recommended choice for the 0-2 hour period with an invariant wind.

Now using the meteorological conditions of "F" and wind speed 0.84 m/sec the design basis accident meteorology χ/Q at the nearest site boundary, 610 m for the 0-2 hour period is computed from the following equation (including a building wake factor) to be equal to 7.8 x 10^{-4} sec/m^3:

$$\chi/Q = 1/((3.14*Sy*Sz + C*A)*u) \qquad (2)$$

where:

χ = concentration (units/m^3)

Q = source release rate (units/sec)

Sy = horizontal diffusion parameter (m)

Sz = vertical diffusion parameter (m)

u = mean wind speed (m/sec)

A = cross-sectional area of containment (1600m^2)

C = building shape factor = 0.5 (dimensionless)

For the period 2-24 hr following the start of a release, it is assumed that the wind direction varies over one sector under “F” stability and 0.84 m/sec wind speed. Inasmuch as the longest observed onsite persistence under stable conditions (“F” stability) was one occurrence for 24 hours, this assumption is conservative.

For the remaining time periods, it is noted that the assumed extended meteorological conditions are the same as presented in the Unit 1 FSAR based upon the 1969-1970 meteorological data. Thus, for the period from 24 - 96 hours, it is assumed that the mean wind direction is varying within the one sector of interest 50 percent of the time. During this time, the stability is assumed to be “D” with a 2.0 m/sec wind speed and “F” and a 0.9 m/sec wind speed.

For the period from 4 to 30 days, meteorological conditions typical of the worst season have been chosen. These conditions, and those for the other time periods, are also presented in Table 2A.2-11.

In addition to these assumed ground level design basis meteorological conditions, it is necessary to postulate for Unit 1 the design basis accident meteorology for the situation of an elevated release (47 m) from the top of the containment building to a receptor located upon a 47 m hill 760 m to the southeast of the containment. As discussed previously, it is necessary to find the χ/Q exceeded only five percent of the time.

The diffusion equation for the situation in which the receptor is on the plume centerline at the same elevation as the release is as follows:

$$\chi/Q = [1/(2*3.14*Sy*Sz*u)]*(1+\exp(-0.5* \frac{(Z+H)}{Sz} **2)) \quad (3)$$

where all terms are as previously defined and
Z = height above ground of the receptor = H = 47 m.

As the equation stands, it is rather difficult to develop a simple calculational technique to determine the χ/Q which is exceeded only 5 percent of the time, and the corresponding equivalent design basis meteorological conditions. However, by inspection it will be noted that equation (1) is a good approximation to equation (3). That is, in very unstable conditions, equation (3) becomes equal to equation (1) and under very stable conditions equation (3) overestimates equation (1) by a factor of 2. Therefore, in order to simplify the calculational technique, equation (1) was used to determine the design basis meteorological conditions, exactly as before.

Thus again for a very conservative analysis including total calms, both daytime and nighttime measured by the less responsive instrument, the design basis meteorological conditions are “F” stability and 0.64 m/sec. Similarly, for a somewhat less conservative analysis including only the nighttime calms measured by the Bendix instrument, the design basis meteorological conditions are “F” and 0.73 m/sec. Finally for a more realistic analysis including only the calms found by the more responsive Packard-Bell instrument, the design basis meteorological conditions are stability “F” and 0.84 m/sec.

Using the design basis meteorological conditions stability class "F" and wind speed equal to 0.84 m/sec, the χ/Q for the elevated release to the elevated receptor is approximated by equation (1) without credit for a building wake effect and is equal to 1.1 x 10^{-3} sec/m^3 at a distance of 760 m southeast of the reactor containment for the 0 - 2 hour period. The design basis accident meteorology for the other time periods is the same as before.

B. Design Basis Accident Meteorology for Unit 2

As was the case for Unit 1, it is necessary to present design basis accident meteorology for Unit 2 by postulating both a ground level release to a ground level receptor at the nearest site boundary 456 m northeast of the site boundary and an elevated release from the top of the containment (47 m) to a receptor at an elevation of 47 m on a hill located 610 m southeast of the Unit 2 containment.

Such an analysis is exactly the same as for Unit 1; thus, the design basis meteorological conditions are stability class "F" and wind speed 0.84 m/sec. Therefore, upon using equation (2) to calculate the design basis χ/Q for the 0 - 2 hour period following the accident for a ground level release to a ground level receptor at the nearest site boundary 456 m from the containment, the χ/Q is equal to 9.4 x 10^{-4} sec/m^3. Using stability class "F" and 0.84 m/sec, the χ/Q from an elevated release of 47 m to an elevated receptor of 47 m located 610 m southeast of the containment is approximated by equation (1) and is equal to 1.6 x 10^{-3} sec/m^3.

The accident meteorology for both release cases for other time periods is the same as presented for Unit 1. The results of the calculations for the four time periods comprising the 30-day model are shown in Figure 2A.2-12 with curves of χ/Q versus distance.

VI. ANNUAL AVERAGE RELEASE METEOROLOGY

The annual average χ/Q for an elevated release is calculated according to the following equation:

```
χ/Q = (((2/3.14)**0.5)*8/(3.14*D))*[SUM, i, 1, 7 ((Fi*fi*Ui)/
          (Szi)*(EXP((-(Z-h)**2)/(2*Szi**2))
          +EXP((-(Z+h)**2)/(2*Szi**2)))]
```

where:

χ = distance (m)
Ui = average reciprocal wind speed for sector of interest, sec per m^3
Szi = vertical diffusion parameter for stability class i (m)
Fi = fraction of time stability class i occurs
h = height of stack (m)
Z = vertical height above valley floor (m)
fi = fraction of time wind direction is in sector of interest for stability class i

In the calculation of χ/Q, Szi has been estimated from Pasquill stability curves(17); Fi*fi is based on the categorization of temperature difference previously discussed and found in Table 2A.2-9. (The value of Sz for G stability is defined as the Sz for class F, divided by SQRT (2.5)).

The release of normal process gas is from a vent 522 ft (158 m) above the valley floor. Although it is possible that the process gas exit velocity and the buoyant cooling tower plume would cause the process gas plume to become more elevated than the release height, for a conservative estimate of the highest annual average χ/Q, no plume rise is assumed. Thus for a release height of 158 m, the highest annual average χ/Q is 1.42 x 10^{-6} sec/m^3 for a receptor located 2,000 m southeast of the containment structure at an elevation 158 m above the valley floor. In addition, a χ/Q of approximately the same magnitude (1.3 x 10^{-6} sec/m^3) was calculated for a receptor located 1,300 m southeast of the containment structure at an elevation of 158 m.

Figure 2A.2-13 contains isopleths of ground level annual average χ/Q for release from the 158 m vent. WINDVANE computer outputs giving the raw data from which the above calculations are made are provided in the Appendix.

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7. Slade, D. H., ed Meteorology and Atomic Energy, pp. 408-409.

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TABLES FOR APPENDIX 2A.2

TABLE 2A.2-1

SUMMARY OF DATA COLLECTION
September 5, 1970 - September 5, 1971

Instrument	Level	Recovery Rate (percent)
Bendix-Friez	50 ft	94
Bendix-Friez	150 ft	83
Packard-Bell	50 ft	67
Bristol Temperature	50 ft	96
Bristol Temperature	150 ft	99

TABLE 2A.2-2

AVERAGE WIND SPEED SUMMARY (mph)

	Bendix 50-foot		Bendix 150-foot		Packard-Bell 50-foot
	1969-1970	1970-1971	1969-1970	1970-1971	1970-1971
Spring	5.7	5.1	6.4	7.4	4.0
Summer	4.2	3.3	4.1*	2.8	2.4
Fall	5.4	4.3	6.4	5.1	4.8
Winter	7.2	6.0	7.9	7.4	6.0
Annual Average	5.6	4.7	6.2	5.7	4.3

*It is doubtful that the average wind speed at 150 feet is actually lower than that for the 50-foot level during summer 1970; rather it is believed that, within the accuracy of the calculations, there is no significant difference between the two levels.

TABLE 2A.2-3

GREATER PITTSBURGH AIRPORT
WIND SPEEDS (mph)

	1969	1970	1971
September	7.4	8.2	
October	9.3	8.3	
November	10.5	10.3	
December	10.9	11.0	
January		10.8	11.9
February		11.5	12.1
March		10.4	12.4
April		10.9	11.2
May		9.3	9.1
June		8.3	7.0
July		7.6	7.0
August		7.2	6.7

TABLE 2A.2-4

WIND SPEEDS VERSUS DIRECTION

50-Foot Level

(Number of Observations)	(2111) Spring 1971	(1949) Spring 1970	(2149) Winter 1970-71	(1898) Winter 1969-70	(1795) Fall 1970	(1934) Fall 1969
Wind Direction						
NNE	4.6	5.5	3.6	6.6	4.5	5.0
NE	3.6	5.2	3.3	5.0	3.0	4.8
E	3.7	5.2	3.2	4.1	2.9	3.8
SE	2.8	4.6	3.2	4.5	3.6	4.6
S	2.3	3.2	2.4	3.3	2.9	3.7
SW	2.2	2.9	2.8	3.7	2.9	3.0
WSW	2.9	3.8	2.5	4.4	3.2	4.1
W	4.9	5.1	4.5	6.2	4.3	6.6
WNW	6.9	8.5	7.5	9.2	6.2	9.0
NW	8.4	9.0	9.6	11.4	8.4	10.5
NNW	8.8	8.4	10.3	11.0	7.8	8.6
N	6.6	6.8	6.6	8.0	6.1	6.5

150-Foot Level

(Number of Observations)	(1763) Spring 1971	(1810) Spring 1970	(2061) Winter 1970-71	(1843) Winter 1969-70	(1386) Fall 1970	(1813) Fall 1969
Wind Direction						
NNE	7.0	5.7	2.8	4.2	7.3	5.5
NE	4.8	5.7	4.4	4.8	5.1	5.0
E	5.0	4.5	4.6	4.6	3.9	4.7
SE	3.9	4.6	3.4	3.7	3.2	4.8
S	3.0	5.0	3.4	5.2	4.6	4.7
SW	5.1	6.4	4.1	6.7	4.1	7.2
WSW	4.8	8.2	4.2	9.3	4.6	8.9
W	5.8	9.8	5.7	11.7	4.2	10.2
WNW	9.6	8.0	9.3	11.8	8.1	9.4
NW	10.3	7.2	12.7	10.9	8.1	8.4
NNW	11.5	7.0	10.7	8.5	7.9	6.2
N	9.2	5.0	6.1	5.4	7.1	6.0

TABLE 2A.2-5

QUANTITATIVE COMPARATIVE EFFECT OF SITE
BUILDING UPON REDUCING WIND SPEEDS AT THE TWO LEVELS

	No. Higher* in Following Year	No. Lower± in Following Year	No. Equal° in Following Year	
50’	0	9	1	Fall
150’	2	6	2	
50’	0	10	0	Winter
150’	3	6	1	
50’	1	8	1	Spring
150’	5	5	0	

* Number of wind directions with higher winds for given season after building erection compared to before.

± Number of wind directions with lower average speeds for given season after building erection compared to before.

° Number of wind directions with equal average wind speeds for given season after building erection compared to before.

TABLE 2A.2-6

STABILITY CATEGORIES

Stability Type	Range of Standard Deviation	Turbulence Type
A = Extremely Unstable	σ_θ 22.5	High Atmospheric Turbulence
B = Unstable	22.5 $> \sigma_\theta \geq$ 17.5	High Atmospheric Turbulence
C = Slightly Unstable	17.5 $> \sigma_\theta \geq$ 12.5	High Atmospheric Turbulence
D = Neutral	12.5 $> \sigma_\theta \geq$ 7.5	Moderate Atmospheric Turbulence
E = Slightly Stable	7.5 $> \sigma_\theta \geq$ 3.8	Low Atmospheric Turbulence
F = Stable	3.8 $> \sigma_\theta \geq$ 1.3	Low Atmospheric Turbulence
G = Extremely Stable	$\sigma_\theta <$ 1.3	Low Atmospheric Turbulence

TABLE 2A.2-7

OCEAN BREEZE AND DRY GULCH STABILITY CLASSIFICATION[4]

T = temperature at 54 ft minus temperature at 6 ft

Category	Range of Vertical Temperature Difference (-F)
Very Unstable	T ≤ -3.0 F
Moderately Unstable	-3.0 < T ≤ 0.0 F
Moderately Stable	0 < T ≤ 3.0 F
Very Stable	T > 3.0 F

TABLE 2A.2-8

NATIONAL REACTOR TESTING STATION STABILITY CLASSIFICATION

Category	Range of Vertical Temperature Gradient (F/100 Ft)
A	-1.1 or less
B	-0.5 to -1.0
C	-0.1 to -0.4
D	0.0 to 0.4
E	0.5 to 1.0
F	1.1 or greater

TABLE 2A.2-9

CLASSIFICATION OF PASQUILL STABILITY CLASS
BASED ON LAPSE RATE

Category	Range of Vertical Temperature Gradient (F/1000 ft)
A - Very Unstable	$T < -16$
B - Moderately Unstable	$-16 \leq T < -13$
C - Slightly Unstable	$-13 \leq T < -7$
D - Neutral	$-7 \leq T < -1$
E - Slightly Stable	$-1 \leq T < 11$
F - Moderately Stable	$11 \leq T < 20$
G - Very Stable	$T \geq 20$

TABLE 2A.2-10

JOINT FREQUENCY DATA

Ordered Condition	Wind Speed	Horiz. Stability	Vert. Stability	Unit 1 χ/Q	Freq.	Cumulative
1	1.0	G	G		.05	.05
2	1.0	F	G		.21	.26
3	1.0	G	F		.08	.34
4	2.0	G	G		0	.34
5	1.0	E	G		.73	1.07
6	1.0	F	F		.17	1.24
7	1.0	G	E		.04	1.28
8	1.0	D	G		.69	1.97
9	3.0	G	G		0	1.97
10	2.0	F	G		.59	2.56
11	2.0	G	F		.02	2.58
12	1.0	G	D		0	2.58
				*2.11 x 10^{-3}		
13	1.0	E	F		.27	2.85
14	4.0	G	G		0	2.85
15	1.0	F	E		.35	3.20
				**1.83 x 103		
16	2.0	E	G		1.13	4.33
17	1.0	C	G		.29	4.62
				***1.62 x 103		
18	1.0	D	F			
19	3.0	F	G			
20	3.0	G	F			
21	4.0	G	G			
22	2.0	F	F			
23	2.0	G	E			

*using all Bendix calms; effective F and 0.64
**using only Bendix nighttime calms; effective F and 0.73
***using all PBell calms; effective and 0.84

TABLE 2A.2-11

DESIGN BASIS ACCIDENT AND EXTENDED RELEASE
METEOROLOGICAL CONDITIONS

Period	Pasquill Class	Mean Wind Speed (m/sec)	Fi*fi	Wind Direction
0 - 24 hours	F	0.9	1.0	Invariant
2 - 24 hours	F	0.9	1.0	Sector Average
24 - 96 hours	D	2.0	0.25	Sector Average
	F	0.9	0.25	Sector Average
4 days	D	1.5	0.020	Sector Average
30 days	E	1.0	0.020	Sector Average
	F	0.9	0.020	Sector Average
	G	1.4	0.025	Sector Average

APPENDIX -

WINDVANE COMPUTER OUTPUTS

24 HOUR SUMMARY OF WIND SPEED DISTRIBUTION

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

TOTAL NUMBER OF READINGS 8.183E + 03

TOTAL NUMBER OF READINGS WITHOUT CALMS 7.989E + 03

WIND SPEED DISTRIBUTION, PERCENT

CALM	1 TO 2	3 TO 4	5 TO 6	7 TO 8	9 TO 11	12 TO 14	15 TO 18	19 TO 23	GT 23
2.37	33.07	25.65	14.73	9.96	8.05	4.02	1.58	.40	.17

SUMMED OVER ALL DIRECTIONS
WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.18	.09	.66	2.45	17.70	6.40	6.40
3 TO 4	.11	.13	1.06	3.48	14.27	2.85	4.37
5 TO 6	.11	.16	1.13	3.15	9.60	.45	.48
7 TO 8	.01	.03	.61	3.05	6.22	.11	.16
9 TO 11	.03	.04	.36	2.34	5.28	.09	.11
12 TO 14	0.00	0.00	.14	1.40	2.53	.04	.01
15 TO 18	0.00	.01	.06	.51	1.03	0.00	0.00
19 TO 23	0.00	0.00	0.00	.16	.25	0.00	0.00
GT 23	0.00	0.00	.01	.05	.11	0.00	0.00

SUMMED OVER ALL TEMP. LAPSE RATE STABILITIES
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.65	.63	.90	1.30	2.17	3.23	3.54	5.65	5.18	3.62	1.85	1.48	.96	.81	.75	1.15
3 TO 4	.61	.56	.68	1.15	2.04	2.14	1.50	2.74	3.33	1.46	1.33	2.05	2.58	1.78	1.05	1.26
5 TO 6	.45	.39	.50	.69	1.28	.99	.31	.51	.23	.46	.49	1.41	2.99	2.17	.69	1.53
7 TO 8	.36	.15	.16	.18	.41	.43	.26	.09	.09	.19	.14	.53	2.45	2.47	.89	1.41
9 TO 11	.18	.04	.01	.03	.08	.10	.18	.05	0.00	.04	.01	.30	1.56	3.19	1.45	1.04
12 TO 14	.04	0.00	0.00	0.00	.03	.03	.04	0.00	0.00	0.00	0.00	.06	.55	1.68	1.26	.44
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.04	.21	.79	.53	.05
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.11	.19	.11	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.04	.13	.01	0.00

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS A
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	.03	.01	0.00	.03	0.00	.03	.04	.03	.01	0.00	0.00	.01	0.00	0.00
3 TO 4	0.00	0.00	.01	.01	0.00	0.00	0.00	.01	.03	.01	.03	0.00	.01	0.00	0.00	0.00
5 TO 6	0.00	.03	0.00	0.00	0.00	0.00	.01	.01	.03	0.00	0.00	0.00	.01	0.00	.03	0.00
7 TO 8	.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS B
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.01	0.00	0.00	0.00	0.00	.03	0.00	0.00	.03	0.00	0.00	0.00	.01	0.00	0.00	.01
3 TO 4	.03	0.00	.01	0.00	0.00	0.00	0.00	0.00	.01	0.00	.01	.04	0.00	.01	.01	0.00
5 TO 6	.01	0.00	.01	0.00	.01	0.00	0.00	0.00	.01	0.00	0.00	.03	.03	.05	.01	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.01
9 TO 11	.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	.01	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS C
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.04	.05	.06	.05	.01	.01	.08	.04	.06	.05	.03	.04	.01	.05	.03	.06
3 TO 4	.05	.05	.03	.04	.05	.01	.05	.05	.04	.04	.04	.06	.11	.19	.15	.11
5 TO 6	.05	.06	.04	.08	.06	.03	.03	.01	0.00	.09	.04	.05	.21	.23	.09	.08
7 TO 8	.05	.01	.04	.03	.04	.04	.01	0.00	0.00	.04	.03	0.00	.09	.15	.05	.05
9 TO 11	.03	.03	0.00	0.00	0.00	.01	0.00	.01	0.00	0.00	0.00	0.00	.04	.15	.04	.06
12 TO 14	.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.04	.04	.03	.03
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.01	.03	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS D
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.15	.21	.18	.23	.16	.15	.09	.30	.16	.16	.09	.11	.05	.15	.11	.15
3 TO 4	.10	.11	.23	.15	.16	.11	.11	.19	.05	.25	.20	.19	.59	.48	.34	.23
5 TO 6	.13	.11	.19	.19	.09	.06	.03	.14	.06	.15	.14	.31	.55	.54	.21	.26
7 TO 8	.15	.09	.05	.08	.13	.09	.08	.01	.01	.05	.05	.08	.80	.79	.25	.36
9 TO 11	.06	.01	.01	.01	.03	.01	.03	0.00	0.00	0.00	.01	.08	.36	.95	.45	.33
12 TO 14	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	.04	.16	.54	.49	.15
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	.30	.14	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.08	.06	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.01	.01	0.00

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS E
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.43	.30	.55	.88	1.51	2.04	2.05	2.38	1.68	1.18	1.14	1.01	.70	.53	.51	.81
3 TO 4	.40	.39	.35	.85	1.36	1.49	.75	.89	.50	.58	.95	1.59	1.80	1.05	.45	.86
5 TO 6	.19	.15	.24	.33	1.04	.83	.24	.26	.05	.21	.26	.93	2.07	1.33	.33	1.16
7 TO 8	.15	.05	.08	.08	.25	.30	.16	.06	.04	.08	.06	.43	1.54	1.46	.55	.94
9 TO 11	.08	0.00	0.00	.01	.04	.06	.13	.03	0.00	.04	0.00	.20	1.14	2.05	.90	.61
12 TO 14	.03	0.00	0.00	0.00	.03	0.00	.03	0.00	0.00	0.00	0.00	.03	.33	1.09	.75	.26
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.04	.11	.46	.36	.05
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.09	.11	.05	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.11	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS F
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.01	.04	.06	.04	.23	.66	.79	1.59	1.30	.81	.35	.23	.14	.01	.05	.09
3 TO 4	.01	.01	.01	.08	.21	.31	.38	.66	.64	.14	.08	.11	.06	.04	.08	.04
5 TO 6	.03	.01	.03	.05	.01	.05	.01	.04	.01	0.00	.03	.08	.05	.01	.03	.03
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.03	.03	.05
9 TO 11	0.00	0.00	0.00	0.00	0.00	.01	.01	0.00	0.00	0.00	0.00	.01	.01	0.00	.03	.01
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	.01	.01	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS G
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.01	.03	.03	.10	.25	.31	.54	1.31	1.92	1.39	.24	.09	.05	.06	.05	.03
3 TO 4	.03	0.00	.04	.03	.25	.21	.21	.94	2.07	.45	.03	.06	0.00	.01	.03	.03
5 TO 6	.05	.03	0.00	.05	.06	.03	0.00	.05	.06	.01	.03	.03	.08	.01	0.00	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	.01	.01	.04	.03	0.00	.01	.03	.03	.01	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	.01	.01	0.00	0.00	0.00	0.00	.01	.03	.03	.03
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

DIRECTION NNE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	.01	.04	.15	.43	.01	.01
3 TO 4	0.00	.03	.05	.10	.40	.01	.03
5 TO 6	0.00	.01	.05	.13	.19	.03	.05
7 TO 8	.01	0.00	.05	.15	.15	0.00	0.00
9 TO 11	0.00	.01	.03	.06	.08	0.00	0.00
12 TO 14	0.00	0.00	.01	0.00	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION NE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	0.00	.05	.21	.30	.04	.03
3 TO 4	0.00	0.00	.05	.11	.39	.01	0.00
5 TO 6	.03	0.00	.06	.11	.15	.01	.03
7 TO 8	0.00	0.00	.01	.09	.05	0.00	0.00
9 TO 11	0.00	0.00	.03	.01	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION ENE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.03	0.00	.06	.18	.55	.06	.03
3 TO 4	.01	.01	.03	.23	.35	.01	.04
5 TO 6	0.00	.01	.04	.19	.24	.03	0.00
7 TO 8	0.00	0.00	.04	.05	.08	0.00	0.00
9 TO 11	0.00	0.00	0.00	.01	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION E

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.01	0.00	.05	.23	.88	.04	.10
3 TO 4	.01	0.00	.04	.15	.85	.08	.03
5 TO 6	0.00	0.00	.08	.19	.33	.05	.05
7 TO 8	0.00	0.00	.03	.08	.08	0.00	0.00
9 TO 11	0.00	0.00	0.00	.01	.01	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

DIRECTION ESE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	0.00	.01	.16	1.51	.23	.25
3 TO 4	0.00	0.00	.05	.16	1.36	.21	.25
5 TO 6	0.00	.01	.06	.09	1.04	.01	.06
7 TO 8	0.00	0.00	.04	.13	.25	0.00	0.00
9 TO 11	.01	0.00	0.00	.03	.04	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.03	.03	.01	.15	2.04	.66	.31
3 TO 4	0.00	0.00	.01	.11	1.49	.31	.21
5 TO 6	0.00	0.00	.03	.06	.83	.05	.03
7 TO 8	0.00	0.00	.04	.09	.30	0.00	0.00
9 TO 11	0.00	0.00	.01	.01	.06	.01	0.00
12 TO 14	0.00	0.00	0.00	.03	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SSE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	0.00	.08	.09	2.05	.79	.54
3 TO 4	0.00	0.00	.05	.11	.75	.38	.21
5 TO 6	.01	0.00	.03	.03	.24	.01	0.00
7 TO 8	0.00	0.00	.01	.08	.16	0.00	.01
9 TO 11	0.00	0.00	0.00	.03	.13	.01	.01
12 TO 14	0.00	0.00	0.00	0.00	.03	.01	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION S

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.03	0.00	.04	.30	2.38	1.59	1.31
3 TO 4	.01	0.00	.05	.19	.89	.65	.94
5 TO 6	.01	0.00	.01	.14	.26	.04	.05
7 TO 8	0.00	0.00	0.00	.01	.06	0.00	.01
9 TO 11	0.00	0.00	.01	0.00	.03	0.00	.01
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

DIRECTION SSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.04	.03	.06	.16	1.68	1.30	1.92
3 TO 4	.03	.01	.04	.05	.50	.64	2.07
5 TO 6	.03	.01	0.00	.06	.05	.01	.06
7 TO 8	0.00	0.00	0.00	.01	.04	0.00	.04
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.03	0.00	.05	.16	1.18	.81	1.39
3 TO 4	.01	0.00	.04	.25	.58	.14	.45
5 TO 6	0.00	0.00	.09	.15	.21	0.00	.01
7 TO 8	0.00	0.00	.04	.05	.08	0.00	.03
9 TO 11	0.00	0.00	0.00	0.00	.04	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION WSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.01	0.00	.03	.09	1.14	.35	.24
3 TO 4	.03	.01	.04	.20	.95	.08	.03
5 TO 6	0.00	0.00	.04	.14	.26	.03	.03
7 TO 8	0.00	0.00	.03	.05	.06	0.00	0.00
9 TO 11	0.00	0.00	0.00	.01	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION W

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	0.00	.04	.11	1.01	.23	.09
3 TO 4	0.00	.04	.06	.19	1.59	.11	.06
5 TO 6	0.00	.03	.05	.31	.93	.08	.03
7 TO 8	0.00	0.00	0.00	.08	.43	.01	.01
9 TO 11	.01	0.00	0.00	.08	.20	.01	0.00
12 TO 14	0.00	0.00	0.00	.04	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	.04	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DUQUESNE, BEAVER VALLEY, 50 FT. BENDIX, 9/5/70-9/5/71

DIRECTION WNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	.01	.01	.05	.70	.14	.05
3 TO 4	.01	0.00	.11	.59	1.80	.06	0.00
5 TO 6	.01	.03	.21	.55	2.07	.05	.08
7 TO 8	0.00	0.00	.09	.80	1.54	0.00	.03
9 TO 11	0.00	0.00	.04	.36	1.14	.01	.01
12 TO 14	0.00	0.00	.04	.16	.33	.01	.01
15 TO 18	0.00	0.00	.03	.08	.11	0.00	0.00
19 TO 23	0.00	0.00	0.00	.03	.09	0.00	0.00
GT 23	0.00	0.00	.01	.03	0.00	0.00	0.00

DIRECTION NW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	.01	0.00	.05	.15	.53	.01	.06
3 TO 4	0.00	.01	.19	.48	1.05	.04	.01
5 TO 6	0.00	.05	.23	.54	1.33	.01	.01
7 TO 8	0.00	.01	.15	.79	1.46	.03	.03
9 TO 11	0.00	.01	.15	.95	2.05	0.00	.03
12 TO 14	0.00	0.00	.04	.54	1.09	.01	0.00
15 TO 18	0.00	.01	.01	.30	.46	0.00	0.00
19 TO 23	0.00	0.00	0.00	.08	.11	0.00	0.00
GT 23	0.00	0.00	0.00	.01	.11	0.00	0.00

DIRECTION NNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	0.00	.03	.11	.51	.05	.05
3 TO 4	0.00	.01	.15	.34	.45	.08	.03
5 TO 6	.03	.01	.09	.21	.33	.03	0.00
7 TO 8	0.00	0.00	.05	.25	.55	.03	.01
9 TO 11	0.00	.01	.04	.45	.90	.03	.03
12 TO 14	0.00	0.00	.03	.49	.75	0.00	0.00
15 TO 18	0.00	0.00	.03	.14	.36	0.00	0.00
19 TO 23	0.00	0.00	0.00	.06	.05	0.00	0.00
GT 23	0.00	0.00	0.00	.01	0.00	0.00	0.00

DIRECTION N

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 TO 2	0.00	.01	.06	.15	.81	.09	.03
3 TO 4	0.00	0.00	.11	.23	.86	.04	.03
5 TO 6	0.00	0.00	.08	.26	1.16	.03	0.00
7 TO 8	0.00	.01	.05	.36	.94	.05	0.00
9 TO 11	0.00	0.00	.06	.33	.61	.01	.03
12 TO 14	0.00	0.00	.03	.15	.26	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	.05	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DAYTIME (9AM-8PM) SUMMARY OF WIND SPEED DISTRIBUTION

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

TOTAL NUMBER OF READINGS 3.522E+43

TOTAL NUMBER OF READINGS WITHOUT CALMS 3.475E+03

WIND SPEED DISTRIBUTION, PERCENT

CALM	1 TO 2	3 TO 4	5 TO 6	7 TO 8	9 TO 11	12 TO 14	15 TO 18	19 TO 23	GT 23
1.33	13.86	18.09	18.03	15.02	16.64	8.18	5.54	2.92	.40

SUMMED OVER ALL DIRECTIONS
WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	0.00	0.00	.06	.09	.65	.20	.34
1 TO 2	.09	.09	.62	2.53	7.75	1.28	1.50
3 TO 4	.20	.26	1.11	3.78	11.16	.85	.74
5 TO 6	.17	.23	1.39	5.34	9.97	.48	.45
7 TO 8	.14	.14	1.76	5.14	7.50	.11	.23
9 TO 11	.09	.09	1.76	5.74	8.80	.14	.03
12 TO 14	.03	.09	.34	3.21	4.40	.09	.03
15 TO 18	0.00	0.00	.45	2.70	2.36	.03	0.00
19 TO 23	0.00	.03	.26	1.16	1.48	0.00	0.00
GT 23	0.00	0.00	0.00	.20	.20	0.00	0.00

SUMMED OVER ALL TEMP. LAPSE RATE STABILITIES
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.68	.40	.74	1.45	.94	.94	.85	.88	.74	.77	.82	1.48	.82	.65	.88	.82
3 TO 4	.57	.45	.62	1.73	1.65	.82	.80	1.02	.80	1.11	1.05	2.27	2.04	1.62	.80	.74
5 TO 6	.68	.97	.91	1.45	1.48	.45	.34	.40	.54	.94	1.50	1.70	2.95	2.07	.85	.80
7 TO 8	.77	.54	.31	.91	.65	.43	.11	.37	.31	.48	.74	2.27	2.73	2.30	.82	1.28
9 TO 11	.74	.43	.43	.51	.60	.40	.11	.28	.51	.45	.71	1.50	3.29	3.61	1.53	1.53
12 TO 14	.54	0.00	.17	0.00	.06	.03	.09	.17	.06	.06	.03	.26	2.02	2.19	1.56	.97
15 TO 18	.20	0.00	0.00	0.00	.06	0.00	.06	0.00	0.00	0.00	.03	.14	1.33	1.79	1.16	.77
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.68	1.28	.77	.17
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.06	.17	.17	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS A
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	.06	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 TO 4	0.00	.03	0.00	0.00	.03	.03	.03	0.00	0.00	0.00	0.00	0.00	.06	0.00	.03	0.00
5 TO 6	.03	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	.06	.03	.03	0.00	0.00	0.00	0.00
7 TO 8	0.00	.06	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	.03	.03	0.00
9 TO 11	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	.03	0.00
12 TO 14	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS B
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	.03	.03	0.00	0.00
3 TO 4	.03	.03	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	.06	.03	.03	0.00	.06
5 TO 6	0.00	.03	.03	0.00	.03	0.00	0.00	0.00	0.00	0.00	.03	0.00	.03	.03	.06	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	.09	.03	0.00
9 TO 11	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	.03	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.03	.03
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS C
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.11	.06	.06	.09	.03	.03	0.00	0.00	0.00	0.00	0.00	.09	0.00	0.00	.06	.11
3 TO 4	.03	0.00	.09	.09	.11	.06	.03	.03	.09	.03	0.00	.09	.11	.20	.09	.09
5 TO 6	.03	.09	.06	.14	.09	.03	.03	.03	.03	.09	.06	.06	.34	.09	.17	.09
7 TO 8	.09	.09	.06	.11	.06	.14	.03	.03	.03	.06	.11	.09	.28	.37	.11	.11
9 TO 11	.09	.17	.03	.11	0.00	.06	0.00	.03	.03	.09	.11	.06	.37	.28	.11	.23
12 TO 14	.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.06	.03	.20	0.00
15 TO 18	.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	.09	.09	.11	.09
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.06	.14	.03
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS D
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.23	.11	.20	.28	.20	.11	.06	.17	.14	.09	.11	.11	.09	.23	.20	.20
3 TO 4	.20	.20	.11	.28	.26	.20	.09	.11	.20	.17	.17	.20	.40	.62	.37	.20
5 TO 6	.14	.43	.34	.20	.28	.09	.09	.20	.11	.20	.45	.34	.94	.97	.34	.23
7 TO 8	.23	.26	.06	.17	.20	.09	.06	.11	.14	.20	.26	.62	1.05	.97	.34	.40
9 TO 11	.17	.14	.17	.14	.14	.06	0.00	.09	.28	.09	.34	.34	1.22	1.42	.77	.37
12 TO 14	.34	0.00	.09	0.00	.06	0.00	.03	.03	.03	0.00	.03	.06	.68	.82	.57	.48
15 TO 18	.06	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	.06	.71	.94	.57	.34
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.31	.43	.34	.06
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.06	.03	.11	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS E
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.31	.20	.37	.82	.60	.43	.43	.40	.45	.51	.48	.82	.57	.34	.57	.45
3 TO 4	.31	.17	.40	1.16	1.05	.45	.43	.74	.40	.77	.82	1.79	1.28	.74	.28	.37
5 TO 6	.48	.43	.45	.94	1.05	.28	.14	.14	.31	.51	.85	1.22	1.48	.94	.28	.45
7 TO 8	.45	.14	.20	.54	.40	.17	.03	.20	.11	.11	.34	1.53	1.39	.82	.28	.77
9 TO 11	.48	.11	.23	.20	.43	.28	.09	.17	.17	.26	.26	1.08	1.68	1.85	.62	.91
12 TO 14	.14	0.00	.06	0.00	0.00	.03	.06	.14	.03	.03	0.00	.17	1.28	1.28	.74	.45
15 TO 18	.09	0.00	0.00	0.00	.03	0.00	.06	0.00	0.00	0.00	0.00	.09	.54	.77	.45	.34
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.31	.80	.28	.09
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.14	.06	0.00

TEMP. LAPSE RATE STABILITY CLASS F
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.03	.03	.09	.14	.06	.17	.11	.14	.06	.03	.11	.17	.06	.03	.03	.03
3 TO 4	0.00	.03	0.00	.14	.14	.09	.11	.03	.03	.06	0.00	.09	.09	.03	.03	0.00
5 TO 6	0.00	0.00	0.00	.11	.03	.03	.06	0.00	0.00	.03	0.00	.03	.14	.03	0.00	.03
7 TO 8	0.00	0.00	0.00	.03	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	.03	.03	0.00
9 TO 11	0.00	0.00	0.00	.03	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	.03	.03	0.00	.03
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	.03	.03	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS G
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	.03	.06	.06	.17	.23	.17	.09	.14	.11	.28	.09	.03	.03	.03
3 TO 4	0.00	0.00	.03	.06	.06	0.00	.11	.09	.09	.09	.06	.06	.09	0.00	0.00	.03
5 TO 6	0.00	0.00	.03	.06	0.00	0.00	.03	.03	.09	.06	.09	.03	.03	.03	0.00	0.00
7 TO 8	0.00	0.00	0.00	.06	0.00	.03	0.00	0.00	0.00	.09	.03	.03	0.00	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION NNE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.11	.23	.31	.03	0.00
3 TO 4	0.00	.03	.03	.20	.31	0.00	0.00
5 TO 6	.03	0.00	.03	.14	.48	0.00	0.00
7 TO 8	0.00	0.00	.09	.23	.45	0.00	0.00
9 TO 11	0.00	0.00	.09	.17	.48	0.00	0.00
12 TO 14	0.00	0.00	.06	.34	.14	0.00	0.00
15 TO 18	0.00	0.00	.06	.06	.09	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION NE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.06	.11	.20	.03	0.00
3 TO 4	.03	.03	0.00	.20	.17	.03	0.00
5 TO 6	0.00	.03	.09	.43	.43	0.00	0.00
7 TO 8	.06	0.00	.09	.26	.14	0.00	0.00
9 TO 11	0.00	0.00	.17	.14	.11	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION ENE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.06	.20	.37	.09	.03
3 TO 4	0.00	0.00	.09	.11	.40	0.00	.03
5 TO 6	0.00	.03	.06	.34	.45	0.00	.03
7 TO 8	0.00	0.00	.06	.06	.20	0.00	0.00
9 TO 11	0.00	0.00	.03	.17	.23	0.00	0.00
12 TO 14	.03	0.00	0.00	.09	.06	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION E

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.06	0.00	.09	.28	.82	.14	.06
3 TO 4	0.00	0.00	.09	.28	1.16	.14	.06
5 TO 6	0.00	0.00	.14	.20	.94	.11	.06
7 TO 8	0.00	0.00	.11	.17	.54	.03	.06
9 TO 11	0.00	.03	.11	.14	.20	.03	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION ESE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.20	.60	.06	.06
3 TO 4	.03	0.00	.11	.26	1.05	.14	.06
5 TO 6	0.00	.03	.09	.28	1.05	.03	0.00
7 TO 8	0.00	0.00	.06	.20	.40	0.00	0.00
9 TO 11	.03	0.00	0.00	.14	.43	0.00	0.00
12 TO 14	0.00	0.00	0.00	.06	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	.03	.03	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.03	0.00	.03	.11	.43	.17	.17
3 TO 4	.03	0.00	.06	.20	.45	.09	0.00
5 TO 6	.03	0.00	.03	.09	.28	.03	0.00
7 TO 8	0.00	0.00	.14	.09	.17	0.00	.03
9 TO 11	0.00	0.00	.06	.06	.28	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SSE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	.03	0.00	.06	.43	.11	.23
3 TO 4	.03	0.00	.03	.09	.43	.11	.11
5 TO 6	0.00	0.00	.03	.09	.14	.06	.03
7 TO 8	0.00	0.00	.03	.06	.03	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	.09	.03	0.00
12 TO 14	0.00	0.00	0.00	.03	.06	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	.06	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION S

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.17	.40	.14	.17
3 TO 4	0.00	.03	.03	.11	.74	.03	.09
5 TO 6	0.00	0.00	.03	.20	.14	0.00	.03
7 TO 8	0.00	0.00	.03	.11	.20	.03	0.00
9 TO 11	0.00	0.00	.03	.09	.17	0.00	0.00
12 TO 14	0.00	0.00	0.00	.03	.14	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION SSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.14	.45	.06	.09
3 TO 4	0.00	0.00	.09	.20	.40	.03	.09
5 TO 6	0.00	0.00	.03	.11	.31	0.00	.09
7 TO 8	.03	0.00	.03	.14	.11	0.00	0.00
9 TO 11	.03	0.00	.03	.28	.17	0.00	0.00
12 TO 14	0.00	0.00	0.00	.03	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.09	.51	.03	.14
3 TO 4	0.00	0.00	.03	.17	.77	.06	.09
5 TO 6	.06	0.00	.09	.20	.51	.03	.06
7 TO 8	0.00	.03	.06	.20	.11	0.00	.09
9 TO 11	0.00	0.00	.09	.09	.26	0.00	.03
12 TO 14	0.00	0.00	0.00	0.00	.03	0.00	.03
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION WSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.11	.48	.11	.11
3 TO 4	0.00	0.00	0.00	.17	.82	0.00	.06
5 TO 6	.03	.03	.06	.45	.85	0.00	.09
7 TO 8	0.00	0.00	.11	.26	.34	0.00	.03
9 TO 11	0.00	0.00	.11	.34	.26	0.00	0.00
12 TO 14	0.00	0.00	0.00	.03	0.00	0.00	0.00
15 TO 18	0.00	0.00	.03	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION W

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.09	.11	.82	.17	.28
3 TO 4	0.00	.06	.09	.20	1.79	.09	.06
5 TO 6	.03	0.00	.06	.34	1.22	.03	.03
7 TO 8	0.00	0.00	.09	.62	1.53	0.00	.03
9 TO 11	0.00	.03	.06	.34	1.08	0.00	0.00
12 TO 14	0.00	0.00	0.00	.06	.17	.03	0.00
15 TO 18	0.00	0.00	0.00	.06	.09	0.00	0.00
19 TO 23	0.00	0.00	0.00	.03	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION WNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	.03	0.00	.09	.57	.06	.09
3 TO 4	.06	.03	.11	.40	1.28	.09	.09
5 TO 6	0.00	.03	.34	.94	1.48	.14	.03
7 TO 8	0.00	0.00	.28	1.05	1.39	0.00	0.00
9 TO 11	0.00	0.00	.37	1.22	1.68	.03	0.00
12 TO 14	0.00	0.00	.06	.68	1.28	0.00	0.00
15 TO 18	0.00	0.00	.09	.71	.54	0.00	0.00
19 TO 23	0.00	.03	.03	.31	.31	0.00	0.00
GT 23	0.00	0.00	0.00	.06	0.00	0.00	0.00

DIRECTION NW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	.03	0.00	.23	.34	.03	.03
3 TO 4	0.00	.03	.20	.62	.74	.03	0.00
5 TO 6	0.00	.03	.09	.97	.94	.03	.03
7 TO 8	.03	.09	.37	.97	.82	.03	0.00
9 TO 11	0.00	.03	.28	1.42	1.85	.03	0.00
12 TO 14	0.00	.03	.03	.82	1.28	.03	0.00
15 TO 18	0.00	0.00	.09	.94	.77	0.00	0.00
19 TO 23	0.00	0.00	.06	.43	.80	0.00	0.00
GT 23	0.00	0.00	0.00	.03	.14	0.00	0.00

DIRECTION NNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.06	.20	.57	.03	.03
3 TO 4	.03	0.00	.09	.37	.28	.03	0.00
5 TO 6	0.00	.06	.17	.34	.28	0.00	0.00
7 TO 8	.03	.03	.11	.34	.28	.03	0.00
9 TO 11	.03	0.00	.11	.77	.62	0.00	0.00
12 TO 14	0.00	.03	.20	.57	.74	.03	0.00
15 TO 18	0.00	0.00	.11	.57	.45	.03	0.00
19 TO 23	0.00	0.00	.14	.34	.28	0.00	0.00
GT 23	0.00	0.00	0.00	.11	.06	0.00	0.00

DIRECTION N

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.11	.20	.45	.03	.03
3 TO 4	0.00	.06	.09	.20	.37	0.00	.03
5 TO 6	0.00	0.00	.09	.23	.45	.03	0.00
7 TO 8	0.00	0.00	.11	.40	.77	0.00	0.00
9 TO 11	0.00	0.00	.23	.37	.91	.03	0.00
12 TO 14	0.00	.03	0.00	.48	.45	0.00	0.00
15 TO 18	0.00	0.00	.09	.34	.34	0.00	0.00
19 TO 23	0.00	0.00	.03	.06	.09	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE RESPONSE 2.5-1 (CONT'D)

NIGHTTIME (9PM-8AM) SUMMARY OF WIND SPEED DISTRIBUTION

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

TOTAL NUMBER OF READINGS 3.693E + 03

TOTAL NUMBER OF READINGS WITHOUT CALMS 3.538E + 03

WIND SPEED DISTRIBUTION, PERCENT

CALM	1 TO 2	3 TO 4	5 TO 6	7 TO 8	9 TO 11	12 TO 14	15 TO 18	19 TO 23	GT 23
4.20	33.12	23.50	14.05	9.31	6.99	4.20	3.11	1.27	.24

SUMMED OVER ALL DIRECTIONS
WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	.03	.03	0.00	.03	.92	.97	2.22
1 TO 2	.08	0.00	.11	.27	12.78	8.56	11.32
3 TO 4	.03	.03	0.00	.27	13.30	5.36	4.52
5 TO 6	0.00	0.00	0.00	.24	10.59	1.81	1.41
7 TO 8	.05	.03	0.00	.22	8.04	.57	.41
9 TO 11	.03	0.00	0.00	.49	6.26	.14	.08
12 TO 14	0.00	0.00	0.00	.51	3.68	0.00	0.00
15 TO 18	0.00	0.00	0.00	.41	2.71	0.00	0.00
19 TO 23	0.00	0.00	0.00	.32	.95	0.00	0.00
GT 23	0.00	0.00	0.00	.08	.16	0.00	0.00

SUMMED OVER ALL TEMP. LAPSE RATE STABILITIES
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.54	.32	.65	1.68	2.36	3.47	4.20	3.09	1.98	1.90	1.62	4.14	2.17	2.52	1.19	1.30
3 TO 4	.43	.41	.54	2.30	3.44	2.65	2.06	2.25	1.03	.84	1.11	2.17	1.92	.97	.65	.73
5 TO 6	.43	.22	.30	2.52	1.68	.65	.43	.43	.41	.65	.76	1.84	1.79	.51	.43	1.00
7 TO 8	.46	.11	.05	.89	.92	.14	.27	.11	.05	.24	.46	1.25	2.19	.81	.41	.95
9 TO 11	.11	.03	0.00	.16	.14	.05	.08	.05	.08	.08	.08	.76	2.36	1.30	.57	1.14
12 TO 14	.08	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00	0.00	.03	.11	1.76	1.52	.41	.24
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	1.14	1.44	.35	.16
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.19	.84	.22	.03
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.14	.08	.03

BEAVER VALLEY 150 FT. WIND DATA - DELTA T - 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS A

WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00
3 TO 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 TO 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS B

WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 TO 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00
5 TO 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS C

WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	0.00	.03	.03	.03	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 TO 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 TO 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS D

WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	.03	.08	0.00	.03	0.00	.05	0.00	0.00	.03	0.00	0.00	0.00	.05
3 TO 4	.03	0.00	.03	.03	.03	.03	0.00	.03	0.00	.03	0.00	0.00	.05	0.00	0.00	.03
5 TO 6	0.00	0.00	0.00	.05	.05	0.00	0.00	0.00	0.00	0.00	0.00	.05	.03	0.00	.05	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	.03	.03	.08
9 TO 11	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.11	.19	.08	.03
12 TO 14	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.19	.24	.03	.03
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	.24	.05	.03
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	.16	.08	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.05	0.00	.03

BEAVER VALLEY 150 FT. WIND DATA - DELTA T - 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS E
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.32	.22	.30	1.03	1.33	1.98	1.52	1.00	.43	.65	.60	1.49	.60	.35	.43	.54
3 TO 4	.35	.32	.49	1.79	2.06	1.52	.81	.41	.46	.32	.62	1.30	1.38	.41	.46	.60
5 TO 6	.41	.16	.30	1.81	1.00	.49	.35	.11	.22	.51	.60	1.41	1.60	.41	.32	.89
7 TO 8	.46	.08	.05	.54	.76	.11	.24	.11	.03	.22	.38	1.03	2.06	.79	.38	.81
9 TO 11	.08	.03	0.00	.11	.14	.05	.08	.05	.08	.08	.08	.57	2.25	1.11	.49	1.06
12 TO 14	.05	0.00	0.00	0.00	.05	0.00	0.00	0.00	0.00	0.00	.03	.11	1.57	1.27	.38	.22
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	0.00	1.06	1.19	.30	.14
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.11	.68	.14	.03
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	.08	0.00

TEMP. LAPSE RATE STABILITY CLASS F
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.14	.05	.14	.38	.43	.97	1.41	1.06	.46	.41	.35	.87	.68	.73	.22	.27
3 TO 4	.05	.03	.03	.24	1.06	.70	.51	.73	.30	.24	.22	.49	.30	.30	.08	.08
5 TO 6	0.00	.03	0.00	.38	.54	.05	.03	.11	.05	.08	.08	.24	.03	.08	.03	.08
7 TO 8	0.00	.03	0.00	.16	.08	.03	.03	0.00	.03	0.00	.05	.08	.03	0.00	0.00	.05
9 TO 11	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.08	0.00	0.00	0.00	.03
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS G
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.08	.05	.22	.24	.49	.49	1.22	1.00	1.00	.84	.68	1.71	.89	1.44	.54	.43
3 TO 4	0.00	.05	0.00	.24	.30	.41	.73	1.06	.27	.24	.27	.38	.16	.27	.11	.03
5 TO 6	.03	.03	0.00	.27	.08	.11	.05	.22	.14	.05	.08	.14	.14	.03	.03	.03
7 TO 8	0.00	0.00	0.00	.19	.08	0.00	0.00	0.00	0.00	.03	.03	.05	.03	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.05	0.00	0.00	0.00	.03
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT. WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION NNE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.32	.14	.08
3 TO 4	0.00	0.00	0.00	.03	.35	.05	0.00
5 TO 6	0.00	0.00	0.00	0.00	.41	0.00	.03
7 TO 8	0.00	0.00	0.00	0.00	.46	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	.08	.03	0.00
12 TO 14	0.00	0.00	0.00	.03	.05	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION NE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.22	.05	.05
3 TO 4	0.00	0.00	0.00	0.00	.32	.03	.05
5 TO 6	0.00	0.00	0.00	0.00	.16	.03	.03
7 TO 8	0.00	0.00	0.00	0.00	.08	.03	0.00
9 TO 11	0.00	0.00	0.00	0.00	.03	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION ENE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.30	.14	.22
3 TO 4	0.00	0.00	0.00	.03	.49	.03	0.00
5 TO 6	0.00	0.00	0.00	0.00	.30	0.00	0.00
7 TO 8	0.00	0.00	0.00	0.00	.05	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION E

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.03	1.03	.38	.24
3 TO 4	0.00	0.00	0.00	.03	1.79	.24	.24
5 TO 6	0.00	0.00	0.00	.05	1.81	.38	.27
7 TO 8	0.00	0.00	0.00	0.00	.54	.16	.19
9 TO 11	0.00	0.00	0.00	.05	.11	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION ESE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.08	1.33	.43	.49
3 TO 4	0.00	0.00	0.00	.03	2.06	1.06	.30
5 TO 6	0.00	0.00	0.00	.05	1.00	.54	.08
7 TO 8	0.00	0.00	0.00	0.00	.76	.08	.08
9 TO 11	0.00	0.00	0.00	0.00	.14	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	.05	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	0.00	1.98	.97	.49
3 TO 4	0.00	0.00	0.00	.03	1.52	.70	.41
5 TO 6	0.00	0.00	0.00	0.00	.49	.05	.11
7 TO 8	0.00	0.00	0.00	0.00	.11	.03	0.00
9 TO 11	0.00	0.00	0.00	0.00	.05	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SSE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.03	1.52	1.41	1.22
3 TO 4	0.00	0.00	0.00	0.00	.81	.51	.73
5 TO 6	0.00	0.00	0.00	0.00	.35	.03	.05
7 TO 8	0.00	0.00	0.00	0.00	.24	.03	0.00
9 TO 11	0.00	0.00	0.00	0.00	.08	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION S

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.03	0.00	0.00	0.00	1.00	1.06	1.00
3 TO 4	.03	0.00	0.00	.03	.41	.73	1.06
5 TO 6	0.00	0.00	0.00	0.00	.11	.11	.22
7 TO 8	0.00	0.00	0.00	0.00	.11	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	.05	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION SSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.05	.43	.46	1.00
3 TO 4	0.00	0.00	0.00	0.00	.46	.30	.27
5 TO 6	0.00	0.00	0.00	0.00	.22	.05	.14
7 TO 8	0.00	0.00	0.00	0.00	.03	.03	0.00
9 TO 11	0.00	0.00	0.00	0.00	.08	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.65	.41	.84
3 TO 4	0.00	0.00	0.00	.03	.32	.24	.24
5 TO 6	0.00	0.00	0.00	0.00	.51	.08	.05
7 TO 8	0.00	0.00	0.00	0.00	.22	0.00	.03
9 TO 11	0.00	0.00	0.00	0.00	.08	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION WSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.60	.35	.68
3 TO 4	0.00	0.00	0.00	0.00	.62	.22	.27
5 TO 6	0.00	0.00	0.00	0.00	.60	.08	.08
7 TO 8	0.00	0.00	0.00	0.00	.38	.05	.03
9 TO 11	0.00	0.00	0.00	0.00	.08	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	.03	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION W

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.05	0.00	0.00	.03	1.49	.87	1.71
3 TO 4	0.00	0.00	0.00	0.00	1.30	.49	.38
5 TO 6	0.00	0.00	0.00	.05	1.41	.24	.14
7 TO 8	.05	.03	0.00	0.00	1.03	.08	.05
9 TO 11	.03	0.00	0.00	.03	.57	.08	.05
12 TO 14	0.00	0.00	0.00	0.00	.11	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION WNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.60	.68	.89
3 TO 4	0.00	.03	0.00	.05	1.38	.30	.16
5 TO 6	0.00	0.00	0.00	.03	1.60	.03	.14
7 TO 8	0.00	0.00	0.00	.08	2.06	.03	.03
9 TO 11	0.00	0.00	0.00	.11	2.25	0.00	0.00
12 TO 14	0.00	0.00	0.00	.19	1.57	0.00	0.00
15 TO 18	0.00	0.00	0.00	.08	1.06	0.00	0.00
19 TO 23	0.00	0.00	0.00	.08	.11	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION NW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.35	.73	1.44
3 TO 4	0.00	0.00	0.00	0.00	.41	.30	.27
5 TO 6	0.00	0.00	0.00	0.00	.41	.08	.03
7 TO 8	0.00	0.00	0.00	.03	.79	0.00	0.00
9 TO 11	0.00	0.00	0.00	.19	1.11	0.00	0.00
12 TO 14	0.00	0.00	0.00	.24	1.27	0.00	0.00
15 TO 18	0.00	0.00	0.00	.24	1.19	0.00	0.00
19 TO 23	0.00	0.00	0.00	.16	.68	0.00	0.00
GT 23	0.00	0.00	0.00	.05	.08	0.00	0.00

DIRECTION NNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	0.00	.43	.22	.54
3 TO 4	0.00	0.00	0.00	0.00	.46	.08	.11
5 TO 6	0.00	0.00	0.00	.05	.32	.03	.03
7 TO 8	0.00	0.00	0.00	.03	.38	0.00	0.00
9 TO 11	0.00	0.00	0.00	.08	.49	0.00	0.00
12 TO 14	0.00	0.00	0.00	.03	.38	0.00	0.00
15 TO 18	0.00	0.00	0.00	.05	.30	0.00	0.00
19 TO 23	0.00	0.00	0.00	.08	.14	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	.08	0.00	0.00

DIRECTION N

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.05	.54	.27	.43
3 TO 4	0.00	0.00	0.00	.03	.60	.08	.03
5 TO 6	0.00	0.00	0.00	0.00	.89	.08	.03
7 TO 8	0.00	0.00	0.00	.08	.81	.05	0.00
9 TO 11	0.00	0.00	0.00	.03	1.06	.03	.03
12 TO 14	0.00	0.00	0.00	.03	.22	0.00	0.00
15 TO 18	0.00	0.00	0.00	.03	.14	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	.03	0.00	0.00
GT 23	0.00	0.00	0.00	.03	0.00	0.00	0.00

24 HOUR SUMMARY OF WIND SPEED DISTRIBUTION

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

TOTAL NUMBER OF READINGS 7.215E + 03

TOTAL NUMBER OF READINGS WITHOUT CALMS 7.013E + 03

WIND SPEED DISTRIBUTION, PERCENT

CALM	1 TO 2	3 TO 4	5 TO 6	7 TO 8	9 TO 11	12 TO 14	15 TO 18	19 TO 23	GT 23
2.80	23.71	20.86	15.99	12.10	11.70	6.14	4.30	2.08	.32

SUMMED OVER ALL DIRECTIONS

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
CALM	.01	.01	.03	.06	.79	.60	1.30
1 TO 2	.08	.04	.36	1.37	10.33	5.00	6.53
3 TO 4	.11	.14	.54	1.98	12.25	3.16	2.67
5 TO 6	.08	.11	.68	2.73	10.28	1.16	.94
7 TO 8	.10	.08	.86	2.62	7.78	.35	.32
9 TO 11	.06	.04	.86	3.05	7.50	.14	.06
12 TO 14	.01	.04	.17	1.83	4.03	.04	.01
15 TO 18	0.00	0.00	.22	1.52	2.54	.01	0.00
19 TO 23	0.00	.01	.12	.73	1.21	0.00	0.00
GT 23	0.00	0.00	0.00	.14	.18	0.00	0.00

SUMMED OVER ALL TEMP. LAPSE RATE STABILITIES

WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.61	.36	.69	1.57	1.66	2.23	2.56	2.01	1.37	1.34	1.23	2.84	1.51	1.61	1.04	1.07
3 TO 4	.50	.43	.58	2.02	2.56	1.76	1.44	1.65	.91	.97	1.08	2.22	1.98	1.29	.72	.73
5 TO 6	.55	.58	.60	2.00	1.58	.55	.39	.42	.47	.79	1.12	1.77	2.36	1.28	.64	.90
7 TO 8	.61	.32	.18	.90	.79	.28	.19	.24	.18	.36	.60	1.75	2.45	1.54	.61	1.11
9 TO 11	.42	.22	.21	.33	.36	.22	.10	.17	.29	.26	.39	1.12	2.81	2.43	1.04	1.33
12 TO 14	.30	0.00	.08	0.00	.06	.01	.04	.08	.03	.03	.03	.18	1.88	1.84	.97	.60
15 TO 18	.10	0.00	0.00	0.00	.03	0.00	.03	0.00	0.00	0.00	.03	.07	1.23	1.61	.75	.46
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	.43	1.05	.49	.10
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.15	.12	.01

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS A
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	.03	0.00	.01	0.00	.01	0.00	0.00	0.00	.03	0.00	0.00	0.00	0.00
3 TO 4	0.00	.01	0.00	0.00	.01	.01	.01	.01	0.00	0.00	0.00	0.00	.03	0.00	.01	0.00
5 TO 6	.01	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	.03	.01	.01	0.00	0.00	0.00	0.00
7 TO 8	0.00	.03	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	.03	0.00	.01	.01	0.00
9 TO 11	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	.01	0.00	0.00	.01	0.00	0.00	.01	0.00
12 TO 14	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS B
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	.01	.01	0.00	0.00
3 TO 4	.01	.01	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	.03	.03	.01	0.00	.03
5 TO 6	0.00	.01	.01	0.00	.01	0.00	0.00	0.00	0.00	0.00	.01	0.00	.01	.01	.03	0.00
7 TO 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.01	0.00	.04	.01	0.00
9 TO 11	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.01	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	.01	.01
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS C
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.06	.03	.03	.04	.03	.03	.01	0.00	.01	0.00	0.00	.04	0.00	0.00	.03	.06
3 TO 4	.01	0.00	.04	.04	.06	.03	.01	.01	.04	.01	0.00	.04	.06	.10	.04	.04
5 TO 6	.01	.04	.03	.07	.04	.01	.01	.01	.01	.04	.03	.03	.17	.04	.08	.04
7 TO 8	.04	.04	.03	.06	.03	.07	.01	.01	.01	.03	.06	.04	.14	.18	.06	.06
9 TO 11	.04	.08	.01	.06	0.00	.03	0.00	.01	.01	.04	.06	.03	.18	.14	.06	.11
12 TO 14	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.01	.10	0.00
15 TO 18	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.04	.04	.06	.04
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	.03	.07	.01
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS D
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.11	.06	.10	.15	.14	.06	.04	.08	.10	.04	.06	.07	.04	.11	.10	.12
3 TO 4	.11	.10	.07	.15	.14	.11	.04	.07	.10	.10	.08	.10	.22	.30	.18	.11
5 TO 6	.07	.21	.17	.12	.17	.04	.04	.10	.06	.10	.22	.19	.47	.47	.19	.11
7 TO 8	.11	.12	.03	.08	.10	.04	.03	.06	.07	.10	.12	.30	.55	.49	.18	.24
9 TO 11	.08	.07	.08	.10	.07	.03	0.00	.04	.14	.04	.17	.18	.65	.79	.42	.19
12 TO 14	.18	0.00	.04	0.00	.03	0.00	.01	.01	.01	0.00	.01	.03	.43	.53	.29	.25
15 TO 18	.03	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	0.00	.03	.39	.58	.30	.18
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	.19	.29	.21	.03
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.04	.06	.01

BEAVER VALLEY 150 FT. WIND DATA - DELTA T - 9/5/70-9/5/71

TEMP. LAPSE RATE STABILITY CLASS E
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.32	.21	.33	.93	.97	1.22	.98	.71	.44	.58	.54	1.16	.58	.35	.50	.50
3 TO 4	.33	.25	.44	1.48	1.57	1.00	.62	.57	.43	.54	.72	1.54	1.33	.57	.37	.49
5 TO 6	.44	.29	.37	1.39	1.03	.39	.25	.12	.26	.51	.72	1.32	1.54	.67	.30	.68
7 TO 8	.46	.11	.12	.54	.58	.14	.14	.15	.07	.17	.36	1.28	1.73	.80	.33	.79
9 TO 11	.28	.07	.11	.15	.28	.17	.08	.11	.12	.17	.17	.82	1.97	1.47	.55	.98
12 TO 14	.10	0.00	.03	0.00	.03	.01	.03	.07	.01	.01	.01	.14	1.43	1.28	.55	.33
15 TO 18	.04	0.00	0.00	0.00	.01	0.00	.03	0.00	0.00	0.00	.01	.04	.80	.98	.37	.24
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.21	.73	.21	.06
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.11	.07	0.00

TEMP. LAPSE RATE STABILITY CLASS F
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.08	.04	.11	.26	.25	.58	.78	.61	.26	.22	.24	.53	.37	.39	.12	.15
3 TO 4	.03	.03	.01	.19	.61	.40	.32	.39	.17	.15	.11	.29	.19	.17	.06	.04
5 TO 6	0.00	.01	0.00	.25	.29	.04	.04	.06	.03	.06	.04	.14	.08	.06	.01	.06
7 TO 8	0.00	.01	0.00	.10	.04	.01	.01	.01	.01	0.00	.03	.04	.01	.01	.01	.03
9 TO 11	.01	0.00	0.00	.01	0.00	0.00	.01	0.00	0.00	0.00	0.00	.04	.01	.01	0.00	.03
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.01	.01	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TEMP. LAPSE RATE STABILITY CLASS G
WIND SPEED VERSUS DIRECTION (IN PERCENT)

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1 TO 2	.04	.03	.12	.15	.28	.33	.73	.60	.55	.50	.40	1.01	.50	.75	.29	.24
3 TO 4	0.00	.03	.01	.15	.18	.21	.43	.58	.18	.17	.17	.22	.12	.14	.06	.03
5 TO 6	.01	.01	.01	.17	.04	.06	.04	.12	.11	.06	.08	.08	.08	.03	.01	.01
7 TO 8	0.00	0.00	0.00	.12	.04	.01	0.00	0.00	0.00	.06	.03	.04	.01	0.00	0.00	0.00
9 TO 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	.03	0.00	0.00	0.00	.01
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.01	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT. WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION NNE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.06	.11	.32	.08	.04
3 TO 4	0.00	.01	.01	.11	.33	.03	0.00
5 TO 6	.01	0.00	.01	.07	.44	0.00	.01
7 TO 8	0.00	0.00	.04	.11	.46	0.00	0.00
9 TO 11	0.00	0.00	.04	.08	.28	.01	0.00
12 TO 14	0.00	0.00	.03	.18	.10	0.00	0.00
15 TO 18	0.00	0.00	.03	.03	.04	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION NE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.06	.21	.04	.03
3 TO 4	.01	.01	0.00	.10	.25	.03	.03
5 TO 6	0.00	.01	.04	.21	.29	.01	.01
7 TO 8	.03	0.00	.04	.12	.11	.01	0.00
9 TO 11	0.00	0.00	.08	.07	.07	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION ENE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.10	.33	.11	.12
3 TO 4	0.00	0.00	.04	.07	.44	.01	.01
5 TO 6	0.00	.01	.03	.17	.37	0.00	.01
7 TO 8	0.00	0.00	.03	.03	.12	0.00	0.00
9 TO 11	0.00	0.00	.01	.08	.11	0.00	0.00
12 TO 14	.01	0.00	0.00	.04	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION E

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.03	0.00	.04	.15	.93	.26	.15
3 TO 4	0.00	0.00	.04	.15	1.48	.19	.15
5 TO 6	0.00	0.00	.07	.12	1.39	.25	.17
7 TO 8	0.00	0.00	.06	.08	.54	.10	.12
9 TO 11	0.00	.01	.06	.10	.15	.01	0.00
12 TO 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION ESE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.14	.97	.25	.28
3 TO 4	.01	0.00	.06	.14	1.57	.61	.18
5 TO 6	0.00	.01	.04	.17	1.03	.29	.04
7 TO 8	0.00	0.00	.03	.10	.58	.04	.04
9 TO 11	.01	0.00	0.00	.07	.28	0.00	0.00
12 TO 14	0.00	0.00	0.00	.03	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	.01	.01	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.01	0.00	.03	.06	1.22	.58	.33
3 TO 4	.01	0.00	.03	.11	1.00	.40	.21
5 TO 6	.01	0.00	.01	.04	.39	.04	.06
7 TO 8	0.00	0.00	.07	.04	.14	.01	.01
9 TO 11	0.00	0.00	.03	.03	.17	0.00	0.00
12 TO 14	0.00	0.00	0.00	0.00	.01	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SSE

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	.01	.01	.04	.98	.78	.73
3 TO 4	.01	0.00	.01	.04	.62	.32	.43
5 TO 6	0.00	0.00	.01	.04	.25	.04	.04
7 TO 8	0.00	0.00	.01	.03	.14	.01	0.00
9 TO 11	0.00	0.00	0.00	0.00	.08	.01	0.00
12 TO 14	0.00	0.00	0.00	.01	.03	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	.03	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION S

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.01	0.00	0.00	.08	.71	.61	.60
3 TO 4	.01	.01	.01	.07	.57	.39	.58
5 TO 6	0.00	0.00	.01	.10	.12	.06	.12
7 TO 8	0.00	0.00	.01	.06	.15	.01	0.00
9 TO 11	0.00	0.00	.01	.04	.11	0.00	0.00
12 TO 14	0.00	0.00	0.00	.01	.07	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION SSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.01	.10	.44	.26	.55
3 TO 4	0.00	0.00	.04	.10	.43	.17	.18
5 TO 6	0.00	0.00	.01	.06	.26	.03	.11
7 TO 8	.01	0.00	.01	.07	.07	.01	0.00
9 TO 11	.01	0.00	.01	.14	.12	0.00	0.00
12 TO 14	0.00	0.00	0.00	.01	.01	0.00	0.00
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION SW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.04	.58	.22	.50
3 TO 4	0.00	0.00	.01	.10	.54	.15	.17
5 TO 6	.03	0.00	.04	.10	.51	.06	.06
7 TO 8	0.00	.01	.03	.10	.17	0.00	.06
9 TO 11	0.00	0.00	.04	.04	.17	0.00	.01
12 TO 14	0.00	0.00	0.00	0.00	.01	0.00	.01
15 TO 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION WSW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	0.00	.06	.54	.24	.40
3 TO 4	0.00	0.00	0.00	.08	.72	.11	.17
5 TO 6	.01	.01	.03	.22	.72	.04	.08
7 TO 8	0.00	0.00	.06	.12	.36	.03	.03
9 TO 11	0.00	0.00	.06	.17	.17	0.00	0.00
12 TO 14	0.00	0.00	0.00	.01	.01	0.00	0.00
15 TO 18	0.00	0.00	.01	0.00	.01	0.00	0.00
19 TO 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DIRECTION W

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	.03	0.00	.04	.07	1.16	.53	1.01
3 TO 4	0.00	.03	.04	.10	1.54	.29	.22
5 TO 6	.01	0.00	.03	.19	1.32	.14	.08
7 TO 8	.03	.01	.04	.30	1.28	.04	.04
9 TO 11	.01	.01	.03	.18	.82	.04	.03
12 TO 14	0.00	0.00	0.00	.03	.14	.01	0.00
15 TO 18	0.00	0.00	0.00	.03	.04	0.00	0.00
19 TO 23	0.00	0.00	0.00	.01	0.00	0.00	0.00
GT 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BEAVER VALLEY 150 FT WIND DATA - DELTA T - 9/5/70-9/5/71

DIRECTION WNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	.01	0.00	.04	.58	.37	.50
3 TO 4	.03	.03	.06	.22	1.33	.19	.12
5 TO 6	0.00	.01	.17	.47	1.54	.08	.08
7 TO 8	0.00	0.00	.14	.55	1.73	.01	.01
9 TO 11	0.00	0.00	.18	.65	1.97	.01	0.00
12 TO 14	0.00	0.00	.03	.43	1.43	0.00	0.00
15 TO 18	0.00	0.00	.04	.39	.80	0.00	0.00
19 TO 23	0.00	.01	.01	.19	.21	0.00	0.00
GT 23	0.00	0.00	0.00	.03	0.00	0.00	0.00

DIRECTION NW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	.01	0.00	.11	.35	.39	.75
3 TO 4	0.00	.01	.10	.30	.57	.17	.14
5 TO 6	0.00	.01	.04	.47	.67	.06	.03
7 TO 8	.01	.04	.18	.49	.80	.01	0.00
9 TO 11	0.00	.01	.14	.79	1.47	.01	0.00
12 TO 14	0.00	.01	.01	.53	1.28	.01	0.00
15 TO 18	0.00	0.00	.04	.58	.98	0.00	0.00
19 TO 23	0.00	0.00	.03	.29	.73	0.00	0.00
GT 23	0.00	0.00	0.00	.04	.11	0.00	0.00

DIRECTION NNW

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.03	.10	.50	.12	.29
3 TO 4	.01	0.00	.04	.18	.37	.06	.06
5 TO 6	0.00	.03	.08	.19	.30	.01	.01
7 TO 8	.01	.01	.06	.18	.33	.01	0.00
9 TO 11	.01	0.00	.06	.42	.55	0.00	0.00
12 TO 14	0.00	.01	.10	.29	.55	.01	0.00
15 TO 18	0.00	0.00	.06	.30	.37	.01	0.00
19 TO 23	0.00	0.00	.07	.21	.21	0.00	0.00
GT 23	0.00	0.00	0.00	.06	.07	0.00	0.00

DIRECTION N

WIND SPEED DISTRIBUTION VERSUS TEMP. LAPSE RATE STABILITY CLASS (IN PERCENT)

	A	B	C	D	E	F	G
1 TO 2	0.00	0.00	.06	.12	.50	.15	.24
3 TO 4	0.00	.03	.04	.11	.49	.04	.03
5 TO 6	0.00	0.00	.04	.11	.68	.06	.01
7 TO 8	0.00	0.00	.06	.24	.79	.03	0.00
9 TO 11	0.00	0.00	.11	.19	.98	.03	.01
12 TO 14	0.00	.01	0.00	.25	.33	0.00	0.00
15 TO 18	0.00	0.00	.04	.18	.24	0.00	0.00
19 TO 23	0.00	0.00	.01	.03	.06	0.00	0.00
GT 23	0.00	0.00	0.00	.01	0.00	0.00	0.00

Figure 1 – SITE PLAN

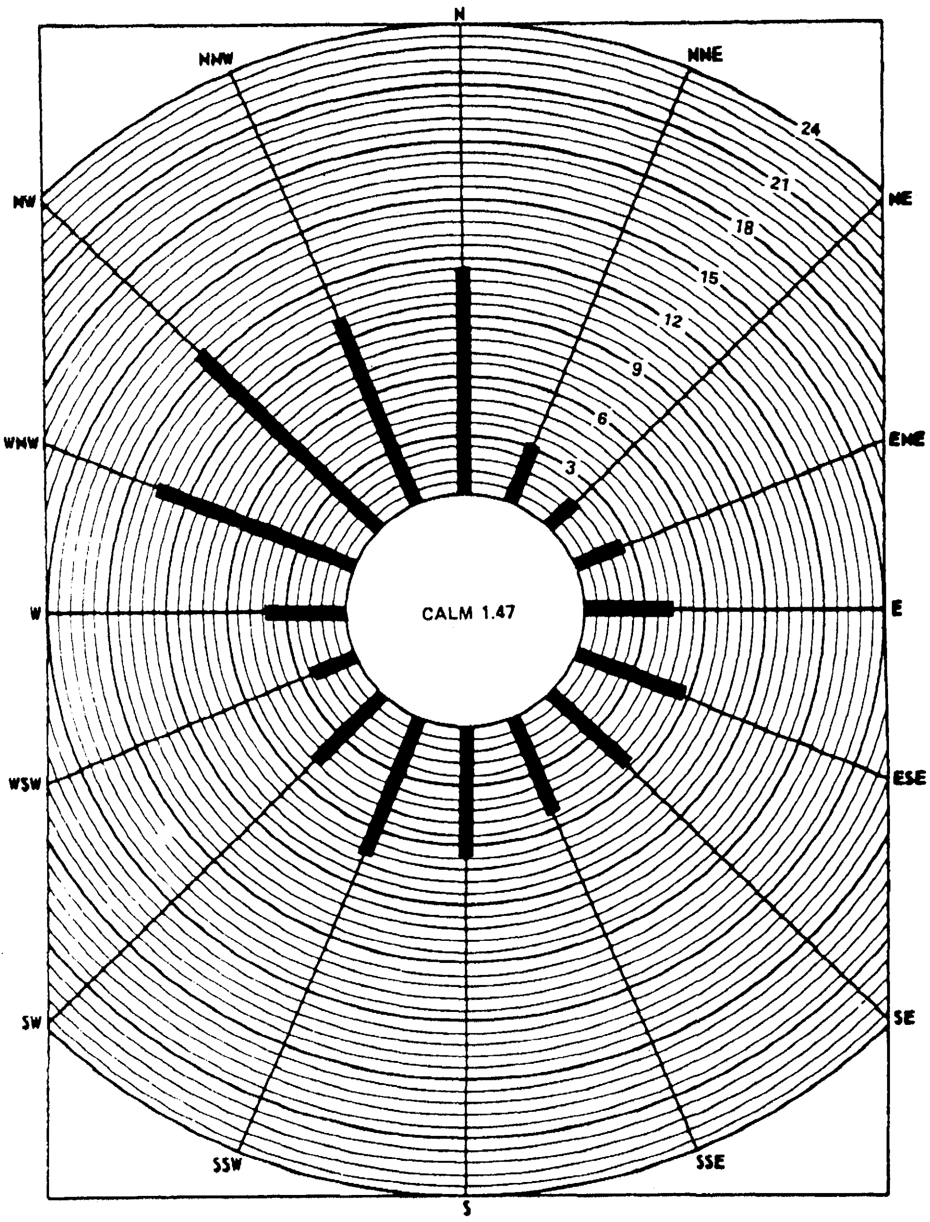


FIGURE 2
GROSS WIND ROSE - BEAVER VALLEY SITE
50 ft Level SEASON I

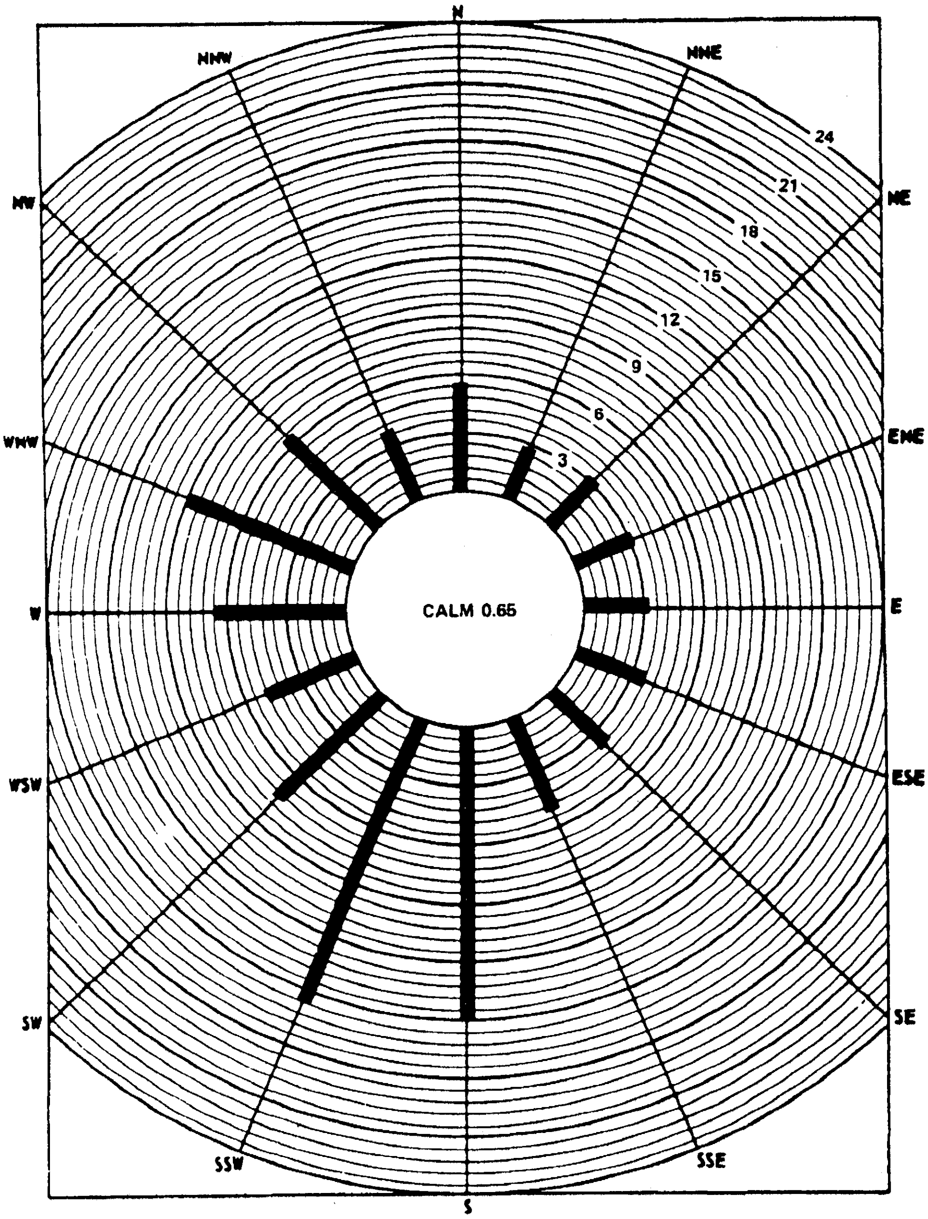


FIGURE 3
GROSS WIND ROSE - BEAVER VALLEY SITE
50 ft. Level SEASON 2

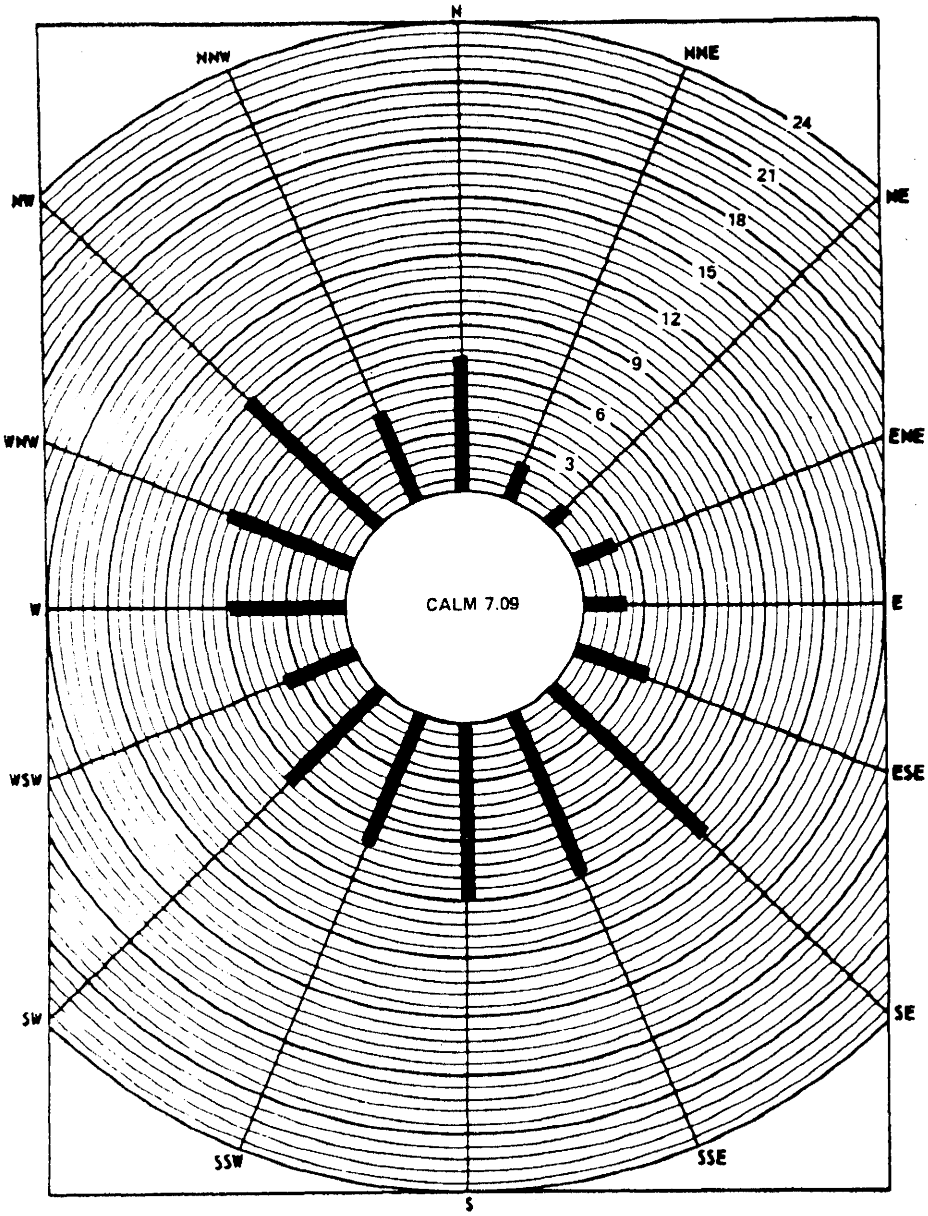


FIGURE 4
GROSS WIND ROSE - BEAVER VALLEY SITE
50ft Level SEASON 3

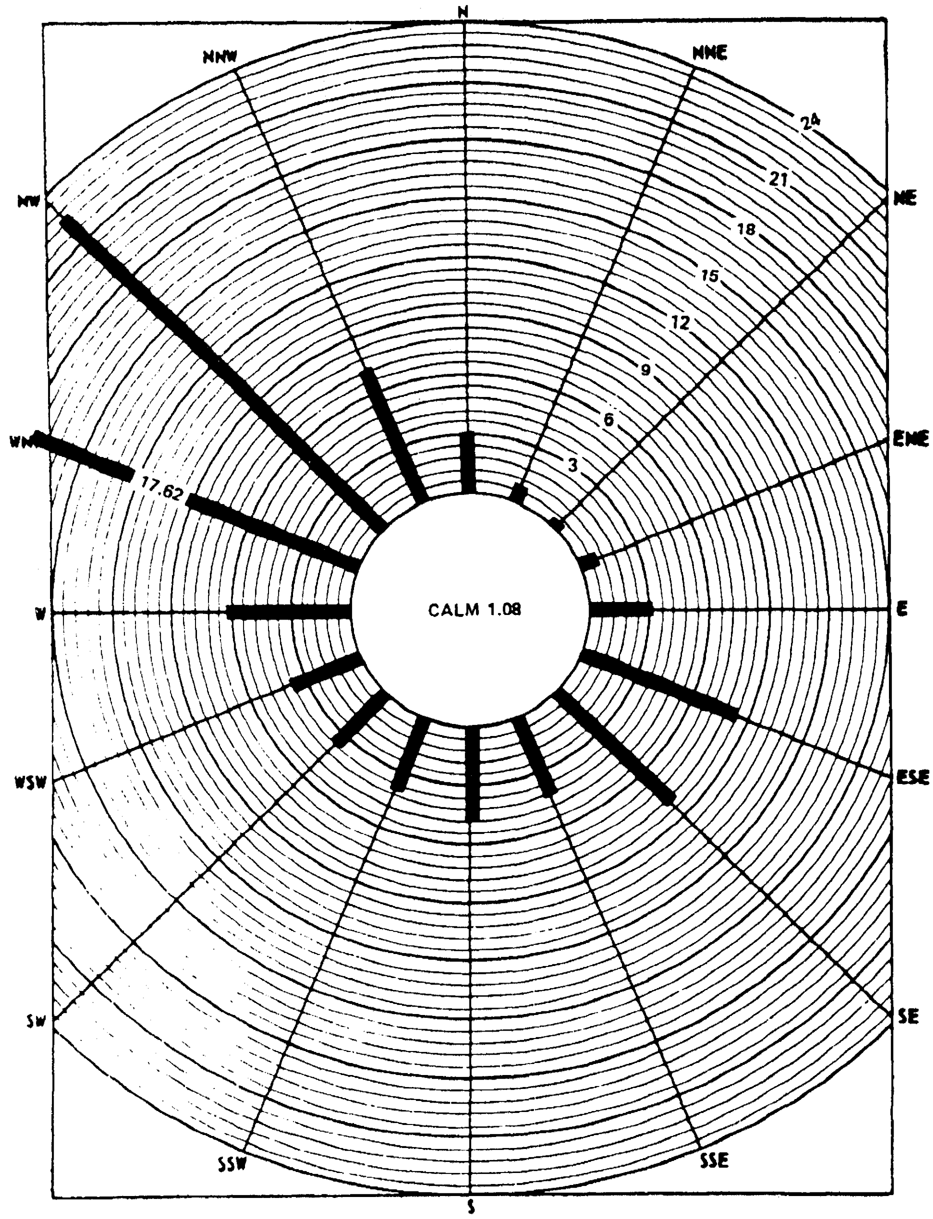


FIGURE 5
GROSS WIND ROSE - BEAVER VALLEY SITE
50 ft. Level SEASON 4

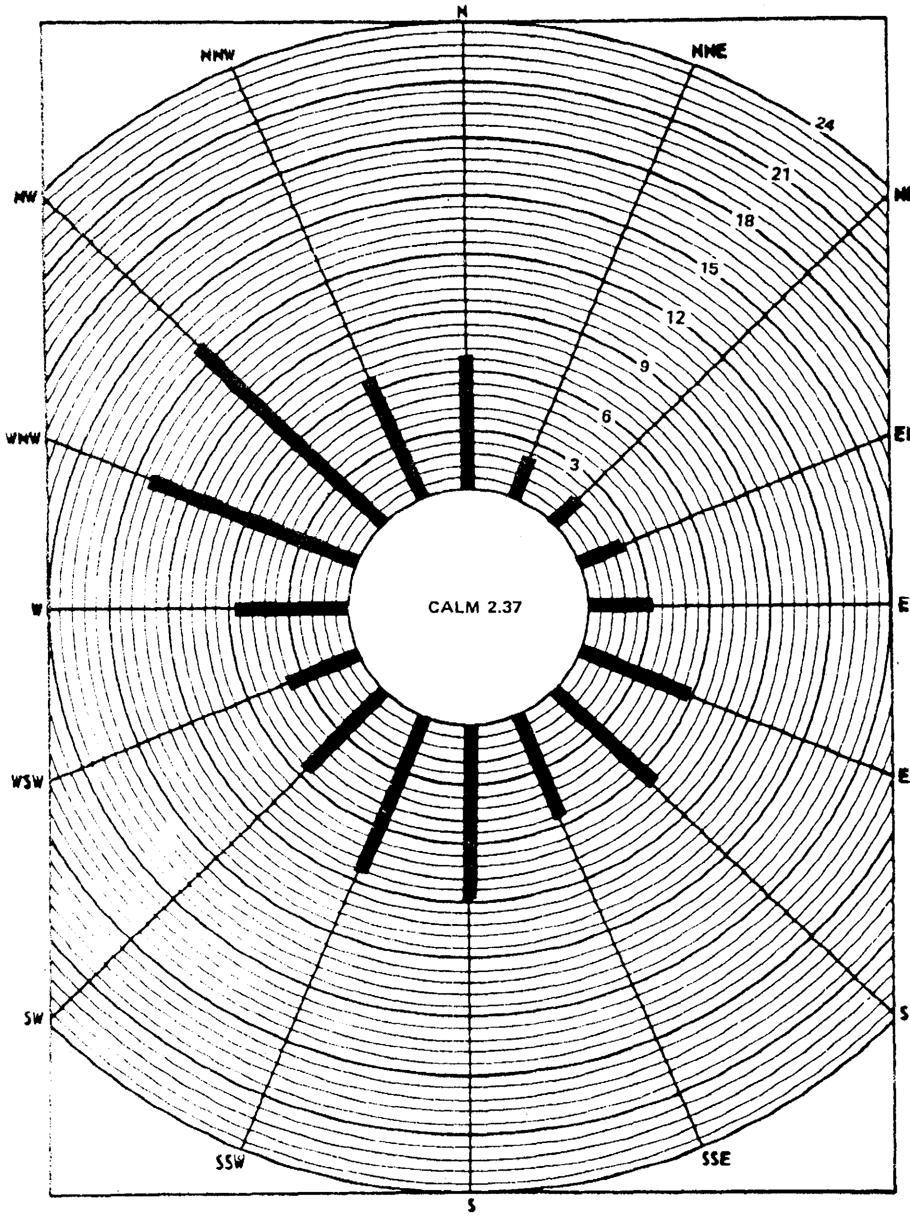


FIGURE 6
GROSS WIND ROSE - BEAVER VALLEY SITE
50 ft. Level ANNUAL AVERAGE

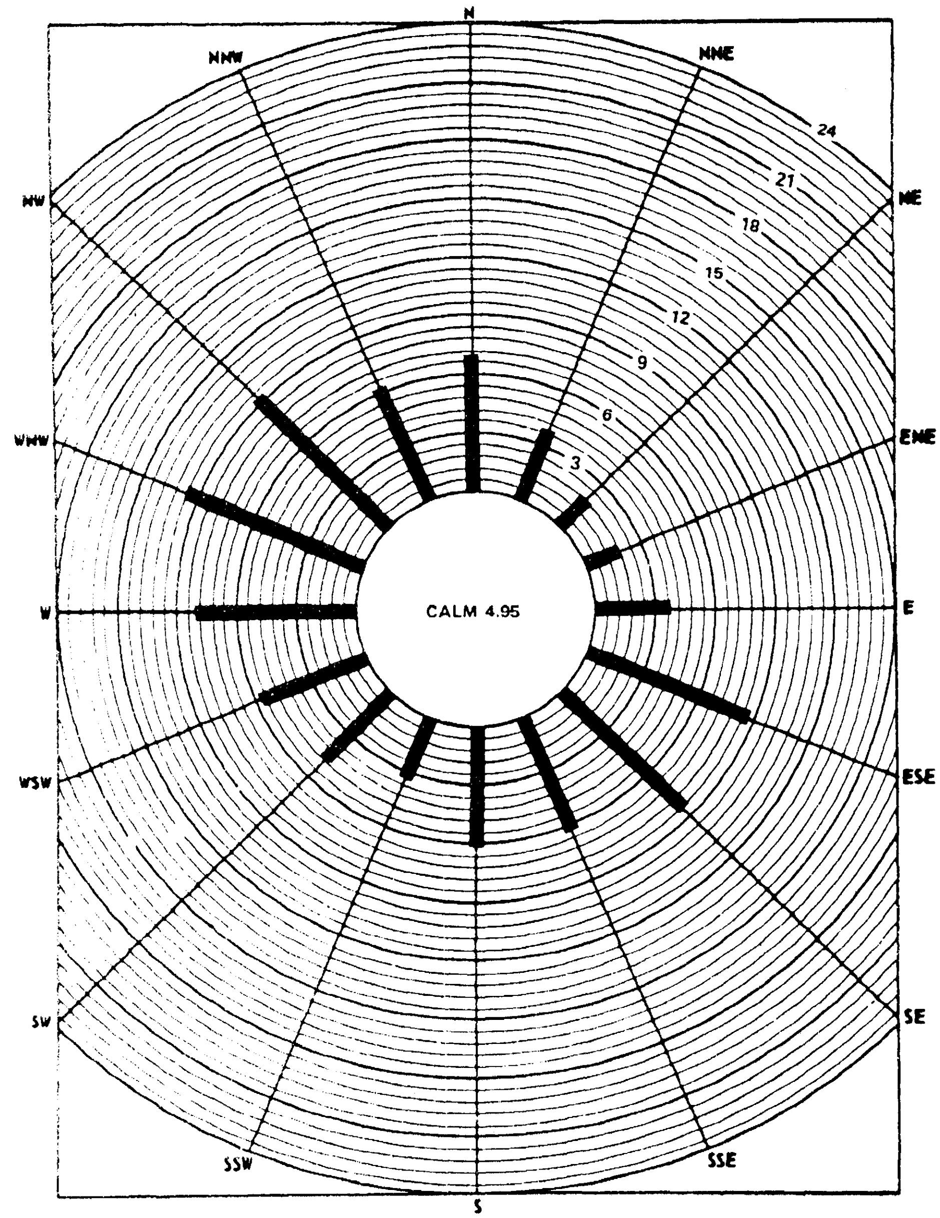


FIGURE 7
GROSS WIND ROSE - BEAVER VALLEY SITE
150ft Level ANNUAL AVERAGE

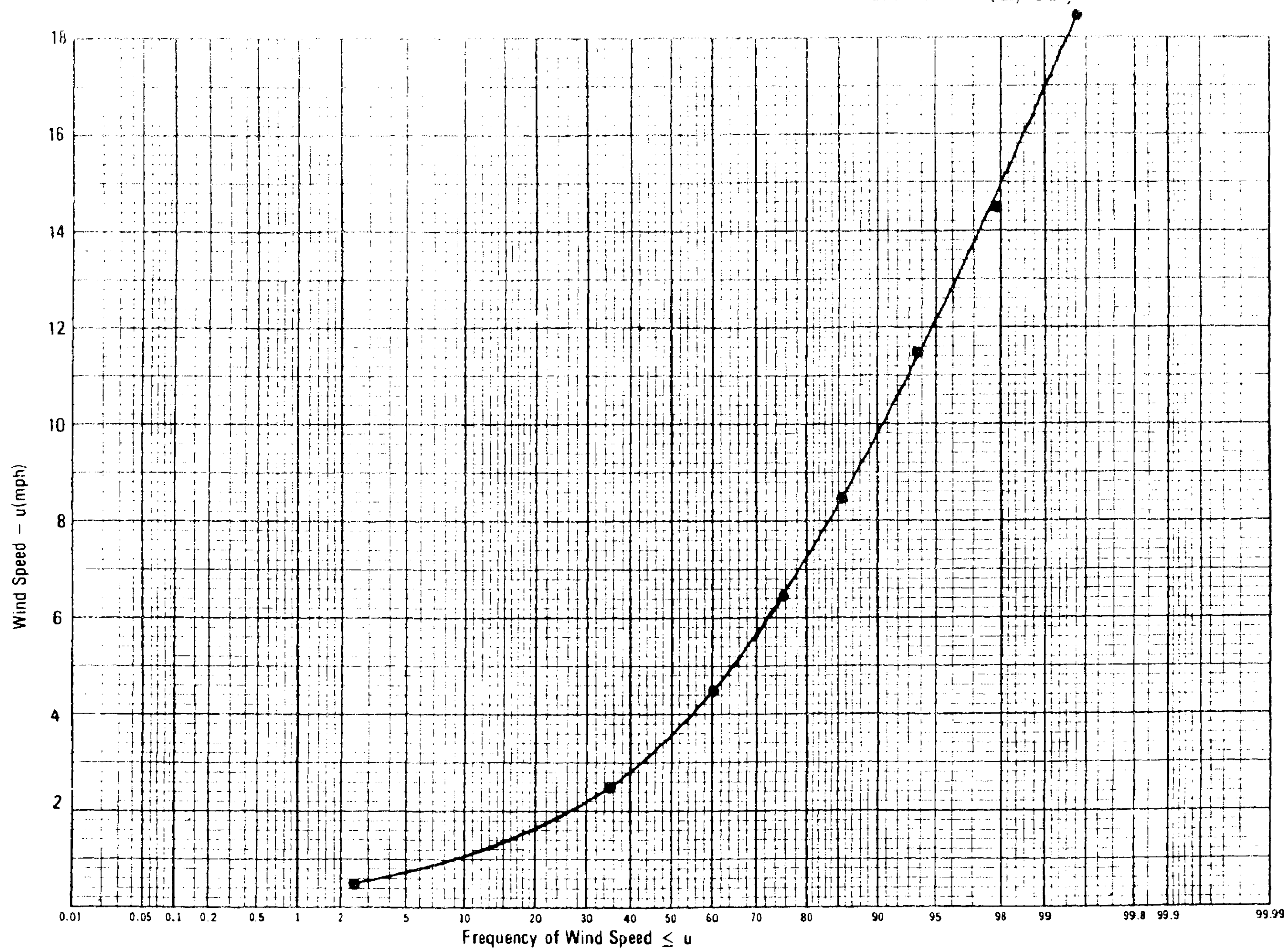


Figure 8 WIND SPEED DISTRIBUTION

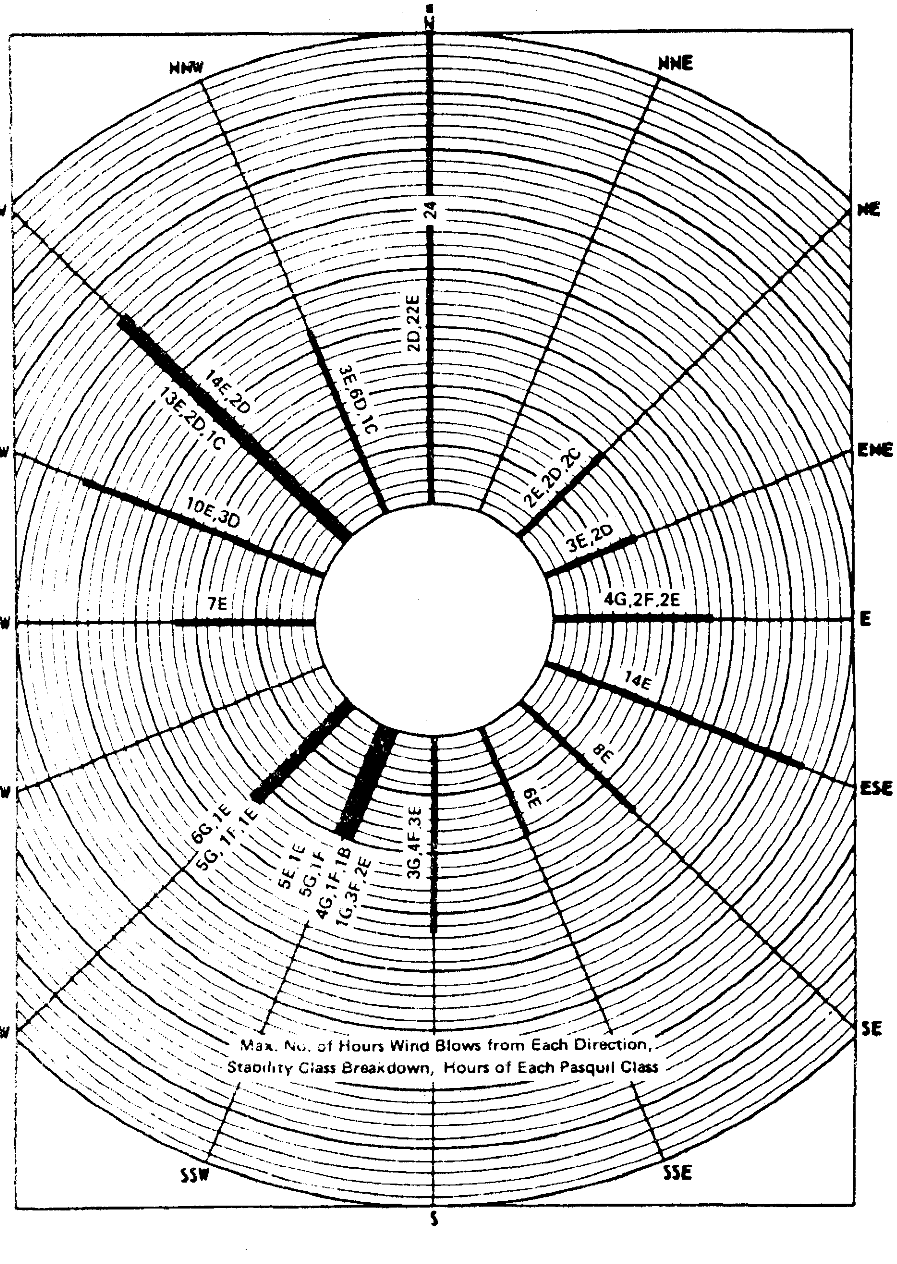


Figure 9 PERSISTENCE WIND ROSE
Beaver Valley Power Station

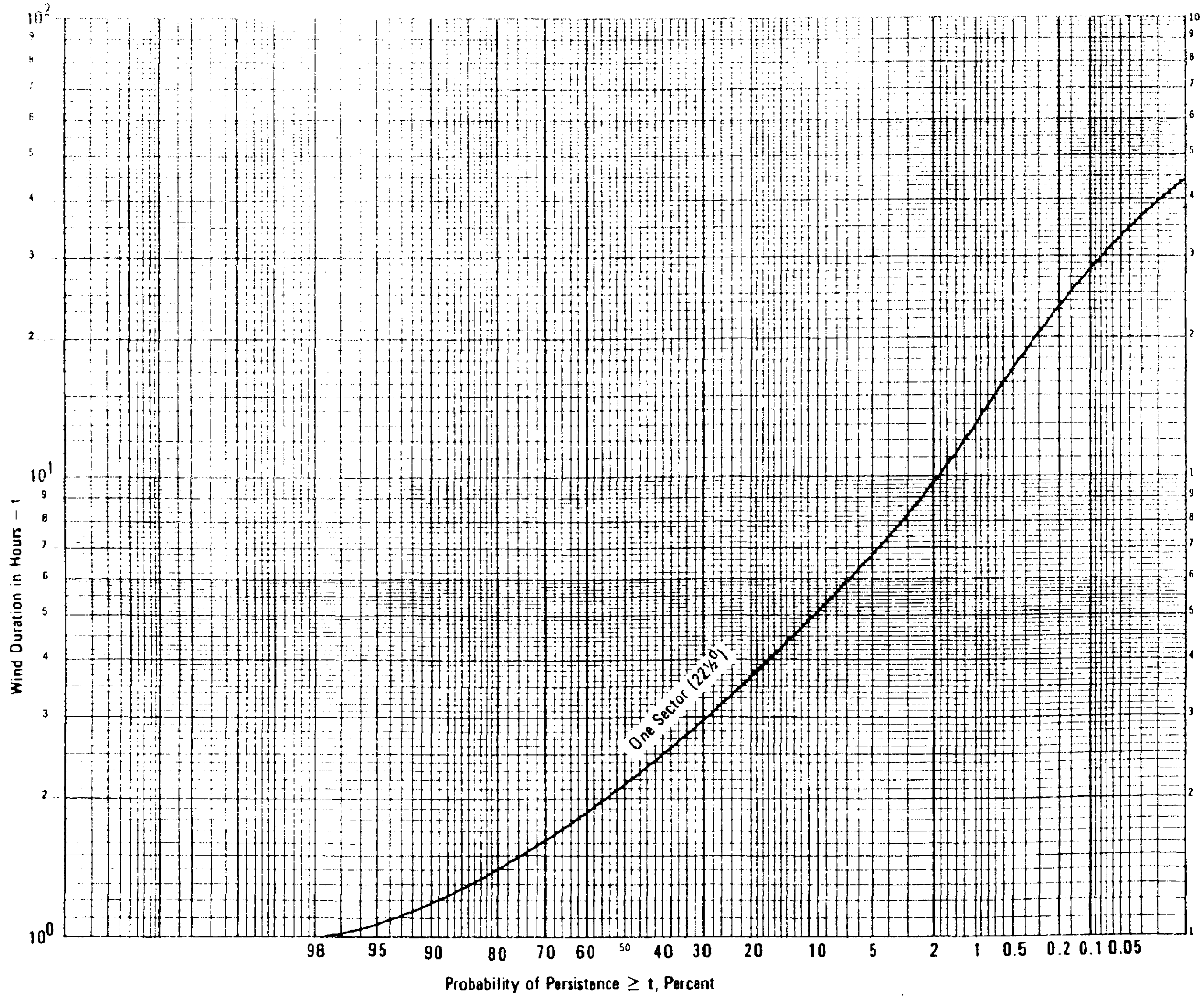


FIGURE 10 WIND DIRECTIONAL PERSISTENCE PROBABILITY
50 Ft. Level, Beaver Valley Power Station

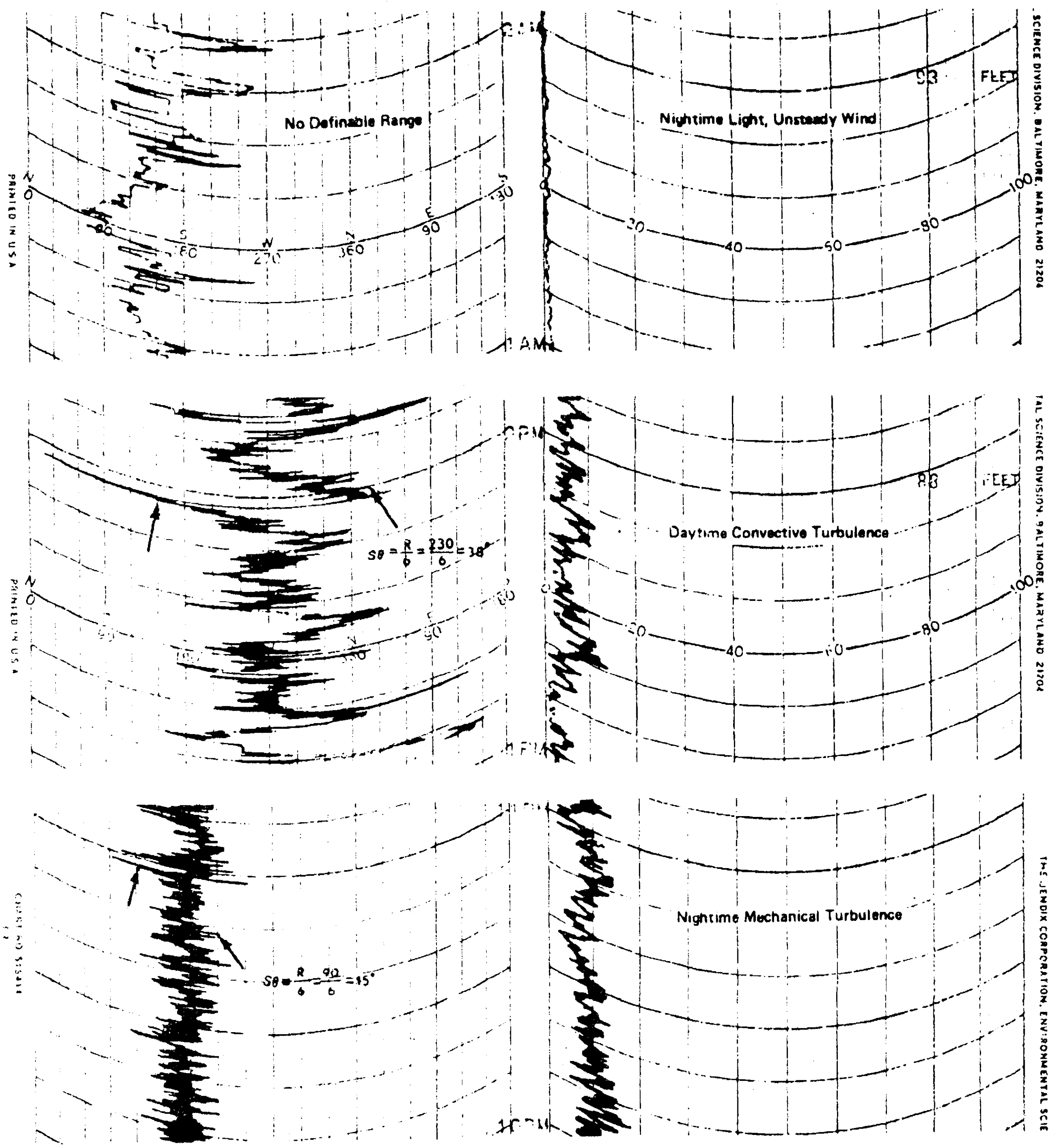


FIGURE II

ESTIMATION OF Sθ FROM WIND DIRECTION RANGE

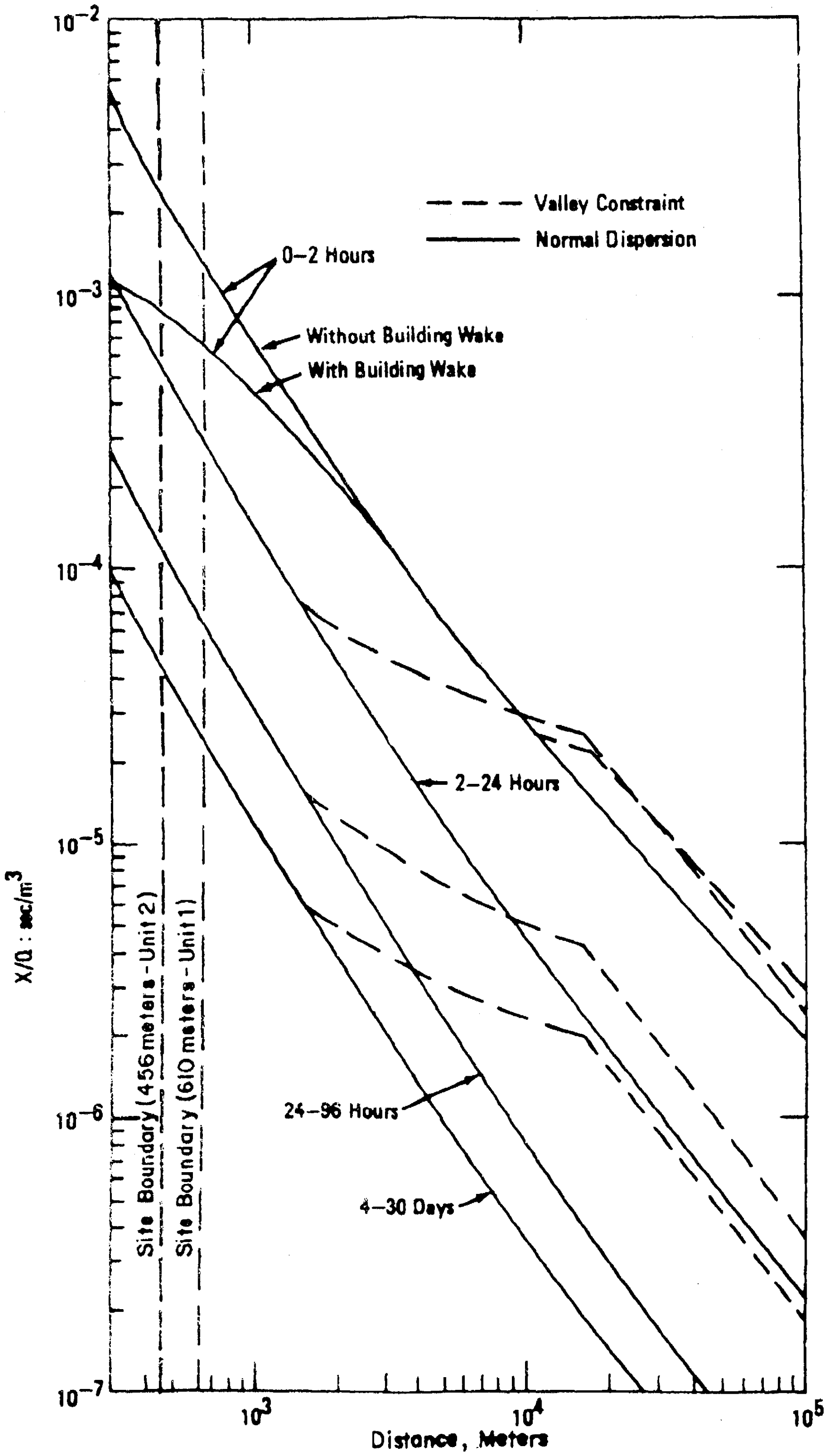
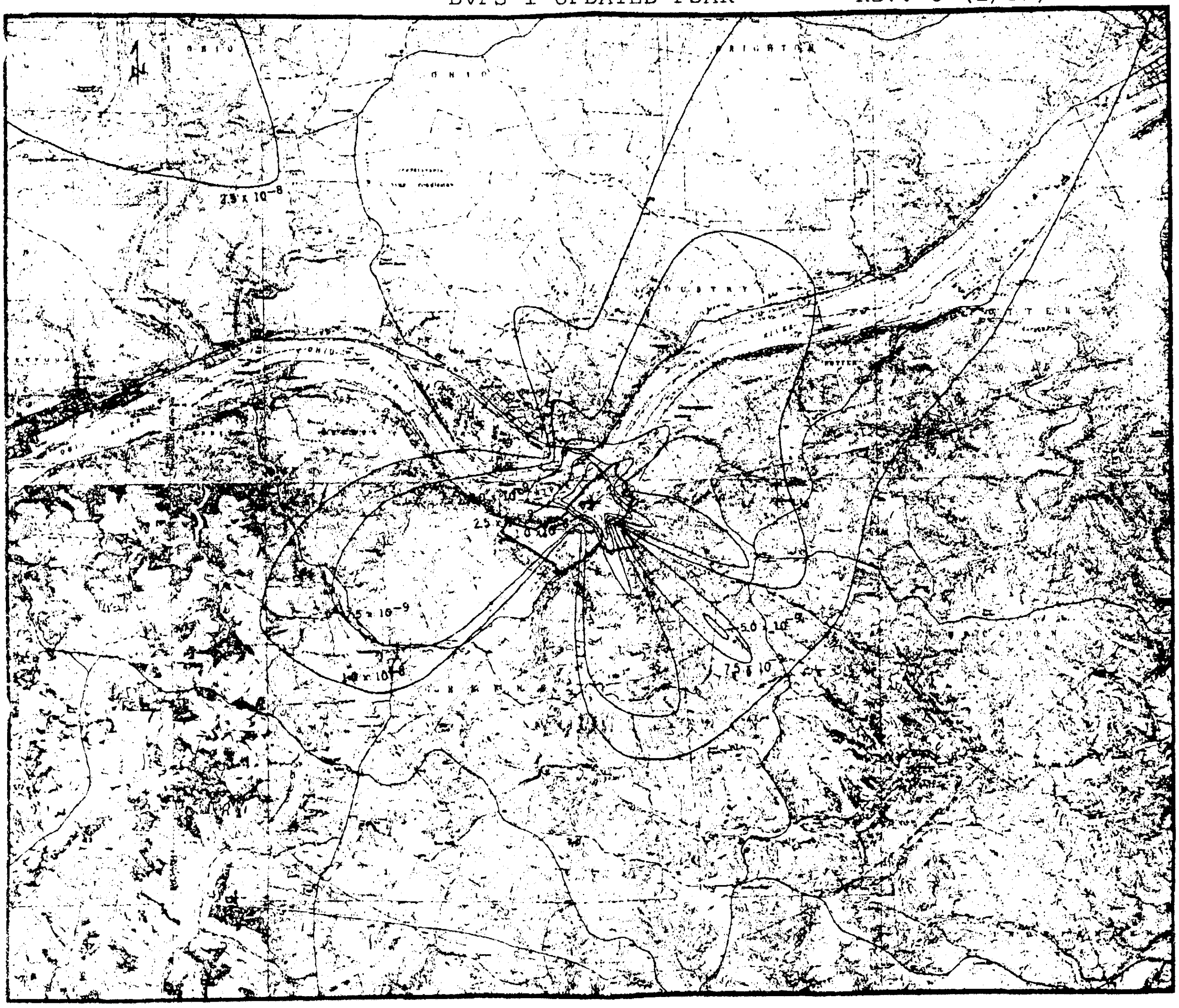


FIGURE 12
BEAVER VALLEY ACCIDENT AND EXTENDED RELEASE DILUTION FACTORS



X/Q : sec/m³

Release Height: 158 m

FIGURE 13

ANNUAL AVERAGE X/Qs

APPENDIX 2A.3

1980 REPORT -

THE METEOROLOGICAL PROGRAM

AT THE

BEAVER VALLEY POWER STATION

Appendix 2A.3 is a copy of the Annual Report for the Beaver Valley Meteorological Program for January 1, 1980 - December 31, 1980. This report has been retyped and reformatted as part of the Updated FSAR.

NUS-3835

ANNUAL REPORT
FOR THE
BEAVER VALLEY METEOROLOGICAL PROGRAM
FOR
JANUARY 1, 1980 - DECEMBER 31, 1980

Prepared for
Duquesne Light Company

by
Roger W. Brode

June 1981

Environmental Services Division
NUS Corporation
4 Research Place
Rockville, Maryland

Approved: John T. Stone
Vice President & General Manager

Approved: Ronald R. Stoner
Manager
Meteorological Programs

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I. INTRODUCTION

Meteorological data collected on a 500-ft tower at the Beaver Valley Power Station for the period January 1, 1980 - December 31, 1980 have been reviewed for validity and analyzed. Onsite meteorological data were reviewed to determine the degree of agreement with previous data collected onsite for the period January 1, 1976 - December 1979[1,2,3] and with concurrent National Weather Service (NWS) data for Pittsburgh, Pennsylvania.[4,5] Onsite data were also compared to climatological normals based on NWS data for Greater Pittsburgh International Airport to help determine the climatic representativeness of the data. The current meteorological program complies with Regulatory Guide 1.23 of the Nuclear Regulatory Commission (NRC), Onsite Meteorological Programs.[6]

II. SYSTEM DESCRIPTION

The present onsite meteorological program began effectively on January 1, 1976. The 500-ft guyed meteorological tower is located approximately 3600 ft northeast of Beaver Valley Unit 1, as shown in Figure 2A.3-1. The base of the tower is at approximately 730 ft MSL. The meteorological data monitoring system consists of three levels of instrumentation on the 500-ft guyed tower. Wind speed and direction measurements are made at elevations of 35-, 150-, and 500-ft. Ambient temperature and dew point measurements are made at the 35-ft level. Temperature differential measurements are made between 35-ft and 150-ft (ΔT(150ft-35ft)) and 35-ft and 500-ft (ΔT(500ft-35ft)). Precipitation data are obtained from a ground-level rain gauge located near the base of the tower.

The 500-ft guyed tower is situated on a relatively flat plot of land in the Ohio River Valley and is enclosed by a fence. The area immediately surrounding the tower is currently being used as a laydown area for construction equipment and parts. The ground surface in the immediate area is composed of slag and dirt.

The data recording and signal conditioning equipment were maintained in three separate locations until May 1980. The signal conditioning equipment is located in an environmentally-controlled trailer located near the base of the meteorological tower, within the enclosed fenced area. Strip chart recorders and TermiNet are located in the Beaver Valley Unit 1 control room. On August 15, 1979, a set of strip chart recorders was installed in the meteorological shelter located near the base of the tower. The PDP8 digital computer originally located in the Duquesne Light Company (DLC) offices in downtown Pittsburgh was moved to the meteorological equipment trailer at the monitoring site in May 1980.

Analog data are telemetered directly to the Unit 1 control room charts. Before May 1, 1980, digital data were transmitted via microwave telemetry to the computer in Pittsburgh where averages were processed at 15-minute intervals. After May 1980, the computer was hard-wired to the meteorological sensors.

The 15-minute averages are telemetered to the Beaver Valley Plant site, where they are outputted on the TermiNet in the control room, and are transmitted via dialable telecommunications to NUS, Rockville, Maryland, to be examined daily for any anomalous conditions or instrumentation problems. The analog data are examined on a weekly basis for any anomalous conditions that might appear in the data.

Onsite meteorological instrumentation on the 500-ft guyed tower at the Beaver Valley Site includes:

A. Wind Instrumentation

Climet wind direction and speed sensors at the 35-ft, 150-ft and 500-ft levels.

B. Temperature Instrumentation

1. Rosemont RTB's at the 35-ft, 150-ft and 500-ft levels.

2. Endevco signal conditioners.

3. Geotech aspirated solar radiation shields to house the RTB's at the 35-ft, 150-ft and 500-ft levels.

C. Dew Point Instrumentation

One Cambridge System dew point measuring unit at the 35-ft level.

D. Precipitation Instrumentation

One Belfort tipping bucket rain gauge at the surface near the tower.

E. Recorders

1. Three Leeds and Northrup analog strip chart recorders, located in the Beaver Valley Unit 1 control room, that record wind direction and wind speed at each level.

2. One multipoint Leeds and Northrup recorder located in the Beaver Valley Unit 1 control room that records temperature at 35-ft, temperature differential between the 150-ft and 35-ft level (ΔT(150ft-35ft)), and between the 500-ft and 35-ft levels (ΔT(500ft-35ft)), precipitation data, and dew point data.

3. Three Esterline-Angus analog strip chart recorders located in the meteorological shelter that record wind direction and wind speed at each level.

4. One multipoint Esterline-Angus recorder located in the meteorological shelter that records temperature at 35-ft, temperature differential between the 150-ft and 35-ft levels (ΔT(150ft-35ft)), and between the 500-ft and 35-ft levels (ΔT(500ft-35ft)), precipitation data, and dew point data.

F. Computer

1. One Digital Equipment Corporation PDP8/E 12 bit mini-computer.

2. One Climet Digital Clock.

The specifications for the above equipment are summarized in Table 2A.3-1.

The shelter housing the signal conditioning equipment is located approximately 10 ft east of the base of the tower. The dimensions of the shelter are approximately 8 ft wide, 16 ft long, and 9 ft high. It is not expected that the trailer shelter will affect meteorological measurements.

An automated tipping bucket rain gauge is located approximately 20 ft west of the tower and approximately 30 ft west of the shelter. It is not anticipated that the tower or the shelter will affect precipitation measurements.

The meteorological instrumentation at Beaver Valley is calibrated quarterly. System surveillance includes daily checks of the system by onsite personnel, computer calibration on a real-time basis, and computer annunciation of any malfunctions every 15 minutes. As soon as a malfunction is detected, field maintenance personnel are dispatched to correct the problem.

III. METEOROLOGICAL DATA REDUCTION

The meteorological data acquisition system consists of a computerized data processing system which collects and reduces data on a real-time basis. The average wind direction, wind speed, ΔT, ambient temperature, dew point, and total precipitation are determined for four 15-minute periods each hour. The sampling rate for each parameter for each level is approximately four times per second. Standard statistical equations are used to compute the 15-minute average values from the instantaneous samples. The standard deviation of the wind direction is calculated every 15 minutes with 10-second smoothing of the instantaneous wind direction. Prior to the computer relocation in May 1980, all digital data were transmitted daily via a dialable telecommunications link to NUS as 15-minute averages where they were reviewed for validity, and where hourly averages centered on the hour were computed. For the remainder of the year digital data in the form of 15-minute averages from the teletype printer output were transmitted weekly to NUS where 15-minute values ending on the hour were manually key punched for use in preparing data summaries.

The meteorological data acquisition system also includes an analog system as a backup to the digital system. On August 15, 1979, the Esterline-Angus recorders located in the meteorological shelter replaced the Leeds and Northrup recorders as the analog backup system. Data from the analog system are utilized to supplement digital data for the ′key′ parameters, 35- and 500-ft winds, ΔT(150ft-35ft) and ΔT(500ft-35ft), to maintain recovery rates greater than the 90 percent required by Regulatory Guide 1.23. Data recovery rates of 80 percent are maintained for the ′non-key′ parameters, ambient temperature, dew point, and 150-ft winds. Because the representativeness of precipitation data can be greatly affected by minor data losses, such as telemetry drifts and trips (see References 2 and 3), analog precipitation data were used to supplement the digital data during the 1980 data period. When necessary to supplement digital data, the strip chart data are manually reduced to obtain hourly averages centered on the hour for wind speed and direction, and temperature differential (ΔT) data. The standard deviation of the wind direction fluctuations ($\sigma\theta$) is determined from analog data based on the procedure of Reference 6 and classified according to Reference 5. Atmospheric stability, based on the temperature differential, is classified according to Reference 5.

IV. METEOROLOGICAL DATA RECOVERY

Monthly and annual meteorological data recovery rates for 35-, 150-, and 500-ft wind, ΔT(150ft-35ft)), ΔT(500ft-35ft), 35-ft ambient temperature, 35-ft dew point temperature, and precipitation are provided in Table 2A.3-2 for the period January 1, 1980 - December 31, 1980. Table 2A.3-3 provides the monthly and annual data recovery rates for the joint 35-ft wind and ΔT(150ft-35ft) and joint 500-ft wind and ΔT(500ft-35ft). The data recovery as provided in Table 2A.3-3 is based on the combined digital and analog data which were used to compile the joint frequency distribution tables for input to the Beaver Valley NRC Regulatory Guide 1.21 analysis. With few exceptions, the monthly recovery rate of the safety-related parameters, 35- and 500-ft winds, ΔT(150ft-35ft) and ΔT(500ft-35ft), exceeded the minimum 90% required by Regulatory Guide 1.23.

Losses of digital data before May 1980 were due mainly to noise or drift in the telemetry links resulting in invalid digital data. Other significant losses of digital data occurred in May due to computer downtime associated with relocation of the computer to the meteorological trailer, and in October due to a failure of the air conditioner unit in the trailer. Losses of analog data from the Esterline-Angus recorders were due mainly to chart jamming and to malfunctions of the printhead on the multi-point recorder.

Low recovery of 35-ft wind data in April 1980 was due to a malfunction of the bearings on the wind speed sensor. Low recoveries of 35-ft wind data and ΔT (500ft-35ft) data in October 1980 were due to loss of digital data during the air conditioner failure mentioned above and chart jamming on the 35-ft wind and multipoint recorders. Loss of analog ΔT(500ft-35ft) data also occurred due to darkening of the thermal sensitive chart paper on the multi-point recorder because of the high temperatures in the shelter during the air conditioner outage.

Low recovery of precipitation data in February 1980 was due primarily to computer downtime resulting in the loss of about five days of digital data, and a malfunction of the multipoint recorder printhead. Low recovery of precipitation data in October 1980 was due primarily to computer downtime associated with the air conditioner outage and to darkening of the multipoint chart paper during the air conditioner outage mentioned above.

Data recoveries in Tables 2A.3-2 and 2A.3-3 represent combined digital data and Esterline-Angus analog data used to prepare the summaries in this report. Analog data from the Leeds & Northrup recorders were also used to supplement the data during the computer relocation in May and the air conditioner outage in October.

V. REPRESENTATIVENESS OF ONSITE METEOROLOGICAL DATA

A. Wind Direction and Wind Speed

Monthly and annual wind roses for the 35-, 150-, and 500-ft levels, for the period January 1, 1980 - December 31, 1980 and January 1, 1976 - December 31, 1980, are presented in Figures 2A.3-2, 2A.3-3, 2A.3-4, 2A.3-5, 2A.3-6, 2A.3-7, 2A.3-8, 2A.3-9, 2A.3-10, and 2A.3-11. The annual wind roses for 1980 exhibit similar wind frequency distributions to the wind roses for the five year composite data period. Additional 35-ft and 500-ft wind data for 1980 and 1976-1980 are provided in Appendices A and B in the form of joint frequency distribution (JFD) tables of 35-ft wind speed and wind direction by ∆T(150ft-35ft) stability class, and in Appendices C and D in the form of JFDs of 500-ft wind speed and wind direction by ∆T(500ft-35ft) stability class.

Winds at the 35-ft level for 1980 are primarily from the west-southwest and southwest and from the east-southeast and southeast. The easterly wind directions are associated with low mean wind speeds and are the result of the nighttime drainage flow down the valley sides. Winds at the 150-ft level exhibit peak frequencies for winds from the west and from the northeast. The northeasterly winds are associated with the turning down-river of the cold-air drainage flow from the valley sides. The 500-ft onsite wind data indicate that the winds are primarily from the west through southwest directions and are not influenced by the valley circulation.

Figures 2A.3-12, 2A.3-13, 2A.3-14, and 2A.3-15 present monthly and annual wind roses of NWS data for Pittsburgh for the periods of January 1, 1980-December 31, 1980, and January 1, 1976-December 31, l980. The distributions for the two periods are similar. Further comparisons of these periods with the onsite distribution at the 500-ft level shows that they are similar, indicating that the onsite data is representative of regional conditions. The differences between Pittsburgh wind data and the 35-ft and 150-ft Beaver Valley wind data are attributable to the differences in topography between the two sites, specifically the valley circulation described by the onsite data above.

Monthly mean wind speeds for onsite data for the period January 1, 1980-December 31, 1980 are presented in Table 2A.3-4 along with five-year composite values and concurrent NWS data for Pittsburgh. The 1980 data are also presented in Figure 2A.3-16 and the 1976-1980 data are presented in Figure 2A.3-17. The mean annual wind speeds for 1976, 1977, 1978, 1979 and 1980 for onsite and Pittsburgh data are presented in Table 2A.3-5 and in Figure 2A.3-18. Onsite wind speed data at the 500-ft level, which is effectively removed from the valley circulation, averages about 1 mph higher than the wind speed at Pittsburgh. Variations between onsite data and Pittsburgh data are primarily due to the differences in exposure of the wind instruments.

The mean annual wind speed for the 1980 data period was 4.0 mph at the 35-ft level, 6.3 mph at the 150-ft level, and 9.5 mph at the 500-ft level. These data agree well with the onsite data for the five-year composite period, 1976-1980, with reported annual average wind speeds of 4.1 mph at the 35-ft level, 6.6 mph at the 150-ft level, and 10.0 mph at the 500-ft level.

The frequency of calms for the 1980 data period was 1.6 percent at the 35-ft level, 0.6 percent at the 150-ft level, and 0.3 percent at the 500-ft level. The frequency of calms recorded at Pittsburgh was higher than Beaver Valley, 7.8 percent for 1980, due to the higher threshold of the wind speed instrumentation employed at NWS airport stations (1.1 mph). Both onsite and Pittsburgh frequencies of calms for 1980 were slightly higher than the 1976-1980 composite values. Monthly and annual frequencies of calms are provided with the wind roses in Figures 2A.3-2, 2A.3-3, 2A.3-4, 2A.3-5, 2A.3-6, 2A.3-7, 2A.3-8, 2A.3-9, 2A.3-10, 2A.3-11, 2A.3-12, 2A.3-13, 2A.3-14, and 2A.3-15.

Wind direction persistence is defined as the number of hours of continuous airflow within a 22 1/2 degree sector. For computation purposes, calms are considered a direction category. Wind direction persistence probabilities for Beaver Valley 35-ft, 150-ft and 500-ft data are presented in Figures 2A.3-19, 2A.3-20 and 2A.3-21, respectively, for 1980 and 1976-1980 data periods. For all three levels, the 1980 data show about a 10-hour shorter duration of wind direction persistence at the 0.01 percent level than the 1976-1980 data period. The maximum persistence periods for 1980 were 17 hours for a WSW wind at the 35-ft level, 20 hours for a WSW wind at the 150-ft level, and 23 hours for a SW wind at the 500-ft level.

B. Atmospheric Stability

Monthly and annual frequency distributions of onsite ΔT(150ft-35ft) and ΔT(500 ft-35ft) stability classes for Beaver Valley are presented in Tables 2A.3-6 and 2A.3-7 for the period January 1, 1980 - December 31, 1980 and Tables 2A.3-8 and 2A.3-9 for the five-year composite period. Annual frequency distributions of ΔT(150ft-35ft) and ΔT(500ft-35ft) stability classes for 1976, 1977, 1978, 1979 and 1980, are presented in Table 2A.3-10. Interannual comparisons of stability class distributions are also presented in Figure 2A.3-22 for ΔT(150ft-35ft) and Figure 2A.3-23 for ΔT(500ft-35ft). The annual stability distributions for 1980 agree well with earlier data periods for both levels of ΔT. Additional data on atmospheric stability for 1980 and for 1976-1980 are provided in Appendices A and B in the form of joint frequency distribution (JFD) tables of 35-ft wind speed and wind direction by ΔT(150ft-35ft) stability class, and in Appendices C and D in the form of JFDs of 500-ft wind speed and wind direction by ΔT(500ft-35ft) stability class.

Table 2A.3-11 presents annual stability class frequency distributions for Pittsburgh (NWS) for 1976, 1977, 1978, 1979, 1980 and for the period January 1976 to December 1980. The Pittsburgh stability distributions are also presented in Figure 2A.3-24. Stability classes for the Pittsburgh data were determined by the Pasquill-Turner method[8] which uses wind speed, cloud cover and radiation intensity data to classify atmospheric stability. The distribution for 1980 shows good agreement with data for previous years. Differences between these distributions and the onsite distributions presented in Tables 2A.3-6, 2A.3-7, 2A.3-8 and 2A.3-9 and Figures 2A.3-22 and 2A.3-23 are attributed to the different methods used to determine atmospheric stability.

C. Ambient Temperature

Monthly and annual mean, average daily maximum and average daily minimum ambient temperature data for Beaver Valley and Pittsburgh (NWS) for 1980 are presented in Table 2A.3-12. Also included in Table 2A.3-12 are the climatological normal (1941-1970) temperature data for Pittsburgh. Table 2A.3-13 presents monthly and annual temperature data for Beaver Valley and Pittsburgh for the five-year composite period 1976-1980. The monthly mean temperature data are also presented in Figure 2A.3-25. Monthly temperature data for Beaver Valley agrees well with concurrent data for Pittsburgh. The 1980 data also show good agreement with the five-year composite data. The annual average temperature at Beaver Valley for 1980 was 49.4°F. The highest temperature recorded onsite during 1980 was 94.4°F and the lowest recorded was -0.8°F.

Diurnal temperature data for Beaver Valley are provided in Table 2A.3-14 for the 1980 period and in Table 2A.3-15 for the five-year composite period 1976-1980.

D. Dew Point and Relative Humidity

Monthly and annual averages of dew point and relative humidity for Beaver Valley and Pittsburgh (NWS) for 1980 and 1976-1980 are presented in Table 2A.3-16. Agreement between onsite and offsite atmospheric water vapor data is good. Dew point and relative humidity are generally somewhat higher onsite than at Pittsburgh. This is probably due to the effect of the valley location on the onsite data. Agreement between the data periods is good. Diurnal water vapor data for Beaver Valley are provided in Table 2A.3-14 for the 1980 period and in Table 2A.3-15 for the five-year composite period 1976-1980.

E. Precipitation

Table 2A.3-17 presents monthly and annual totals and maximum 24-hour precipitation for Beaver Valley and Pittsburgh (NWS). The monthly totals for Beaver Valley and Pittsburgh for 1980 are also presented in Figure 2A.3-26 together with the normal values for Pittsburgh. Total precipitation recorded during the period January 1, 1980-December 31, 1980 was 30.06 inches at Beaver Valley and 39.46 inches at Pittsburgh. This compares with a normal total for Pittsburgh of 36.23 inches based on the 1941 to 1970 period of record. The maximum 24-hour precipitation during 1980 was 1.47 inches at Beaver Valley and 2.27 inches at Pittsburgh. Beaver Valley precipitation totals are less than Pittsburgh for every month except February, August and September. This is attributed primarily to data loss on the Beaver Valley system for reasons discussed in Section IV. A comparison of major precipitation events reported in the Pittsburgh LCDs (Reference 4) with precipitation values recorded onsite shows that major discrepancies are largely associated with periods of missing onsite data. Lower onsite precipitation totals during winter months may also be due to the heater in the tipping-bucket rain gauge causing evaporation of some of the frozen precipitation captured in the gauge before it falls through the funnel and activates the measuring device. For these reasons, the onsite data are not considered representative of total annual precipitation occurring at the site. However, data for individual precipitation events, where available, are representative of the site for those events.

REFERENCES

1. "Annual Meteorological Report for the Beaver Valley Meteorological Program for January 1, 1977-December 31, 1977, "NUS-3174, NUS Corporation, Rockville, Maryland (June 1978).

2. "Annual Meteorological Report for the Beaver Valley Meteorological Program for January 1, 1978-December 31, 1978, "NUS-3394, NUS Corporation, Rockville, Maryland (June 1979).

3. "Annual Meteorological Report for the Beaver Valley Meteorological Program for January 1, 1979 - December 31, 1979, "NUS-3563, NUS Corporation, Rockville, Maryland (February 1981).

4. "Local Climatological Data, 1980, Greater Pittsburgh International Airport." NOAA, EDS, National Climatic Center, Asheville, North Carolina.

5. Surface Observations for Greater Pittsburgh International Airport, January 1976 to December 1980, National Weather Service TDF-14. NOAA, EDS, National Climatic Center, Asheville, North Carolina.

6. NRC Regulatory Guide 1.23, "Onsite Meteorological Programs," Nuclear Regulatory Commission (Issued February 17, 1972).

7. Slade, David H.J. "Dispersion Estimates from Pollutant Releases of a Few Seconds to 8 Hours in Duration," U.S. Department of Commerce, Washington, D.C. (August 1965).

8. Turner, D.B. "A Diffusion Model for an Urban Area," J. Of Appl. Met., 3, pp. 83-91 (February 1964).

TABLES FOR APPENDIX 2A.3

TABLE 2A.3-1

METEOROLOGICAL SYSTEM EQUIPMENT SPECIFICATIONS FOR BEAVER VALLEY (January 1, 1980 - December 31, 1980)

Instrument	Manufacturer	Model	Level	Specifications
Wind Speed-Direction (WS/WD)	Climet	Wind Direction WD-012-10 Wind Speed WS-011-1	35 ft 150 ft 500 ft	Threshold 0.75 mph Accuracy ±3° for direction Threshold 0.6 mph Accuracy ±1% of the wind speed reading or 0.2 mph, whichever is greater.
		Translator 025-2		
Temperature	Endevco GEOTECH Rosemont	4470.114 Universal Sig. Cond 4473.2 RTB Conditioner M327 Aspirators 104MB12ADCA four wire RTB	T_{35ft} $\Delta T_{150\text{-}35ft}$ $\Delta T_{500\text{-}35ft}$	T accuracy ± 1°F ΔT accuracy ± .18°F (T=-20°F to 100°F, ΔT_{150} = -4.0° to +8.0°F) ΔT_{500} = -6.0° to +12.0°F)
Precipitation	Belfort	5-405 Rain Gauge	Ground	Accuracy ± 2% for 1 in/hr
Dew Point	Cambridge	Dew Point Measuring Set 110S-M	35 ft	Accuracy ±0.5°F
Multipoint Recorder (T_{35ft}, $\Delta T_{150\text{-}35ft}$, $\Delta T_{500\text{-}35ft}$)	Leeds and Northrup	Speedomax W		Accuracy ±0.3% of full scale
Precip., Dew Point	Esterline-Angus	Speed Servo II		Accuracy ±0.35% of full scale
Strip Recorders (3 ea.) (ws/wd)	Leeds and Northrup	Speedomax W/L		Accuracy ±0.3% of full scale wd = 0 to 540° ws = 0 to 50 mph
	Esterline-Angus	Speed Servo II		Accuracy ±0.35% of full scale wd = 0 to 540° ws = 0 to 50 mph
Mini-Computer	Digital Equipment Corporation	PDP8/E ADO1 Analog to Digital Converter		Accuracy of converter is 0.1% full scale
Digital Clock	Climet	Model 0180		Line frequency

TABLE 2A.3-2

Monthly and Annual Meteorological Data Recovery for Beaver Valley
(January 1, 1980-December 31, 1980)
(%)

	35-ft Winds	150-ft Winds	500-ft Winds	ΔT(150ft-35ft)	ΔT(500ft-35ft)	35-ft Ambient Temperature	35-ft Dew Point	Precipitation
January	97	94	94	91	95	94	97	97
February	98	81	94	97	98	81	82	78
March	99	96	99	95	95	94	94	97
April	85	97	98	96	94	92	90	97
May	99	99	99	92	92	92	88	87
June	97	94	96	93	93	93	93	93
July	94	93	94	94	92	94	94	95
August	97	97	97	97	97	97	97	97
September	93	89	93	93	93	89	83	87
October	88	99	99	92	88	81	94	63
November	96	92	96	94	93	96	95	97
December	99	94	94	91	94	93	92	94
Annual	95	94	96	94	94	91	92	90

Note: Data recovery for wind is based on the joint availability of valid wind speed and wind direction data.

TABLE 2A.3-3
Monthly and Annual Joint Recovery (%)
of ΔT and Winds (January 1, 1980-December 31, 1980)

	Joint ΔT (150ft-35ft) and 35-ft Wind	Joint ΔT (500ft-35ft) and 500-ft Wind
January	91	91
February	96	94
March	95	95
April	82	94
May	92	91
June	93	93
July	94	91
August	97	97
September	93	93
October	82	88
November	93	93
December	91	94
Annual	92	93

TABLE 2A.3-4

Monthly and Annual Average Wind Speed (mph)
For Beaver Valley and Pittsburgh (NWS)

	Beaver Valley						Pittsburgh	
	35-ft		150-ft		500-ft			
	1980	1976-1980	1980	1976-1980	1980	1976-1980	1980	1976-1980
January	4.5	5.3	7.2	8.4	10.3	11.5	8.8	10.8
February	4.6	4.7	7.1	7.7	10.2	11.0	8.6	10.0
March	4.7	4.9	7.9	8.2	11.5	11.8	9.9	10.6
April	4.2	4.5	6.7	7.2	10.1	10.5	8.6	9.7
May	3.8	3.6	5.7	5.8	8.6	9.1	8.0	8.3
June	3.6	3.6	5.9	5.6	8.7	8.8	8.6	8.0
July	2.9	3.3	4.4	5.2	7.2	7.8	7.6	7.3
August	2.9	3.0	4.5	4.8	7.3	7.7	6.3	6.4
September	3.1	3.0	4.8	5.1	7.8	8.2	6.0	6.5
October	4.4	3.9	7.2	6.5	10.9	10.4	8.1	8.7
November	4.6	4.5	7.3	7.1	11.2	10.9	8.8	9.2
December	4.2	5.0	6.6	7.7	9.9	11.8	9.0	10.4
Annual	4.0	4.1	6.3	6.6	9.5	10.0	8.2	8.8

Note: Pittsburgh 1980 and 1976-1980 data are based on hourly observations from TDF-14 data tapes.[4]

TABLE 2A.3-5

Annual Average Wind Speeds (mph) for Beaver Valley
and Pittsburgh for 1976 to 1980

	Beaver Valley			Pittsburgh
	35-ft	150-ft	500-ft	
1976	4.2	6.9	10.3	9.5
1977	4.4	7.2	10.8	9.1
1978	4.0	6.4	9.6	8.7
1979	4.0	6.4	9.7	8.5
1980	4.0	6.3	9.5	8.2
1976-1980	4.1	6.6	10.0	8.8

TABLE 2A.3-6
Monthly and Annual Stability Class Distributions
For Beaver Valley Based on ΔT(150ft-35ft)
(January 1, 1980-December 31, 1980)
(%)

	Stability Class						
	A	B	C	D	E	F	G
January	2.94	1.62	2.79	62.94	18.82	7.94	2.94
February	4.77	4.32	5.07	61.70	9.69	5.81	8.64
March	13.46	3.26	4.96	39.24	19.12	7.37	12.61
April	17.52	3.23	2.55	29.59	16.33	11.22	19.56
May	27.31	3.08	3.96	18.36	17.91	8.37	21.00
June	29.10	3.88	3.28	19.70	14.93	16.72	12.39
July	23.35	3.30	3.87	22.21	19.91	18.62	8.74
August	21.28	4.31	3.89	19.33	30.46	18.92	1.81
September	21.73	3.27	3.13	20.09	16.82	21.28	13.69
October	14.64	2.63	4.44	33.06	14.64	14.14	16.45
November	9.99	3.58	4.62	39.64	15.95	11.33	14.90
December	5.64	2.97	4.30	50.15	18.84	8.61	9.50
Annual	16.01	3.30	3.92	34.64	17.91	12.55	11.67

TABLE 2A.3-7
Monthly and Annual Stability Class Distributions
For Beaver Valley Based on ΔT(500ft-35ft)
(January 1, 1980-December 31, 1980)
(%)

	Stability Class						
	A	B	C	D	E	F	G
January	0.00	0.00	0.00	77.56	19.17	3.27	0.00
February	0.00	0.00	0.77	77.64	12.86	6.89	1.84
March	0.14	1.14	2.28	66.15	18.35	9.53	2.42
April	0.00	0.44	2.81	56.95	21.30	14.35	4.14
May	0.74	3.54	4.28	43.36	24.63	19.32	4.13
June	1.05	4.20	9.15	41.08	24.44	18.44	1.65
July	0.15	1.32	7.94	43.24	29.71	17.50	0.15
August	0.00	0.70	3.06	48.40	38.80	9.04	0.00
September	0.30	1.19	5.95	43.75	30.51	18.15	0.15
October	0.61	2.15	3.23	54.38	24.88	12.29	2.46
November	0.00	0.00	0.30	66.22	19.22	12.91	1.35
December	0.00	0.00	0.86	66.62	22.21	10.17	0.14
<u>Annual</u>	0.25	1.22	3.38	57.07	23.93	12.64	1.52

TABLE 2A.3-8
Monthly and Annual Stability Class Distributions
For Beaver Valley Based on ΔT(150ft-35ft)
(January 1, 1976-December 31, 1980)
(%)

	Stability Class						
	A	B	C	D	E	F	G
January	3.09	1.66	2.71	58.02	21.23	7.04	6.25
February	6.39	2.76	3.65	46.22	19.03	8.42	13.53
March	14.64	2.37	3.73	36.90	21.14	8.55	12.68
April	20.88	2.96	3.32	27.90	17.01	10.09	17.84
May	23.90	2.95	3.94	23.60	17.35	11.46	16.81
June	29.29	3.21	3.85	19.54	16.21	14.39	13.51
July	27.28	2.43	2.61	19.21	19.60	17.84	11.03
August	23.96	2.78	2.43	17.86	24.99	19.24	8.73
September	21.34	2.32	2.79	18.67	21.78	18.17	14.93
October	9.62	2.84	3.72	32.31	21.95	12.55	17.02
November	5.08	2.01	3.26	44.08	22.30	10.25	13.02
December	3.20	1.83	2.49	50.88	22.70	9.04	9.85
Annual	15.90	2.51	3.20	32.65	20.46	12.34	12.92

TABLE 2A.3-9
Monthly and Annual Stability Class Distributions
For Beaver Valley Based on ΔT(500ft-35ft)
(January 1, 1976-December 31, 1980)
(%)

	Stability Class						
	A	B	C	D	E	F	G
January	0.00	0.00	0.00	78.96	15.83	4.56	0.62
February	0.13	0.03	0.63	67.93	20.25	10.06	0.97
March	0.09	0.84	2.49	63.62	19.42	10.58	2.97
April	0.00	1.30	4.77	54.56	20.64	15.62	3.10
May	0.81	2.55	5.63	46.93	22.67	17.34	4.07
June	1.69	3.87	7.61	40.24	26.24	19.24	1.12
July	1.57	3.33	5.70	42.99	30.26	15.78	0.37
August	1.22	2.47	3.86	44.07	34.67	13.69	0.03
September	1.05	2.15	4.09	42.58	31.76	18.08	0.30
October	0.12	0.53	1.44	54.06	26.97	15.19	1.68
November	0.00	0.00	0.29	66.40	20.19	11.40	1.72
December	0.00	0.00	0.29	68.17	21.92	8.57	1.05
Annual	0.57	1.45	3.13	55.44	24.42	13.48	1.51

TABLE 2A.3-10
Comparison of Annual Stability Class Distributions
for Beaver Valley for 1976 to 1980
(%)

	A	B	C	D	E	F	G
ΔT(150ft-35ft)							
1976	20.42	2.35	2.92	27.53	21.03	12.35	13.50
1977	16.49	2.85	3.39	30.73	20.35	11.68	14.52
1978	16.33	2.13	2.71	33.56	20.76	12.82	11.70
1979	11.31	2.44	3.39	36.01	21.76	12.08	13.01
1980	16.01	3.30	3.92	34.64	17.91	12.55	11.67
1976-1980	15.90	2.51	3.20	32.65	20.46	12.34	12.92
ΔT(500ft-35ft)							
1976	0.61	1.80	5.91	52.04	24.37	13.00	2.25
1977	0.38	1.20	3.76	53.32	25.07	16.01	0.26
1978	1.35	2.15	3.44	54.37	24.51	12.59	1.60
1979	0.10	0.53	1.39	59.18	24.32	12.92	1.57
1980	0.25	1.22	3.38	57.07	23.93	12.64	1.52
1976-1980	0.57	1.45	3.13	55.44	24.42	13.48	1.51

TABLE 2A.3-11
Comparison of Annual Stability Class Distributions
for Beaver Valley for 1976 to 1980[5,8]
(%)

	A	B	C	D	E	F	G
1976	0.42	3.79	9.02	62.53	9.13	9.87	5.24
1977	0.66	4.81	9.94	59.95	8.94	9.38	6.31
1978	0.43	4.35	10.16	60.45	8.04	9.50	7.08
1979	0.54	4.42	10.29	59.36	9.75	9.71	5.94
1980	0.43	4.75	10.90	57.32	9.78	10.55	6.27
1976-1980	0.49	4.47	10.01	60.01	9.19	9.75	6.09

TABLE 2A.3-12
Comparison of Monthly Mean, Average Daily Maximum and Average Daily Minimum
Temperature Data for Beaver Valley and Pittsburgh
(January 1, 1980-December 31, 1980)
(°F)

	Monthly Mean			Average Daily Maximum			Average Daily Minimum		
	Beaver Valley	Pittsburgh	Normal*	Beaver Valley	Pittsburgh	Normal*	Beaver Valley	Pittsburgh	Normal*
January	28.3	27.3	28.1	33.9	33.1	35.3	21.7	20.6	20.8
February	25.0	24.1	29.3	31.5	31.3	37.3	19.1	17.1	21.3
March	35.9	35.6	38.1	44.7	44.1	47.2	27.0	26.9	29.0
April	48.0	48.5	50.2	58.5	57.7	60.9	36.9	38.4	39.4
May	59.7	60.8	59.8	71.3	70.3	70.8	48.0	49.8	48.7
June	64.9	66.7	68.6	76.6	77.5	79.5	52.5	54.9	57.7
July	72.0	74.5	71.9	82.9	85.2	82.5	61.7	64.7	61.3
August	72.5	73.5	70.2	81.9	83.2	80.9	65.4	65.8	59.4
September	64.9	67.0	63.8	76.0	78.0	74.9	54.8	56.2	52.7
October	49.4	49.2	53.2	57.5	58.2	63.9	39.5	40.4	42.4
November	39.8	38.7	41.3	47.4	45.6	49.3	31.6	31.1	33.3
December	29.3	29.2	30.5	37.1	35.7	37.3	21.7	21.5	23.6
Annual	49.4	49.7	50.4	58.6	58.4	60.0	40.3	40.7	40.8

* Based on NWS data for Pittsburgh for the period 1941-1970.
Note: Pittsburgh 1980 data are based on hourly observations from TDF-14 data tapes.[5]

TABLE 2A.3-13
Comparison of Monthly Mean, Average Daily Maximum and Average Daily Minimum Temperature Data for Beaver Valley and Pittsburgh
(January 1, 1976-December 31, 1980)
(°F)

	Monthly Mean		Average Daily Maximum		Average Daily Minimum	
	Beaver Valley	Pittsburgh	Beaver Valley	Pittsburgh	Beaver Valley	Pittsburgh
January	21.7	21.4	28.4	27.9	14.8	13.7
February	26.2	25.2	33.9	33.5	17.8	17.1
March	40.4	40.7	50.2	50.4	30.4	30.8
April	48.9	50.0	60.0	60.5	37.4	38.9
May	58.9	60.0	70.2	70.5	47.1	48.4
June	66.2	67.4	77.3	78.0	54.8	56.1
July	70.7	71.3	80.7	81.3	61.0	61.5
August	69.7	69.4	79.3	78.8	60.8	60.5
September	63.3	64.0	74.1	74.3	53.9	54.1
October	49.0	49.1	58.2	58.1	40.1	40.2
November	41.0	40.8	49.4	48.7	33.0	32.3
December	30.5	30.5	38.1	37.8	22.8	22.1
Annual	49.0	49.2	58.5	58.4	39.6	39.7

Note: Pittsburgh data are based on hourly observations from TDF-14 data tapes.[5]

TABLE 2A.3-14
ANNUAL DIURNAL TEMPERATURE AND ATMOSPHERIC WATER VAPOR DATA FOR BEAVER VALLEY
(January 1, 1980 - December 31, 1980)

35.0 FEET LEVEL

	TEMPERATURE		DEW POINT		RELATIVE HUM		ABSOLUTE HUM		WET BULB	
HOUR	NUMBER OBS	(DEG F)	NUMBER OBS	(DEG F)	NUMBER OBS	(%)	NUMBER OBS	(GM/M3)	NUMBER OBS	(DEG F)
1	342	44.7	348	41.0	340	87.1	340	8.4	340	43.3
2	341	44.2	346	40.6	340	87.5	340	8.3	340	42.8
3	340	43.7	344	40.2	338	87.7	338	8.2	338	42.4
4	339	43.4	344	40.1	338	88.2	338	8.1	338	42.2
5	339	43.2	311	40.5	305	88.3	305	8.3	305	42.6
6	340	43.1	340	39.6	333	88.4	333	8.0	333	41.8
7	339	44.0	307	39.4	302	86.4	302	8.1	302	41.9
8	336	45.6	341	40.6	333	83.5	333	8.3	333	43.4
9	331	48.1	337	40.8	329	76.9	329	8.3	329	44.6
10	321	51.0	324	40.8	310	69.3	310	8.3	310	46.4
11	322	53.2	338	40.3	320	64.6	320	8.1	320	47.0
12	323	54.9	339	40.1	322	61.1	322	8.1	322	47.8
13	320	56.2	336	40.0	317	58.4	317	8.1	317	48.4
14	323	57.3	336	39.9	320	56.6	320	8.0	320	48.9
15	325	57.7	336	40.0	322	55.8	322	8.0	322	49.1
16	331	57.6	339	40.3	328	56.8	328	8.1	328	49.2
17	334	56.4	310	41.4	300	60.0	300	8.5	300	49.2
18	338	54.9	344	41.5	334	64.1	334	8.6	334	48.4
19	339	52.3	308	41.0	302	69.7	302	8.6	302	46.7
20	340	50.0	347	42.3	339	76.6	339	8.9	339	46.6
21	340	48.4	346	42.1	338	80.4	338	8.8	338	45.8
22	340	47.0	336	42.0	330	83.0	330	8.7	330	45.1
23	340	46.2	345	41.4	338	84.3	338	8.6	338	44.3
24	343	45.2	347	41.2	341	86.2	341	8.5	341	43.7
Hourly Mean		49.4		40.7		75.2		8.3		45.5
Avg Daily Max		58.6		46.8		95.0		10.0		50.7
Avg Daily Min		40.3		35.4		51.2		6.9		39.3
Absolute Max		94.4		77.3		100.0		22.8		80.7
Absolute Min		-3.8		-7.9		19.0		0.9		-1.2
Total OBS	8026		8049		7819		7819		7819	

TABLE 2A.3-15
ANNUAL DIURNAL TEMPERATURE AND ATMOSPHERIC WATER VAPOR DATA FOR BEAVER VALLEY
(January 1, 1976 - December 31, 1980)

35.0 FEET LEVEL

	TEMPERATURE		DEW POINT		RELATIVE HUM		ABSOLUTE HUM		WET BULB	
HOUR	NUMBER OBS	(DEG F)	NUMBER OBS	(DEG F)	NUMBER OBS	(%)	NUMBER OBS	(GM/M3)	NUMBER OBS	(DEG F)
1	1704	44.4	1709	40.4	1666	84.8	1666	8.1	1666	42.9
2	1698	43.9	1710	40.1	1669	85.5	1669	8.0	1669	42.5
3	1698	43.5	1693	40.0	1652	86.1	1652	8.0	1652	42.3
4	1709	43.0	1664	40.3	1626	86.8	1626	8.0	1626	42.4
5	1697	42.8	1658	39.8	1621	86.8	1621	7.9	1621	42.0
6	1692	42.9	1695	39.5	1656	86.9	1656	7.9	1656	41.7
7	1683	43.7	1675	39.7	1629	85.1	1629	7.9	1629	42.0
8	1683	45.4	1694	40.2	1646	81.3	1646	8.1	1646	43.2
9	1650	48.0	1687	40.3	1625	74.4	1625	8.0	1625	44.5
10	1607	50.7	1643	40.1	1570	67.7	1570	7.9	1570	45.7
11	1571	52.8	1643	39.8	1532	62.5	1532	7.8	1532	46.5
12	1568	54.4	1671	39.8	1537	59.1	1537	7.7	1537	47.2
13	1549	55.9	1655	39.6	1515	56.7	1515	7.7	1515	47.9
14	1604	56.7	1666	39.7	1572	55.4	1572	7.7	1572	48.4
15	1622	56.9	1652	39.6	1576	54.8	1576	7.7	1576	48.4
16	1635	56.6	1631	40.4	1555	55.6	1555	7.9	1555	49.0
17	1660	55.8	1642	40.6	1580	57.9	1580	8.0	1580	48.6
18	1667	54.1	1692	40.9	1628	62.5	1628	8.1	1628	47.8
19	1665	51.7	1669	41.4	1599	68.6	1599	8.3	1599	46.7
20	1677	49.4	1699	41.7	1636	74.9	1636	8.5	1636	46.0
21	1681	47.8	1715	41.4	1654	78.3	1654	8.4	1654	45.1
22	1694	46.6	1705	41.2	1656	80.7	1656	8.3	1656	44.4
23	1699	45.7	1704	40.7	1657	82.1	1657	8.2	1657	43.7
24	1700	45.0	1713	40.5	1667	83.6	1667	8.1	1667	43.2
Hourly Mean		49.0		40.3		73.6		8.0		45.0
Avg Daily Max		58.5		45.9		93.1		9.6		50.3
Avg Daily Min		39.6		34.6		50.3		6.6		38.6
Absolute Max		94.4		78.5		100.0		23.8		80.7
Absolute Min		-15.0		-22.0		19.0		0.4		-15.6
Total OBS	39819		40285		38724		38724		38724	

TABLE 2A.3-16

COMPARISON OF MONTHLY AND ANNUAL AVERAGES OF DEW POINT AND RELATIVE HUMIDITY DATA FOR BEAVER VALLEY AND PITTSBURGH

	Mean Dew Point (°F)				Mean Relative Humidity (%)			
	Beaver Valley 1980	Pittsburgh 1980	Beaver Valley 1976-1980	Pittsburgh 1976-1980	Beaver Valley 1980	Pittsburgh 1980	Beaver Valley 1976-1980	Pittsburgh 1976-1980
January	19.5	14.2	14.4	12.8	71.5	58.7	72.8	69.9
February	15.1	10.8	16.4	14.7	67.7	58.1	67.2	62.7
March	25.9	25.0	27.8	26.7	69.7	67.8	64.1	60.5
April	37.2	35.1	36.0	34.5	69.7	63.6	65.7	59.2
May	48.7	47.0	47.8	45.5	73.1	64.5	71.8	62.4
June	55.0	52.8	56.7	53.4	74.7	64.3	74.9	63.5
July	64.8	63.0	63.1	60.4	81.0	70.2	79.5	70.6
August	67.8	66.0	63.7	61.1	86.5	79.2	83.0	76.3
September	58.3	55.9	56.4	54.6	80.8	69.8	80.3	73.7
October	40.8	37.3	41.0	39.4	75.7	65.7	76.6	71.5
November	30.5	27.7	32.3	30.6	73.2	67.1	73.7	69.1
December	22.9	20.7	22.1	20.3	77.3	71.7	71.8	67.1
Annual	40.7	38.1	40.3	38.0	75.2	66.8	73.6	67.2

TABLE 2A.3-17
MONTHLY AND ANNUAL PRECIPITATION DATA FOR BEAVER VALLEY AND PITTSBURGH
(INCHES)

	Beaver Valley 1980		Pittsburgh 1980		Pittsburgh Long Term		
	Total Precipitation	Greatest Precipitation In 24 hours	Total Precipitation	Greatest Precipitation In 24 hours	Normal Total[a]	Maximum Monthly[b]	Minimum Monthly[b]
January	0.82	0.60	1.56	0.52	2.79	6.25	1.06
February	1.70	1.00	1.32	0.58	2.35	5.98	0.51
March	2.90	1.02	5.65	1.17	3.60	6.10	1.14
April	1.07	0.46	2.94	0.97	3.40	7.61	0.48
May	3.53	1.17	4.32	2.05	3.63	6.36	1.21
June	4.15	1.16	4.34	1.03	3.48	5.08	0.90
July	3.82	0.96	6.76	2.27	3.84	7.43	1.82
August	8.02	1.47	5.10	1.43	3.15	7.56	0.78
September	1.36	0.50	1.29	0.32	2.52	5.42	0.74
October	1.01	0.47	2.42	1.36	2.52	8.20	0.16
November	1.27	0.38	2.38	0.88	2.47	4.70	0.90
December	0.41	0.12	1.38	0.36	2.48	5.24	0.40
Annual	30.06	1.47	39.46	2.27	36.23	8.20	0.16

[a] Based on NWS data for Pittsburgh for the period of 1941-1970.
[b] Based on NWS data for Pittsburgh for the period of 1953-1980.

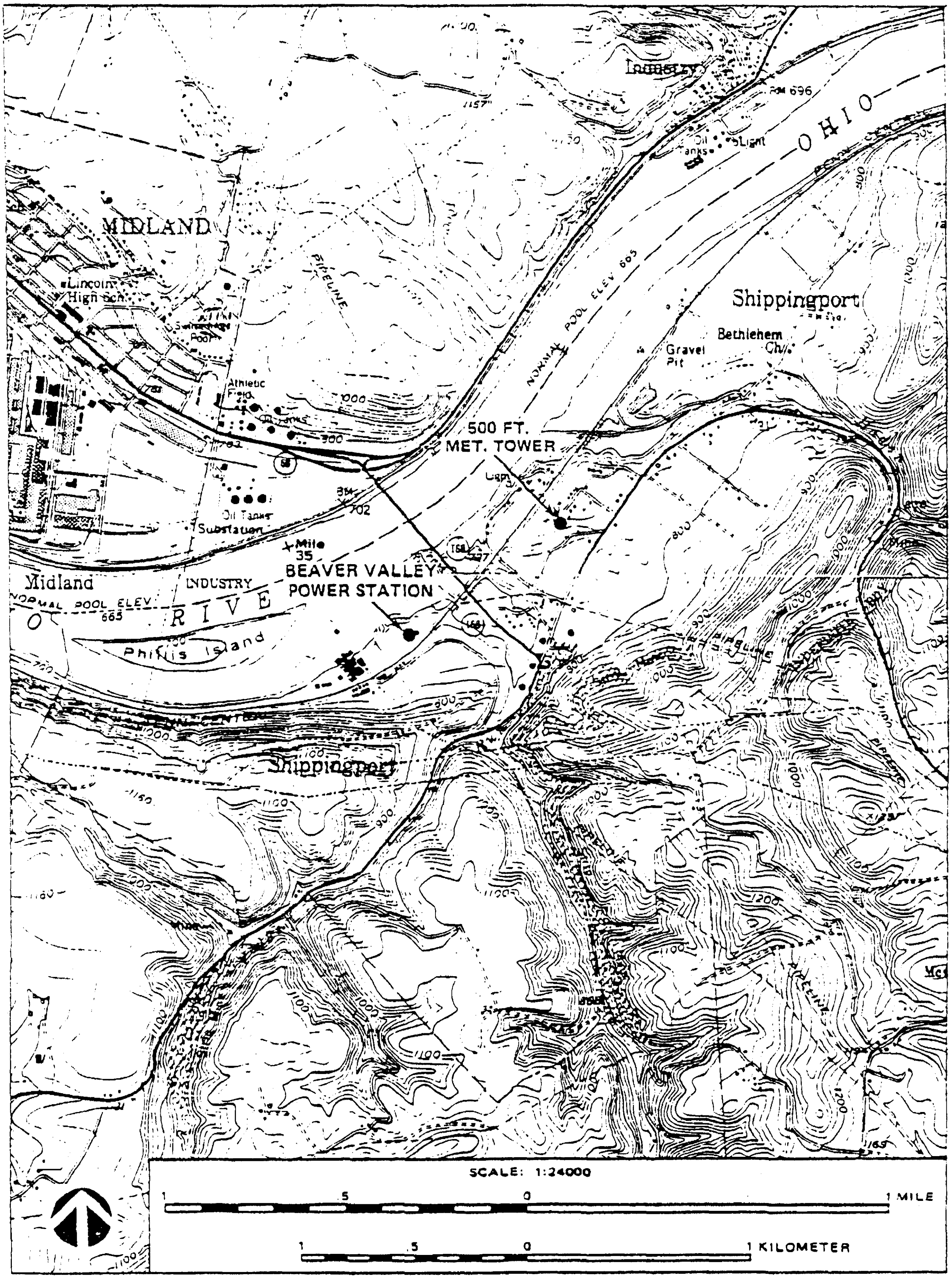


FIGURE 1

LOCATION OF 500 FT. METEOROLOGICAL TOWER

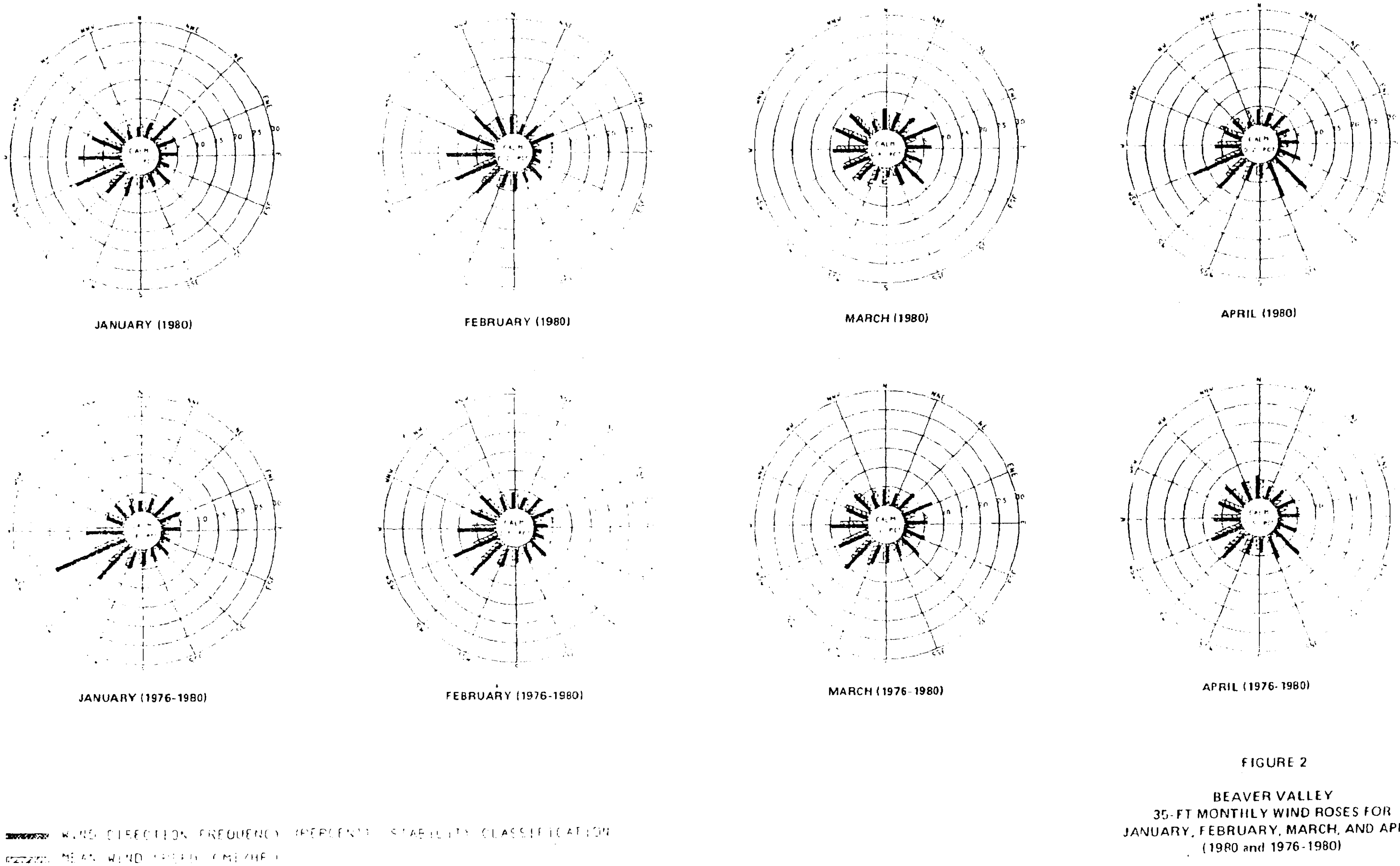
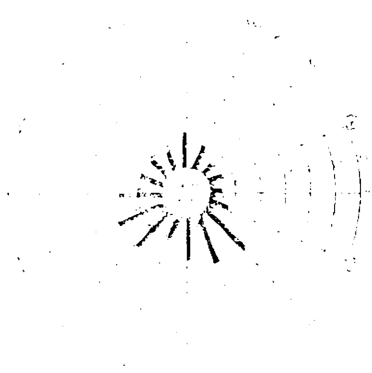
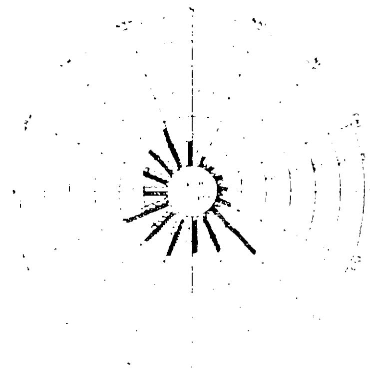


FIGURE 2

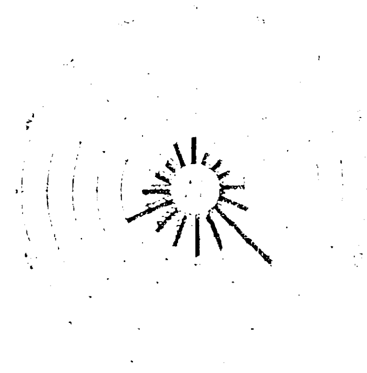
BEAVER VALLEY
35-FT MONTHLY WIND ROSES FOR
JANUARY, FEBRUARY, MARCH, AND APRIL
(1980 and 1976-1980)



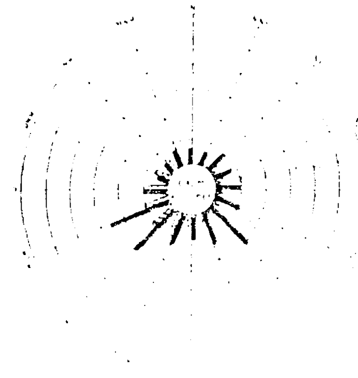
MAY (1980)



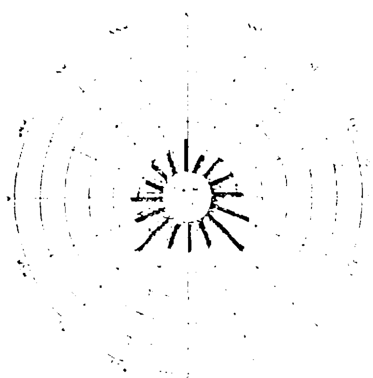
JUNE (1980)



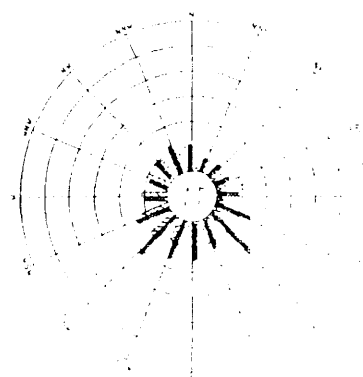
JULY (1980)



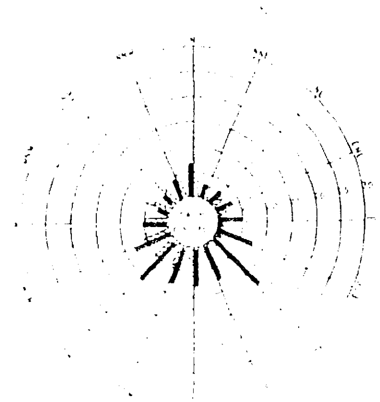
AUGUST (1980)



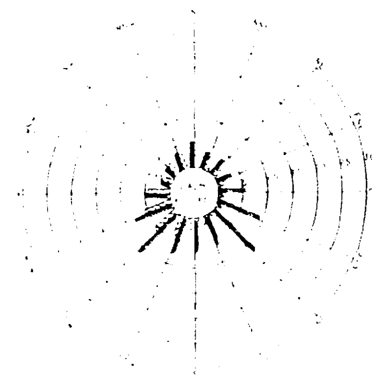
MAY (1976-1980)



JUNE (1976-1980)



JULY (1976-1980)



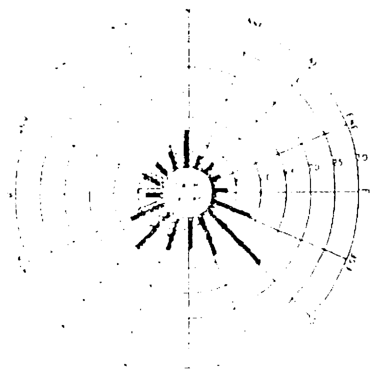
AUGUST (1976-1980)

FIGURE 3

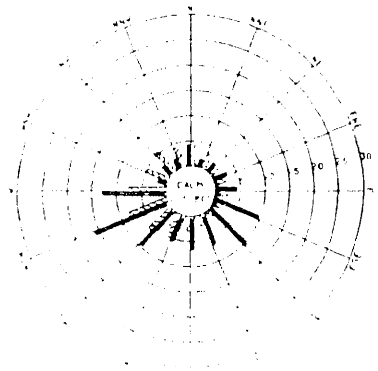
BEAVER VALLEY
35-FT MONTHLY WIND ROSES FOR
MAY, JUNE, JULY, AND AUGUST
(1980 and 1976-1980)

WIND DIRECTION FREQUENCY (PERCENT)

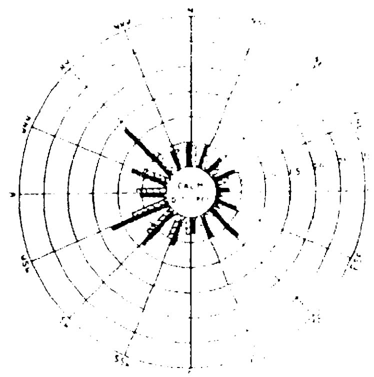
MEAN WIND SPEED (MPH)



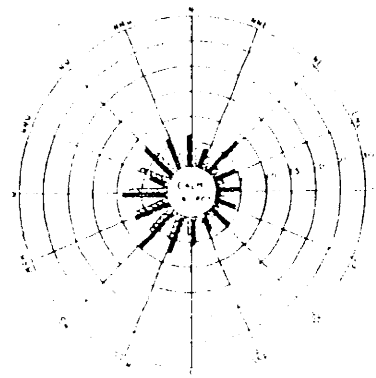
SEPTEMBER (1980)



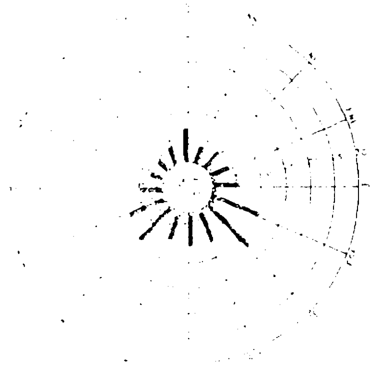
OCTOBER (1980)



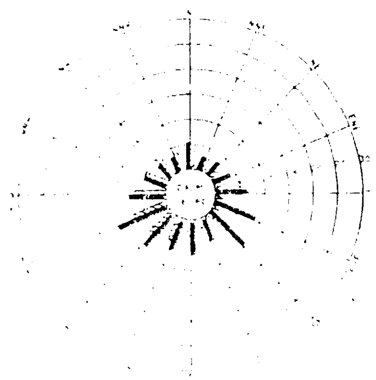
NOVEMBER (1980)



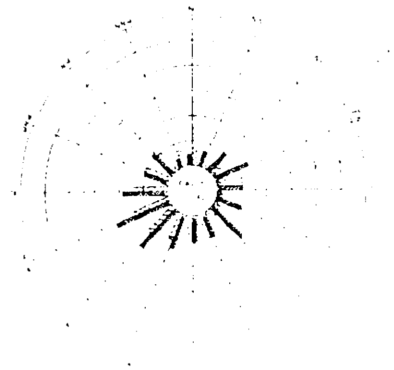
DECEMBER (1980)



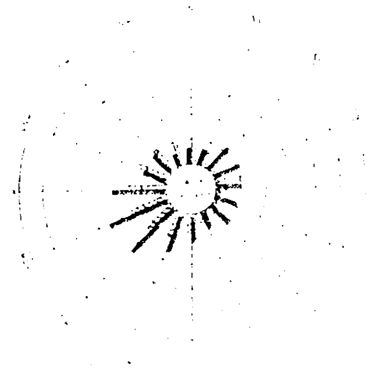
SEPTEMBER (1976-1980)



OCTOBER (1976-1980)



NOVEMBER (1976-1980)



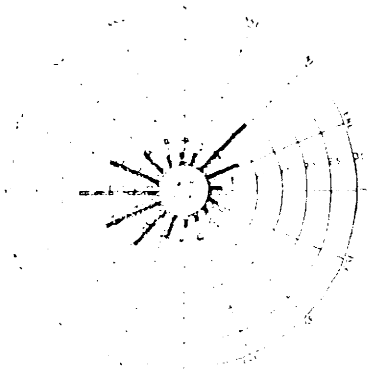
DECEMBER (1976-1980)

WIND DIRECTION FREQUENCY (PERCENT) STABILITY CLASSIFICATION

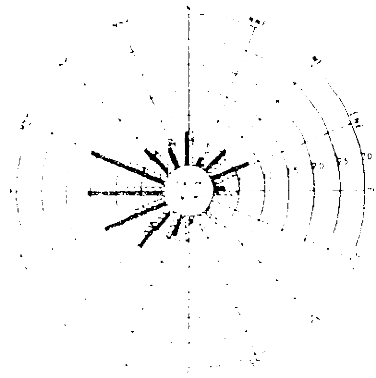
MEAN WIND SPEED (MI/HR)

FIGURE 4

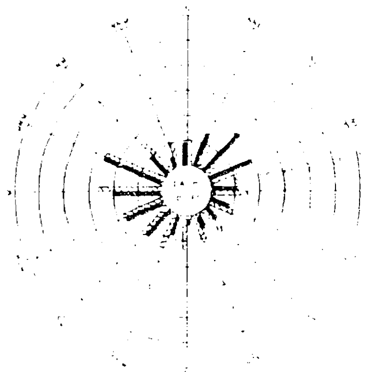
BEAVER VALLEY
35-FT MONTHLY WIND ROSES FOR
SEPTEMBER, OCTOBER, NOVEMBER, AND DECEMBER
(1980 and 1976-1980)



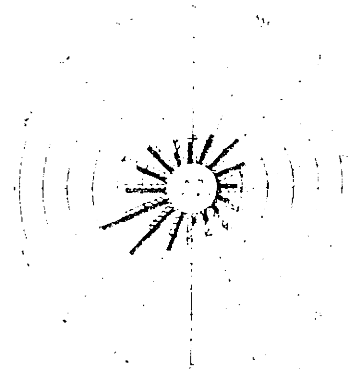
JANUARY (1980)



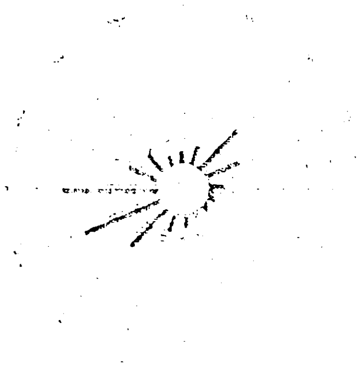
FEBRUARY (1980)



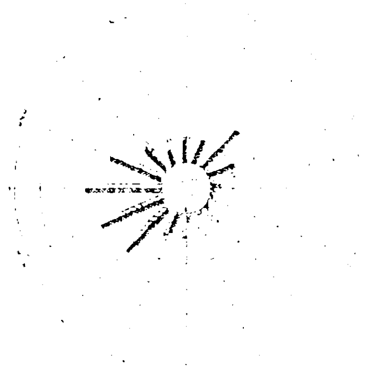
MARCH (1980)



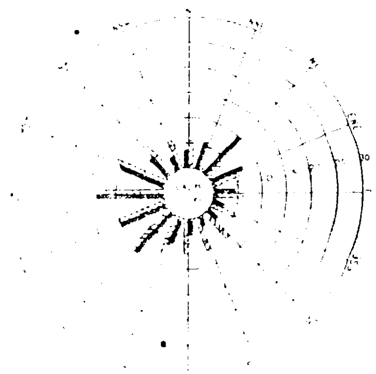
APRIL (1980)



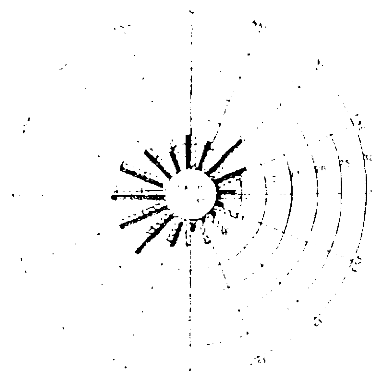
JANUARY (1976-1980)



FEBRUARY (1976-1980)



MARCH (1976-1980)



APRIL (1976-1980)

FIGURE 5

BEAVER VALLEY
150-FT MONTHLY WIND ROSES FOR
JANUARY, FEBRUARY, MARCH, AND APRIL
(1980 and 1976-1980)

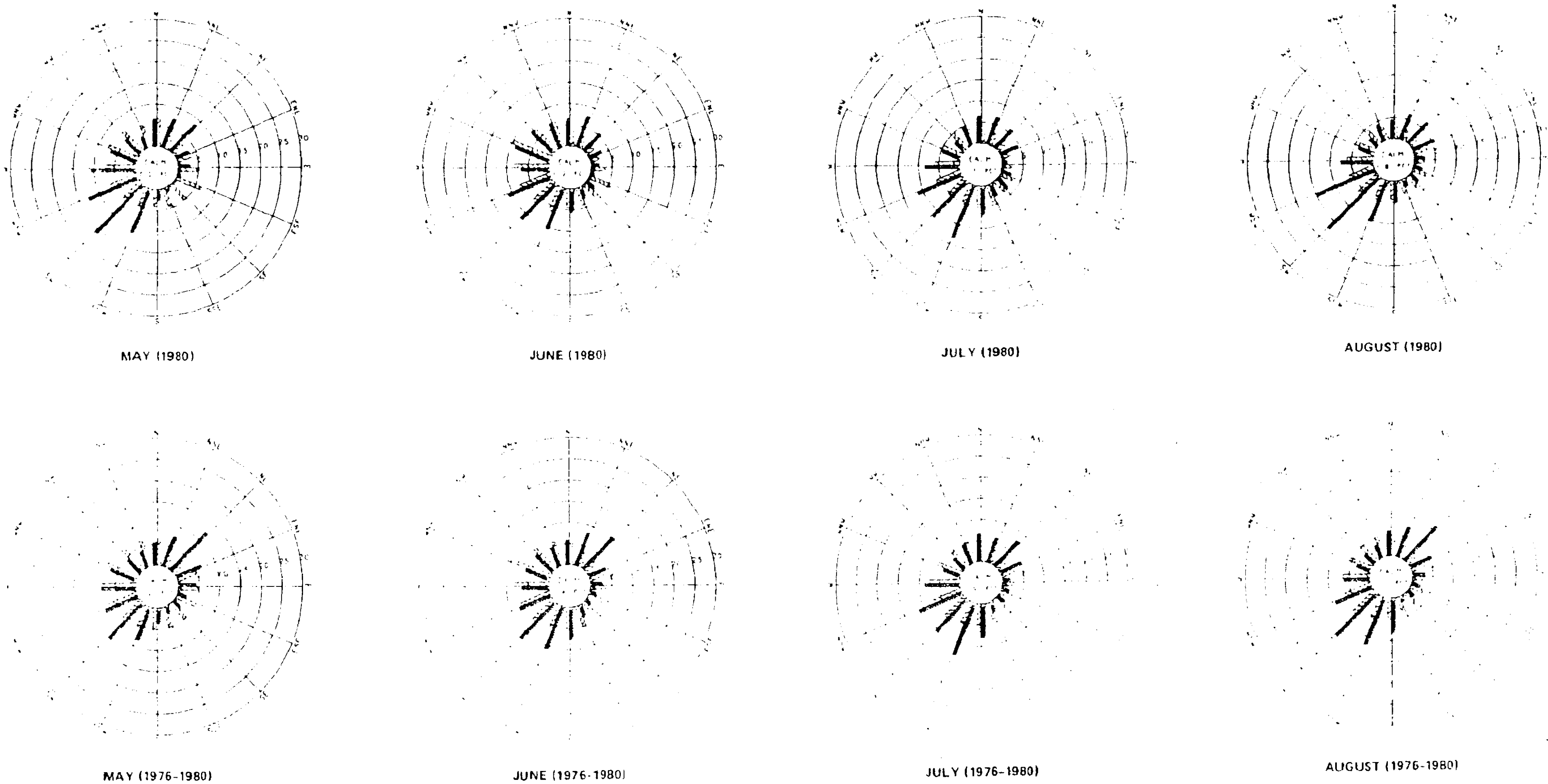
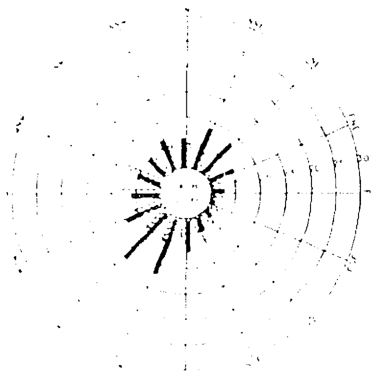
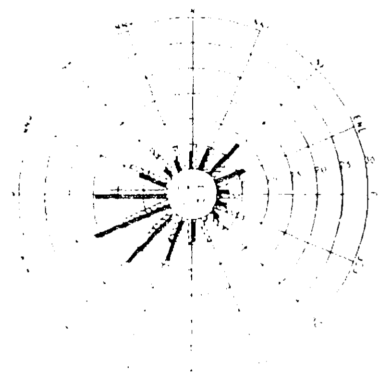


FIGURE 6

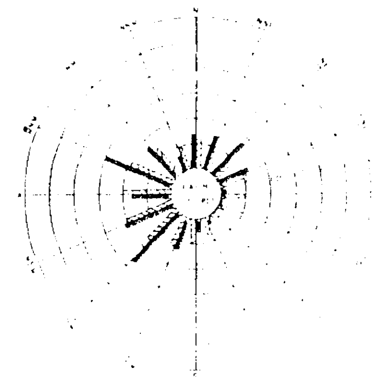
BEAVER VALLEY
150 FT MONTHLY WIND ROSES FOR
MAY, JUNE, JULY, AND AUGUST
(1980 and 1976-1980)



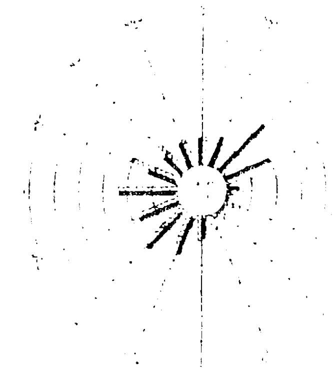
SEPTEMBER (1980)



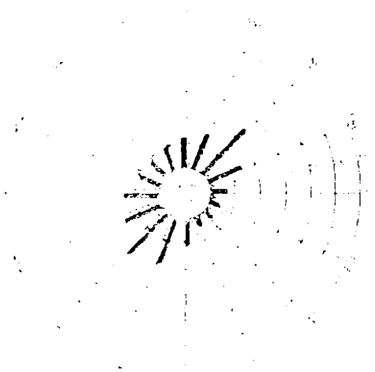
OCTOBER (1980)



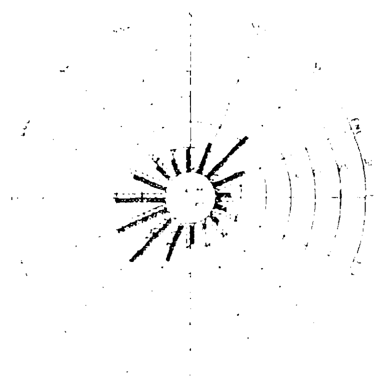
NOVEMBER (1980)



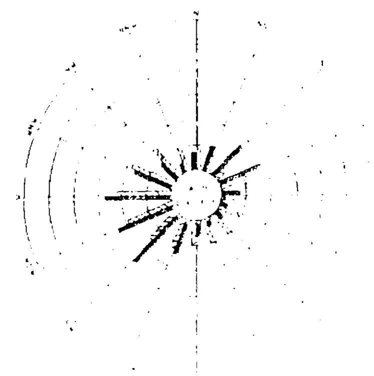
DECEMBER (1980)



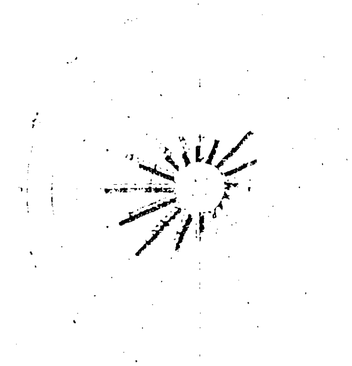
SEPTEMBER (1976-1980)



OCTOBER (1976-1980)



NOVEMBER (1976-1980)



DECEMBER (1976-1980)

FIGURE 7

BEAVER VALLEY
150-FT MONTHLY WIND ROSES FOR
SEPTEMBER, OCTOBER, NOVEMBER, AND DECEMBER
(1980 and 1976-1980)

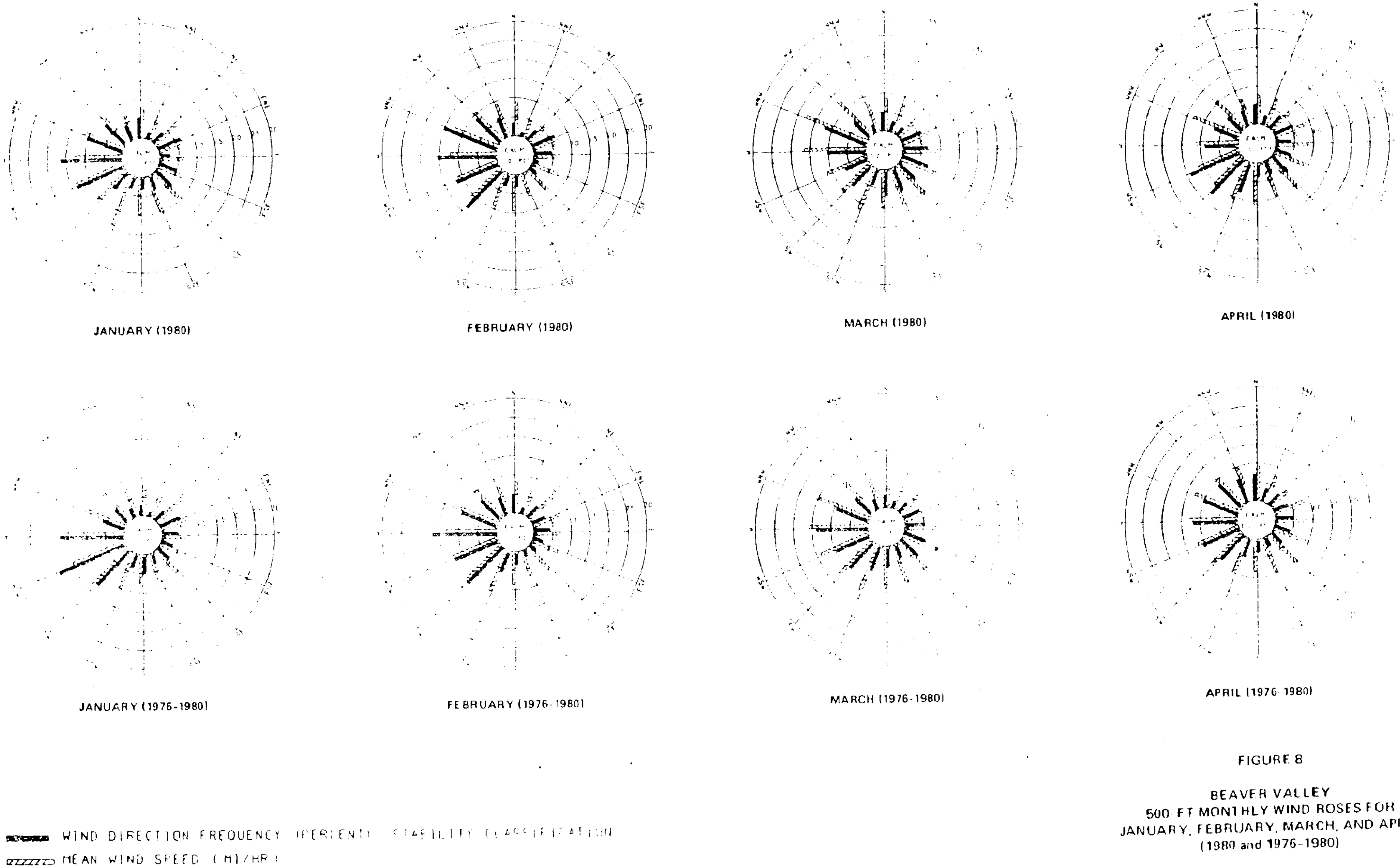
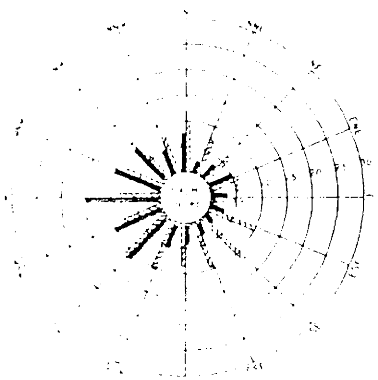
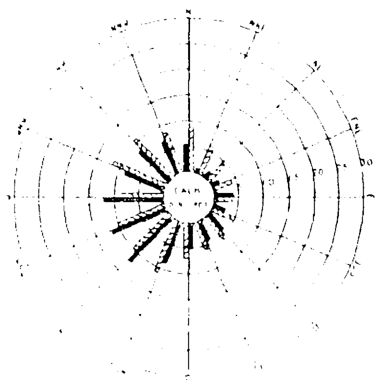


FIGURE 8

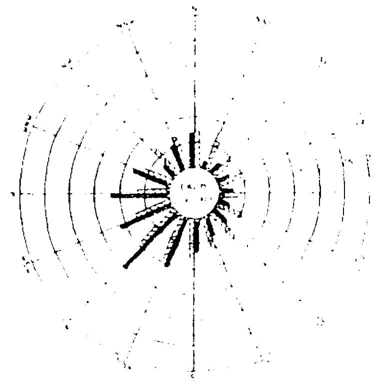
BEAVER VALLEY
500 FT MONTHLY WIND ROSES FOR
JANUARY, FEBRUARY, MARCH, AND APRIL
(1980 and 1976-1980)



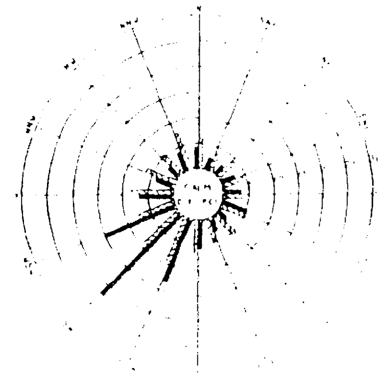
MAY (1980)



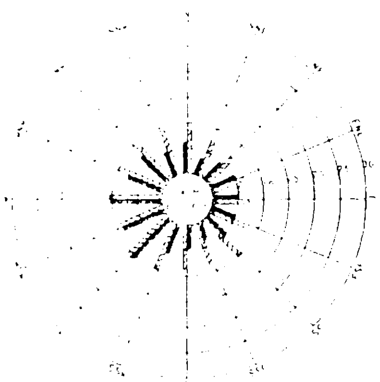
JUNE (1980)



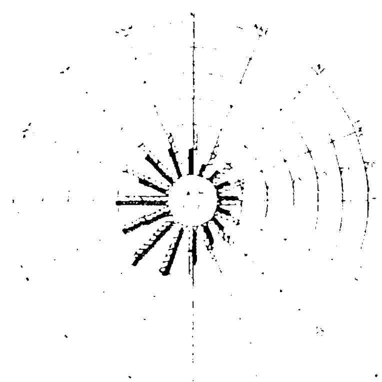
JULY (1980)



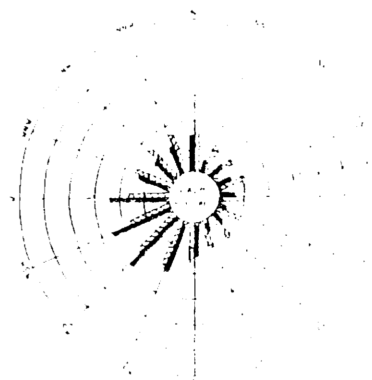
AUGUST (1980)



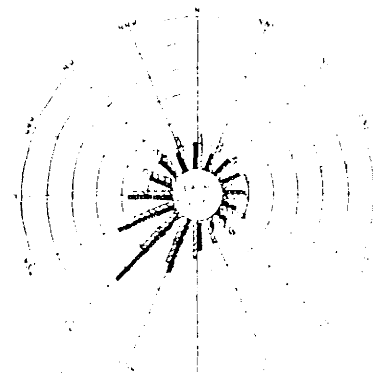
MAY (1976-1980)



JUNE (1976-1980)



JULY (1976-1980)



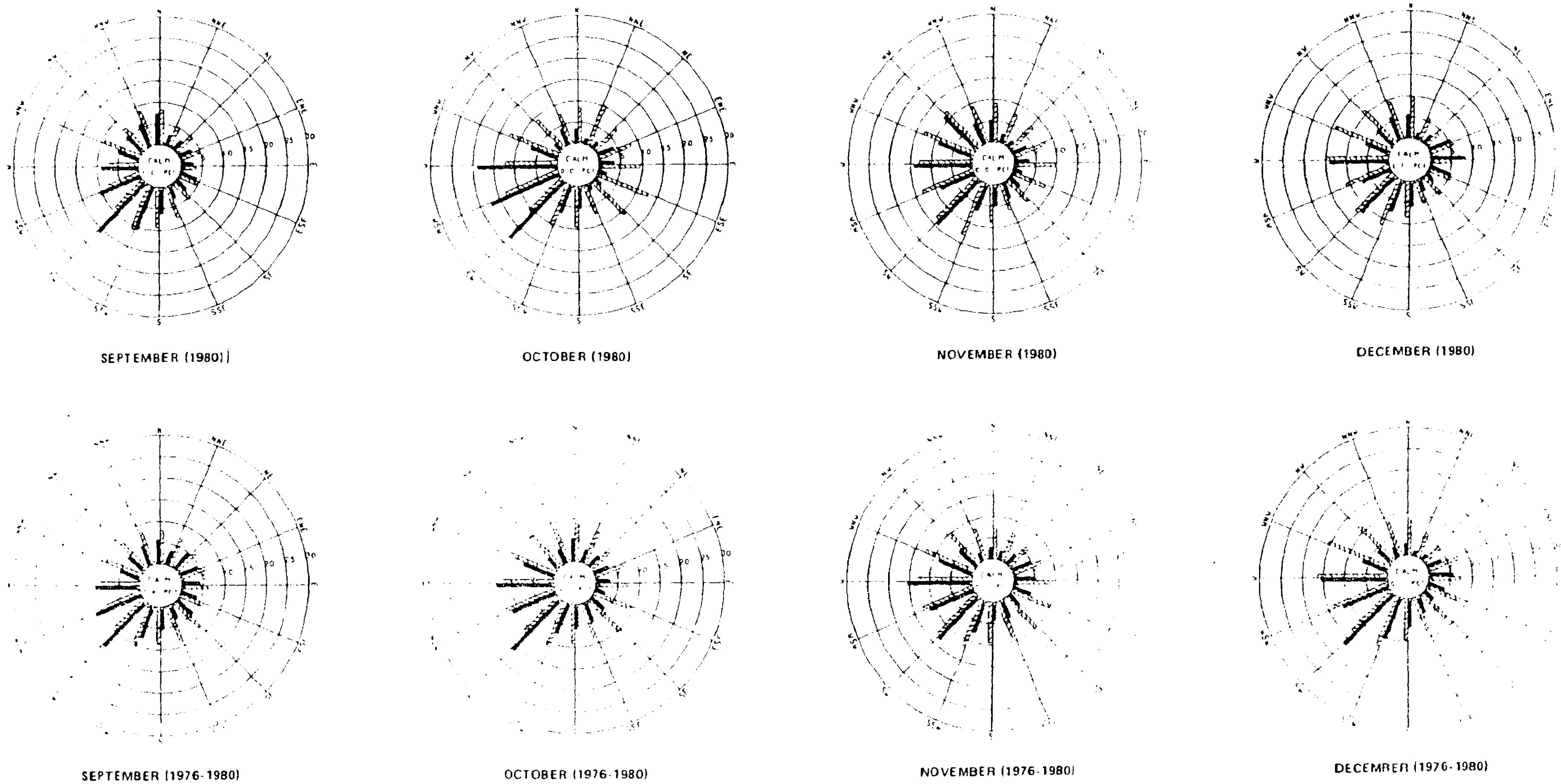
AUGUST (1976-1980)

WIND DIRECTION FREQUENCY (PERCENT) [illegible]

MEAN WIND SPEED (MI/HR)

FIGURE 9

BEAVER VALLEY
500-FT MONTHLY WIND ROSES FOR
MAY, JUNE, JULY, AND AUGUST
(1980 and 1976-1980)



WIND DIRECTION FREQUENCY (PERCENT) STABILITY CLASSIFICATION

MEAN WIND SPEED (MI/HR)

FIGURE 10

BEAVER VALLEY
500-FT MONTHLY WIND ROSES FOR
SEPTEMBER, OCTOBER, NOVEMBER, AND DECEMBE
(1980 and 1976-1980)

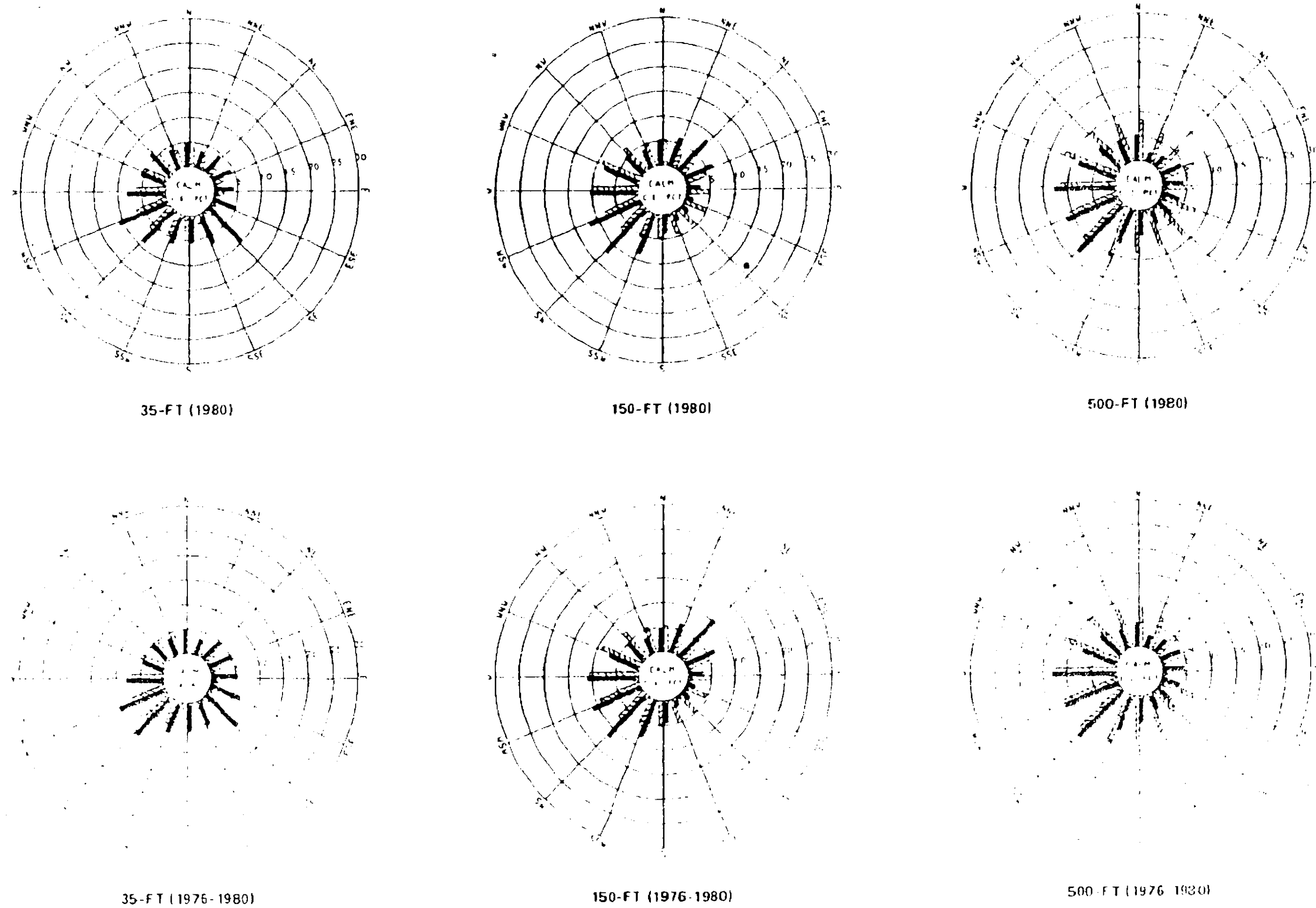
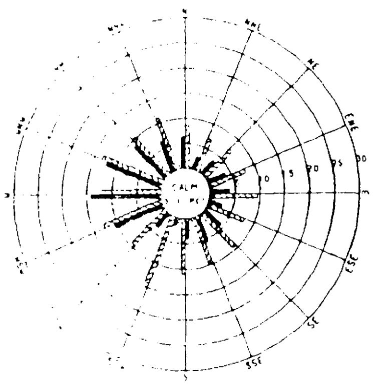
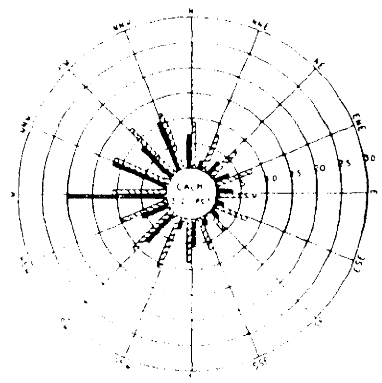


FIGURE 11

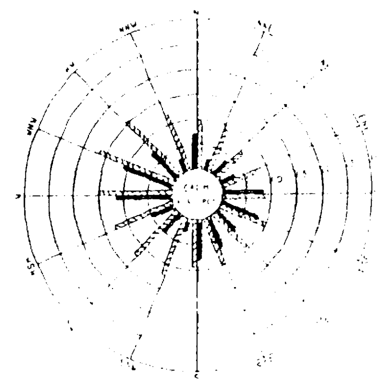
BEAVER VALLEY
35-FT, 150-FT, AND 500
ANNUAL WIND ROSES
(1980 and 1976-1980)



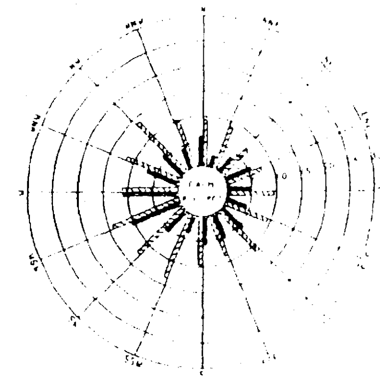
JANUARY (1980)



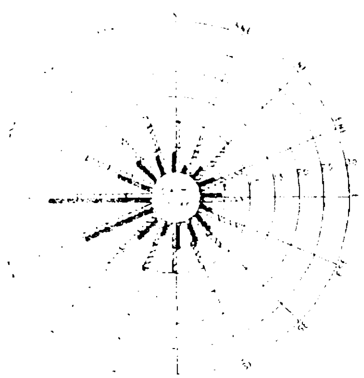
FEBRUARY (1980)



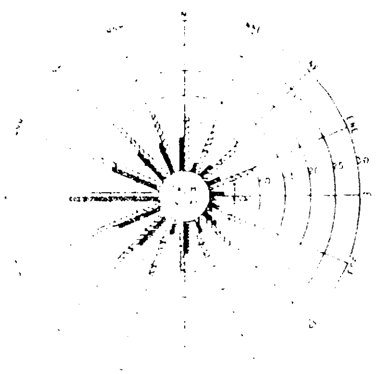
MARCH (1980)



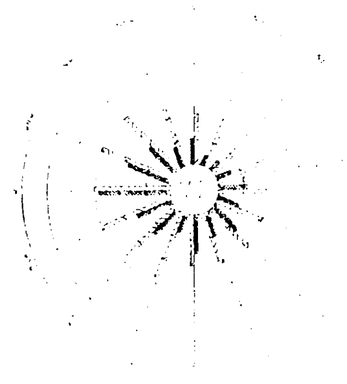
APRIL (1980)



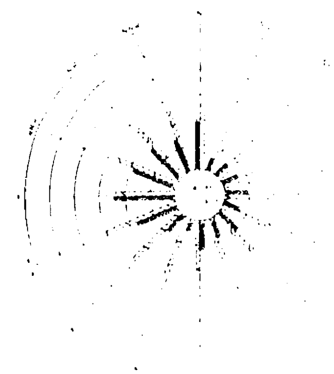
JANUARY (1976-1980)



FEBRUARY (1976-1980)



MARCH (1976-1980)



APRIL (1976-1980)

[illegible] DIRECTION FREQUENCY [illegible]
[illegible]

FIGURE 12

PITTSBURGH
MONTHLY WIND ROSES FOR
JANUARY, FEBRUARY, MARCH, AND APR[illegible]
(1980 and 1976-1980)

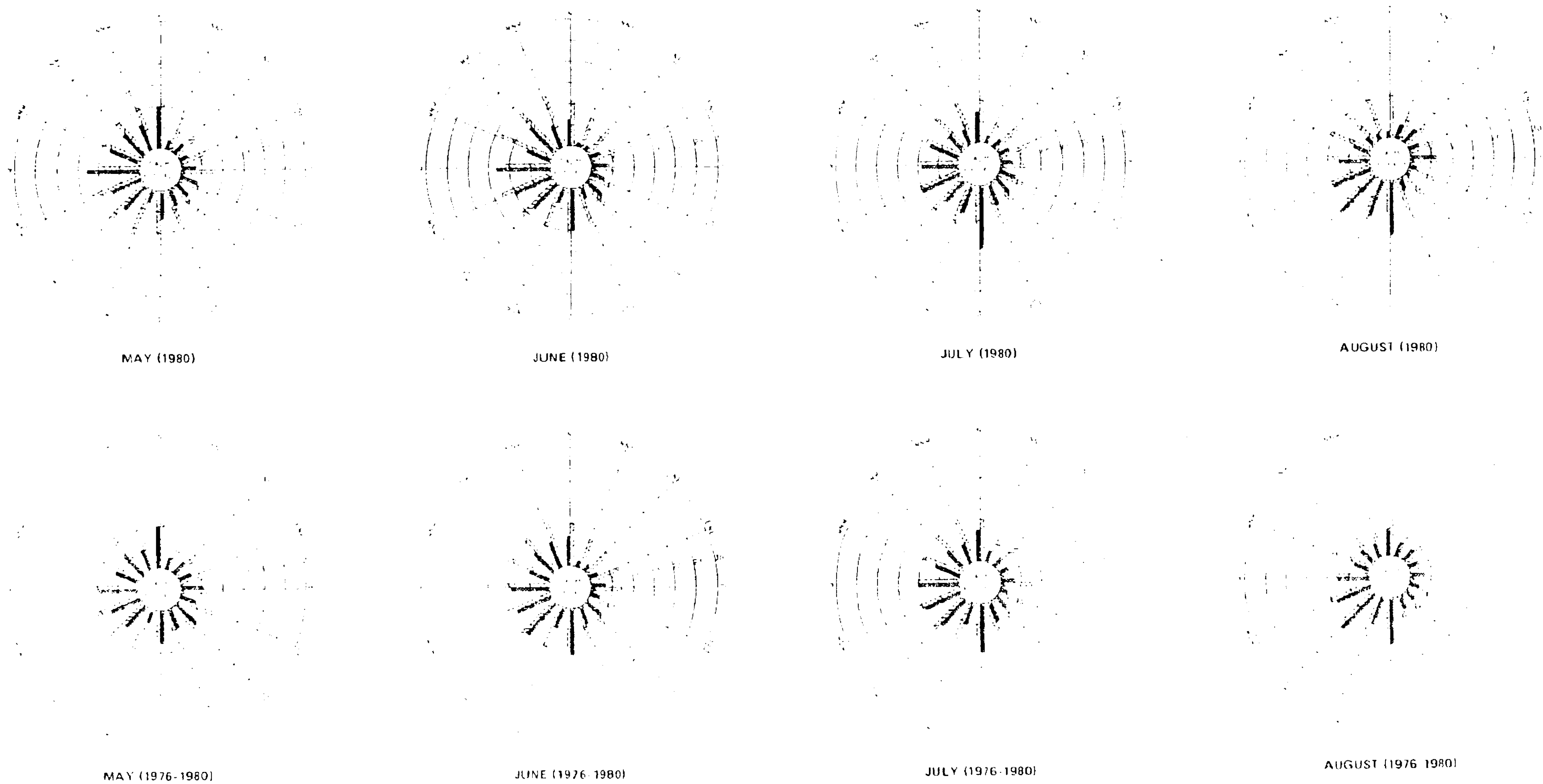


FIGURE 13

PITTSBURGH
MONTHLY WIND ROSES FOR
MAY, JUNE, JULY, AND AUGUST
(1980 and 1976-1980)

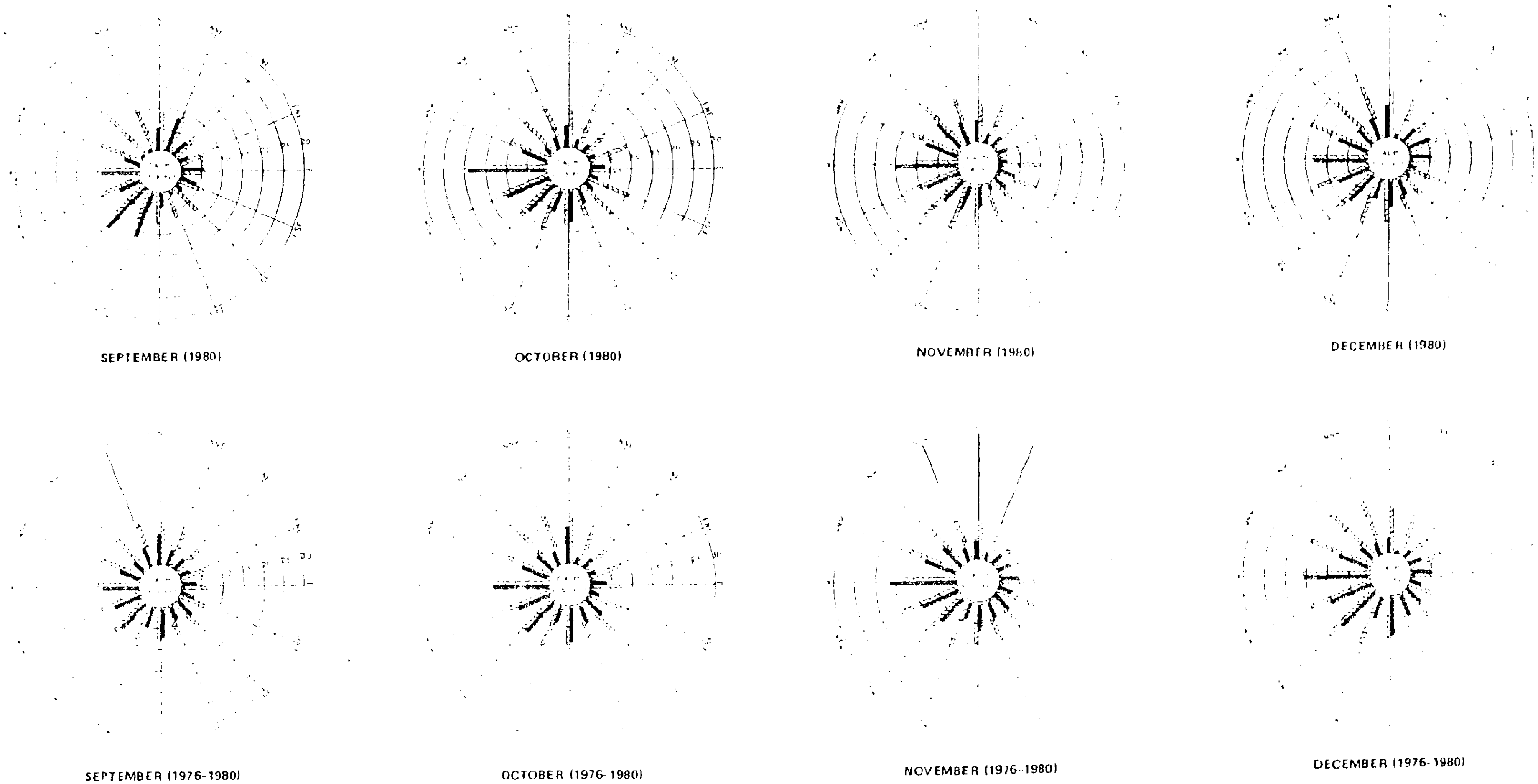
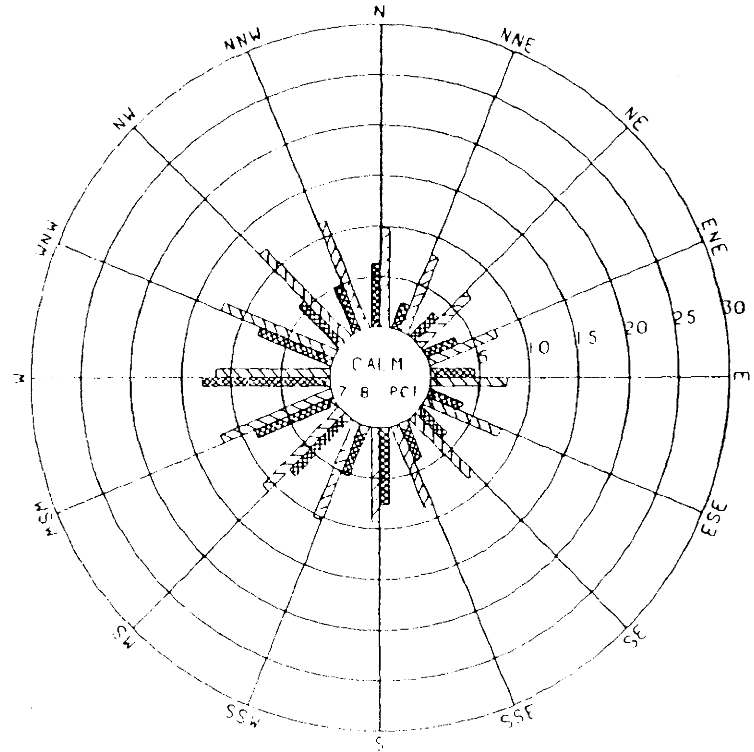
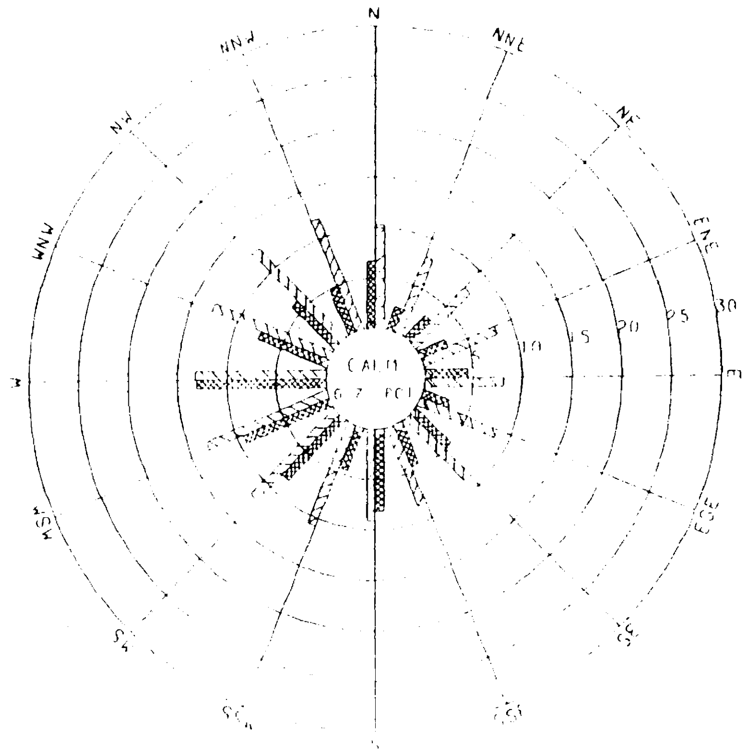


FIGURE 14

PITTSBURGH
MONTHLY WIND ROSES FOR
SEPTEMBER, OCTOBER, NOVEMBER, AND DECEMBEI
(1980 and 1976-1980)



1980



1976-1980

FIGURE 15

PITTSBURGH
ANNUAL WIND ROSES
(1980 and 1976-1980)

FIGURE 16

MONTHLY AVERAGE WIND SPEEDS FOR 1980

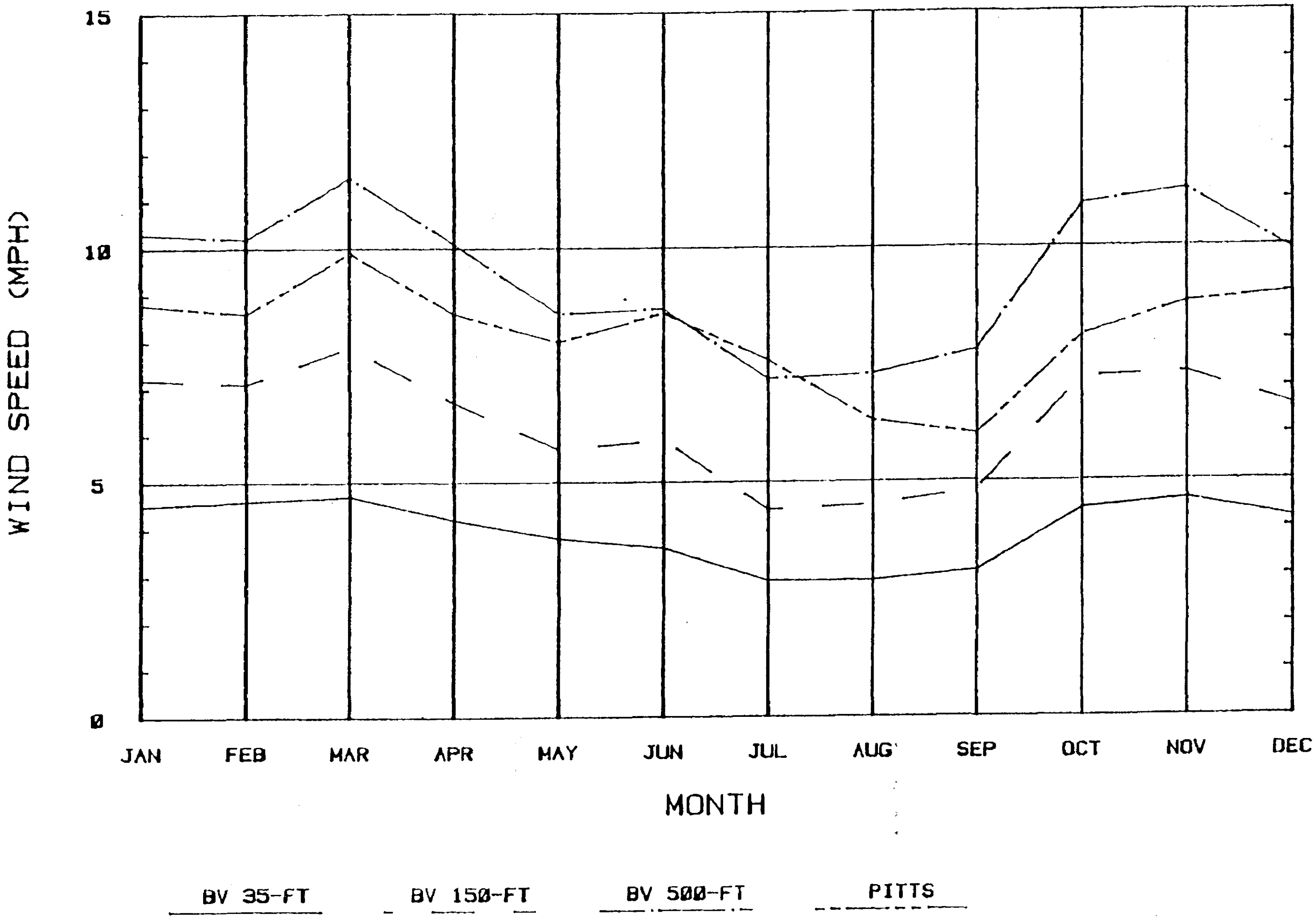


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FIGURE 17

MONTHLY AVERAGE WIND SPEEDS FOR CY1976-1980

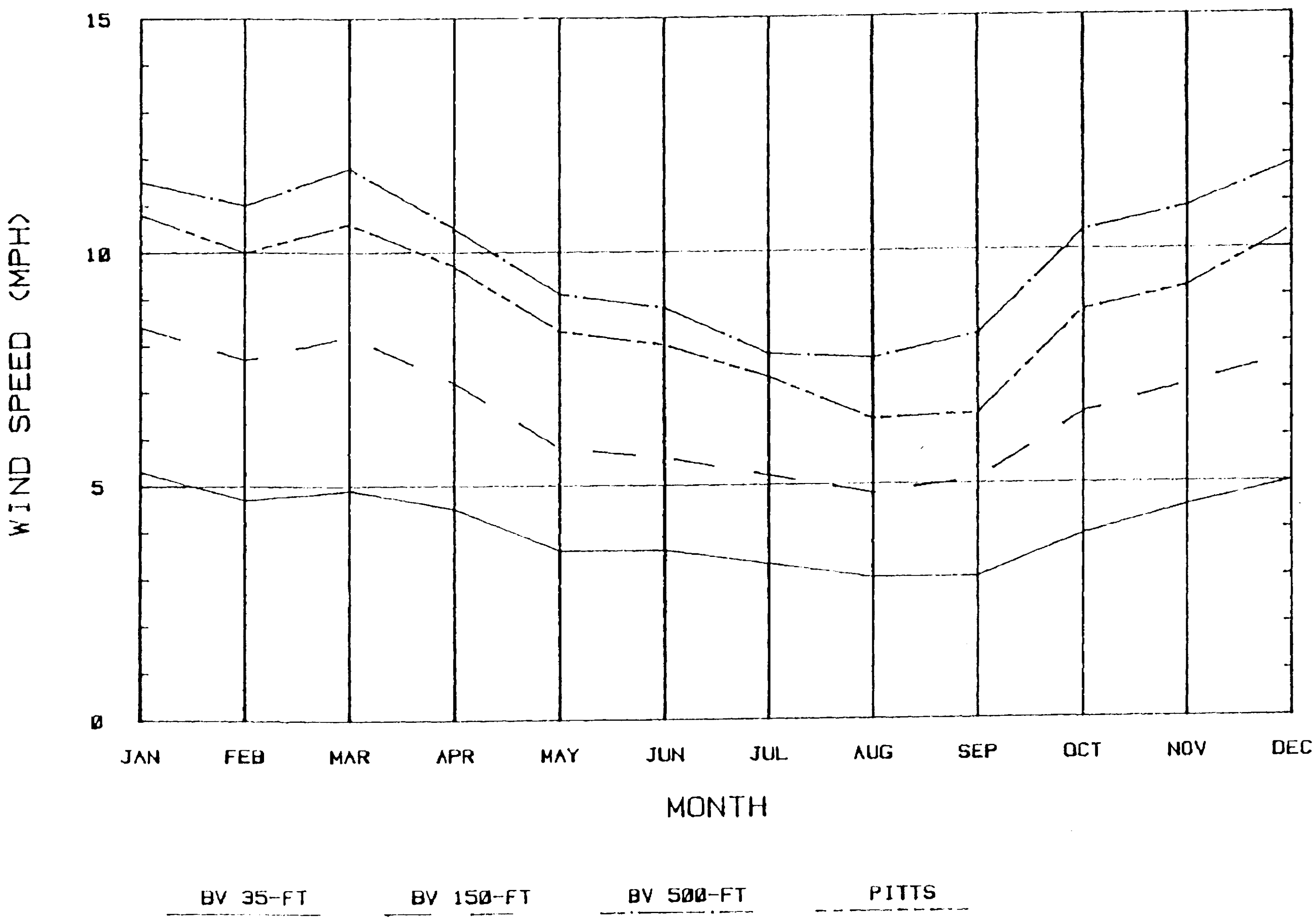


FIGURE 18

ANNUAL AVERAGE WIND SPEEDS FOR BVPS 1976-1980

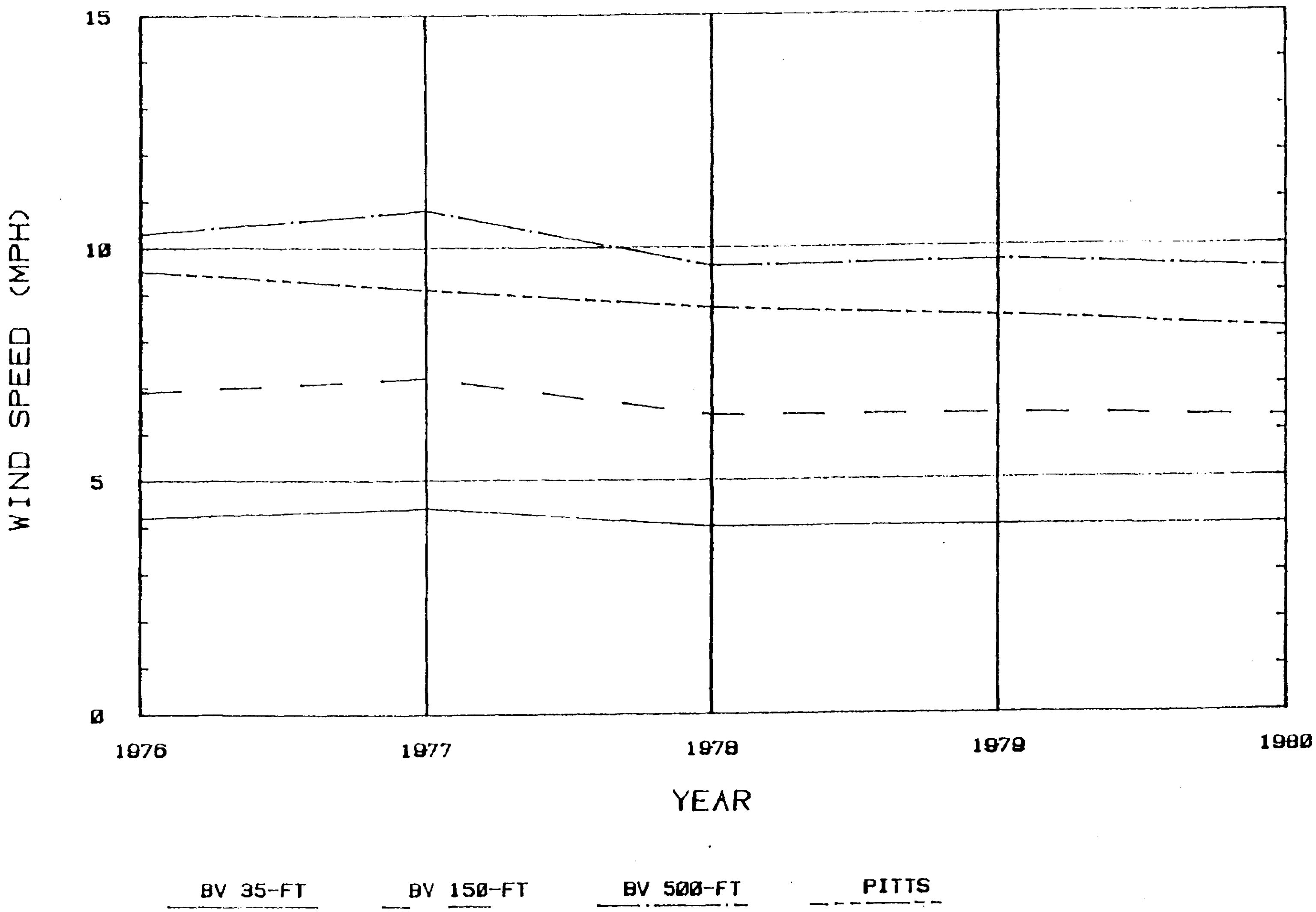


FIGURE 19

35 FT WIND DIRECTION PERSISTENCE FOR BVPS

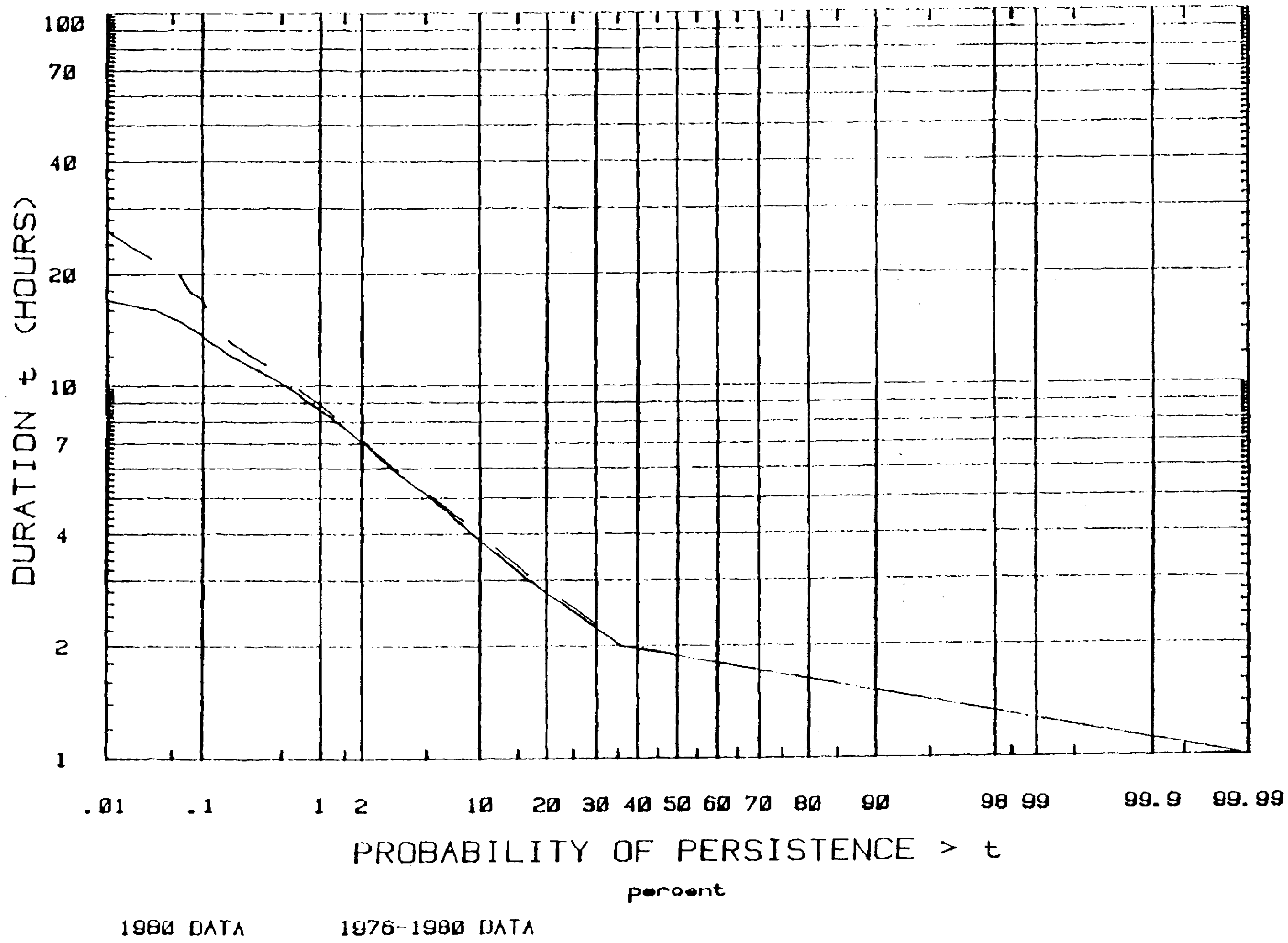


FIGURE 20

150 FT WIND DIRECTION PERSISTENCE FOR BVPS

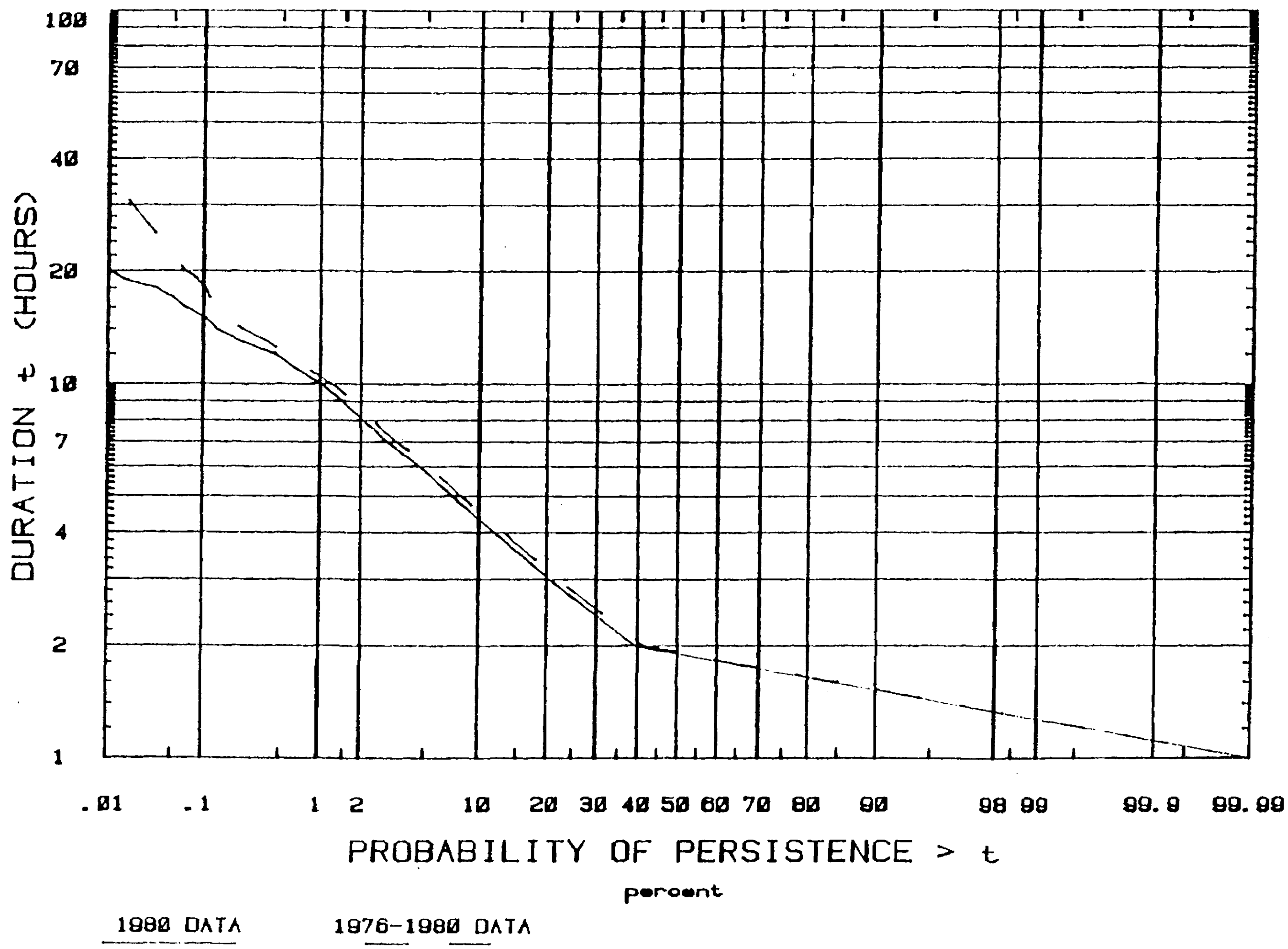
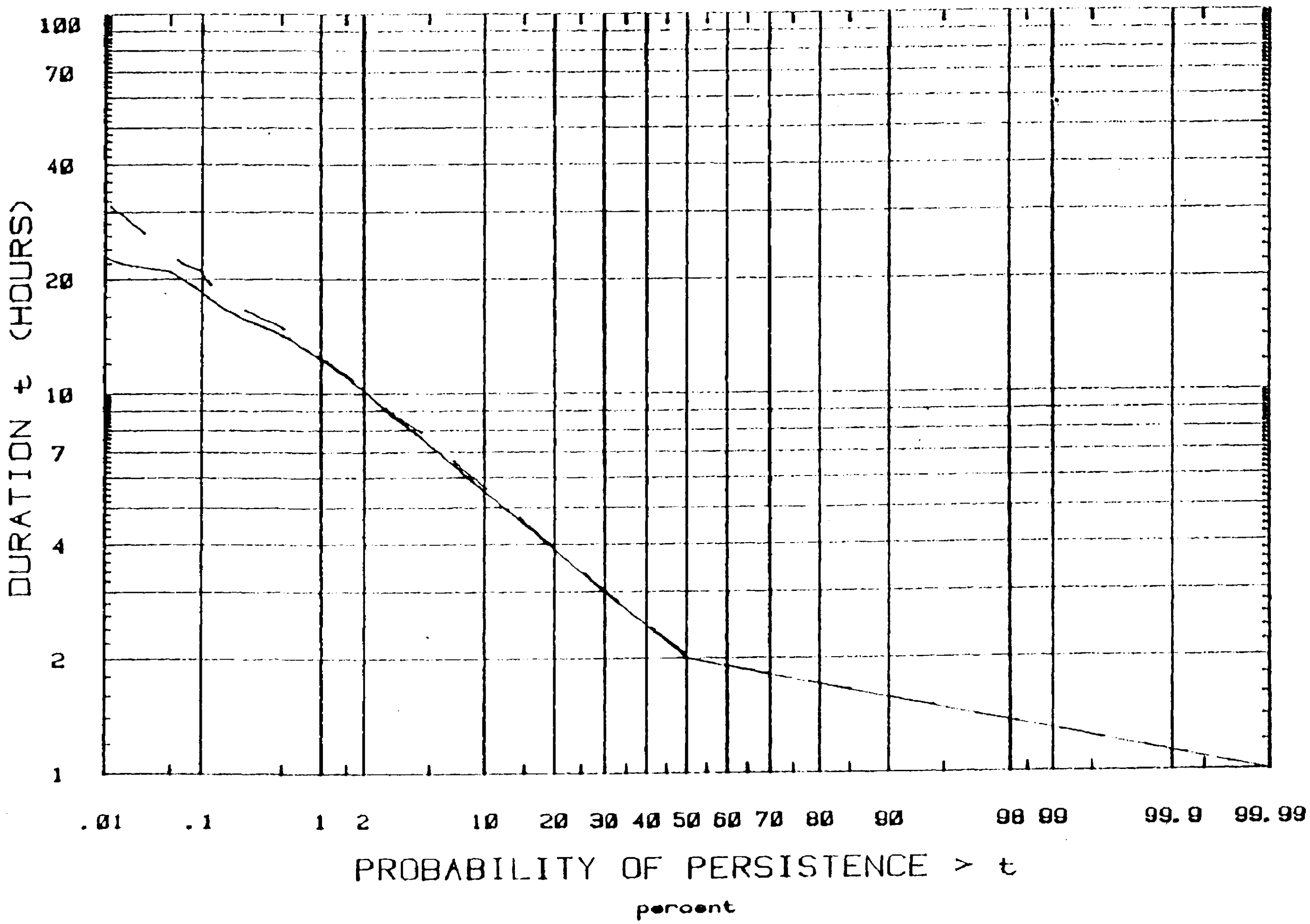


FIGURE 21

500 FT WIND DIRECTION PERSISTENCE FOR BVPS



1980 DATA ———— 1976-1980 DATA — —

FIGURE 22

ANNUAL STABILITY CLASS DISTRIBUTIONS FOR BVPS

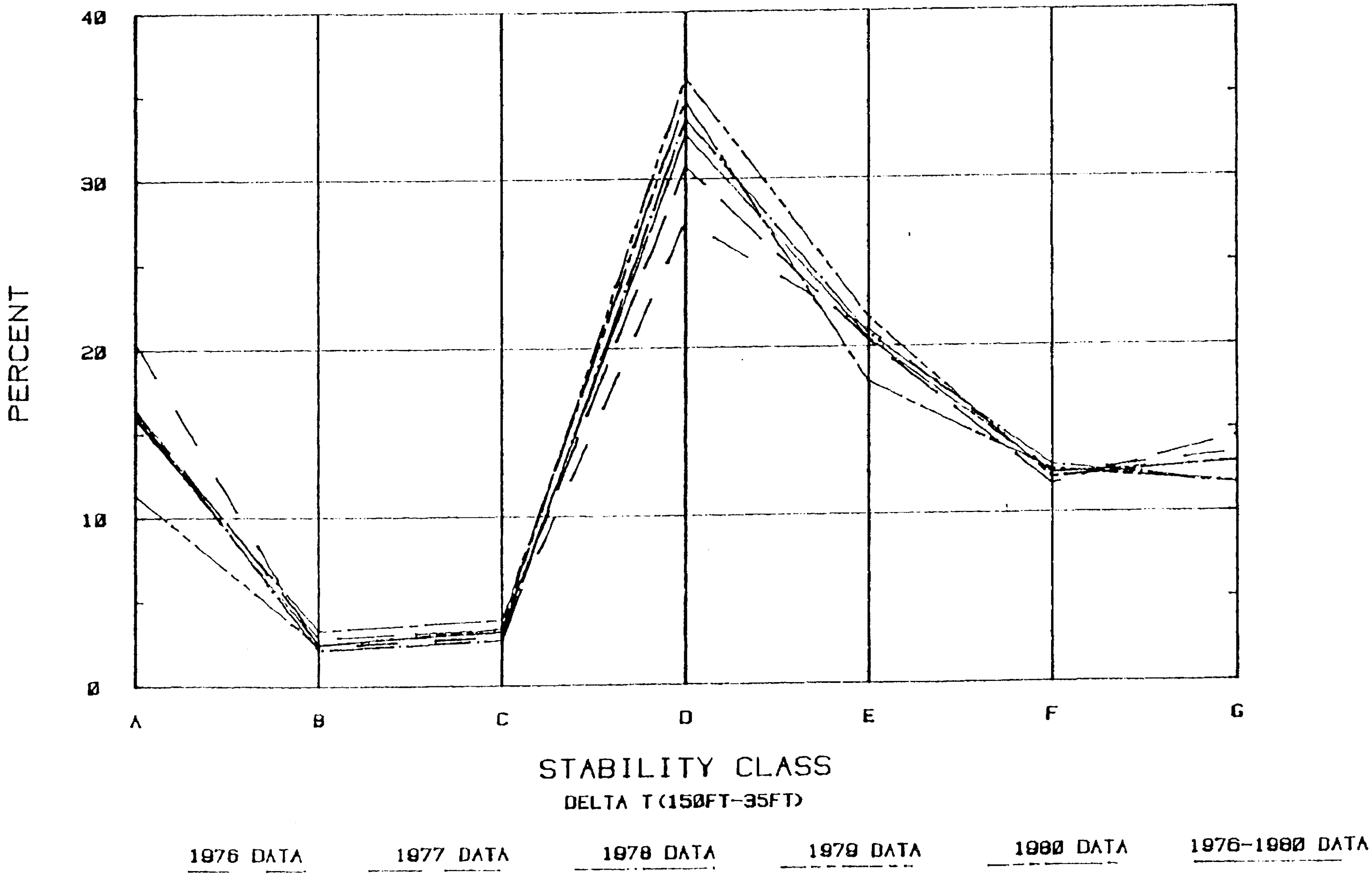


FIGURE 23

ANNUAL STABILITY CLASS DISTRIBUTIONS FOR BVPS

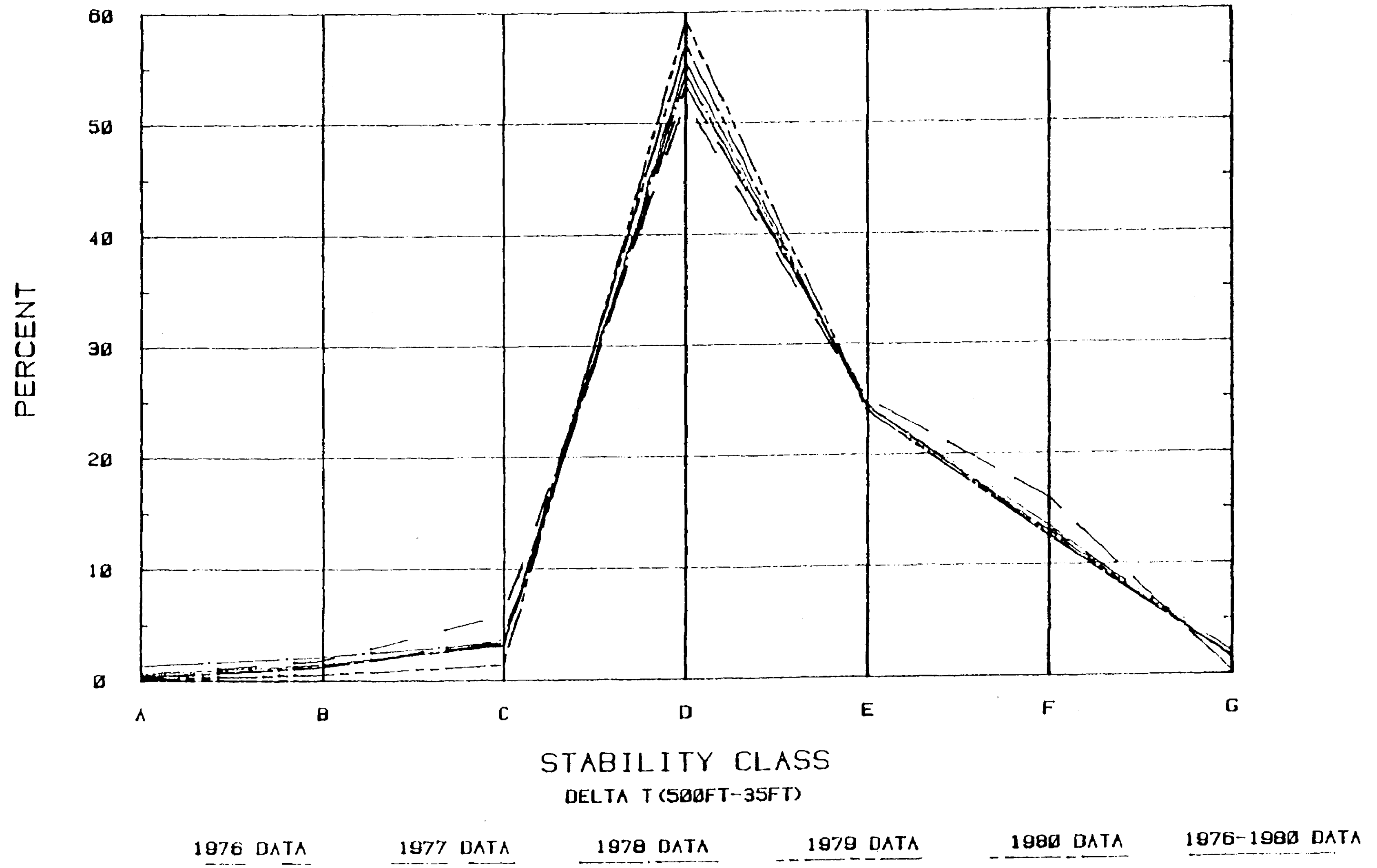


FIGURE 24

ANNUAL STABILITY CLASS DISTRIBUTIONS FOR PITTSBURGH

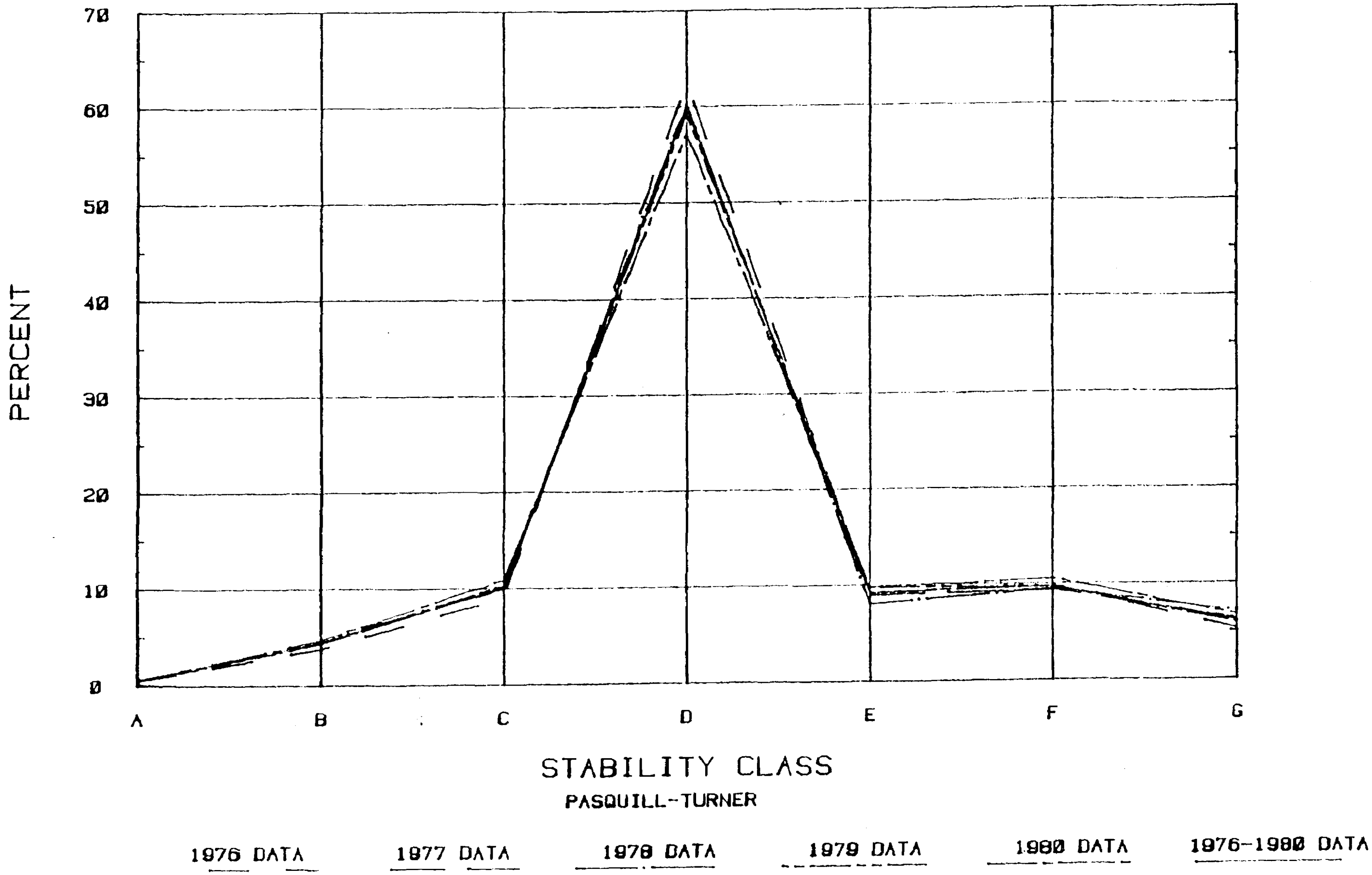


FIGURE 25 MONTHLY AVERAGE TEMPERATURES

BEAVER VALLEY AND PITTSBURGH NWS

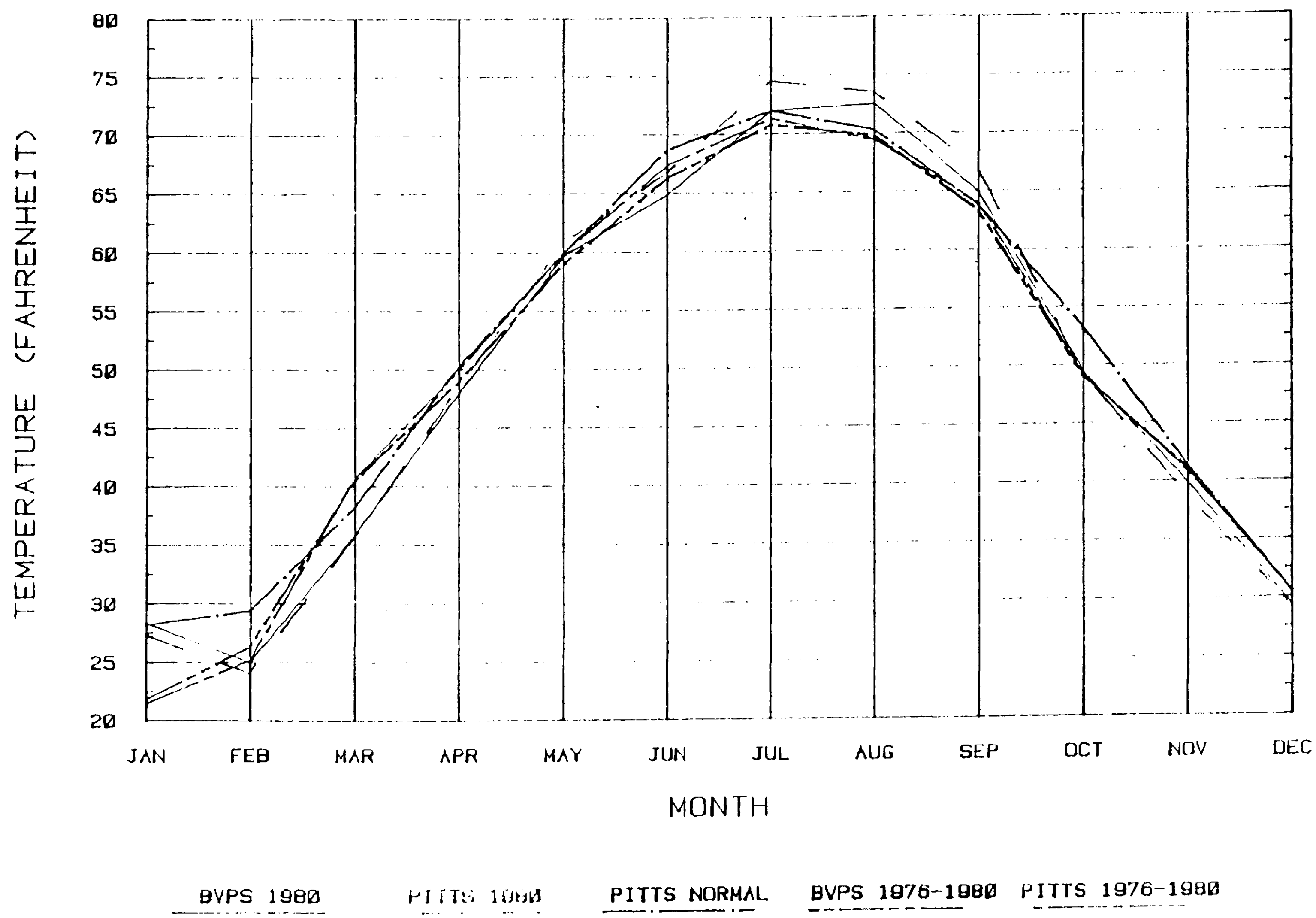
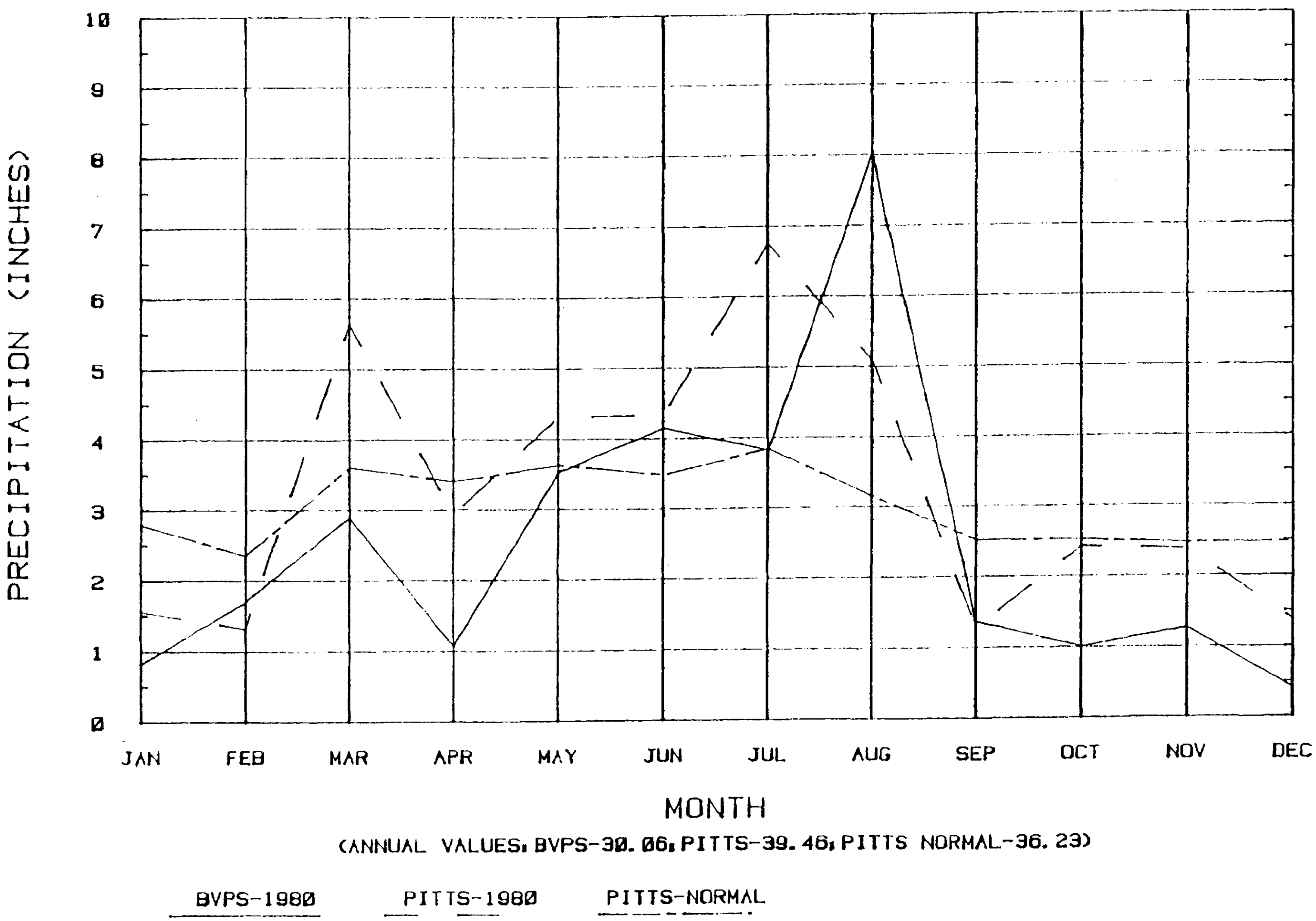


FIGURE 26 MONTHLY AND ANNUAL PRECIPITATION DATA

BEAVER VALLEY AND PITTSBURGH NWS



APPENDIX A

Monthly and Annual Joint Frequency Distribution
of ∆T(150ft-35ft) and 35-ft Wind Data
(January 1, 1980 - December 31, 1980)

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	1	0	0	0	0	0	0	0	0	3	4	0	0	8
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	6	2	3	0	11
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	1	1	0	0	0	0	0	0	0	9	6	3	0	20

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	1	0	0	0	0	0	2	2	1	1	0	7
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	1	0	0	0	0	0	5	3	1	1	0	11

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	2	0	0	0	0	0	1	4	2	3	2	0	14
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	0	2	0	0	0	0	0	1	5	3	5	2	0	19

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	7	9	25	18	12	8	3	1	2	4	1	4	6	9	12	3	124
3.50 - 7.49	6	3	4	0	1	1	0	2	2	19	34	39	36	30	35	9	221
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	12	31	19	9	0	1	73
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	10
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	13	12	29	18	13	9	3	3	4	24	47	83	62	48	47	13	428

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	3	8	19	7	8	3	12	4	7	5	3	4	1	3	2	2	91
3.50 - 7.49	0	5	4	0	0	0	0	1	8	8	2	0	0	0	1	1	30
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	2	0	1	0	0	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	13	23	7	8	3	12	5	15	15	7	4	3	3	3	3	128

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	2	3	6	7	5	15	7	2	1	1	0	1	0	0	0	51
3.50 - 7.49	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	3	6	7	5	15	7	3	2	1	0	1	0	0	0	54

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	2	0	3	1	2	5	1	1	0	0	0	0	0	0	15
3.50 - 7.49	0	1	1	0	0	0	0	0	3	0	0	0	0	0	0	0	5
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	3	0	3	1	2	5	4	1	0	0	0	0	0	0	20

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	11	19	50	31	31	17	32	17	12	11	5	8	8	12	14	5	283
3.50 - 7.49	6	10	9	1	3	2	0	3	14	28	37	45	43	38	39	10	288
7.50 - 12.49	0	0	0	0	0	0	0	0	0	3	14	35	28	13	3	1	97
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	9	2	0	0	0	11
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	17	29	59	32	34	19	32	20	26	42	56	97	81	63	56	16	680

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 680

TOTAL NUMBER OF MISSING OBSERVATIONS: 64

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.4%

MEAN WIND SPEED FOR THIS PERIOD: 4.7 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
2.94	1.62	2.79	62.94	18.82	7.94	2.94

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	1	1	0	0	0	0	0	0	0	9	6	3	0	0
B	0	0	0	0	0	1	0	0	0	0	0	5	3	1	1	0	0
C	0	0	1	0	2	0	0	0	0	0	1	5	3	5	2	0	0
D	13	12	29	18	13	9	3	3	4	24	47	83	62	48	47	13	0
E	3	13	23	7	8	3	12	5	15	15	7	4	3	3	3	3	1
F	1	3	3	6	7	5	15	7	3	2	1	0	1	0	0	0	0
G	0	1	3	0	3	1	2	5	4	1	0	0	0	0	0	0	0
Total	17	29	59	32	34	19	32	20	26	42	56	97	81	63	56	16	1

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	3	0	0	1	1	0	0	0	0	0	2	2	5	1	1	4	20
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	9	0	2	1	12
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	0	0	1	1	0	0	0	0	0	2	2	14	1	3	5	32

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3.50 - 7.49	2	0	1	1	1	0	0	0	0	0	0	4	4	5	3	0	21
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	3	1	1	0	0	0	0	0	1	4	6	7	3	0	29

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	0	3	0	0	0	1	0	0	0	0	0	0	0	0	6
3.50 - 7.49	2	2	0	1	0	0	0	0	0	1	2	3	1	4	5	2	23
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	2	2	0	0	1	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	4	0	4	0	0	0	1	0	1	4	5	1	4	6	2	34

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	6	7	20	23	7	3	1	0	3	1	1	5	14	15	14	12	132
3.50 - 7.49	13	1	1	5	0	0	0	0	3	9	32	36	41	35	32	13	221
7.50 - 12.49	2	0	0	0	0	0	0	0	0	5	12	18	6	9	2	3	57
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	21	8	21	28	7	3	1	0	6	15	45	62	62	59	48	28	414

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	4	5	9	2	3	2	4	2	4	1	2	1	2	1	1	43
3.50 - 7.49	1	1	1	0	0	0	0	0	1	7	7	1	0	1	0	0	20
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	5	6	9	2	3	2	4	3	11	9	3	2	3	1	1	65

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	0	2	6	3	8	4	4	2	0	0	2	0	0	0	33
3.50 - 7.49	0	0	0	0	0	0	0	0	4	0	1	0	1	0	0	0	6
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	0	2	6	3	8	4	8	2	1	0	3	0	0	0	39

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	8	22	14	5	0	1	0	0	0	0	0	50
3.50 - 7.49	0	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0	8
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	8	22	14	12	0	2	0	0	0	0	0	58

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	7	15	27	37	15	17	33	23	14	7	3	7	17	17	15	13	267
3.50 - 7.49	21	4	3	8	2	0	0	0	15	17	45	46	52	46	41	19	319
7.50 - 12.49	2	0	0	0	0	0	0	0	0	5	16	20	18	11	5	4	81
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30	19	30	45	17	17	33	23	29	29	64	76	88	74	61	36	671

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 696

TOTAL NUMBER OF VALID OBSERVATIONS: 671

TOTAL NUMBER OF MISSING OBSERVATIONS: 25

PERCENT DATA RECOVERY FOR THIS PERIOD: 96.4%

MEAN WIND SPEED FOR THIS PERIOD: 4.6 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
4.77	4.32	5.07	61.70	9.69	5.81	8.64

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	3	0	0	1	1	0	0	0	0	0	2	2	14	1	3	5	0
B	2	1	3	1	1	0	0	0	0	0	1	4	6	7	3	0	0
C	2	4	0	4	0	0	0	1	0	1	4	5	1	4	6	2	0
D	21	8	21	28	7	3	1	0	6	15	45	62	62	59	48	28	0
E	1	5	6	9	2	3	2	4	3	11	9	3	2	3	1	1	0
F	1	1	0	2	6	3	8	4	8	2	1	0	3	0	0	0	0
G	0	0	0	0	0	8	22	14	12	0	2	0	0	0	0	0	0
Total	30	19	30	45	17	17	33	23	29	29	64	76	88	74	61	36	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	4
3.50 - 7.49	7	4	5	6	2	6	3	3	3	2	0	3	7	0	0	1	52
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	2	8	11	11	2	0	36
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	3
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	4	5	6	2	8	4	4	3	4	2	12	20	11	2	1	95

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2
3.50 - 7.49	0	2	2	0	0	0	0	0	3	0	2	3	1	1	1	0	15
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	2	1	0	0	0	0	3	0	5	3	2	2	3	0	23

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	3	2	0	0	0	0	0	0	0	1	0	1	1	1	0	10
3.50 - 7.49	1	1	2	0	2	0	0	1	0	2	2	2	0	0	0	0	13
7.50 - 12.49	0	0	0	0	0	0	0	0	1	0	1	3	2	4	0	0	11
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	4	4	0	2	0	0	1	1	2	5	5	3	5	1	0	35

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	9	12	5	8	4	2	3	1	0	0	1	2	1	3	3	7	61
3.50 - 7.49	20	1	0	8	10	3	2	3	2	9	11	9	9	18	26	7	138
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	4	13	21	14	18	0	72
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	1	1	3	0	0	6
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29	13	5	16	14	5	5	4	2	11	17	25	32	38	47	14	277

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	3	10	18	25	9	6	6	4	2	0	1	2	5	2	0	4	97
3.50 - 7.49	0	0	1	9	4	0	0	0	2	6	4	6	0	2	0	0	34
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	10	19	34	13	6	6	4	4	7	5	8	6	4	0	4	135

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	1	2	8	6	4	12	8	3	1	1	0	0	0	1	1	48
3.50 - 7.49	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	2	8	6	4	12	8	3	3	1	0	0	0	1	1	52

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	5	3	12	14	33	16	0	0	0	0	0	0	1	2	86
3.50 - 7.49	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	5	3	12	14	33	17	2	0	0	0	0	0	1	2	89

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	13	26	32	45	31	28	55	30	5	1	5	4	7	6	6	14	308
3.50 - 7.49	28	9	10	23	18	9	5	8	12	21	19	23	17	21	27	8	258
7.50 - 12.49	0	0	0	0	0	0	0	0	1	5	8	24	36	30	22	0	126
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	3	2	3	3	0	0	11
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	41	35	42	68	49	37	60	38	18	27	35	53	63	60	55	22	706

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 706

TOTAL NUMBER OF MISSING OBSERVATIONS: 38

PERCENT DATA RECOVERY FOR THIS PERIOD: 94.9%

MEAN WIND SPEED FOR THIS PERIOD: 4.7 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
13.46	3.26	4.96	39.24	19.12	7.37	12.61

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	7	4	5	6	2	8	4	4	3	4	2	12	20	11	2	1	0
B	0	2	2	1	0	0	0	0	3	0	5	3	2	2	3	0	0
C	2	4	4	0	2	0	0	1	1	2	5	5	3	5	1	0	0
D	29	13	5	16	14	5	5	4	2	11	17	25	32	38	47	14	0
E	3	10	19	34	13	6	6	4	4	7	5	8	6	4	0	4	2
F	0	2	2	8	6	4	12	8	3	3	1	0	0	0	1	1	1
G	0	0	5	3	12	14	33	17	2	0	0	0	0	0	1	2	0
Total	41	35	42	68	49	37	60	38	18	27	35	53	63	60	55	22	3

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	1	1	1	0	0	0	0	0	0	0	0	1	1	2	0	9
3.50 - 7.49	9	7	1	0	2	1	4	1	0	4	4	12	12	6	1	1	65
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	5	6	6	8	2	1	29
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	8	2	1	2	1	4	1	0	5	9	18	19	15	5	2	103

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	1	0	0	0	0	0	2	0	0	0	0	0	5
3.50 - 7.49	0	1	0	0	0	0	0	0	0	0	1	3	0	2	1	0	8
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	1	2	1	0	0	0	6
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	1	1	1	0	0	0	0	2	4	5	1	2	1	0	19

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	0	0	0	0	0	0	0	0	1	1	1	0	2	0	6
3.50 - 7.49	0	0	0	0	0	0	0	1	1	0	0	1	2	0	0	1	6
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	0	0	0	0	0	1	1	0	2	3	4	0	2	1	15

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	6	4	5	1	0	2	0	0	3	4	3	7	4	7	1	48
3.50 - 7.49	7	2	0	0	3	3	1	1	1	8	12	17	4	2	7	2	70
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	21	25	2	1	1	0	52
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	8	4	5	4	3	3	1	1	13	37	49	13	7	15	3	174

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	2	13	3	8	7	2	5	7	0	5	3	3	2	3	3	69
3.50 - 7.49	1	1	2	2	1	1	1	0	1	4	6	2	1	1	0	1	25
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	3	15	5	9	8	3	5	8	4	11	7	4	3	3	4	96

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	0	1	5	4	6	15	16	6	6	0	2	0	0	0	0	63
3.50 - 7.49	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	1	5	4	6	15	16	7	6	1	3	0	0	0	0	66

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	2	1	2	10	14	42	36	5	0	0	0	0	0	0	0	112
3.50 - 7.49	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	1	2	10	14	42	36	7	0	0	0	0	0	0	0	115

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	8	12	21	17	24	27	61	57	18	9	12	9	12	7	14	4	312
3.50 - 7.49	17	11	3	2	6	5	6	3	6	16	24	36	19	11	9	5	179
7.50 - 12.49	0	0	0	0	0	0	0	0	0	5	28	36	10	9	3	1	92
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25	23	24	19	30	32	67	60	24	30	64	85	41	27	26	10	588

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 588

TOTAL NUMBER OF MISSING OBSERVATIONS: 132

PERCENT DATA RECOVERY FOR THIS PERIOD: 81.7%

MEAN WIND SPEED FOR THIS PERIOD: 4.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
17.52	3.23	2.55	29.59	16.33	11.22	19.56

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	11	8	2	1	2	1	4	1	0	5	9	18	19	15	5	2	0
B	0	1	1	1	1	0	0	0	0	2	4	5	1	2	1	0	0
C	0	1	0	0	0	0	0	1	1	0	2	3	4	0	2	1	0
D	8	8	4	5	4	3	3	1	1	13	37	49	13	7	15	3	0
E	4	3	15	5	9	8	3	5	8	4	11	7	4	3	3	4	0
F	2	0	1	5	4	6	15	16	7	6	1	3	0	0	0	0	0
G	0	2	1	2	10	14	42	36	7	0	0	0	0	0	0	0	1
Total	25	23	24	19	30	32	67	60	24	30	64	85	41	27	26	10	1

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	1	0	0	0	0	0	0	0	0	1	0	1	0	1	1	7
3.50 - 7.49	25	13	6	1	1	0	0	0	2	6	12	13	26	20	11	14	150
7.50 - 12.49	3	1	0	0	0	0	0	0	0	0	4	7	6	3	3	1	28
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30	15	6	1	1	0	0	0	2	6	18	20	33	23	15	16	186

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	3	1	0	1	1	0	6
3.50 - 7.49	0	1	0	0	0	0	0	0	0	1	2	1	1	3	3	0	12
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	0	0	0	0	0	0	0	1	6	4	1	4	4	0	21

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	0	2	0	0	0	0	0	0	0	1	3	0	0	1	9
3.50 - 7.49	1	0	0	0	3	0	0	0	0	0	0	4	3	1	0	2	14
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	2	0	2	3	0	0	0	0	0	1	6	8	1	0	3	27

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	7	5	5	3	2	1	0	2	5	4	4	10	9	2	2	0	61
3.50 - 7.49	3	2	0	4	2	1	1	0	1	2	9	8	1	3	5	4	46
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	6	10	2	0	0	0	18
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	7	5	7	4	2	1	2	6	6	19	28	12	5	7	4	125

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	6	5	4	4	2	5	6	7	17	6	10	2	2	3	2	5	86
3.50 - 7.49	4	2	0	2	0	0	1	0	5	5	9	3	3	0	0	1	35
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	7	4	6	2	5	7	7	22	11	19	5	5	3	2	6	122

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	0	0	0	1	8	18	9	10	1	1	1	1	0	1	0	51
3.50 - 7.49	1	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	5
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	0	0	1	8	18	9	11	4	1	1	1	0	1	0	57

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	1	1	4	4	13	48	51	14	0	1	0	0	0	0	0	137
3.50 - 7.49	0	1	0	0	0	0	0	2	2	0	0	0	0	0	0	0	5
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	1	4	4	13	48	53	16	0	1	0	0	0	0	0	143

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	15	14	10	13	9	27	72	69	46	11	20	15	16	6	7	7	357
3.50 - 7.49	34	19	6	7	6	1	2	2	11	17	32	29	34	27	19	21	267
7.50 - 12.49	3	1	0	0	0	0	0	0	0	0	12	19	10	3	3	1	52
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	52	34	16	20	15	28	74	71	57	28	65	64	60	36	29	29	681

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 681

TOTAL NUMBER OF MISSING OBSERVATIONS: 63

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.5%

MEAN WIND SPEED FOR THIS PERIOD: 3.7 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
27.31	3.08	3.96	18.36	17.91	8.37	21.00

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	30	15	6	1	1	0	0	0	2	6	18	20	33	23	15	16	0
B	0	1	0	0	0	0	0	0	0	1	6	4	1	4	4	0	0
C	1	2	0	2	3	0	0	0	0	0	1	6	8	1	0	3	0
D	10	7	5	7	4	2	1	2	6	6	19	28	12	5	7	4	0
E	10	7	4	6	2	5	7	7	22	11	19	5	5	3	2	6	1
F	1	0	0	0	1	8	18	9	11	4	1	1	1	0	1	0	1
G	0	2	1	4	4	13	48	53	16	0	1	0	0	0	0	0	1
Total	52	34	16	20	15	28	74	71	57	28	65	64	60	36	29	29	3

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	2	1	0	0	1	2	4	5	3	0	1	4	5	3	3	36
3.50 - 7.49	6	3	0	1	2	1	2	1	8	12	11	15	15	14	19	22	132
7.50 - 12.49	0	0	0	0	0	0	0	0	0	5	5	5	4	7	1	0	27
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	5	1	1	2	2	4	5	13	20	16	21	23	26	23	25	195

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	1	0	1	1	0	0	1	1	6
3.50 - 7.49	2	0	0	0	0	0	0	0	0	0	3	5	1	1	3	1	16
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	1	0	0	0	0	0	1	0	4	9	2	1	4	2	26

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3
3.50 - 7.49	0	0	0	0	0	0	0	0	0	2	4	1	0	0	1	1	9
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	5	3	0	0	1	1	10
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	0	1	0	0	1	0	0	2	9	4	0	0	2	2	22

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	8	7	2	2	0	0	1	2	1	3	4	6	1	1	5	6	49
3.50 - 7.49	3	0	0	0	0	0	0	0	0	9	11	11	5	3	7	10	59
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	7	8	1	3	0	0	20
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	7	2	2	0	0	1	2	1	13	22	26	7	7	12	16	132

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	4	1	3	4	9	2	4	7	14	8	3	2	1	2	6	8	78
3.50 - 7.49	1	0	0	0	0	0	0	0	0	6	5	4	1	3	0	0	20
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	1	3	4	9	2	4	7	14	14	8	6	2	5	6	8	100

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
0.75 - 3.49	0	2	1	4	4	14	26	26	11	2	1	0	0	0	0	2	93
3.50 - 7.49	0	0	0	0	0	0	0	0	1	7	0	0	0	0	0	0	8
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	1	4	4	14	26	26	12	9	1	0	0	0	0	2	112

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	1	0	1	0	1	5	51	12	5	1	0	0	0	0	0	0	77
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	1	0	1	5	51	12	5	1	0	0	0	0	0	0	83

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	22
0.75 - 3.49	16	12	9	11	14	22	85	51	37	17	9	10	6	8	15	20	342
3.50 - 7.49	12	3	0	1	2	1	2	1	9	36	34	36	22	21	30	34	244
7.50 - 12.49	0	0	0	0	0	0	0	0	0	6	17	19	6	10	2	1	61
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	15	9	12	16	23	87	52	46	59	60	66	34	39	47	55	670

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 670

TOTAL NUMBER OF MISSING OBSERVATIONS: 50

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.1%

MEAN WIND SPEED FOR THIS PERIOD: 3.6 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
29.10	3.88	3.28	19.70	14.93	16.72	12.39

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	8	5	1	1	2	2	4	5	13	20	16	21	23	26	23	25	0
B	2	0	1	0	0	0	0	0	1	0	4	9	2	1	4	2	0
C	1	0	0	1	0	0	1	0	0	2	9	4	0	0	2	2	0
D	11	7	2	2	0	0	1	2	1	13	22	26	7	7	12	16	3
E	5	1	3	4	9	2	4	7	14	14	8	6	2	5	6	8	2
F	0	2	1	4	4	14	26	26	12	9	1	0	0	0	0	2	11
G	1	0	1	0	1	5	51	12	5	1	0	0	0	0	0	0	6
Total	28	15	9	12	16	23	87	52	46	59	60	66	34	39	47	55	22

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	7	3	2	0	4	3	4	3	3	1	0	3	0	5	2	3	43
3.50 - 7.49	10	1	1	0	1	1	1	0	4	10	16	28	19	7	3	6	108
7.50 - 12.49	0	0	0	0	0	0	0	0	1	2	2	5	1	0	0	0	11
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	17	4	3	0	5	4	5	3	8	13	18	37	20	12	5	9	163

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	0	1	2	0	1	0	1	0	1	2	0	1	0	0	11
3.50 - 7.49	3	0	0	0	0	0	0	0	1	1	0	4	0	0	0	3	12
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	0	1	2	0	1	0	2	1	1	6	0	1	0	3	23

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	3	2	2	0	0	0	0	0	0	1	0	0	1	0	10
3.50 - 7.49	2	0	0	0	0	0	0	0	2	0	2	4	0	1	0	4	15
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	3	2	2	0	0	0	2	0	2	7	0	1	1	4	27

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	7	9	5	8	9	1	6	1	11	8	2	0	8	5	8	7	95
3.50 - 7.49	3	0	1	0	0	1	0	1	0	5	12	17	4	3	4	2	53
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	9	6	8	9	2	6	2	11	14	16	18	13	8	12	9	155

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	3	1	3	6	5	11	20	22	22	9	2	1	5	2	0	8	120
3.50 - 7.49	0	1	0	0	0	0	0	0	2	4	6	0	1	1	0	1	16
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	3	6	5	11	20	22	24	14	8	1	6	3	0	9	139

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	1	0	6	3	10	21	45	23	8	3	0	0	1	0	0	1	122
3.50 - 7.49	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	6	3	10	21	45	23	9	5	0	0	1	0	0	1	130

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	0	0	0	2	3	7	37	7	2	1	0	0	0	0	0	0	59
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	2	3	7	37	7	2	1	0	0	0	0	0	0	61

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
0.75 - 3.49	19	15	19	22	35	43	113	56	47	22	5	7	14	13	11	19	460
3.50 - 7.49	18	2	2	0	1	2	1	1	10	22	36	53	24	12	7	16	207
7.50 - 12.49	0	0	0	0	0	0	0	0	1	4	4	8	2	0	0	0	19
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	37	17	21	22	36	45	114	57	58	48	45	69	40	25	18	35	698

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 698

TOTAL NUMBER OF MISSING OBSERVATIONS: 46

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.8%

MEAN WIND SPEED FOR THIS PERIOD: 2.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
23.35	3.30	3.87	22.21	19.91	18.62	8.74

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	17	4	3	0	5	4	5	3	8	13	18	37	20	12	5	9	0
B	4	1	0	1	2	0	1	0	2	1	1	6	0	1	0	3	0
C	2	1	3	2	2	0	0	0	2	0	2	7	0	1	1	4	0
D	10	9	6	8	9	2	6	2	11	14	16	18	13	8	12	9	2
E	3	2	3	6	5	11	20	22	24	14	8	1	6	3	0	9	2
F	1	0	6	3	10	21	45	23	9	5	0	0	1	0	0	1	5
G	0	0	0	2	3	7	37	7	2	1	0	0	0	0	0	0	2
Total	37	17	21	22	36	45	114	57	58	48	45	69	40	25	18	35	11

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	1	1	1	0	5	1	4	3	2	1	4	0	2	0	6	36
3.50 - 7.49	6	2	0	1	0	0	1	0	0	7	26	33	13	1	5	2	97
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	11	8	1	0	0	0	20
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	3	1	2	0	5	2	4	3	9	38	45	14	3	5	8	153

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	1	1	1	0	0	1	0	1	0	1	0	0	2	0	1	11
3.50 - 7.49	0	0	0	0	0	0	0	0	0	4	4	7	2	0	1	0	18
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	1	1	0	0	1	0	1	4	6	8	2	2	1	1	31

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	1	1	0	0	2	2	1	0	2	1	0	2	0	12
3.50 - 7.49	1	0	0	0	0	0	0	0	1	1	1	6	1	2	0	0	13
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	3
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	0	1	1	0	0	2	3	2	3	9	2	2	2	0	28

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	6	5	17	4	5	1	3	3	2	3	7	6	7	4	1	6	80
3.50 - 7.49	2	0	0	0	0	0	0	0	1	5	15	22	3	1	1	2	52
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	5	17	4	5	1	3	3	3	8	26	28	10	5	2	8	139

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	26
0.75 - 3.49	2	11	12	14	17	21	14	23	17	15	3	1	6	4	6	8	174
3.50 - 7.49	0	1	0	0	0	0	0	0	1	7	7	1	0	0	0	0	17
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	12	12	14	17	21	14	23	18	22	10	3	6	5	6	8	219

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	29
0.75 - 3.49	0	0	1	7	13	11	50	13	7	4	1	0	0	0	0	0	107
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	7	13	11	50	13	7	4	1	0	0	0	0	0	136

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	0	0	0	0	0	2	6	3	0	0	0	0	0	0	0	0	11
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	2	6	3	0	0	0	0	0	0	0	0	13

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	60
0.75 - 3.49	15	18	32	28	36	40	75	48	32	25	13	13	14	12	9	21	431
3.50 - 7.49	9	3	0	1	0	0	1	0	3	24	53	69	19	4	7	4	197
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	18	11	1	1	0	0	31
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	24	21	32	29	36	40	76	48	35	49	84	93	34	17	16	25	719

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 719

TOTAL NUMBER OF MISSING OBSERVATIONS: 25

PERCENT DATA RECOVERY FOR THIS PERIOD: 96.6%

MEAN WIND SPEED FOR THIS PERIOD: 2.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
21.28	4.31	3.89	19.33	30.46	18.92	1.81

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	11	3	1	2	0	5	2	4	3	9	38	45	14	3	5	8	0
B	2	1	1	1	0	0	1	0	1	4	6	8	2	2	1	1	0
C	1	0	0	1	1	0	0	2	3	2	3	9	2	2	2	0	0
D	8	5	17	4	5	1	3	3	3	8	26	28	10	5	2	8	3
E	2	12	12	14	17	21	14	23	18	22	10	3	6	5	6	8	26
F	0	0	1	7	13	11	50	13	7	4	1	0	0	0	0	0	29
G	0	0	0	0	0	2	6	3	0	0	0	0	0	0	0	0	2
Total	24	21	32	29	36	40	76	48	35	49	84	93	34	17	16	25	60

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	8	0	0	1	0	2	1	2	5	3	2	1	2	4	1	4	36
3.50 - 7.49	16	2	0	0	0	0	0	2	3	11	12	19	6	10	6	7	94
7.50 - 12.49	1	0	0	0	0	0	0	0	0	0	7	3	2	3	0	0	16
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25	2	0	1	0	2	1	4	8	14	21	23	10	17	7	11	146

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	0	0	0	0	0	0	1	0	1	0	0	3	0	1	8
3.50 - 7.49	0	0	0	0	0	0	0	0	0	1	2	4	2	1	1	0	11
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	0	0	0	0	0	0	1	1	4	6	2	4	1	1	22

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	1	0	0	0	0	0	0	0	2	0	0	2	1	1	8
3.50 - 7.49	1	2	0	0	0	0	0	0	0	1	3	2	1	0	0	1	11
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	2	1	0	0	0	0	0	0	1	5	4	1	2	1	2	21

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	9	4	5	1	0	2	2	4	5	3	4	3	2	1	7	8	60
3.50 - 7.49	7	2	1	0	0	0	0	0	1	7	22	4	7	5	5	3	64
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	2	6	1	0	1	0	10
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	6	6	1	0	2	2	4	6	10	28	13	10	6	13	11	135

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	6	3	7	9	5	15	9	7	8	7	2	0	0	1	2	2	83
3.50 - 7.49	0	1	1	0	0	0	0	0	0	12	6	6	1	0	0	0	27
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	4	8	9	5	15	9	7	8	19	8	6	1	1	2	2	113

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	0	2	2	4	13	23	57	23	10	2	0	0	0	0	0	0	136
3.50 - 7.49	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	2	4	13	23	57	23	12	3	0	0	0	0	0	0	143

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SS W	SW	WSW	W	WN W	NW	NN W	TOTA L
CALM																	3
0.75 - 3.49	0	1	2	1	3	20	36	20	4	0	0	0	0	0	0	0	87
3.50 - 7.49	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	2	1	3	20	36	20	6	0	0	0	0	0	0	0	92

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SS W	SW	WSW	W	WN W	NW	NN W	TOTA L
CALM																	11
0.75 - 3.49	25	11	17	16	21	62	105	56	33	15	11	4	4	11	11	16	418
3.50 - 7.49	24	7	2	0	0	0	0	2	8	33	45	35	17	16	12	11	212
7.50 - 12.49	1	0	0	0	0	0	0	0	0	0	10	13	3	3	1	0	31
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	50	18	19	16	21	62	105	58	41	48	66	52	24	30	24	27	672

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 672

TOTAL NUMBER OF MISSING OBSERVATIONS: 48

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.3%

MEAN WIND SPEED FOR THIS PERIOD: 3.1 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
21.73	3.27	3.13	20.09	16.82	21.28	13.69

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	25	2	0	1	0	2	1	4	8	14	21	23	10	17	7	11	0
B	1	1	0	0	0	0	0	0	1	1	4	6	2	4	1	1	0
C	2	2	1	0	0	0	0	0	0	1	5	4	1	2	1	2	0
D	16	6	6	1	0	2	2	4	6	10	28	13	10	6	13	11	1
E	6	4	8	9	5	15	9	7	8	19	8	6	1	1	2	2	3
F	0	2	2	4	13	23	57	23	12	3	0	0	0	0	0	0	4
G	0	1	2	1	3	20	36	20	6	0	0	0	0	0	0	0	3
Total	50	18	19	16	21	62	105	58	41	48	66	52	24	30	24	27	11

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	2	0	0	1	0	0	0	0	1	5
3.50 - 7.49	7	4	4	2	3	2	2	1	0	7	5	5	4	0	2	4	52
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	5	11	11	3	0	0	31
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	4	5	2	3	2	2	3	0	8	11	16	16	3	2	5	89

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
3.50 - 7.49	1	0	0	0	0	0	0	0	0	2	1	3	1	1	0	0	9
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	0	0	0	1	1	0	0	2	2	6	2	1	0	0	16

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	0	1	0	0	0	0	1	0	0	0	0	0	0	1	5
3.50 - 7.49	3	0	0	0	0	0	0	0	0	3	2	4	4	0	1	0	17
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	0	1	0	0	0	0	1	3	2	5	8	0	1	1	27

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	3	1	5	5	4	3	1	0	3	3	4	0	3	2	2	0	39
3.50 - 7.49	4	0	0	1	1	2	0	0	2	1	17	20	20	4	8	6	86
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	4	35	25	0	2	0	66
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	8
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	1	5	6	5	5	1	0	5	4	25	60	51	6	12	6	201

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	2	4	3	8	6	7	6	9	6	2	0	0	1	1	1	61
3.50 - 7.49	0	0	1	0	2	0	1	0	2	4	12	4	0	0	0	0	26
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	2	5	3	10	6	8	6	11	11	15	4	0	1	1	1	89

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	1	0	6	5	14	18	23	5	1	1	0	0	0	0	0	76
3.50 - 7.49	1	1	0	0	0	0	0	0	6	2	0	0	0	0	0	0	10
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	0	6	5	14	18	23	11	3	1	0	0	0	0	0	86

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	1	6	35	35	9	9	2	0	0	1	1	0	0	99
3.50 - 7.49	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	1	6	35	35	9	10	2	0	0	1	1	0	0	100

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	10	6	10	16	23	59	62	40	27	12	8	0	4	4	3	3	287
3.50 - 7.49	16	5	5	3	6	4	3	1	11	19	37	36	29	5	11	10	201
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	11	50	41	3	2	0	109
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	9
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	26	11	15	19	29	63	65	41	38	33	56	91	78	12	16	13	608

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 608

TOTAL NUMBER OF MISSING OBSERVATIONS: 136

PERCENT DATA RECOVERY FOR THIS PERIOD: 81.7%

MEAN WIND SPEED FOR THIS PERIOD: 4.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
14.64	2.63	4.44	33.06	14.64	14.14	16.45

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	7	4	5	2	3	2	2	3	0	8	11	16	16	3	2	5	0
B	1	0	0	0	0	1	1	0	0	2	2	6	2	1	0	0	0
C	3	2	0	1	0	0	0	0	1	3	2	5	8	0	1	1	0
D	7	1	5	6	5	5	1	0	5	4	25	60	51	6	12	6	2
E	5	2	5	3	10	6	8	6	11	11	15	4	0	1	1	1	0
F	3	2	0	6	5	14	18	23	11	3	1	0	0	0	0	0	0
G	0	0	0	1	6	35	35	9	10	2	0	0	1	1	0	0	0
Total	26	11	15	19	29	63	65	41	38	33	56	91	78	12	16	13	2

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	0	0	0	0	0	0	0	1	2	1	0	1	1	0	7
3.50 - 7.49	6	2	0	0	0	0	0	0	1	5	3	5	7	4	9	2	44
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	5	1	6	0	1	16
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	3	0	0	0	0	0	0	1	6	8	11	8	11	10	3	67

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	2	2	3	0	1	3	0	11
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	1	6	2	2	1	0	13
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	3	3	9	2	3	4	0	24

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	4
3.50 - 7.49	1	0	0	0	0	0	0	0	0	0	2	3	2	3	3	1	15
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	2	3	1	2	3	0	12
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	0	0	0	0	0	0	0	1	4	7	4	5	6	1	31

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	6	14	10	5	0	0	1	1	3	1	1	0	2	7	7	10	68
3.50 - 7.49	14	7	1	5	0	0	0	0	2	6	7	14	7	19	51	12	145
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	9	22	4	3	12	0	52
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	20	21	11	10	0	0	1	1	5	9	17	37	13	29	70	22	266

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	2	5	9	2	6	4	2	4	1	3	1	1	2	3	0	1	46
3.50 - 7.49	0	1	0	8	0	0	0	0	1	4	9	14	2	0	1	0	40
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	6	5	5	0	1	0	18
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	6	9	10	6	4	2	4	2	8	16	20	9	3	2	1	107

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	0	6	7	8	12	15	7	2	5	1	0	1	0	0	0	64
3.50 - 7.49	0	0	0	0	0	0	0	0	5	4	2	0	0	0	0	0	11
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	6	7	8	12	15	7	7	9	3	0	1	0	0	0	76

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	1	0	4	6	15	36	21	3	2	0	0	0	1	0	0	89
3.50 - 7.49	0	0	0	1	0	0	0	0	3	4	1	0	0	1	0	0	10
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	0	5	6	15	36	21	6	6	1	0	0	2	0	0	100

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	9	22	25	18	20	31	54	33	9	12	5	3	6	12	8	11	278
3.50 - 7.49	21	10	1	14	0	0	0	0	12	25	26	39	18	28	67	15	276
7.50 - 12.49	0	0	0	0	0	0	0	0	0	5	21	41	13	13	17	1	111
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30	32	26	32	20	31	54	33	21	42	52	84	37	53	92	27	671

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 671

TOTAL NUMBER OF MISSING OBSERVATIONS: 49

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.2%

MEAN WIND SPEED FOR THIS PERIOD: 4.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
9.99	3.58	4.62	39.64	15.95	11.33	14.90

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	6	3	0	0	0	0	0	0	1	6	8	11	8	11	10	3	0
B	0	0	0	0	0	0	0	0	0	3	3	9	2	3	4	0	0
C	2	1	0	0	0	0	0	0	0	1	4	7	4	5	6	1	0
D	20	21	11	10	0	0	1	1	5	9	17	37	13	29	70	22	0
E	2	6	9	10	6	4	2	4	2	8	16	20	9	3	2	1	3
F	0	0	6	7	8	12	15	7	7	9	3	0	1	0	0	0	1
G	0	1	0	5	6	15	36	21	6	6	1	0	0	2	0	0	1
Total	30	32	26	32	20	31	54	33	21	42	52	84	37	53	92	27	5

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	3
3.50 - 7.49	2	0	0	0	2	1	0	0	0	1	0	1	11	4	6	3	31
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	0	0	3	1	2	0	0	1	0	2	12	5	7	3	38

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	2	0	0	0	0	0	1	0	0	1	1	0	7
3.50 - 7.49	0	0	0	1	0	0	0	0	0	0	0	3	4	1	1	1	11
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	2	2	0	0	0	0	0	1	3	4	2	3	2	20

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	3	1	0	0	0	0	0	1	0	0	1	0	1	3	12
3.50 - 7.49	1	3	0	0	0	0	0	0	0	0	1	1	1	0	4	1	12
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	5
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	4	3	1	0	0	0	0	0	1	1	1	3	0	7	6	29

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	11	12	37	15	1	1	3	2	4	8	4	2	1	1	4	5	111
3.50 - 7.49	20	2	0	0	0	0	0	0	4	15	18	18	16	11	19	13	136
7.50 - 12.49	0	0	0	0	0	0	0	0	0	11	21	12	19	9	4	2	78
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	3	6	0	1	0	10
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	31	14	37	15	1	1	3	2	8	34	43	35	42	21	28	20	338

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SS W	SW	WSW	W	WN W	NW	NN W	TOTA L
CALM																	5
0.75 - 3.49	5	5	11	8	17	6	2	5	4	4	5	3	3	1	3	1	83
3.50 - 7.49	2	1	0	0	0	0	0	0	4	9	7	3	0	0	0	3	29
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	8	2	0	0	0	0	10
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	6	11	8	17	6	2	5	8	13	20	8	3	1	3	4	127

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SS W	SW	WSW	W	WN W	NW	NN W	TOTA L
CALM																	4
0.75 - 3.49	0	3	1	3	5	6	6	7	3	0	2	1	0	0	0	0	37
3.50 - 7.49	0	0	0	0	0	0	0	1	12	4	0	0	0	0	0	0	17
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	3	1	3	5	6	6	8	15	4	2	1	0	0	0	0	58

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	0	5	3	5	11	20	9	5	0	0	0	0	0	0	2	60
3.50 - 7.49	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	5	3	5	11	20	9	8	0	0	0	0	0	0	2	64

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	13
0.75 - 3.49	17	21	58	31	31	24	33	23	16	13	12	6	5	3	9	11	313
3.50 - 7.49	25	6	0	1	2	1	0	1	23	29	26	26	32	16	30	21	239
7.50 - 12.49	0	0	0	0	0	0	0	0	0	11	29	15	21	10	8	5	99
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	3	6	0	1	0	10
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	42	27	58	32	33	25	33	24	39	53	67	50	64	29	48	37	674

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 674

TOTAL NUMBER OF MISSING OBSERVATIONS: 70

PERCENT DATA RECOVERY FOR THIS PERIOD: 90.6%

MEAN WIND SPEED FOR THIS PERIOD: 4.3 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
5.64	2.97	4.30	50.15	18.84	8.61	9.50

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	2	0	0	0	3	1	2	0	0	1	0	2	12	5	7	3	0
B	0	0	1	2	2	0	0	0	0	0	1	3	4	2	3	2	0
C	2	4	3	1	0	0	0	0	0	1	1	1	3	0	7	6	0
D	31	14	37	15	1	1	3	2	8	34	43	35	42	21	28	20	3
E	7	6	11	8	17	6	2	5	8	13	20	8	3	1	3	4	5
F	0	3	1	3	5	6	6	8	15	4	2	1	0	0	0	0	4
G	0	0	5	3	5	11	20	9	8	0	0	0	0	0	0	2	1
Total	42	27	58	32	33	25	33	24	39	53	67	50	64	29	48	37	13

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	26	9	6	3	6	13	11	16	16	10	7	10	8	18	10	18	187
3.50 - 7.49	97	38	17	13	14	12	13	8	21	65	91	136	128	71	63	66	853
7.50 - 12.49	4	1	0	0	0	0	0	0	1	11	44	59	59	44	14	4	241
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	6
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	127	48	23	16	20	25	24	24	38	86	143	207	198	133	87	88	1287

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	4	6	5	5	1	3	0	4	0	11	4	0	8	3	3	61
3.50 - 7.49	8	4	3	2	1	1	0	0	4	11	17	42	18	17	18	5	151
7.50 - 12.49	0	0	0	0	0	0	0	0	0	3	8	21	9	5	4	1	51
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	8	9	7	6	2	3	0	8	14	37	68	27	30	25	9	265

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	13	10	11	3	0	1	3	3	2	4	6	8	3	8	6	86
3.50 - 7.49	13	8	2	1	7	0	0	2	4	10	20	35	17	14	16	13	162
7.50 - 12.49	0	0	0	0	0	0	0	0	1	1	14	20	12	8	7	3	66
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	18	21	12	12	10	0	1	5	8	13	39	61	37	25	31	22	315

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	14
0.75 - 3.49	80	91	140	97	45	22	26	17	39	41	37	41	61	54	72	65	928
3.50 - 7.49	102	20	8	23	17	11	4	7	19	95	200	215	153	134	200	83	1291
7.50 - 12.49	2	0	0	0	0	0	0	0	0	25	104	181	101	48	40	6	507
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	1	27	12	3	1	0	44
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	184	111	148	120	62	33	30	24	58	161	342	464	327	239	313	154	2784

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	45
0.75 - 3.49	42	57	108	94	96	89	86	98	110	67	38	21	29	26	26	44	1031
3.50 - 7.49	9	14	10	21	7	1	3	1	27	76	80	44	9	8	2	7	319
7.50 - 12.49	0	0	0	0	0	0	0	0	0	6	18	10	8	1	1	0	44
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	51	71	118	115	103	90	89	99	137	149	136	75	47	35	29	51	1440

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	56
0.75 - 3.49	7	12	23	55	82	127	285	166	71	28	9	4	6	0	2	4	881
3.50 - 7.49	2	3	0	0	0	0	0	1	34	26	4	1	1	0	0	0	72
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	15	23	55	82	127	285	167	105	54	13	5	7	0	2	4	1009

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	17
0.75 - 3.49	1	5	17	20	53	145	368	203	53	7	2	0	1	2	1	4	882
3.50 - 7.49	0	2	1	1	0	0	0	3	25	4	2	0	0	1	0	0	39
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	7	18	21	53	145	368	206	78	11	4	0	1	3	1	4	938

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	132
0.75 - 3.49	165	191	310	285	290	397	780	503	296	155	108	86	113	111	122	144	4056
3.50 - 7.49	231	89	41	61	46	25	20	22	134	287	414	473	326	245	299	174	2887
7.50 - 12.49	6	1	0	0	0	0	0	0	2	46	188	291	189	106	66	14	909
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	4	30	16	3	1	0	54
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	402	281	351	346	336	422	800	525	432	488	714	880	644	465	488	332	8038

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 8784

TOTAL NUMBER OF VALID OBSERVATIONS: 8038

TOTAL NUMBER OF MISSING OBSERVATIONS: 746

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.5%

MEAN WIND SPEED FOR THIS PERIOD: 4.0 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
16.01	3.30	3.92	34.64	17.91	12.55	11.67

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	127	48	23	16	20	25	24	24	38	86	143	207	198	133	87	88	0
B	12	8	9	7	6	2	3	0	8	14	37	68	27	30	25	9	0
C	18	21	12	12	10	0	1	5	8	13	39	61	37	25	31	22	0
D	184	111	148	120	62	33	30	24	58	161	342	464	327	239	313	154	14
E	51	71	118	115	103	90	89	99	137	149	136	75	47	35	29	51	45
F	9	15	23	55	82	127	285	167	105	54	13	5	7	0	2	4	56
G	1	7	18	21	53	145	368	206	78	11	4	0	1	3	1	4	17
Total	402	281	351	346	336	422	800	525	432	488	714	880	644	465	488	332	132

APPENDIX B

Monthly and Annual Joint Frequency Distribution
of ΔT(150ft-35ft) and 35-ft Wind Data
(January 1, 1976 - December 31, 1980)

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	0	3	2	1	1	2	2	1	1	0	0	0	2	0	0	0	15
3.50 - 7.49	0	2	2	6	1	0	2	1	0	3	4	8	7	5	2	0	43
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	7	16	4	3	0	33
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	5	4	7	2	2	4	2	1	3	7	18	26	9	5	0	97

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
3.50 - 7.49	0	1	0	0	0	1	0	0	0	2	1	4	2	2	2	1	16
7.50 - 12.49	0	1	0	0	0	0	0	0	1	1	9	7	4	1	1	0	25
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	2	5	0	1	0	9
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	0	0	0	1	0	0	2	3	11	13	12	3	4	1	52

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	0	2	1	1	0	1	1	0	0	0	2	0	0	0	0	8
3.50 - 7.49	0	0	1	4	3	0	0	0	1	1	2	6	9	3	5	1	36
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	7	10	10	4	1	0	33
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	2	4	1	0	0	0	7
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	3	5	4	0	1	1	1	2	11	22	20	7	6	1	85

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	32	46	77	59	47	19	8	13	18	19	12	13	16	23	23	20	445
3.50 - 7.49	23	11	32	22	2	2	0	3	23	49	135	206	115	59	77	33	792
7.50 - 12.49	1	0	3	2	1	0	0	0	2	11	92	254	109	31	13	1	519
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	11	39	4	1	0	0	55
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	8
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	56	57	112	83	50	21	8	16	43	79	255	515	244	114	113	54	1820

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
0.75 - 3.49	20	31	56	39	40	23	28	22	22	22	9	9	3	11	6	10	351
3.50 - 7.49	4	12	21	21	1	0	0	3	26	44	49	15	7	5	4	3	215
7.50 - 12.49	0	0	5	3	0	0	0	0	1	6	28	29	5	0	0	0	77
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	4	6	1	0	0	0	11
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	24	43	82	63	41	23	28	25	49	73	90	59	16	16	10	13	666

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	3	9	18	20	38	17	30	25	11	4	2	2	3	0	0	3	185
3.50 - 7.49	3	2	0	0	0	0	0	1	9	9	3	1	0	0	0	0	27
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	11	18	20	38	17	30	25	20	13	6	5	3	0	0	3	221

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	1	2	5	9	20	19	57	51	10	2	0	0	0	0	0	0	176
3.50 - 7.49	0	1	1	1	0	0	0	0	11	0	0	0	0	0	0	0	14
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	6	10	20	19	57	51	21	2	0	0	0	0	0	0	196

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	27
0.75 - 3.49	56	91	160	129	147	80	126	113	63	47	23	26	25	34	29	33	1182
3.50 - 7.49	30	29	57	54	7	3	2	7	70	108	194	240	140	74	90	38	1143
7.50 - 12.49	0	1	8	5	1	0	0	0	4	19	140	308	144	40	18	1	689
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	18	55	12	1	1	0	87
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	5	3	0	0	0	0	9
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	86	121	225	188	155	83	128	120	137	175	380	632	321	149	138	72	3137

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3137

TOTAL NUMBER OF MISSING OBSERVATIONS: 583

PERCENT DATA RECOVERY FOR THIS PERIOD: 84.3%

MEAN WIND SPEED FOR THIS PERIOD: 5.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
3.09	1.66	2.71	58.02	21.23	7.04	6.25

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	5	4	7	2	2	4	2	1	3	7	18	26	9	5	0	2
B	0	2	0	0	0	1	0	0	2	3	11	13	12	3	4	1	0
C	0	0	3	5	4	0	1	1	1	2	11	22	20	7	6	1	1
D	55	57	112	83	50	21	8	16	43	79	255	515	244	114	113	54	1
E	24	43	82	63	41	23	28	25	49	73	90	59	16	16	10	13	11
F	6	11	18	20	38	17	30	25	20	13	6	5	3	0	0	3	6
G	1	3	6	10	20	19	57	51	21	2	0	0	0	0	0	0	6
Total	86	121	225	188	155	83	128	120	137	175	380	632	321	149	138	72	27

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	6	2	0	1	2	0	0	1	2	0	2	1	1	0	20
3.50 - 7.49	8	3	5	12	4	0	2	0	5	5	7	23	29	18	12	4	137
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	4	22	6	4	1	40
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	4
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	4	11	14	4	1	4	0	5	6	12	28	55	26	17	5	201

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	3	0	0	0	0	0	0	0	1	0	0	0	0	1	7
3.50 - 7.49	3	0	4	3	2	1	1	0	0	1	3	14	6	9	6	1	54
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	2	5	11	5	1	0	26
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	7	3	2	1	1	0	0	3	6	19	17	14	7	2	87

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 to 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	1	4	0	0	2	1	0	0	1	2	0	0	0	2	15
3.50 - 7.49	6	3	2	6	0	0	0	1	1	2	3	11	17	9	9	3	73
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	10	3	9	2	1	1	27
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	5	3	10	0	0	2	2	1	3	14	16	26	11	10	6	115

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	29	25	44	54	18	5	8	6	5	7	14	19	25	33	22	25	339
3.50 - 7.49	53	25	22	34	2	0	2	2	7	37	84	115	122	115	131	51	802
7.50 - 12.49	3	1	2	0	0	0	0	0	0	21	77	98	54	22	12	7	297
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	6	10	1	0	0	0	17
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	85	51	68	88	20	5	10	8	12	65	181	242	202	170	165	83	1455

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFO-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	12	21	32	38	26	21	16	9	15	10	16	9	10	8	12	14	269
3.50 - 7.49	6	9	15	10	1	0	0	1	9	36	68	42	11	12	14	11	245
7.50 - 12.49	0	0	1	1	1	0	0	0	0	10	44	17	4	1	2	0	81
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	18	30	48	49	28	21	16	10	24	56	129	69	25	21	28	25	599

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	5	6	16	26	23	18	34	30	16	6	2	2	4	0	0	1	189
3.50 - 7.49	1	0	1	1	0	0	0	1	26	11	18	3	1	0	2	0	65
7.50 - 12.49	0	0	0	0	0	0	1	0	0	1	5	0	0	0	0	0	7
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	6	17	27	23	18	35	31	42	18	25	5	5	0	2	1	265

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	14
0.75 - 3.49	3	8	14	14	37	36	112	89	26	11	3	2	0	1	2	2	360
3.50 - 7.49	0	2	2	2	1	1	0	4	22	10	2	3	0	0	0	0	49
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	10	16	16	38	37	112	93	48	22	7	5	0	1	2	2	426

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	20
0.75 - 3.49	50	65	116	138	104	81	174	135	62	35	39	34	41	43	37	45	1199
3.50 - 7.49	77	42	51	68	10	2	5	9	70	102	185	211	185	163	174	70	1425
7.50 - 12.49	3	1	3	1	1	0	1	0	0	36	143	127	100	36	20	9	481
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	7	12	3	1	0	0	23
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	130	109	170	207	115	83	180	144	132	173	374	384	330	243	231	124	3148

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3408

TOTAL NUMBER OF VALID OBSERVATIONS: 3148

TOTAL NUMBER OF MISSING OBSERVATIONS: 260

PERCENT DATA RECOVERY FOR THIS PERIOD: 92.4%

MEAN WIND SPEED FOR THIS PERIOD: 4.6 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
6.39	2.76	3.65	46.22	19.03	8.42	13.53

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	9	4	11	14	4	1	4	0	5	6	12	28	55	26	17	5	0
B	3	2	7	3	2	1	1	0	0	3	6	19	17	14	7	2	0
C	6	5	3	10	0	0	2	2	1	3	14	16	26	11	10	6	0
D	85	51	68	88	20	5	10	8	12	65	181	242	202	170	165	83	0
E	18	30	48	49	28	21	16	10	24	56	129	69	25	21	28	25	2
F	6	6	17	27	23	18	35	31	42	18	25	5	5	0	2	1	4
G	3	10	16	16	38	37	112	93	48	22	7	5	0	1	2	2	14
Total	130	108	170	207	115	83	180	144	132	173	374	384	330	243	231	124	20

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	5	0	1	1	4	2	2	1	0	2	2	0	0	3	2	25
3.50 - 7.49	33	19	16	11	10	19	21	15	9	13	18	28	37	19	7	9	284
7.50 - 12.49	0	0	0	0	0	0	1	3	6	14	26	36	44	27	13	2	172
12.50 -18.49	0	0	0	0	0	0	0	0	0	3	7	2	2	0	0	0	14
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	33	24	16	12	11	23	24	20	16	30	53	68	83	46	23	13	495

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	2	0	0	0	1	0	0	1	1	0	1	1	1	9
3.50 - 7.49	3	3	3	1	0	0	2	2	4	1	8	5	4	3	3	1	43
7.50 - 12.49	0	0	0	0	0	0	1	0	0	2	5	8	6	3	2	0	27
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	3	4	3	0	0	3	3	4	3	15	14	10	7	6	2	80

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	2	3	3	0	0	1	1	0	0	0	1	3	1	1	2	0	18
3.50 - 7.49	3	5	3	3	2	2	2	2	3	2	7	6	2	3	5	2	52
7.50 - 12.49	0	0	0	0	0	0	0	1	1	7	10	10	13	8	0	1	51
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	8	6	3	2	3	3	3	4	9	21	19	17	12	7	3	126

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	21	22	33	36	15	9	9	5	5	5	7	6	10	16	10	24	233
3.50 - 7.49	54	15	26	43	19	6	6	4	10	37	64	61	82	59	90	41	617
7.50 - 12.49	2	1	0	0	0	0	1	0	11	25	82	67	80	32	37	5	343
12.50 -18.49	0	0	0	0	0	0	0	0	0	6	14	20	2	8	1	0	51
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	77	38	59	79	34	15	16	9	26	73	167	154	174	115	138	70	1248

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFO-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	17	24	60	66	42	17	17	13	26	6	7	11	16	10	14	10	356
3.50 - 7.49	6	6	21	46	20	2	5	6	24	43	41	29	13	9	15	7	293
7.50 - 12.49	0	0	0	0	0	1	0	0	3	9	23	7	8	2	0	0	53
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	23	30	81	112	62	20	22	19	53	58	76	47	37	21	29	17	715

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	3	8	8	29	34	42	54	23	21	5	6	2	0	0	2	2	239
3.50 - 7.49	0	2	3	2	0	0	1	2	11	10	8	1	0	0	0	0	40
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	10	11	31	34	42	55	25	32	15	15	3	1	0	2	2	289

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	19
0.75 - 3.49	3	6	19	33	48	84	111	54	16	4	5	0	4	0	3	2	392
3.50 - 7.49	0	0	0	4	0	0	0	1	9	2	2	0	0	0	0	0	18
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	6	19	37	48	84	111	55	25	6	7	0	4	0	3	2	429

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	40
0.75 - 3.49	46	68	124	167	140	157	194	98	69	20	29	25	31	28	35	41	1272
3.50 - 7.49	99	50	72	110	51	29	37	32	70	108	148	130	138	93	120	60	1347
7.50 - 12.49	2	1	0	0	0	1	3	4	21	57	147	128	152	72	52	8	648
12.50 -18.49	0	0	0	0	0	0	0	0	0	9	30	22	5	8	1	0	75
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	147	119	196	277	191	187	234	134	160	194	354	305	326	201	208	109	3382

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3382

TOTAL NUMBER OF MISSING OBSERVATIONS: 338

PERCENT DATA RECOVERY FOR THIS PERIOD: 90.9%

MEAN WIND SPEED FOR THIS PERIOD: 4.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
14.64	2.37	3.73	36.90	21.14	8.55	12.68

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	33	24	16	12	11	23	24	20	16	30	53	68	83	46	23	13	0
B	3	3	4	3	0	0	3	3	4	3	15	14	10	7	6	2	0
C	5	8	6	3	2	3	3	3	4	9	21	19	17	12	7	3	1
D	77	39	59	79	34	15	16	9	26	73	167	154	174	115	138	70	4
E	23	30	81	112	62	20	22	19	53	58	76	47	37	21	29	17	8
F	3	10	11	31	34	42	55	25	32	15	15	3	1	0	2	2	8
G	3	5	19	37	48	84	111	55	25	6	7	0	4	0	3	2	19
Total	147	119	146	277	191	187	234	134	160	194	354	305	326	201	208	109	40

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	3	2	2	0	0	0	1	1	1	2	2	5	4	3	4	34
3.50 - 7.49	50	34	15	12	13	2	7	3	7	11	38	59	66	42	34	47	440
7.50 - 12.49	17	3	1	0	0	0	0	0	0	5	45	28	27	23	15	19	183
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	5	10	10	2	0	0	27
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	71	40	18	14	13	2	7	4	8	17	90	99	109	71	52	70	685

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	3	2	1	2	1	0	1	1	2	1	0	1	0	1	17
3.50 - 7.49	6	3	3	2	0	0	1	0	0	3	4	6	4	6	7	9	54
7.50 - 12.49	0	0	0	0	0	0	0	0	0	4	7	4	4	1	2	0	22
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	4
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	3	6	4	1	2	2	0	1	8	15	12	8	9	9	10	97

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	3	1	0	0	0	0	0	1	2	2	1	3	3	0	18
3.50 - 7.49	12	1	1	3	2	1	0	1	2	2	3	5	9	7	17	8	74
7.50 - 12.49	1	0	0	0	0	0	0	0	0	2	1	3	4	1	0	3	15
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	14	2	4	4	2	1	0	1	2	5	7	10	15	11	20	11	109

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	13	17	22	17	13	3	9	3	10	11	9	15	16	11	27	10	206
3.50 - 7.49	52	14	11	29	30	7	8	3	4	26	57	45	24	53	84	43	490
7.50 - 12.49	3	0	0	1	2	0	0	0	0	7	61	50	25	25	13	3	190
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	4	18	3	0	0	0	25
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	68	31	33	47	45	10	17	6	14	44	132	128	69	89	124	56	915

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	15	21	46	31	37	25	17	21	16	16	12	8	12	17	11	15	320
3.50 - 7.49	15	10	11	17	7	6	4	2	19	22	22	11	5	12	9	8	180
7.50 - 12.49	0	0	0	0	0	0	0	0	2	8	15	13	5	3	2	0	48
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	2	1	3	1	0	0	8
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30	31	57	48	44	31	21	23	37	47	51	33	25	33	22	23	558

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	7	2	13	37	40	43	48	46	25	18	6	4	1	1	2	4	297
3.50 - 7.49	0	1	1	0	0	0	0	0	11	9	2	2	0	1	0	0	27
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	3	14	37	40	43	48	46	36	28	9	6	1	2	2	4	331

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	40
0.75 - 3.49	2	5	7	17	45	81	204	139	23	5	1	1	1	0	0	1	532
3.50 - 7.49	0	0	0	1	0	0	0	2	8	2	0	0	0	0	0	0	13
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	5	7	18	45	81	204	141	31	7	1	1	1	0	0	1	585

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	49
0.75 - 3.49	43	49	96	107	136	154	279	210	76	53	34	33	36	37	46	35	1424
3.50 - 7.49	135	63	42	64	52	16	20	11	51	75	126	128	108	121	151	115	1278
7.50 - 12.49	21	3	1	1	2	0	0	0	2	27	130	98	65	53	32	25	460
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	14	30	17	4	0	0	66
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	199	115	139	172	190	170	299	221	129	156	305	289	228	215	229	175	3280

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3280

TOTAL NUMBER OF MISSING OBSERVATIONS: 320

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.1%

MEAN WIND SPEED FOR THIS PERIOD: 4.4 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
20.88	2.96	3.32	27.90	17.01	10.09	17.84

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	71	40	19	14	13	2	7	4	8	17	90	99	109	71	52	70	0
B	7	3	6	4	1	2	2	0	1	8	15	12	8	9	9	10	0
C	14	2	4	4	2	1	0	1	2	5	7	10	15	11	20	11	0
D	68	31	33	47	45	10	17	6	14	44	132	128	69	89	124	56	2
E	30	31	57	48	44	31	21	23	37	47	51	33	25	33	22	23	2
F	7	3	14	37	40	43	48	46	36	28	9	6	1	2	2	4	5
G	2	5	7	18	45	81	204	141	31	7	1	1	1	0	0	1	40
Total	199	115	139	172	190	170	299	221	129	156	305	289	228	215	229	175	49

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	6	8	3	4	5	5	6	4	10	2	6	2	8	7	8	5	89
3.50 - 7.49	83	26	26	16	12	6	5	10	27	33	60	49	73	45	33	45	549
7.50 - 12.49	12	1	0	0	2	0	0	0	4	12	37	21	22	9	19	11	150
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	2	3	1	0	0	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	101	35	29	20	19	11	11	14	41	47	105	75	104	61	60	61	795

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	2	2	0	0	1	1	1	2	0	4	1	0	2	3	1	23
3.50 - 7.49	4	3	1	1	2	0	0	0	0	3	15	4	7	6	3	9	58
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	8	3	1	3	0	1	16
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	5	3	1	2	1	1	1	2	3	27	9	8	11	6	11	98

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	5	3	5	3	1	2	0	1	0	0	2	3	4	4	2	37
3.50 - 7.49	11	0	1	1	4	0	0	0	2	6	7	13	10	7	5	8	75
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	6	2	7	1	0	1	18
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	13	5	4	6	7	1	2	0	3	7	14	17	20	12	9	11	131

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	28	25	50	33	17	15	11	10	17	19	25	21	26	15	18	16	346
3.50 - 7.49	31	10	1	22	10	4	3	3	12	38	75	53	21	31	33	39	386
7.50 - 12.49	0	0	3	0	0	0	0	0	1	4	17	16	7	0	3	2	50
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	59	35	51	55	27	19	14	13	30	61	118	91	54	46	54	57	785

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	20	29	59	45	57	34	27	29	42	30	17	7	14	9	14	13	446
3.50 - 7.49	8	4	2	9	2	1	2	0	12	31	27	10	5	0	2	4	119
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	4
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	33	61	54	59	35	29	29	54	61	46	19	19	9	16	17	577

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	13
0.75 - 3.49	4	7	10	23	53	73	75	44	31	8	3	2	1	0	4	2	340
3.50 - 7.49	1	0	1	1	1	2	0	0	6	9	5	1	1	0	0	0	28
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	7	11	24	54	75	75	44	37	17	8	3	2	0	4	2	381

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	5	5	7	14	38	137	214	89	21	3	5	0	0	1	1	1	541
3.50 - 7.49	0	1	0	0	0	0	0	2	6	1	0	0	0	0	0	0	10
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	6	7	14	38	137	214	91	27	4	5	0	0	1	1	1	559

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	31
0.75 - 3.49	68	81	134	124	173	266	336	177	124	62	60	35	52	38	52	40	1822
3.50 - 7.49	138	44	32	50	31	13	10	15	65	121	189	130	117	89	76	105	1225
7.50 - 12.49	12	1	0	0	2	0	0	0	5	17	70	44	37	13	22	15	238
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	4	5	1	0	0	0	10
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	218	126	166	174	206	279	346	192	194	200	323	214	207	140	150	160	3326

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3326

TOTAL NUMBER OF MISSING OBSERVATIONS: 394

PERCENT DATA RECOVERY FOR THIS PERIOD: 89.4%

MEAN WIND SPEED FOR THIS PERIOD: 3.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
23.90	2.95	3.94	23.60	17.35	11.46	16.81

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	101	35	29	20	19	11	11	14	41	47	105	75	104	61	60	61	1
B	7	5	3	1	2	1	1	1	2	3	27	9	8	11	6	11	0
C	13	5	4	6	7	1	2	0	3	7	14	17	20	12	9	11	0
D	59	36	51	55	27	19	14	13	30	61	118	91	54	46	54	57	1
E	28	33	61	54	59	35	29	29	54	61	46	19	19	9	16	17	8
F	5	7	11	24	54	75	75	44	37	17	8	3	2	0	4	2	13
G	5	5	7	14	38	137	214	91	27	4	5	0	0	1	1	1	8
Total	218	126	166	174	206	279	346	192	194	200	323	214	207	140	150	160	31

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	8	11	15	6	8	6	13	9	17	9	6	5	10	8	11	11	153
3.50 - 7.49	52	17	19	13	8	2	5	15	52	53	89	72	62	48	49	75	631
7.50 - 12.49	1	4	1	0	0	0	0	0	0	19	63	26	26	14	11	8	173
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	2	7	1	0	0	0	10
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	61	32	35	19	16	8	18	24	69	81	160	110	99	70	71	94	967

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	2	2	3	2	0	0	1	3	1	3	6	5	1	1	3	33
3.50 - 7.49	4	0	0	0	0	0	0	0	1	4	18	15	3	5	8	3	61
7.50 - 12.49	1	0	0	0	0	0	0	0	0	1	3	4	2	0	0	0	11
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	2	2	3	2	0	0	1	4	6	24	25	10	6	9	6	106

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	1	4	3	1	0	2	0	3	1	0	3	0	3	2	4	31
3.50 - 7.49	13	1	1	0	0	0	0	1	3	9	24	9	2	1	7	6	77
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	10	7	0	0	1	1	19
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	17	2	5	3	1	0	2	1	6	10	34	19	2	4	10	11	127

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	39	27	20	19	10	11	11	13	23	23	13	17	7	12	22	26	293
3.50 - 7.49	25	3	2	0	1	0	1	3	22	46	56	31	22	23	30	28	293
7.50 - 12.49	1	0	0	0	0	0	0	0	0	4	21	19	5	3	0	0	53
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	65	30	22	19	11	11	12	16	45	73	90	68	34	38	52	54	645

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	20	21	27	36	51	38	31	28	50	38	14	5	9	4	12	18	402
3.50 - 7.49	4	0	1	0	0	0	0	0	14	44	28	10	4	10	4	3	122
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	2	6
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	24	21	28	36	51	38	31	28	64	82	45	15	14	14	16	23	535

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	26
0.75 - 3.49	1	10	11	26	52	93	109	73	40	6	2	2	1	1	1	4	432
3.50 - 7.49	0	0	0	0	0	0	0	0	8	9	0	0	0	0	0	0	17
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	10	11	26	52	93	109	73	48	15	2	2	1	1	1	4	475

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	12
0.75 - 3.49	3	2	7	9	18	100	199	62	22	5	0	2	1	1	0	1	432
3.50 - 7.49	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	7	9	18	100	199	63	23	5	0	2	1	1	0	1	446

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	49
0.75 - 3.49	75	74	86	102	142	248	365	186	158	83	38	40	33	30	49	67	1776
3.50 - 7.49	98	21	23	13	9	2	6	20	101	165	215	137	93	87	98	115	1203
7.50 - 12.49	3	4	1	0	0	0	0	0	0	24	100	56	34	17	12	11	262
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	0	11
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	176	99	110	115	151	250	371	206	259	272	355	241	161	134	159	193	3301

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3301

TOTAL NUMBER OF MISSING OBSERVATIONS: 299

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.7%

MEAN WIND SPEED FOR THIS PERIOD: 3.6 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
29.29	3.21	3.85	19.54	16.21	14.39	13.51

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	61	32	35	19	16	8	18	24	69	81	160	110	99	70	71	94	0
B	5	2	2	3	2	0	0	1	4	6	24	25	10	6	9	6	1
C	17	2	5	3	1	0	2	1	6	10	34	19	2	4	10	11	0
D	65	30	22	19	11	11	12	16	45	73	90	68	34	38	52	54	5
E	24	21	28	36	51	38	31	28	64	82	45	15	14	14	16	23	5
F	1	10	11	26	52	93	109	73	48	15	2	2	1	1	1	4	26
G	3	2	7	9	18	100	199	63	23	5	0	2	1	1	0	1	12
Total	176	99	110	115	151	250	371	206	259	272	355	241	161	134	159	193	49

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	25	13	15	11	12	9	12	14	16	5	7	8	13	16	10	10	196
3.50 - 7.49	86	18	7	3	8	1	3	5	35	70	109	84	70	35	35	51	620
7.50 - 12.49	1	0	0	0	0	0	0	0	1	18	47	28	12	2	1	1	111
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	112	31	22	14	20	10	15	19	52	93	163	122	96	53	46	62	930

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	6	2	2	2	2	0	1	1	1	0	1	3	1	2	0	2	26
3.50 - 7.49	5	0	0	0	0	0	0	0	1	14	8	9	4	1	4	8	54
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	3
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	2	2	2	2	0	1	1	2	14	10	12	6	3	5	10	83

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	1	4	3	3	0	0	0	1	2	1	3	1	0	2	1	26
3.50 - 7.49	11	1	0	0	0	0	0	0	3	2	7	9	7	1	4	10	55
7.50 - 12.49	0	1	0	0	0	0	0	0	0	0	2	5	0	0	0	0	8
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	15	3	4	3	3	0	0	0	4	4	10	17	8	1	6	11	89

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	33	30	30	32	17	5	12	14	21	20	13	14	16	16	18	28	319
3.50 - 7.49	20	5	1	0	0	2	0	1	6	54	71	61	18	11	17	14	281
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1`	32	17	3	0	0	0	53
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	53	35	31	32	17	7	12	15	27	75	116	92	37	27	35	42	655

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	12
0.75 - 3.49	23	17	32	52	50	46	53	72	81	35	24	14	15	8	5	19	546
3.50 - 7.49	4	1	2	0	0	1	0	2	23	24	29	6	10	1	1	2	106
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	4
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	27	18	34	52	50	47	53	74	104	60	56	20	25	9	6	21	668

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	9
0.75 - 3.49	4	9	10	22	61	127	191	91	40	18	1	2	1	0	0	2	579
3.50 - 7.49	0	0	0	0	0	0	0	1	9	6	3	0	0	1	0	0	20
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	9	10	22	61	127	191	92	49	24	4	2	1	1	0	2	608

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	7
0.75 - 3.49	1	1	1	4	21	76	175	56	26	3	0	0	0	0	1	1	366
3.50 - 7.49	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	1	4	21	76	175	57	28	3	0	0	0	0	1	1	376

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	30
0.75 - 3.49	96	73	94	126	166	263	444	248	186	83	47	44	47	42	36	63	2058
3.50 - 7.49	126	25	10	3	8	4	3	10	79	170	227	169	109	50	61	85	1139
7.50 - 12.49	1	1	0	0	0	0	0	0	1	20	85	50	16	2	2	1	179
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	223	99	104	129	174	267	447	258	266	273	359	265	173	94	99	149	3409

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3409

TOTAL NUMBER OF MISSING OBSERVATIONS: 311

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.6%

MEAN WIND SPEED FOR THIS PERIOD: 3.3 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
27.28	2.43	2.61	19.21	19.60	17.84	11.03

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	112	31	22	14	20	10	16	19	52	93	163	122	96	53	46	62	0
B	11	2	2	2	2	0	1	1	2	14	10	12	6	3	5	10	0
C	15	3	4	3	3	0	0	0	4	4	10	17	8	1	6	11	0
D	53	35	31	32	17	7	12	15	27	75	116	92	37	27	35	42	2
E	27	18	34	52	58	47	53	74	104	68	56	20	25	9	6	21	12
F	4	9	10	22	61	127	191	82	49	24	4	2	1	1	0	2	9
G	1	1	1	4	21	76	175	57	28	3	0	0	0	0	1	1	7
Total	223	99	104	129	174	267	447	258	266	273	359	265	173	94	99	149	30

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	21	6	15	11	12	11	5	11	14	6	7	10	11	8	13	19	180
3.50 - 7.49	58	31	10	12	7	2	1	1	12	47	119	114	62	15	23	29	5
																	43
7.50 - 12.49	0	0	0	0	0	0	0	0	0	9	51	42	9	2	0	0	113
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	79	37	25	23	19	13	6	12	26	62	177	166	82	25	36	48	837

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	2	3	1	1	3	3	0	1	1	2	1	0	2	0	3	27
3.50 - 7.49	6	2	0	0	0	0	0	0	0	10	13	15	6	0	3	5	60
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	8	2	0	0	0	0	10
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	4	3	1	1	3	3	0	1	11	23	18	6	2	3	8	97

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	4	2	2	4	0	0	4	2	1	2	3	4	1	3	2	37
3.50 - 7.49	2	0	0	0	0	0	0	0	3	5	12	7	6	3	1	3	42
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	6
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	4	2	2	4	0	0	4	5	6	18	12	10	4	4	5	85

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	32	31	45	25	20	10	11	11	19	16	20	15	21	18	8	22	324
3.50 - 7.49	19	1	0	0	0	0	0	1	10	37	74	58	27	12	9	14	262
7.50 - 12.49	0	0	0	0	0	0	0	0	0	3	21	6	0	0	0	0	30
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	51	32	45	25	20	10	11	12	29	56	115	79	48	30	17	36	624

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	43
0.75 - 3.49	19	42	57	35	71	76	69	78	82	48	20	7	16	8	16	17	661
3.50 - 7.49	8	4	1	0	0	0	0	1	23	63	35	10	5	1	4	6	161
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	4	1	0	1	0	1	8
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	27	46	58	35	71	76	69	79	105	112	59	18	21	10	20	24	873

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	65
0.75 - 3.49	4	3	4	25	72	155	201	63	43	10	3	0	0	0	1	4	588
3.50 - 7.49	0	0	0	0	0	0	0	2	11	4	1	0	0	1	0	0	19
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	3	4	25	72	155	201	65	54	14	4	0	0	1	1	4	672

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	28
0.75 - 3.49	0	0	2	2	14	69	121	47	15	1	1	0	0	0	1	0	273
3.50 - 7.49	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	4
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	2	2	14	69	121	47	18	2	1	0	0	0	1	0	305

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	145
0.75 - 3.49	83	88	128	101	194	324	410	214	176	83	55	36	52	37	42	67	2090
3.50 - 7.49	93	38	11	12	7	2	1	5	62	167	254	204	106	32	40	57	1091
7.50 - 12.49	0	0	0	0	0	0	0	0	0	13	88	53	9	3	0	1	167
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	176	126	139	113	201	326	411	219	238	263	397	293	167	72	82	125	3493

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3493

TOTAL NUMBER OF MISSING OBSERVATIONS: 227

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.9%

MEAN WIND SPEED FOR THIS PERIOD: 3.0 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
23.96	2.78	2.43	17.86	24.99	19.24	8.73

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	79	37	25	23	19	13	6	12	26	62	177	166	82	25	36	48	1
B	10	4	3	1	1	3	3	0	1	11	23	18	6	2	3	8	0
C	5	4	2	2	4	0	0	4	5	6	18	12	10	4	4	5	0
D	51	32	45	25	20	10	11	12	29	56	115	79	48	30	17	36	8
E	27	46	58	35	71	76	69	79	105	112	59	18	21	10	20	24	43
F	4	3	4	25	72	155	201	65	54	14	4	0	0	1	1	4	65
G	0	0	2	2	14	69	121	47	18	2	1	0	0	0	1	0	28
Total	176	126	139	113	201	326	411	219	238	263	397	293	167	72	82	125	145

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	21	9	10	4	9	10	7	8	8	8	9	8	12	8	4	13	148
3.50 - 7.49	73	18	6	6	8	7	4	6	31	37	67	100	37	30	20	42	492
7.50 - 12.49	2	0	0	0	0	0	0	0	1	3	26	30	16	6	0	1	85
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	96	27	16	10	17	17	11	14	40	48	103	138	65	44	24	56	726

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	4	2	2	1	0	0	0	1	3	3	0	2	3	1	1	25
3.50 - 7.49	6	1	0	0	0	1	0	1	1	7	3	9	5	2	2	2	40
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	9	5	0	0	0	0	14
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	5	2	2	1	1	0	1	2	10	15	14	7	5	3	3	79

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	3	3	1	1	1	0	0	3	0	4	2	2	3	3	1	32
3.50 - 7.49	7	4	1	0	1	0	0	0	0	4	9	10	7	3	3	5	54
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	5	1	0	0	0	9
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	7	4	1	2	1	0	0	3	4	16	17	10	6	6	6	95

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	43	32	38	24	10	9	13	12	23	18	14	11	15	27	15	18	322
3.50 - 7.49	28	11	2	0	0	1	0	0	7	14	73	53	29	10	21	27	276
7.50 - 12.49	0	0	0	0	0	0	0	0	0	4	13	13	2	0	2	0	34
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	71	43	40	24	10	10	13	12	30	36	100	77	46	37	38	45	635

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	27
0.75 - 3.49	31	25	65	63	45	59	45	55	54	35	30	10	16	9	15	14	571
3.50 - 7.49	5	3	2	0	2	1	0	1	11	40	33	20	7	3	7	3	138
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	6
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	36	28	67	63	47	60	45	56	65	76	65	31	24	12	22	17	741

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	27
0.75 - 3.49	6	8	15	25	79	134	149	83	46	15	3	1	0	0	0	2	566
3.50 - 7.49	0	1	0	0	0	0	0	2	8	7	7	0	0	0	0	0	25
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	9	15	25	79	134	149	85	54	22	10	1	0	0	0	2	618

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	23
0.75 - 3.49	1	1	4	12	33	139	192	63	27	3	0	0	1	0	0	0	476
3.50 - 7.49	0	0	0	0	0	0	1	2	3	2	1	0	0	0	0	0	9
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	4	12	33	139	193	65	30	5	1	0	1	0	0	0	508

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	80
0.75 - 3.49	109	82	137	131	178	352	406	221	162	82	63	32	48	50	38	49	2140
3.50 - 7.49	119	38	11	6	11	10	5	12	61	111	193	192	85	48	53	79	1034
7.50 - 12.49	2	0	0	0	0	0	0	0	1	8	53	54	20	6	2	1	147
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	230	120	148	137	189	362	411	233	224	201	310	278	153	104	93	129	3402

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3680

TOTAL NUMBER OF VALID OBSERVATIONS: 3402

TOTAL NUMBER OF MISSING OBSERVATIONS: 198

PERCENT DATA RECOVERY FOR THIS PERIOD: 94.5%

MEAN WIND SPEED FOR THIS PERIOD: 3.0 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
21.34	2.32	2.79	18.67	21.78	18.17	14.93

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	96	27	16	10	17	17	11	14	40	48	103	138	65	44	24	56	0
B	8	5	2	2	1	1	0	1	2	10	15	14	7	5	3	3	0
C	12	7	4	1	2	1	0	0	3	4	16	17	10	6	6	6	0
D	71	43	40	24	10	10	13	12	30	36	100	77	46	37	38	45	3
E	36	28	67	63	47	60	45	56	65	76	65	31	24	12	22	17	27
F	6	9	15	25	79	134	149	85	54	22	10	1	0	0	0	2	27
G	1	1	4	12	33	139	193	65	30	5	1	0	1	0	0	0	23
Total	230	120	148	137	189	362	411	233	224	201	310	278	153	104	93	129	80

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	2	4	6	4	2	2	3	2	0	3	2	2	2	2	3	40
3.50 - 7.49	20	9	8	6	14	9	8	3	12	16	13	26	13	15	7	11	190
7.50 - 12.49	3	0	0	0	0	0	0	0	0	2	12	30	20	7	0	0	74
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	24	11	12	12	18	11	10	6	14	18	28	61	36	24	9	14	308

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	2	1	1	1	1	1	0	1	0	0	1	2	0	12
3.50 - 7.49	2	1	1	0	0	0	0	0	3	3	2	17	5	10	2	1	47
7.50 - 12.49	0	0	0	0	0	0	0	0	0	4	8	12	6	2	0	0	32
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	1	1	2	1	1	1	1	4	7	11	29	11	13	4	1	91

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	3	0	3	1	0	0	0	1	2	1	1	0	1	0	3	18
3.50 - 7.49	6	0	3	0	1	1	1	0	1	10	4	18	8	5	5	3	66
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	11	10	7	1	1	0	32
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	3	3	3	2	1	1	0	2	15	18	29	15	7	6	6	119

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	12
0.75 - 3.49	24	32	26	24	21	11	10	6	14	16	11	7	17	13	17	13	262
3.50 - 7.49	53	10	2	1	3	3	2	4	18	31	70	91	75	58	60	42	523
7.50 - 12.49	4	0	0	0	0	0	0	0	1	10	53	104	47	6	3	1	229
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	5	3	0	0	0	9
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	81	42	28	25	24	14	12	10	33	57	135	207	142	77	80	56	1035

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	16
0.75 - 3.49	21	22	51	34	54	41	41	30	57	33	16	4	12	11	9	13	449
3.50 - 7.49	3	6	4	1	9	2	2	1	28	50	42	20	14	15	6	5	208
7.50 - 12.49	0	0	0	0	0	0	0	0	0	4	15	6	2	1	2	0	30
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	24	28	55	35	63	43	43	31	85	87	73	30	28	27	17	18	703

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	17
0.75 - 3.49	8	7	10	23	61	69	73	49	35	11	6	2	0	0	0	3	357
3.50 - 7.49	2	1	0	0	0	0	0	4	13	5	2	1	0	0	0	0	28
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	8	10	23	61	69	73	53	48	16	8	3	0	0	0	3	402

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	9
0.75 - 3.49	0	3	7	28	53	152	182	65	24	3	1	2	1	1	0	1	523
3.50 - 7.49	0	0	0	0	0	0	1	2	9	0	1	0	0	0	0	0	13
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	3	7	28	53	152	183	67	33	3	2	2	1	1	0	1	545

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	54
0.75 - 3.49	57	69	98	120	195	276	309	154	134	65	39	18	32	29	30	36	1661
3.50 - 7.49	86	27	18	8	27	15	14	14	84	115	134	173	115	103	80	62	1075
7.50 - 12.49	7	0	0	0	0	0	0	0	1	22	99	162	82	17	6	1	397
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	3	8	4	0	0	0	16
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	150	96	116	128	222	291	323	168	219	203	275	361	233	149	116	99	3203

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3203

TOTAL NUMBER OF MISSING OBSERVATIONS: 517

PERCENT DATA RECOVERY FOR THIS PERIOD: 86.1%

MEAN WIND SPEED FOR THIS PERIOD: 3.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
9.62	2.84	3.72	32.31	21.95	12.55	17.02

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	24	11	12	12	18	11	10	6	14	18	28	61	36	24	9	14	0
B	3	1	1	2	1	1	1	1	4	7	11	29	11	13	4	1	0
C	8	3	3	3	2	1	1	0	2	15	18	29	15	7	6	6	0
D	81	42	28	25	24	14	12	10	33	57	135	207	142	77	80	56	12
E	24	28	55	35	63	43	43	31	85	87	73	30	28	27	17	18	16
F	10	8	10	23	61	69	73	53	48	16	8	3	0	0	0	3	17
G	0	3	7	28	53	152	183	67	33	3	2	2	1	1	0	1	9
Total	150	95	116	128	222	291	323	168	219	203	275	361	233	149	116	99	54

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	1	0	0	0	0	0	2	1	2	1	0	2	1	0	11
3.50 - 7.49	7	3	6	11	9	2	5	9	4	7	4	13	17	9	13	2	121
7.50 - 12.49	0	0	0	0	0	0	0	0	3	0	3	11	7	9	1	1	35
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	4	7	11	9	2	5	9	9	8	9	25	24	20	15	3	167

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	3
3.50 - 7.49	0	2	0	1	2	1	0	1	1	2	5	10	3	4	6	0	38
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	4	9	6	3	1	0	25
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	0	2	3	1	0	1	1	4	10	19	9	7	7	0	66

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	1	0	2	1	0	0	0	0	0	1	2	3	0	0	0	12
3.50 - 7.49	2	0	1	0	4	1	1	0	3	3	10	9	11	6	6	1	58
7.50 - 12.49	0	0	0	0	0	0	0	0	0	2	12	9	8	3	3	0	37
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	1	2	5	1	1	0	3	5	23	20	22	9	9	1	107

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	25	49	64	63	31	15	12	12	12	11	11	11	13	19	18	25	391
3.50 - 7.49	22	15	12	31	17	2	3	3	13	52	67	94	98	82	113	26	650
7.50 - 12.49	0	0	0	0	0	0	0	0	5	28	78	141	97	18	16	1	384
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	4	14	3	0	0	0	22
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	47	64	76	94	48	17	15	15	30	92	160	260	211	119	147	52	1449

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
0.75 - 3.49	9	28	49	72	45	28	28	25	28	26	9	7	9	9	8	8	388
3.50 - 7.49	1	4	8	33	4	6	9	3	24	55	64	29	9	4	7	2	262
7.50 - 12.49	0	0	0	0	0	0	0	0	0	14	29	19	7	0	1	0	70
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	32	57	105	49	34	37	28	52	95	102	57	25	13	16	10	733

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	3	1	17	20	27	55	68	42	24	9	5	2	2	1	0	0	276
3.50 - 7.49	0	1	0	0	2	0	1	0	27	11	7	1	1	0	0	1	52
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	17	20	29	55	69	42	51	20	13	3	3	1	0	1	337

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	1	4	5	17	31	71	166	74	16	6	0	0	0	3	0	0	394
3.50 - 7.49	0	2	0	1	0	1	0	1	17	5	1	0	1	1	0	0	30
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	6	5	18	31	72	166	75	33	11	1	0	1	4	0	0	428

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	25
0.75 - 3.49	40	84	136	175	136	169	274	153	82	53	29	23	27	34	27	33	1475
3.50 - 7.49	32	27	27	77	38	13	19	17	89	135	158	156	140	106	145	32	1211
7.50 - 12.49	0	0	0	0	0	0	0	0	8	46	127	189	125	33	22	2	552
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	4	16	3	0	0	0	24
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	73	111	163	252	174	182	293	170	179	235	318	384	295	173	194	67	3287

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3287

TOTAL NUMBER OF MISSING OBSERVATIONS: 313

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.3%

MEAN WIND SPEED FOR THIS PERIOD: 4.4 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
5.08	2.01	3.26	44.08	22.30	10.25	13.02

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	7	4	7	11	9	2	5	9	9	8	9	25	24	20	15	3	0
B	0	2	0	2	3	1	0	1	1	4	10	19	9	7	7	0	0
C	4	1	1	2	5	1	1	0	3	5	23	20	22	9	9	1	0
D	47	64	76	94	48	17	15	15	30	92	160	260	211	119	147	52	2
E	10	32	57	105	49	34	37	28	52	95	102	57	25	13	16	10	11
F	3	2	17	20	29	55	69	42	51	20	13	3	3	1	0	1	8
G	1	6	6	18	31	72	166	75	33	11	1	0	1	4	0	0	4
Total	72	111	163	252	174	182	293	170	179	235	318	384	295	173	194	67	25

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	3	0	2	0	1	0	0	0	0	0	0	0	8
3.50 - 7.49	5	4	0	4	3	1	0	0	2	4	3	4	17	6	6	5	64
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	9	11	8	3	0	34
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	4	1	5	6	1	2	0	3	4	6	14	28	14	9	5	107

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	0	2	2	4	0	0	0	0	0	1	0	0	1	2	1	15
3.50 - 7.49	1	1	0	1	1	0	1	1	2	2	0	5	8	2	4	2	31
7.50 - 12.49	0	0	0	0	0	0	0	0	0	4	1	1	2	3	1	1	13
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	1	2	3	5	0	1	1	2	6	2	6	12	6	7	4	61

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	1	3	1	1	0	0	1	0	2	0	0	1	0	1	4	17
3.50 - 7.49	2	4	2	0	0	1	0	1	2	3	3	3	4	3	4	4	36
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	3	3	11	4	4	3	28
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	5	5	1	1	1	0	2	2	5	6	6	17	8	9	11	83

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	26	33	71	54	15	6	11	10	19	17	12	13	9	13	14	13	336
3.50 - 7.49	45	17	6	3	9	2	2	5	26	79	133	148	90	66	70	31	732
7.50 - 12.49	0	0	0	0	0	0	0	0	2	39	114	169	155	47	32	4	562
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	3	28	28	3	1	0	64
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	71	50	77	57	24	8	13	15	47	136	262	359	283	129	117	48	1699

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	16	24	71	50	42	23	14	23	33	22	16	8	6	6	12	4	370
3.50 - 7.49	5	10	6	14	7	2	1	4	34	86	77	24	15	7	10	5	307
7.50 - 12.49	0	0	0	0	0	0	0	0	2	5	37	16	5	1	2	0	68
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	7
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	21	34	77	64	49	25	15	27	69	113	130	53	28	14	24	9	758

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	3	10	16	26	42	41	55	30	16	6	3	2	1	0	1	1	253
3.50 - 7.49	2	0	1	0	0	0	0	1	20	10	3	2	0	0	0	0	39
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	10	17	26	42	41	55	31	36	16	6	6	1	0	1	1	302

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	3	5	17	22	49	69	78	38	20	2	4	0	0	0	1	3	311
3.50 - 7.49	0	0	0	3	0	0	0	0	5	7	0	0	0	0	0	0	15
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	5	17	25	49	69	78	38	25	9	4	0	0	0	1	3	329

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	20
0.75 - 3.49	52	73	181	156	156	139	160	102	89	49	36	23	17	20	31	26	1310
3.50 - 7.49	60	36	15	25	20	6	4	12	91	191	219	186	134	84	94	47	1224
7.50 - 12.49	0	0	0	0	0	0	0	0	4	48	158	200	184	63	42	8	707
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	3	34	33	4	1	0	76
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	112	109	196	181	176	145	164	114	184	289	416	444	369	171	168	81	3339

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3339

TOTAL NUMBER OF MISSING OBSERVATIONS: 381

PERCENT DATA RECOVERY FOR THIS PERIOD: 89.8%

MEAN WIND SPEED FOR THIS PERIOD: 5.1 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
3.20	1.83	2.49	50.88	22.70	9.04	9.85

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	5	4	1	5	6	1	2	0	3	4	6	14	28	14	9	5	0
B	3	1	2	3	5	0	1	1	2	6	2	6	12	6	7	4	0
C	4	5	5	1	1	1	0	2	2	5	6	6	17	8	9	11	0
D	71	50	77	57	24	8	13	15	47	136	262	359	283	129	117	48	3
E	21	34	77	64	49	25	15	27	69	113	130	53	28	14	24	9	6
F	5	10	17	26	42	41	55	31	36	16	6	6	1	0	1	1	8
G	3	5	17	25	49	69	78	38	25	9	4	0	0	0	1	3	3
Total	112	109	196	181	176	145	164	114	184	289	416	444	369	171	168	81	20

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	87	62	74	49	55	50	53	53	73	33	46	40	65	56	56	67	919
3.50 - 7.49	475	184	120	112	97	51	63	68	196	299	531	580	490	287	241	320	4114
7.50 - 12.49	36	8	2	0	2	0	1	3	15	82	319	272	232	117	70	44	1203
12.50 -18.49	0	0	0	0	0	0	0	0	0	3	17	32	19	3	0	0	74
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	598	254	196	161	154	101	117	124	284	417	913	924	807	463	367	431	6315

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	19	14	20	17	13	7	7	5	11	6	20	13	9	14	10	14	199
3.50 - 7.49	40	17	12	9	7	4	5	5	13	52	80	113	57	50	50	42	556
7.50 - 12.49	1	1	0	0	0	0	1	0	1	20	65	60	43	21	9	2	224
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	4	4	7	1	1	0	17
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	60	32	32	26	20	11	13	10	25	78	169	190	116	86	70	58	997

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	27	25	28	26	16	3	8	7	11	9	13	25	16	16	20	19	269
3.50 - 7.49	75	19	16	17	17	6	4	6	24	49	91	106	92	51	71	54	698
7.50 - 12.49	1	1	0	0	0	0	0	1	1	16	79	69	70	24	11	10	283
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	9	4	4	1	0	0	19
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	103	45	44	43	33	9	12	14	36	75	192	204	182	92	102	83	1271

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	43
0.75 - 3.49	345	369	520	440	234	118	125	115	186	182	161	162	191	216	212	240	3816
3.50 - 7.49	425	137	117	185	83	29	27	32	158	500	959	1016	723	579	735	389	6104
7.50 - 12.49	13	2	5	3	3	0	1	0	22	157	661	954	584	184	131	24	2744
12.50 -18.49	0	0	0	0	0	0	0	0	0	8	44	136	44	12	2	0	246
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	6	4	2	0	0	0	12
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	783	508	642	628	330	147	153	147	366	847	1831	2272	1544	991	1080	653	12965

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	151
0.75 - 3.49	223	305	605	561	560	431	386	405	506	321	190	99	138	110	134	155	5129
3.50 - 7.49	69	69	94	151	53	21	23	24	247	538	515	226	105	79	83	59	2356
7.50 - 12.49	0	0	6	4	1	1	0	0	8	59	205	111	38	9	9	3	454
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	12	15	6	1	0	0	35
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	292	374	705	716	614	453	409	429	761	920	922	451	287	199	226	217	8126

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	196
0.75 - 3.49	51	80	148	302	582	867	1087	599	348	116	42	23	14	3	11	28	4301
3.50 - 7.49	9	8	7	4	3	2	2	13	159	100	59	12	3	3	2	1	387
7.50 - 12.49	0	0	0	0	0	0	1	0	0	2	9	3	1	0	0	0	16
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	60	88	155	306	585	869	1096	612	507	218	110	39	18	6	13	29	4901

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	173
0.75 - 3.49	23	42	95	181	407	1033	1811	827	246	48	20	7	8	7	9	12	4776
3.50 - 7.49	0	6	3	12	1	2	2	16	96	30	7	3	1	1	0	0	180
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	3
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	23	48	98	193	408	1035	1813	843	342	79	29	10	9	8	9	12	5132

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 35.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	570
0.75 - 3.49	775	697	1490	1576	1867	2509	3477	2011	1381	715	492	369	441	422	452	535	19409
3.50 - 7.49	1043	440	369	490	271	115	126	164	893	1568	2242	2056	1471	1050	1182	865	14395
7.50 - 12.49	51	12	13	7	6	1	4	4	47	337	1340	1469	968	355	230	83	4927
12.50 -18.49	0	0	0	0	0	0	0	0	0	13	86	192	80	18	3	0	392
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	6	4	3	0	0	0	14
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1919	1349	1872	2073	2144	2625	3607	2179	2321	2634	4166	4090	2963	1845	1867	1483	39707

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-35 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 35.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 43848

TOTAL NUMBER OF VALID OBSERVATIONS: 39707

TOTAL NUMBER OF MISSING OBSERVATIONS: 4141

PERCENT DATA RECOVERY FOR THIS PERIOD: 90.6%

MEAN WIND SPEED FOR THIS PERIOD: 4.1 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
15.90	2.51	3.20	32.65	20.46	12.34	12.92

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	598	254	196	161	154	101	117	124	284	417	913	924	807	463	367	431	4
B	60	32	32	26	20	11	13	10	25	78	169	190	116	86	70	58	1
C	103	45	44	43	33	9	12	14	36	75	192	204	182	92	102	83	2
D	783	509	642	628	330	147	153	147	366	847	1831	2272	1544	991	1080	653	43
E	292	374	705	716	614	453	409	429	761	920	922	451	287	199	226	217	151
F	60	83	155	306	585	869	1090	612	507	218	110	39	18	6	13	29	196
G	23	48	88	193	408	1035	1813	843	342	79	29	10	9	8	9	12	173
Total	1919	1349	1872	2073	2144	2625	3607	2179	2321	2634	4166	4090	2963	1845	1867	1483	570

APPENDIX C

Monthly and Annual Joint Frequency Distribution
of ΔT(500ft-35ft) and 500-ft Wind Data
(January 1, 1980 - December 31, 1980)

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	5	2	1	4	1	0	1	1	1	1	0	1	2	2	1	3	26
3.50 - 7.49	3	3	7	13	8	13	1	1	4	0	7	11	8	4	11	8	102
7.50 - 12.49	19	7	8	17	0	7	5	11	3	10	15	28	39	23	26	12	230
12.50 -18.49	1	0	3	0	0	0	3	0	4	2	7	24	30	18	9	0	101
18.50 -23.99	0	0	0	0	0	0	0	0	0	4	4	8	18	11	0	0	45
> 23.99	0	0	0	0	0	0	0	0	0	3	0	10	4	0	0	0	17
TOTAL	28	12	19	34	9	20	10	13	12	20	33	82	101	58	47	23	522

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	1	0	0	0	1	1	1	0	1	0	1	1	2	10
3.50 - 7.49	3	0	2	1	7	8	7	0	2	1	2	1	4	5	1	0	44
7.50 - 12.49	0	0	1	5	5	3	18	2	1	0	3	9	6	3	1	1	58
12.50 -18.49	0	0	0	0	0	1	0	3	4	0	2	1	1	0	0	0	12
18.50 -23.99	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	5
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	0	3	7	12	12	25	9	9	3	7	12	11	9	3	3	129

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3.50 - 7.49	1	0	3	2	0	0	1	1	1	0	0	0	0	0	0	0	9
7.50 - 12.49	1	0	0	1	0	0	2	4	0	0	0	1	0	0	1	0	10
12.50 -18.49	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	3	3	0	0	4	5	2	1	0	1	0	0	1	0	22

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	6	2	1	5	1	0	1	2	3	2	0	2	2	3	2	5	37
3.50 - 7.49	7	3	12	16	15	21	9	2	7	1	9	12	12	9	12	8	155
7.50 - 12.49	20	7	9	23	5	10	25	17	4	10	18	38	45	26	28	13	298
12.50 -18.49	1	0	3	0	0	1	4	3	8	3	9	25	31	18	9	0	115
18.50 -23.99	0	0	0	0	0	0	0	3	1	5	4	8	18	11	0	0	50
> 23.99	0	0	0	0	0	0	0	0	0	3	0	10	4	0	0	0	17
TOTAL	34	12	25	44	21	32	39	27	23	24	40	95	112	67	51	26	673

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JANUARY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 673

TOTAL NUMBER OF MISSING OBSERVATIONS: 71

PERCENT DATA RECOVERY FOR THIS PERIOD: 90.5%

MEAN WIND SPEED FOR THIS PERIOD: 10.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.00	77.56	19.17	3.27	0.00

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	28	12	19	34	9	20	10	13	12	20	33	82	101	58	47	23	1
E	4	0	3	7	12	12	25	9	9	3	7	12	11	9	3	3	0
F	2	0	3	3	0	0	4	5	2	1	0	1	0	0	1	0	0
G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	34	12	25	44	21	32	39	27	23	24	40	95	112	67	51	26	1

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	1	0	0	0	0	0	0	0	3	1	0	0	5

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	2	0	2	2	0	1	1	0	0	1	0	0	0	0	0	10
3.50 - 7.49	9	4	12	16	17	1	1	2	1	0	8	7	7	3	7	10	105
7.50 - 12.49	8	0	3	16	9	3	0	0	4	6	28	25	29	44	30	18	223
12.50 -18.49	2	0	0	2	1	0	0	0	1	2	25	15	44	31	15	8	146
18.50 -23.99	2	0	0	0	0	0	0	0	0	0	2	6	1	9	0	0	20
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
TOTAL	22	6	15	36	29	4	2	3	6	8	64	54	82	88	52	36	507

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	3
3.50 - 7.49	0	2	5	5	0	0	2	0	1	2	2	3	5	3	0	1	31
7.50 - 12.49	0	0	1	1	0	3	1	2	0	5	4	7	10	3	5	0	42
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	2	4	1	0	1	0	8
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	7	6	0	3	3	2	1	8	8	15	16	6	6	1	84

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	3
3.50 - 7.49	0	0	0	0	0	0	3	0	1	2	1	3	0	0	0	0	10
7.50 - 12.49	0	0	0	0	0	2	5	0	6	2	7	2	0	1	0	0	25
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	7
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	2	8	0	7	4	16	7	0	1	0	0	45

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7.50 - 12.49	0	0	0	0	0	0	3	0	7	1	0	0	0	0	0	0	11
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	3	0	7	2	0	0	0	0	0	0	12

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	2	1	2	2	0	1	1	0	1	3	2	0	0	0	0	16
3.50 - 7.49	9	6	17	21	17	1	6	2	3	5	11	13	12	6	7	11	147
7.50 - 12.49	8	0	4	17	10	8	9	2	17	14	39	34	40	48	35	18	303
12.50 -18.49	2	0	0	2	1	0	0	0	1	2	33	20	47	32	16	8	164
18.50 -23.99	2	0	0	0	0	0	0	0	0	0	2	6	1	9	0	0	20
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
TOTAL	22	8	22	42	30	9	16	5	21	22	88	76	101	96	58	37	653

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

FEBRUARY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 696

TOTAL NUMBER OF VALID OBSERVATIONS: 653

TOTAL NUMBER OF MISSING OBSERVATIONS: 43

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.8%

MEAN WIND SPEED FOR THIS PERIOD: 10.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.77	77.64	12.86	6.89	1.84

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	1	0	0	0	0	0	0	0	3	1	0	0	0
D	22	6	15	36	29	4	2	3	6	8	64	54	82	88	52	36	0
E	0	2	7	6	0	3	3	2	1	8	8	15	16	6	6	1	0
F	0	0	0	0	0	2	8	0	7	4	16	7	0	1	0	0	0
G	0	0	0	0	0	0	3	0	7	2	0	0	0	0	0	0	0
Total	22	8	22	42	30	9	16	5	21	22	88	76	101	96	58	37	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
7.50 - 12.49	0	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0	5
12.50 -18.49	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	1	2	4	0	0	0	0	0	0	0	0	0	0	8

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	4
7.50 - 12.49	4	0	1	0	0	0	0	0	0	1	0	0	1	0	0	2	9
12.50 -18.49	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	0	1	1	0	3	1	0	0	1	0	0	1	2	0	2	16

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	1	0	1	0	0	0	1	0	1	1	1	2	0	0	9
3.50 - 7.49	11	8	11	6	6	6	8	4	2	1	5	4	3	3	5	7	90
7.50 - 12.49	21	6	1	5	15	5	7	10	7	11	9	5	10	10	15	7	144
12.50 -18.49	0	2	0	6	8	15	8	4	7	2	16	17	22	24	18	0	149
18.50 -23.99	0	0	0	0	1	1	0	1	1	1	1	1	20	14	3	0	44
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	9	20	0	0	29
TOTAL	33	16	13	17	31	27	23	19	18	15	32	28	65	73	41	14	465

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	1	1	0	1	0	0	1	0	0	0	0	0	6
3.50 - 7.49	0	2	1	3	5	10	6	7	5	1	2	3	3	0	2	1	51
7.50 - 12.49	0	0	0	5	3	2	5	9	10	3	1	6	3	1	0	1	49
12.50 -18.49	0	0	0	0	0	0	6	4	4	0	1	2	1	0	0	0	18
18.50 -23.99	0	0	0	0	0	0	2	1	0	1	0	1	0	0	0	0	5
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	2	9	9	13	19	22	19	5	5	12	7	1	2	2	129

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3
3.50 - 7.49	0	0	1	6	3	4	1	1	5	1	6	5	0	0	0	0	33
7.50 - 12.49	0	0	1	6	0	4	1	1	3	1	6	0	1	1	0	0	25
12.50 -18.49	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	2	12	3	8	2	5	9	5	13	5	1	1	0	0	67

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	6
7.50 - 12.49	0	0	0	0	0	0	0	1	4	2	0	0	0	0	0	0	7
12.50 -18.49	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	4	2	0	1	2	4	4	0	0	0	0	0	0	17

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	2	1	2	1	0	1	2	0	3	1	1	2	0	0	18
3.50 - 7.49	11	10	13	19	16	25	16	12	12	3	13	12	6	3	7	8	186
7.50 - 12.49	25	6	4	16	21	13	13	21	24	18	16	11	15	12	15	10	240
12.50 -18.49	0	2	0	8	8	15	14	12	11	7	17	19	23	26	18	0	180
18.50 -23.99	0	0	0	0	1	1	3	2	1	2	1	2	20	14	3	0	50
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	9	20	0	0	29
TOTAL	37	19	19	44	48	55	46	48	50	30	50	45	74	77	43	18	703

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MARCH

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 703

TOTAL NUMBER OF MISSING OBSERVATIONS: 41

PERCENT DATA RECOVERY FOR THIS PERIOD: 94.5%

MEAN WIND SPEED FOR THIS PERIOD: 11.4 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.14	1.14	2.28	66.15	18.35	9.53	2.42

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	1	1	2	4	0	0	0	0	0	0	0	0	0	0	0
C	4	0	1	1	0	3	1	0	0	1	0	0	1	2	0	2	0
D	33	16	13	17	31	27	23	19	18	15	32	28	65	73	41	14	0
E	0	2	2	9	9	13	19	22	19	5	5	12	7	1	2	2	0
F	0	1	2	12	3	8	2	5	9	5	13	5	1	1	0	0	0
G	0	0	0	4	2	0	1	2	4	4	0	0	0	0	0	0	0
Total	37	19	19	44	48	55	46	48	50	30	50	45	74	77	43	18	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3
7.50 - 12.49	3	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	5
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	1	0	3	2	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	5
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	0	0	0	1	0	0	0	0	0	1	1	3	7	3	0	19

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	0	3	0	1	1	0	2	2	3	1	3	1	1	1	4	25
3.50 - 7.49	6	4	9	5	1	6	3	0	0	4	4	13	6	5	2	3	71
7.50 - 12.49	7	7	2	2	1	1	1	4	2	9	23	16	4	5	12	11	107
12.50 -18.49	3	0	0	3	6	0	2	1	4	19	15	25	15	16	11	2	122
18.50 -23.99	0	0	0	0	2	6	6	1	1	4	9	12	9	4	1	0	55
> 23.99	0	0	0	0	0	0	2	0	0	0	0	2	0	1	0	0	5
TOTAL	18	11	14	10	11	14	14	8	9	39	52	71	35	32	27	20	385

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 150.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	2	1	3	1	4	0	0	0	4	2	1	1	2	0	22
3.50 - 7.49	5	1	2	2	6	4	4	4	2	4	7	3	4	1	2	2	53
7.50 - 12.49	1	4	2	3	0	1	5	0	5	2	5	5	6	2	1	3	45
12.50 -18.49	1	0	0	2	0	2	5	3	5	0	0	2	2	1	0	0	23
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	5	6	8	9	8	18	7	12	7	16	12	13	5	5	5	144

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	1	1	0	0	1	2	0	4	2	1	2	0	1	2	19
3.50 - 7.49	4	1	4	7	4	5	0	2	1	4	5	5	5	3	2	3	55
7.50 - 12.49	1	0	0	1	0	0	2	1	0	0	2	5	2	0	0	1	15
12.50 -18.49	1	0	0	0	0	0	1	1	2	2	0	1	0	0	0	0	8
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	2	5	9	4	5	4	6	3	10	9	12	9	3	3	6	97

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
3.50 - 7.49	0	0	0	0	0	0	0	0	2	1	6	1	0	2	0	0	12
7.50 - 12.49	0	0	0	0	0	0	2	3	0	0	2	2	0	0	0	0	9
12.50 -18.49	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	5
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	5	5	2	1	10	3	0	2	0	0	28

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	1	6	2	4	2	5	4	2	7	9	6	4	2	4	6	68
3.50 - 7.49	15	6	15	14	11	15	7	6	5	13	23	22	17	11	6	8	194
7.50 - 12.49	13	11	6	6	2	2	10	8	7	11	32	28	13	7	13	15	184
12.50 -18.49	5	0	0	5	6	2	11	7	11	21	15	29	17	20	13	2	164
18.50 -23.99	0	0	0	0	2	6	6	1	1	5	9	12	9	8	2	0	61
> 23.99	0	0	0	0	0	0	2	0	0	0	0	2	0	1	0	0	5
TOTAL	37	18	27	27	25	27	41	26	26	57	88	99	60	49	38	31	676

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

APRIL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 676

TOTAL NUMBER OF MISSING OBSERVATIONS: 44

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.9%

MEAN WIND SPEED FOR THIS PERIOD: 10.1 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.44	2.81	56.95	21.30	14.35	4.14

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	3	0	0	0	1	0	0	0	0	0	1	1	3	7	3	0	0
D	18	11	14	10	11	14	14	8	9	39	52	71	35	32	27	20	0
E	8	5	6	8	9	8	18	7	12	7	16	12	13	5	5	5	0
F	7	2	5	9	4	5	4	6	3	10	9	12	9	3	3	6	0
G	0	0	0	0	0	0	5	5	2	1	10	3	0	2	0	0	0
Total	37	18	27	27	25	27	41	26	26	57	88	99	60	49	38	31	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
12.50 -18.49	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	5

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
7.50 - 12.49	4	0	3	1	0	0	0	0	0	1	0	3	1	0	2	2	17
12.50 -18.49	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	1	3	2	0	0	0	0	0	1	0	3	1	0	2	2	24

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	2	0	1	0	1	0	1	0	0	0	1	1	0	1	0	1	9
7.50 - 12.49	3	0	1	0	0	0	0	1	0	0	1	0	5	3	3	1	18
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	0	2	0	1	0	1	1	0	0	2	1	7	4	0	2	29

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	1	1	1	0	0	0	0	1	1	3	4	5	0	1	19
3.50 - 7.49	5	1	3	10	3	3	0	4	4	6	9	11	9	4	14	10	96
7.50 - 12.49	9	1	0	4	1	3	6	2	6	5	5	4	14	16	7	7	90
12.50 -18.49	2	0	0	0	0	6	3	0	0	7	25	7	9	9	3	2	73
18.50 -23.99	3	0	0	0	0	0	1	0	0	1	3	1	6	1	0	0	16
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	19	3	4	15	5	12	10	6	10	20	43	26	42	35	24	20	294

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	4	1	0	3	1	0	0	0	0	0	1	3	4	3	2	0	22
3.50 - 7.49	4	5	6	6	4	4	1	0	5	1	5	13	11	8	5	3	81
7.50 - 12.49	3	2	0	3	3	2	1	2	2	1	1	6	6	0	4	4	40
12.50 -18.49	3	1	0	0	0	1	1	0	0	4	8	2	1	0	0	0	21
18.50 -23.99	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	14	9	6	12	8	7	4	2	9	6	15	24	22	11	11	7	167

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	1	2	0	0	1	0	1	0	1	1	2	1	1	0	13
3.50 - 7.49	5	2	3	3	6	0	0	0	3	4	4	6	14	12	11	3	76
7.50 - 12.49	0	1	2	2	3	1	0	4	2	1	5	3	5	4	4	1	38
12.50 -18.49	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	4	7	8	9	1	1	5	6	5	10	11	21	17	16	4	131

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	4
3.50 - 7.49	0	0	0	0	0	1	0	0	1	0	0	1	1	1	0	0	5
7.50 - 12.49	0	0	0	0	0	0	0	4	0	0	3	6	4	0	0	0	17
12.50 -18.49	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	1	0	1	0	5	1	0	4	7	5	1	1	1	28

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	3	3	7	2	0	1	0	1	1	3	7	10	9	4	2	58
3.50 - 7.49	17	8	13	20	14	8	2	4	13	11	19	32	35	26	30	17	269
7.50 - 12.49	19	4	7	10	7	6	7	13	10	8	15	22	35	23	20	16	222
12.50 -18.49	11	3	1	1	0	7	4	1	0	11	34	10	12	9	3	2	109
18.50 -23.99	3	0	0	0	0	0	2	1	2	1	3	1	6	1	0	0	20
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	55	18	24	38	23	21	16	19	26	32	74	72	98	68	57	37	678

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

MAY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 678

TOTAL NUMBER OF MISSING OBSERVATIONS: 66

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.1%

MEAN WIND SPEED FOR THIS PERIOD: 8.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.74	3.54	4.28	43.36	24.63	19.32	4.13

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
B	9	1	3	2	0	0	0	0	0	1	0	3	1	0	2	2	0
C	5	0	2	0	1	0	1	1	0	0	2	1	7	4	3	2	0
D	19	3	4	15	5	12	10	6	10	20	43	26	42	35	24	20	0
E	14	9	6	12	8	7	4	2	9	6	15	24	22	11	11	7	0
F	6	4	7	8	9	1	1	5	6	5	10	11	21	17	16	4	0
G	0	0	1	1	0	1	0	5	1	0	4	7	5	1	1	1	0
Total	55	18	24	38	23	21	16	19	26	32	74	72	98	68	57	37	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	4
12.50 -18.49	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	2	2	1	1	0	0	0	0	1	0	0	7

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	1	1	1	1	2	0	0	1	1	0	0	1	9
7.50 - 12.49	0	0	0	0	1	1	0	1	1	1	0	0	2	3	2	1	13
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	0	2	2	1	2	3	1	0	1	3	7	2	3	28

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	1	0	0	2	2	3	0	2	2	2	4	4	1	23
7.50 - 12.49	2	0	0	0	0	0	1	1	3	0	1	1	4	3	4	3	23
12.50 -18.49	0	0	0	0	0	0	0	0	0	1	1	0	1	1	3	0	7
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	0	1	3	3	0	0	8
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	0	1	0	0	3	3	6	2	4	4	10	11	11	4	61

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	1	0	0	1	0	2	2	2	2	4	0	0	16
3.50 - 7.49	4	0	0	0	0	1	2	6	7	6	4	11	6	2	4	9	62
7.50 - 12.49	9	0	0	0	1	0	0	1	6	14	10	10	4	7	9	11	82
12.50 -18.49	2	0	0	0	0	0	1	0	1	13	21	19	8	10	13	7	95
18.50 -23.99	0	0	0	0	0	0	0	0	1	3	1	4	3	4	1	0	17
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
TOTAL	15	0	1	1	2	1	3	8	15	38	39	46	23	28	27	27	274

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	2	1	0	1	4	4	4	0	1	2	6	2	2	2	1	1	33
3.50 - 7.49	0	1	3	1	1	2	7	1	3	2	6	6	10	2	2	4	51
7.50 - 12.49	5	0	1	0	2	1	1	0	1	3	11	7	6	2	2	0	42
12.50 -18.49	3	1	0	0	0	0	0	1	0	8	5	7	2	1	7	0	35
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	3	4	2	7	7	12	2	5	15	29	22	20	7	12	5	163

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	3	1	1	2	7	2	2	4	1	1	7	4	7	1	3	2	48
3.50 - 7.49	1	3	3	5	7	5	3	6	2	1	3	3	7	1	1	1	52
7.50 - 12.49	1	0	0	0	0	0	3	0	0	1	1	1	8	1	0	0	16
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	4	4	7	14	7	8	10	3	3	12	8	23	3	4	3	123

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	3
3.50 - 7.49	0	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	6
7.50 - 12.49	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	2	0	2	3	2	1	1	0	0	0	0	0	11

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	5	2	3	4	14	6	6	5	3	5	15	8	11	7	4	3	101
3.50 - 7.49	5	4	6	7	9	9	17	19	18	9	15	23	26	9	11	16	203
7.50 - 12.49	17	0	1	0	4	4	6	3	12	20	24	19	24	16	17	15	182
12.50 -18.49	5	1	0	0	0	0	2	2	1	22	28	26	12	14	23	8	144
18.50 -23.99	0	0	0	0	0	0	0	0	1	4	2	5	6	10	1	0	29
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
TOTAL	32	7	10	11	27	19	31	29	35	60	85	81	79	57	56	42	667

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JUNE

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 667

TOTAL NUMBER OF MISSING OBSERVATIONS: 53

PERCENT DATA RECOVERY FOR THIS PERIOD: 92.6%

MEAN WIND SPEED FOR THIS PERIOD: 8.7 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
1.05	4.20	9.15	41.08	24.44	18.44	1.65

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	2	2	1	1	0	0	0	0	1	0	0	0
B	0	0	1	0	2	2	1	2	3	1	0	1	3	7	2	3	0
C	2	0	0	1	0	0	3	3	6	2	4	4	10	11	11	4	0
D	15	0	1	1	2	1	3	8	15	38	39	46	23	28	27	27	0
E	10	3	4	2	7	7	12	2	5	15	29	22	20	7	12	5	1
F	5	4	4	7	14	7	8	10	3	3	12	8	23	3	4	3	5
G	0	0	0	0	2	0	2	3	2	1	1	0	0	0	0	0	0
Total	32	7	10	11	27	19	31	29	35	60	85	81	79	57	56	42	6

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	4
7.50 - 12.49	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	0	0	0	0	1	0	1	1	0	0	0	0	0	0	2	9

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
3.50 - 7.49	4	1	0	2	0	1	4	1	2	3	3	4	2	1	1	3	32
7.50 - 12.49	2	0	0	0	0	0	0	1	0	4	2	4	3	1	0	0	17
12.50 -18.49	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6	1	0	2	1	1	4	2	3	9	6	8	5	2	1	3	54

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	2	4	1	0	2	1	2	2	1	3	2	5	2	1	2	31
3.50 - 7.49	8	2	3	2	3	2	4	4	6	5	14	15	7	9	3	9	96
7.50 - 12.49	9	0	0	1	1	1	4	7	4	15	27	19	10	9	6	9	122
12.50 -18.49	1	0	0	0	0	0	3	1	3	1	16	5	3	1	2	1	37
18.50 -23.99	0	1	0	0	0	0	1	0	2	1	0	0	2	1	0	0	8
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	19	5	7	4	4	5	13	14	17	23	60	41	27	22	12	21	294

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	3	1	2	2	1	2	2	3	5	1	3	2	14	8	1	2	52
3.50 - 7.49	2	1	7	4	4	4	2	3	5	7	7	8	12	5	0	1	72
7.50 - 12.49	3	0	1	0	0	0	3	2	2	12	11	6	4	4	1	0	49
12.50 -18.49	1	0	0	1	1	0	0	1	2	8	7	1	0	0	1	2	25
18.50 -23.99	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	9	2	10	7	6	7	7	9	15	28	29	17	30	17	3	5	202

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	3	1	0	4	7	2	0	2	4	2	6	5	9	2	4	2	53
3.50 - 7.49	5	1	0	1	2	1	0	2	2	5	2	6	2	9	2	3	43
7.50 - 12.49	1	0	0	0	0	1	1	0	3	6	2	1	0	0	1	1	17
12.50 -18.49	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	4
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	10	2	0	5	9	4	1	4	10	14	11	12	11	11	7	6	119

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	7	4	6	7	9	6	3	7	12	4	12	9	28	12	6	6	138
3.50 - 7.49	20	5	10	9	9	8	10	11	16	20	26	33	23	25	6	17	248
7.50 - 12.49	18	1	1	1	1	3	8	10	9	37	42	30	17	14	8	11	211
12.50 -18.49	3	0	0	1	1	0	3	2	6	12	25	6	3	1	3	3	69
18.50 -23.99	0	1	0	0	0	1	1	0	3	1	0	0	2	1	0	0	10
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	48	11	17	18	20	18	25	30	46	74	106	78	73	53	23	37	680

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

JULY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 680

TOTAL NUMBER OF MISSING OBSERVATIONS: 64

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.4%

MEAN WIND SPEED FOR THIS PERIOD: 7.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.15	1.32	7.94	43.24	29.71	17.50	0.15

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	4	0	0	0	0	1	0	1	1	0	0	0	0	0	0	2	0
C	6	1	0	2	1	1	4	2	3	9	6	8	5	2	1	3	0
D	19	5	7	4	4	5	13	14	17	23	60	41	27	22	12	21	0
E	9	2	10	7	6	7	7	9	15	28	29	17	30	17	3	5	1
F	10	2	0	5	9	4	1	4	10	14	11	12	11	11	7	6	2
G	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Total	48	11	17	18	20	18	25	30	46	74	106	78	73	53	23	37	3

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	4
7.50 - 12.49	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	2	0	0	1	1	0	0	0	0	0	0	0	0	0	5

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
3.50 - 7.49	0	1	0	2	0	0	1	1	2	0	0	2	1	1	0	0	11
7.50 - 12.49	0	0	0	0	1	0	2	0	0	1	3	1	0	0	0	0	8
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	0	2	1	1	3	1	2	1	4	3	1	1	0	0	22

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	2	0	1	6	4	3	3	4	3	1	2	2	2	2	3	41
3.50 - 7.49	3	3	0	2	5	7	3	6	8	7	16	27	4	3	3	6	103
7.50 - 12.49	7	1	0	0	3	3	2	1	1	14	45	29	8	9	3	7	133
12.50 -18.49	0	0	0	0	0	0	0	0	1	11	29	9	12	1	0	1	64
18.50 -23.99	0	0	0	0	0	0	0	0	1	4	2	0	0	0	0	0	7
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	13	6	0	3	14	14	8	10	15	39	93	67	26	15	8	17	348

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	5	3	3	6	8	6	3	5	4	6	7	6	3	5	5	2	77
3.50 - 7.49	5	2	8	6	2	11	3	3	9	11	21	15	6	4	0	3	109
7.50 - 12.49	2	0	0	2	1	3	0	1	4	20	16	6	8	1	4	4	72
12.50 -18.49	2	0	0	0	0	1	0	0	0	5	5	0	1	0	0	3	17
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	14	5	11	14	11	21	6	9	17	43	50	27	18	10	9	12	279

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	2	5	2	1	0	1	0	1	2	3	6	5	2	1	1	0	32
3.50 - 7.49	0	0	2	0	0	0	0	1	1	6	7	5	1	0	1	0	24
7.50 - 12.49	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	5
12.50 -18.49	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	5	4	1	0	1	0	2	7	12	13	10	3	1	2	0	65

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	11	10	5	8	14	12	6	9	10	12	14	13	7	8	8	5	152
3.50 - 7.49	8	7	12	10	7	18	8	11	20	24	44	49	12	8	4	9	251
7.50 - 12.49	9	1	0	2	5	7	4	2	8	37	64	36	16	10	7	11	219
12.50 -18.49	2	0	0	0	0	1	0	0	2	17	35	9	13	1	0	4	84
18.50 -23.99	0	0	0	0	0	0	0	0	1	5	3	0	0	0	0	0	9
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30	18	17	20	26	38	18	22	41	95	160	107	48	27	19	29	719

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

AUGUST

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 719

TOTAL NUMBER OF MISSING OBSERVATIONS: 25

PERCENT DATA RECOVERY FOR THIS PERIOD: 96.6%

MEAN WIND SPEED FOR THIS PERIOD: 7.3 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.70	3.06	48.40	38.80	9.04	0.00

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	1	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0
C	1	1	0	2	1	1	3	1	2	1	4	3	1	1	0	0	0
D	13	6	0	3	14	14	8	10	15	39	93	67	26	15	8	17	0
E	14	5	11	14	11	21	6	9	17	43	50	27	18	10	9	12	2
F	2	5	4	1	0	1	0	2	7	12	13	10	3	1	2	0	2
G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	30	18	17	20	26	38	18	22	41	95	160	107	48	27	19	29	4

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
3.50 - 7.49	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	4
7.50 - 12.49	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	3
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	0	0	0	0	0	1	1	0	0	1	0	1	0	2	8

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
3.50 - 7.49	0	0	0	0	0	1	2	3	1	1	3	5	2	1	1	0	20
7.50 - 12.49	1	0	0	0	0	0	0	0	1	0	1	4	1	1	1	3	13
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	4	0	0	5
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	0	0	0	1	2	3	2	1	5	9	3	7	2	3	40

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	3	1	1	3	2	1	0	1	0	3	3	6	1	2	3	33
3.50 - 7.49	8	2	1	0	5	3	5	1	6	3	10	10	4	3	3	4	68
7.50 - 12.49	18	0	2	0	0	1	2	3	8	17	16	9	6	4	12	11	109
12.50 -18.49	1	2	0	0	0	0	0	0	3	16	22	8	11	7	4	2	76
18.50 -23.99	0	0	0	0	0	0	0	0	2	0	1	2	1	0	0	1	7
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
TOTAL	30	7	4	1	8	6	8	4	20	36	52	32	28	16	21	21	294

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	1	2	2	3	6	2	3	2	1	1	2	2	11	3	2	1	44
3.50 - 7.49	2	4	3	10	1	6	3	1	4	7	10	11	7	7	4	2	82
7.50 - 12.49	5	1	0	0	0	0	1	4	4	6	15	3	1	0	1	4	45
12.50 -18.49	3	0	0	0	0	1	0	2	4	11	6	2	0	0	0	2	31
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	7	5	13	7	9	7	9	13	25	33	18	19	10	7	9	205

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	3	1	3	2	4	3	1	2	1	1	3	4	5	3	7	0	43
3.50 - 7.49	1	2	5	5	1	8	3	2	0	2	8	6	5	1	0	0	49
7.50 - 12.49	0	0	2	1	0	0	1	1	4	5	6	0	0	0	0	4	24
12.50 -18.49	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	3	10	8	5	11	5	5	5	10	17	10	10	4	7	4	122

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	7
0.75 - 3.49	8	6	6	6	13	8	5	4	3	2	8	9	22	8	11	5	124
3.50 - 7.49	12	9	9	15	7	18	13	8	12	13	31	33	18	12	8	6	224
7.50 - 12.49	25	1	4	1	0	1	4	9	17	28	38	16	8	6	14	23	195
12.50 -18.49	4	2	0	0	0	1	0	2	7	29	29	10	11	11	4	4	114
18.50 -23.99	0	0	0	0	0	0	0	0	2	0	1	2	1	0	0	1	7
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
TOTAL	49	18	19	22	20	28	22	23	41	72	107	70	60	38	37	39	672

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

SEPTEMBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 672

TOTAL NUMBER OF MISSING OBSERVATIONS: 48

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.3%

MEAN WIND SPEED FOR THIS PERIOD: 7.8 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.30	1.19	5.95	43.75	30.51	18.15	0.15

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
B	1	1	0	0	0	0	0	1	1	0	0	1	0	1	0	2	0
C	2	0	0	0	0	1	2	3	2	1	5	9	3	7	2	3	0
D	30	7	4	1	8	6	8	4	20	36	52	32	28	16	21	21	0
E	11	7	5	13	7	9	7	9	13	25	33	18	19	10	7	9	3
F	4	3	10	8	5	11	5	5	5	10	17	10	10	4	7	4	4
G	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Total	49	18	19	22	20	28	22	23	41	72	107	70	60	38	37	39	7

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
12.50 -18.49	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	4

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
7.50 - 12.49	2	1	1	1	0	0	1	0	0	3	0	0	0	0	0	0	9
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	1	1	0	1	1	0	0	3	1	0	1	0	0	0	14

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
7.50 - 12.49	2	0	0	1	0	0	0	0	0	1	3	3	3	0	0	0	13
12.50 -18.49	0	0	0	0	0	2	0	0	0	1	3	0	0	0	0	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	1	1	0	2	0	0	0	2	6	3	3	0	0	1	21

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	1	2	0	2	0	1	1	0	0	0	0	1	9
3.50 - 7.49	2	1	1	5	6	0	5	3	6	3	6	2	5	2	0	5	52
7.50 - 12.49	3	1	0	4	5	1	3	2	5	9	26	23	9	7	4	12	114
12.50 -18.49	2	2	0	2	0	2	2	0	0	4	11	31	42	16	3	0	117
18.50 -23.99	0	0	0	0	0	2	2	0	1	3	1	13	14	10	0	0	46
> 23.99	0	0	0	0	0	0	0	0	0	1	0	5	10	0	0	0	16
TOTAL	8	4	1	11	12	7	12	7	12	21	45	74	80	35	7	18	354

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	1	1	3	1	0	1	7
3.50 - 7.49	1	2	4	3	0	1	0	1	1	1	11	6	14	1	2	0	48
7.50 - 12.49	3	1	0	3	10	1	3	1	4	4	11	12	10	0	3	3	69
12.50 -18.49	1	1	1	1	3	1	0	1	3	2	12	4	1	1	0	0	32
18.50 -23.99	0	1	0	0	0	0	0	0	1	0	4	0	0	0	0	0	6
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	5	5	7	13	3	3	3	9	7	39	23	28	3	5	4	162

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	0	0	0	2	0	1	3	1	2	1	0	0	11
3.50 - 7.49	3	1	4	7	0	0	0	0	4	3	11	1	1	2	2	1	40
7.50 - 12.49	0	0	2	2	1	0	0	0	5	2	2	1	3	0	1	0	19
12.50 -18.49	0	0	0	0	0	0	0	0	3	4	3	0	0	0	0	0	10
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	6	9	1	0	0	2	12	10	19	3	6	3	3	1	80

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	0	0	0	0	2	4	3	0	0	0	0	0	9
7.50 - 12.49	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	6
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	6	6	4	0	0	0	0	0	16

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	0	0	0	1	2	0	4	0	2	6	2	5	2	0	2	28
3.50 - 7.49	8	4	10	15	6	1	5	4	13	11	31	9	21	5	4	7	154
7.50 - 12.49	11	3	3	12	16	2	7	3	18	21	42	39	25	7	8	15	232
12.50 -18.49	3	3	2	3	3	6	2	1	6	11	30	35	43	17	3	0	168
18.50 -23.99	0	1	0	0	0	3	2	0	2	3	5	13	14	10	0	0	53
> 23.99	0	0	0	0	0	0	0	0	0	1	0	5	10	0	0	0	16
TOTAL	24	11	15	30	26	14	16	12	39	49	114	103	118	41	15	24	651

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

OCTOBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 651

TOTAL NUMBER OF MISSING OBSERVATIONS: 93

PERCENT DATA RECOVERY FOR THIS PERIOD: 87.5%

MEAN WIND SPEED FOR THIS PERIOD: 11.2 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.61	2.15	3.23	54.38	24.88	12.29	2.46

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
B	4	1	1	1	0	1	1	0	0	3	1	0	1	0	0	0	0
C	2	0	1	1	0	2	0	0	0	2	6	3	3	0	0	1	0
D	8	4	1	11	12	7	12	7	12	21	45	74	80	35	7	18	0
E	5	5	5	7	13	3	3	3	9	7	39	23	28	3	5	4	0
F	4	1	6	9	1	0	0	2	12	10	19	3	6	3	3	1	0
G	0	0	0	0	0	0	0	0	6	6	4	0	0	0	0	0	0
Total	24	11	15	30	26	14	16	12	39	49	114	103	118	41	15	24	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	1	5
3.50 - 7.49	9	4	5	5	4	2	1	1	1	4	6	5	6	1	4	7	65
7.50 - 12.49	24	5	5	4	8	1	0	0	6	6	10	2	11	19	39	23	163
12.50 -18.49	2	2	0	0	6	3	0	0	0	13	36	18	25	28	30	5	168
18.50 -23.99	0	0	0	0	0	0	0	0	0	2	7	11	11	5	1	0	37
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	3
TOTAL	35	12	10	9	19	7	1	1	7	25	59	37	56	53	74	36	441

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	0	1	1	0	1	2	0	0	1	1	2	1	1	0	12
3.50 - 7.49	0	2	1	2	1	1	3	5	5	2	3	7	8	2	1	0	43
7.50 - 12.49	1	0	1	10	1	1	1	2	3	2	1	5	14	1	0	0	43
12.50 -18.49	0	0	0	0	1	1	0	0	5	1	6	3	6	1	0	0	24
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	3	0	1	0	0	0	5
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	1	3	2	13	4	3	5	9	13	6	14	16	32	5	2	0	128

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	1	1	3	0	0	0	0	0	0	1	0	6
3.50 - 7.49	0	1	1	0	0	2	7	5	9	1	11	4	2	0	0	0	43
7.50 - 12.49	0	0	0	3	1	1	7	7	2	2	4	1	1	0	0	0	29
12.50 -18.49	0	0	0	0	0	0	0	0	1	2	2	0	1	0	0	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	1	3	1	4	15	15	12	5	19	5	4	0	1	0	86

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
7.50 - 12.49	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
12.50 -18.49	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	2	0	5	2	0	0	0	0	0	9

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	0	1	2	2	2	5	0	0	1	1	3	1	2	1	23
3.50 - 7.49	9	7	7	7	5	5	11	12	15	7	20	16	16	3	5	7	152
7.50 - 12.49	25	5	6	17	10	3	8	10	11	11	15	8	27	20	39	24	239
12.50 -18.49	2	2	0	0	7	4	0	0	6	20	46	21	32	29	30	5	204
18.50 -23.99	0	0	0	0	0	0	0	0	0	3	12	11	12	5	1	0	44
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	4
TOTAL	36	16	13	25	24	14	21	27	32	41	94	58	93	58	77	37	666

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

NOVEMBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 720

TOTAL NUMBER OF VALID OBSERVATIONS: 666

TOTAL NUMBER OF MISSING OBSERVATIONS: 54

PERCENT DATA RECOVERY FOR THIS PERIOD: 92.5%

MEAN WIND SPEED FOR THIS PERIOD: 11.1 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.30	66.22	19.22	12.91	1.35

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
D	35	12	10	9	19	7	1	1	7	25	59	37	56	53	74	36	0
E	1	3	2	13	4	3	5	9	13	6	14	16	32	5	2	0	0
F	0	1	1	3	1	4	15	15	12	5	19	5	4	0	1	0	0
G	0	0	0	0	0	0	0	2	0	5	2	0	0	0	0	0	0
Total	36	16	13	25	24	14	21	27	32	41	94	58	93	58	77	37	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	4
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
12.50 -18.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	3	0	0	0	0	0	1	0	2	0	0	0	6

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	4	5	2	2	6	0	3	1	0	1	0	0	0	1	0	26
3.50 - 7.49	6	1	3	19	16	11	5	1	5	3	6	11	6	1	3	11	108
7.50 - 12.49	20	2	1	6	8	6	0	2	4	5	14	16	22	12	17	20	155
12.50 -18.49	9	1	0	0	0	0	0	0	2	17	24	12	26	14	12	8	125
18.50 -23.99	0	0	0	0	0	0	0	0	0	2	10	3	10	8	1	1	35
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	12	3	0	0	16
TOTAL	36	8	9	27	26	23	5	6	12	27	55	43	76	38	34	40	465

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	1	1	3	0	2	1	2	2	2	2	0	0	1	4	2	0	23
3.50 - 7.49	1	2	2	3	9	9	3	5	7	4	2	1	1	0	2	1	52
7.50 - 12.49	2	0	0	2	1	1	2	1	7	8	15	6	14	0	0	0	59
12.50 -18.49	0	0	0	0	0	0	0	0	2	7	3	1	4	0	0	0	17
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	3	5	5	12	11	7	8	18	21	20	8	20	4	4	1	155

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	1	0	1	3	0	2	1	1	0	2	1	0	0	0	1	13
3.50 - 7.49	0	0	4	6	11	3	2	5	2	4	0	0	0	0	0	0	37
7.50 - 12.49	0	0	0	1	1	1	1	1	5	2	2	0	0	0	0	0	14
12.50 -18.49	0	0	0	0	0	0	1	0	2	1	2	0	0	0	0	0	6
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	4	8	15	4	6	7	10	7	6	1	0	0	0	1	71

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 -18.49	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	2	6	8	3	7	7	4	6	4	2	3	1	1	4	3	1	62
3.50 - 7.49	7	3	9	28	39	23	10	11	14	11	9	12	7	1	5	12	201
7.50 - 12.49	22	2	1	9	10	8	3	4	16	15	31	22	37	12	17	20	229
12.50 -18.49	9	1	0	0	0	0	1	0	7	25	29	13	31	14	12	8	150
18.50 -23.99	0	0	0	0	0	0	0	0	0	2	10	3	10	8	1	1	35
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	12	3	0	0	16
TOTAL	40	12	18	40	56	38	18	21	41	55	82	52	98	42	38	42	698

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

DECEMBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 744

TOTAL NUMBER OF VALID OBSERVATIONS: 698

TOTAL NUMBER OF MISSING OBSERVATIONS: 46

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.8%

MEAN WIND SPEED FOR THIS PERIOD: 9.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.86	66.62	22.21	10.17	0.14

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	3	0	0	0	0	0	1	0	2	0	0	0	0
D	36	8	9	27	26	23	5	6	12	27	55	43	76	38	34	40	0
E	4	3	5	5	12	11	7	8	18	21	20	8	20	4	4	1	4
F	0	1	4	8	15	4	6	7	10	7	6	1	0	0	0	1	1
G	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Total	40	12	18	40	56	38	18	21	41	55	82	52	98	42	38	42	5

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	2	1	1	1	1	2	1	0	1	0	0	0	0	0	0	1	11
12.50 -18.49	2	1	1	0	0	1	1	1	0	0	0	0	0	1	0	0	8
18.50 -23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	2	2	1	1	4	2	1	1	0	0	0	0	1	0	1	20

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
3.50 - 7.49	5	2	2	1	1	3	2	2	4	0	0	2	2	0	0	2	28
7.50 - 12.49	10	1	7	2	3	5	1	2	1	5	0	3	3	4	4	5	56
12.50 -18.49	4	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	9
18.50 -23.99	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	4
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	19	4	10	4	4	9	3	4	5	5	1	5	5	8	4	9	99

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	2	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	6
3.50 - 7.49	6	2	2	5	4	5	11	7	1	4	11	14	9	8	6	6	108
7.50 - 12.49	17	0	2	1	3	0	3	3	8	7	11	13	21	8	8	10	111
12.50 -18.49	0	0	0	1	0	2	0	0	4	4	7	1	6	11	5	0	37
18.50 -23.99	0	0	0	0	0	0	0	0	0	1	0	1	3	7	1	0	13
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25	2	4	7	8	8	14	10	13	16	29	29	39	35	20	16	275

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	18	17	17	13	20	18	7	15	12	12	15	17	24	19	8	18	250
3.50 - 7.49	74	33	55	83	74	55	38	33	50	42	95	127	71	40	59	89	1018
7.50 - 12.49	154	30	22	59	52	32	30	43	56	121	228	186	166	165	180	148	1672
12.50 -18.49	25	9	3	13	21	26	22	6	26	107	247	190	247	175	120	36	1273
18.50 -23.99	5	1	0	0	3	9	10	2	9	25	41	61	95	67	7	2	337
> 23.99	0	0	0	0	0	0	2	0	0	4	1	20	38	27	0	0	92
TOTAL	276	90	97	168	170	140	109	99	153	311	627	601	641	493	374	293	4643

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	11
0.75 - 3.49	18	10	14	19	27	17	19	16	14	14	26	21	41	29	17	9	311
3.50 - 7.49	23	24	44	46	40	60	41	30	49	43	78	77	85	38	21	18	717
7.50 - 12.49	25	8	7	34	26	18	41	26	43	66	94	78	88	17	22	20	613
12.50 -18.49	14	3	1	4	5	8	12	15	29	46	57	29	20	4	9	7	263
18.50 -23.99	0	1	0	0	0	1	3	4	5	5	9	1	1	0	0	0	30
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
TOTAL	80	46	66	103	98	104	116	91	140	174	265	206	236	88	69	54	1947

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	14
0.75 - 3.49	14	12	8	13	21	9	8	17	12	12	33	23	29	9	18	7	245
3.50 - 7.49	20	11	30	42	34	28	20	25	31	33	58	44	37	28	19	11	471
7.50 - 12.49	4	1	7	17	6	10	23	19	33	24	37	15	20	7	7	7	237
12.50 -18.49	2	0	1	1	0	0	3	4	10	17	15	3	2	0	0	0	58
18.50 -23.99	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	40	24	46	73	61	47	54	66	86	86	145	85	88	44	44	25	1028

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	1	2	0	0	0	1	0	3	0	0	0	1	1	10
3.50 - 7.49	0	0	0	4	2	1	2	5	6	6	9	2	1	4	0	0	42
7.50 - 12.49	0	0	0	0	0	0	5	9	15	7	6	8	4	0	0	0	54
12.50 -18.49	0	0	0	0	0	0	3	4	1	6	3	0	0	0	0	0	17
18.50 -23.99	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	5	4	1	11	18	23	19	21	10	5	4	1	1	124

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	26
0.75 - 3.49	52	39	41	46	71	46	34	48	40	38	77	61	94	58	44	36	825
3.50 - 7.49	128	72	133	181	155	152	114	102	148	128	251	266	205	118	105	126	2384
7.50 - 12.49	212	41	46	114	91	67	104	102	153	230	376	303	302	201	221	191	2754
12.50 -18.49	47	14	6	20	26	37	41	30	66	180	330	223	275	192	134	44	1665
18.50 -23.99	5	2	0	0	3	11	14	7	14	31	52	63	99	77	8	2	388
> 23.99	0	0	0	0	0	0	2	0	0	4	2	20	39	27	0	0	94
TOTAL	444	168	226	361	346	313	309	289	421	611	1088	936	1014	673	512	399	8136

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/80 - 12/31/80

ANNUAL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 8784

TOTAL NUMBER OF VALID OBSERVATIONS: 8136

TOTAL NUMBER OF MISSING OBSERVATIONS: 648

PERCENT DATA RECOVERY FOR THIS PERIOD: 92.6%

MEAN WIND SPEED FOR THIS PERIOD: 9.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.25	1.22	3.38	57.07	23.93	12.64	1.52

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	4	2	2	1	1	4	2	1	1	0	0	0	0	1	0	1	0
B	19	4	10	4	4	9	3	4	5	5	1	5	5	8	4	9	0
C	25	2	4	7	8	8	14	10	13	16	29	29	39	35	20	16	0
D	276	90	97	168	170	140	109	99	153	311	627	601	641	493	374	293	1
E	80	46	66	103	98	104	116	91	140	174	265	206	236	88	69	54	11
F	40	24	46	73	61	47	54	66	86	86	145	85	88	44	44	25	14
G	0	0	1	5	4	1	11	18	23	19	21	10	5	4	1	1	0
Total	444	168	226	361	346	313	309	289	421	611	1088	936	1014	673	512	399	26

APPENDIX D

Monthly and Annual Joint Frequency Distribution
of ∆T(500ft-35ft) and 500-ft Wind Data
(January 1, 1976 - December 31, 1980)

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	11	5	7	7	6	7	7	8	4	4	3	3	2	2	5	3	84
3.50 - 7.49	12	12	15	48	35	41	26	17	28	12	41	25	19	12	24	22	389
7.50 - 12.49	36	18	44	45	15	24	9	19	14	20	76	159	100	64	61	34	738
12.50 - 18.49	3	0	24	11	12	3	3	1	22	12	122	194	204	59	34	5	709
18.50 - 23.99	0	0	2	4	0	0	0	0	1	5	34	83	92	27	1	0	249
> 23.99	0	0	0	0	0	0	0	0	0	4	28	50	27	5	0	0	114
TOTAL	62	35	92	115	68	75	45	45	69	57	304	514	444	169	125	64	2285

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	2	3	4	3	2	3	6	5	3	3	1	3	4	3	4	54
3.50 - 7.49	11	0	6	12	16	12	19	6	24	12	19	12	7	7	1	3	167
7.50 - 12.49	0	0	3	18	12	9	28	15	10	8	22	21	13	5	1	2	167
12.50 - 18.49	0	0	0	1	3	5	1	6	8	6	12	5	5	0	1	0	53
18.50 - 23.99	0	0	0	0	3	1	0	3	1	2	1	2	2	0	0	0	15
> 23.99	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
TOTAL	16	2	12	35	38	29	52	36	48	31	57	41	30	16	6	9	458

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	1	1	4	1	2	3	0	3	2	4	1	3	0	1	1	27
3.50 - 7.49	2	1	3	5	2	2	4	9	6	4	8	9	6	1	0	0	62
7.50 - 12.49	1	0	0	4	0	0	3	5	6	3	0	4	9	1	1	0	37
12.50 - 18.49	0	0	0	0	0	0	1	1	0	2	0	1	1	0	0	0	6
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	4	13	3	4	11	15	15	11	12	15	19	2	2	1	132

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	2	0	1	1	0	1	0	1	0	0	0	0	6
3.50 - 7.49	0	0	0	0	0	0	1	2	6	2	1	0	0	0	0	0	12
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	2	0	2	3	6	3	1	1	0	0	0	0	18

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	16	8	11	15	12	11	14	15	12	10	10	6	8	6	9	8	171
3.50 - 7.49	25	13	24	65	54	55	50	34	64	30	69	46	32	20	25	25	631
7.50 - 12.49	37	18	47	67	27	33	40	39	30	31	98	184	122	70	63	36	942
12.50 - 18.49	3	0	24	12	15	8	5	8	30	20	134	200	210	59	35	5	768
18.50 - 23.99	0	0	2	4	3	1	0	3	2	7	35	85	94	27	1	0	264
> 23.99	0	0	0	0	1	0	1	0	0	4	28	50	27	5	0	0	116
TOTAL	81	39	108	163	112	108	110	99	138	102	374	571	493	187	133	74	2894

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JANUARY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 2894

TOTAL NUMBER OF MISSING OBSERVATIONS: 826

PERCENT DATA RECOVERY FOR THIS PERIOD: 77.8%

MEAN WIND SPEED FOR THIS PERIOD: 11.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.03	78.96	15.83	4.56	0.62

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	62	35	92	115	68	75	45	45	69	57	304	514	444	169	125	64	2
E	16	2	12	35	38	29	52	36	48	31	57	41	30	16	6	9	0
F	3	2	4	13	3	4	11	15	15	11	12	15	19	2	2	1	0
G	0	0	0	0	2	0	2	3	6	3	1	1	0	0	0	0	0
Total	81	39	108	163	112	108	110	99	138	102	374	571	493	187	133	74	2

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	4
7.50 - 12.49	0	0	0	1	3	0	0	0	0	0	0	0	3	2	0	0	9
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	0	5
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	2	4	2	0	0	0	0	0	0	6	3	1	0	19

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	6	6	3	4	6	6	2	3	4	2	2	3	6	3	2	10	68
3.50 - 7.49	27	9	34	37	33	11	7	12	8	8	41	32	20	11	36	37	363
7.50 - 12.49	61	13	21	25	19	14	1	3	14	21	76	86	122	118	122	62	778
12.50 - 18.49	12	3	16	11	2	0	1	2	2	27	111	81	162	101	36	15	582
18.50 - 23.99	2	0	7	1	0	0	1	0	0	11	48	40	50	27	1	0	188
> 23.99	0	0	5	1	0	1	1	0	0	1	4	12	29	7	0	0	61
TOTAL	108	31	86	79	60	32	13	20	28	70	282	254	389	267	197	124	2040

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	3	5	8	0	5	3	2	1	2	4	2	5	4	3	2	5	54
3.50 - 7.49	13	12	13	14	15	11	10	3	3	6	6	13	18	12	3	17	169
7.50 - 12.49	13	1	2	5	18	13	9	12	18	16	13	30	41	12	14	6	223
12.50 - 18.49	0	0	1	1	1	1	5	0	6	19	31	25	17	6	4	0	117
18.50 - 23.99	0	0	0	0	0	1	2	0	0	2	20	8	7	0	0	0	40
> 23.99	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	4
TOTAL	29	18	24	20	39	29	29	16	29	47	72	82	89	33	23	28	608

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	4	3	4	4	6	3	1	5	3	3	9	9	4	3	1	2	64
3.50 - 7.49	7	2	5	6	11	10	6	9	10	5	6	6	6	3	3	4	99
7.50 - 12.49	0	0	1	1	1	9	8	3	14	23	15	6	4	1	1	0	87
12.50 - 18.49	0	0	0	0	0	3	1	0	1	17	17	5	1	0	1	0	46
18.50 - 23.99	0	0	0	0	0	0	2	0	0	1	2	0	0	0	0	0	5
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	11	5	10	11	18	25	18	17	28	49	49	26	15	7	6	6	302

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
7.50 - 12.49	0	0	0	0	0	0	5	0	7	7	1	0	0	0	0	0	20
12.50 - 18.49	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
18.50 - 23.99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	5	2	7	13	2	0	0	0	0	0	29

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	13	14	15	8	17	13	5	9	9	9	13	17	14	9	5	17	187
3.50 - 7.49	47	23	53	58	60	33	23	24	21	23	53	51	44	26	42	58	639
7.50 - 12.49	74	14	29	32	41	36	23	18	53	67	105	122	170	133	137	68	1122
12.50 - 18.49	12	3	17	12	3	4	7	2	9	65	160	111	183	108	42	15	753
18.50 - 23.99	2	0	7	1	0	1	5	2	0	14	70	48	57	27	1	0	235
> 23.99	0	0	5	1	0	1	2	0	0	1	4	13	31	7	0	0	65
TOTAL	148	54	126	112	121	88	65	55	92	179	405	362	499	310	227	158	3003

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

FEBRUARY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3408

TOTAL NUMBER OF VALID OBSERVATIONS: 3003

TOTAL NUMBER OF MISSING OBSERVATIONS: 405

PERCENT DATA RECOVERY FOR THIS PERIOD: 88.1%

MEAN WIND SPEED FOR THIS PERIOD: 10.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.13	0.03	0.63	67.93	20.25	10.06	0.97

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	1	2	4	2	0	0	0	0	0	0	6	3	1	0	0
D	108	31	86	79	60	32	13	20	28	70	282	254	389	267	197	124	0
E	29	18	24	20	39	29	29	16	29	47	72	82	89	33	23	28	1
F	11	5	10	11	18	25	18	17	28	49	49	26	15	7	6	6	1
G	0	0	0	0	0	0	5	2	7	13	2	0	0	0	0	0	0
Total	148	54	126	112	121	88	65	55	92	179	405	362	499	310	227	158	2

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
12.50 - 18.49	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	2	1	1	0	0	3	1	0	0	0	0	0	0	0	0	0	8
7.50 - 12.49	1	0	1	0	2	4	2	0	0	0	0	0	0	0	0	1	11
12.50 - 18.49	0	0	1	1	0	1	3	0	0	0	0	0	1	0	0	0	7
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	3	1	3	1	2	8	6	0	0	0	0	0	3	0	0	1	28

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	5	1	0	0	1	9	3	0	0	0	0	0	1	0	0	1	21
7.50 - 12.49	5	1	1	0	0	3	2	0	0	1	0	0	5	3	2	5	28
12.50 - 18.49	0	0	2	1	0	0	3	1	0	0	0	2	5	4	2	0	20
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	1	5	2	2	0	10
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	4
TOTAL	10	2	3	1	1	12	8	1	0	1	0	3	19	10	6	6	83

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	3	2	6	6	6	2	1	1	6	3	5	3	3	8	4	3	62
3.50 - 7.49	34	17	23	21	32	23	24	10	10	5	13	19	18	11	22	28	310
7.50 - 12.49	55	15	14	45	58	15	30	21	22	35	62	48	64	69	68	37	658
12.50 - 18.49	2	7	8	17	14	31	34	12	19	49	84	126	150	100	53	11	717
18.50 - 23.99	0	0	0	0	1	5	12	6	13	15	26	38	94	32	9	1	252
> 23.99	0	0	0	0	0	0	2	0	2	7	10	19	47	30	6	0	123
TOTAL	94	41	51	89	111	76	103	50	72	114	200	253	376	250	162	80	2123

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	5	4	7	5	3	3	3	6	5	5	8	3	3	0	62
3.50 - 7.49	1	16	12	8	13	21	14	11	14	5	11	8	14	6	14	6	174
7.50 - 12.49	1	0	6	16	17	17	18	19	22	17	11	22	20	15	7	4	212
12.50 - 18.49	0	0	2	1	1	15	21	15	23	25	24	16	8	4	1	0	156
18.50 - 23.99	0	0	0	0	0	3	11	2	5	5	12	2	1	0	0	0	41
> 23.99	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	3
TOTAL	3	17	25	29	38	61	67	50	67	60	63	53	51	28	26	10	648

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	2	2	4	3	2	3	5	3	3	4	4	0	2	0	3	3	43
3.50 - 7.49	5	6	13	12	7	25	16	8	10	4	17	9	4	3	5	2	146
7.50 - 12.49	2	2	8	17	7	15	4	4	14	14	10	0	4	6	3	2	112
12.50 - 18.49	0	0	0	0	0	4	3	5	10	21	2	0	0	0	0	0	45
18.50 - 23.99	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	6
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	10	25	32	16	48	33	20	37	43	33	9	10	9	11	7	353

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	2	3	5	1	2	0	1	0	1	1	0	0	2	1	0	19
3.50 - 7.49	1	2	5	6	6	1	0	0	3	1	1	0	0	0	0	1	27
7.50 - 12.49	0	0	0	1	3	1	0	1	10	7	3	2	0	0	0	1	29
12.50 - 18.49	1	0	0	0	2	3	0	1	2	12	0	0	0	0	0	0	21
18.50 - 23.99	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	4	8	12	12	7	1	3	15	22	6	2	0	2	1	2	99

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	6	7	18	18	15	12	9	8	12	14	15	8	13	13	11	6	186
3.50 - 7.49	48	43	54	47	59	82	58	29	37	15	42	36	37	20	41	38	686
7.50 - 12.49	64	18	30	79	88	56	56	45	68	74	86	72	93	93	80	50	1052
12.50 - 18.49	3	7	13	20	17	54	65	34	54	107	110	144	164	108	56	11	967
18.50 - 23.99	0	0	0	0	1	9	29	8	18	21	39	41	101	34	11	1	313
> 23.99	0	0	0	0	0	0	2	0	2	9	10	19	51	31	7	0	131
TOTAL	121	75	115	164	181	213	219	124	191	240	302	320	459	299	206	106	3337

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MARCH

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3337

TOTAL NUMBER OF MISSING OBSERVATIONS: 383

PERCENT DATA RECOVERY FOR THIS PERIOD: 89.7%

MEAN WIND SPEED FOR THIS PERIOD: 11.7 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.09	0.84	2.49	63.62	19.42	10.58	2.97

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
B	3	1	3	1	2	8	6	0	0	0	0	0	3	0	0	1	0
C	10	2	3	1	1	12	8	1	0	1	0	3	19	10	6	6	0
D	94	41	51	89	111	76	103	50	72	114	200	253	376	250	162	80	1
E	3	17	25	29	38	61	67	50	67	60	63	53	51	28	26	10	0
F	9	10	25	32	16	48	33	20	37	43	33	9	10	9	11	7	1
G	2	4	8	12	12	7	1	3	15	22	6	2	0	2	1	2	0
Total	121	75	115	164	181	213	219	124	191	240	302	320	459	299	206	106	2

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
7.50 - 12.49	5	2	2	0	1	0	0	0	0	0	2	2	5	3	1	2	25
12.50 - 18.49	2	1	0	2	0	0	0	0	0	0	0	0	5	2	0	1	13
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	3	3	2	1	0	0	0	0	0	2	2	11	5	1	5	42

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
3.50 - 7.49	7	2	2	0	1	0	0	0	0	1	1	1	5	2	4	1	27
7.50 - 12.49	14	1	2	2	1	1	0	0	0	1	0	6	13	4	10	10	65
12.50 - 18.49	7	0	0	3	0	2	0	0	0	1	1	3	6	8	6	8	45
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	8	2	1	12
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3
TOTAL	28	3	4	5	2	3	0	0	0	3	2	10	27	25	22	20	154

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	4	4	4	2	3	2	1	3	5	4	3	6	6	1	6	8	62
3.50 - 7.49	25	19	41	9	7	7	14	6	12	17	24	30	21	17	31	16	296
7.50 - 12.49	76	31	6	13	25	20	9	10	10	27	52	37	41	61	95	74	587
12.50 - 18.49	32	6	0	11	17	22	23	7	6	33	62	71	71	100	69	35	565
18.50 - 23.99	0	0	0	2	2	15	11	5	4	6	28	33	53	26	4	4	193
> 23.99	0	1	0	0	0	1	2	1	1	1	2	11	24	10	2	0	56
TOTAL	137	61	51	37	54	67	60	32	38	88	171	188	216	215	207	137	1760

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	4	0	9	5	9	5	8	1	1	4	7	3	4	2	5	5	72
3.50 - 7.49	20	17	12	15	22	19	15	11	17	8	13	15	17	13	9	9	232
7.50 - 12.49	13	10	5	13	18	8	12	12	15	12	19	14	26	18	11	19	225
12.50 - 18.49	5	2	0	4	4	4	14	6	12	9	7	22	11	5	5	4	114
18.50 - 23.99	0	0	1	1	0	0	0	0	0	2	5	5	3	1	0	0	18
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
TOTAL	42	29	27	38	53	36	49	30	45	35	52	59	62	39	30	37	666

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	6	4	7	6	8	2	5	2	9	8	8	5	10	5	6	6	97
3.50 - 7.49	9	12	22	18	18	12	6	12	13	10	11	22	28	13	14	7	227
7.50 - 12.49	4	4	5	10	7	6	6	4	3	6	15	30	20	12	3	5	140
12.50 - 18.49	1	0	2	0	0	0	2	3	4	5	6	5	3	1	1	2	35
18.50 - 23.99	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	20	20	36	34	33	20	20	21	29	29	42	62	61	31	24	20	504

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	5	2	0	1	2	0	0	0	0	3	0	0	0	0	2	16
3.50 - 7.49	0	1	6	7	0	0	1	0	3	2	10	11	1	3	0	0	45
7.50 - 12.49	0	0	0	0	0	0	2	3	0	3	5	11	7	0	0	0	31
12.50 - 18.49	0	0	0	0	0	0	3	2	0	0	1	0	0	0	0	0	6
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	6	8	7	1	2	6	5	3	5	21	22	8	3	0	2	100

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	15	13	23	13	21	11	14	6	15	16	21	14	21	9	17	21	250
3.50 - 7.49	61	51	83	49	48	38	36	29	45	38	59	79	73	48	58	34	829
7.50 - 12.49	112	48	20	38	52	35	29	29	28	49	93	100	112	98	120	110	1073
12.50 - 18.49	47	9	2	20	21	28	42	18	22	48	77	101	96	116	81	50	778
18.50 - 23.99	0	0	1	3	2	15	12	5	4	8	37	38	57	35	6	6	229
> 23.99	0	1	0	0	0	1	2	1	1	1	3	11	26	12	2	0	61
TOTAL	235	122	129	123	144	128	135	88	115	160	290	343	385	318	284	221	3226

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

APRIL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3226

TOTAL NUMBER OF MISSING OBSERVATIONS: 374

PERCENT DATA RECOVERY FOR THIS PERIOD: 89.6%

MEAN WIND SPEED FOR THIS PERIOD: 10.4 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	1.30	4.77	54.56	20.64	15.62	3.10

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	7	3	3	2	1	0	0	0	0	0	2	2	11	5	1	5	0
C	28	3	4	5	2	3	0	0	0	3	2	10	27	25	22	20	0
D	137	61	51	37	54	67	60	32	38	88	171	188	216	215	207	137	1
E	42	29	27	38	53	36	49	30	45	35	52	59	62	39	30	37	3
F	20	20	36	34	33	20	20	21	29	29	42	62	61	31	24	20	2
G	1	6	8	7	1	2	6	5	3	5	21	22	8	3	0	2	0
Total	235	122	129	123	144	128	135	88	115	160	290	343	385	318	284	221	6

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	2	0	2	3	2	0	1	1	0	0	0	0	1	2	0	2	16
12.50 - 18.49	2	1	0	0	3	0	0	0	2	0	0	0	0	3	0	0	11
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	2	3	5	0	1	1	2	0	0	0	1	5	0	2	27

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
3.50 - 7.49	2	0	1	1	2	1	2	2	1	0	1	0	0	0	0	0	13
7.50 - 12.49	7	3	5	3	0	1	3	3	0	3	0	5	6	2	3	3	47
12.50 - 18.49	6	1	1	1	1	1	1	0	1	0	0	0	1	1	5	1	21
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
TOTAL	15	4	7	5	3	3	6	5	2	3	1	5	7	6	9	4	85

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3
3.50 - 7.49	7	3	6	2	5	4	3	0	1	2	4	2	6	4	0	2	51
7.50 - 12.49	13	2	3	3	2	3	3	4	2	3	6	4	12	9	7	3	79
12.50 - 18.49	2	0	1	0	1	0	2	0	0	1	4	6	6	5	8	11	47
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	1	0	2	3	0	0	6
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
TOTAL	23	5	10	5	8	7	8	4	3	6	15	13	27	22	15	17	188

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	5	9	8	6	7	3	3	2	3	2	6	6	8	7	3	3	81
3.50 - 7.49	22	18	22	32	17	23	11	14	16	21	42	42	31	22	39	24	396
7.50 - 12.49	52	16	20	22	23	21	28	14	23	41	68	54	39	55	63	50	589
12.50 - 18.49	19	5	7	7	10	15	19	8	8	21	72	59	63	38	41	27	419
18.50 - 23.99	3	0	0	0	4	1	1	1	1	4	16	2	18	12	2	2	67
> 23.99	0	0	0	0	0	0	0	0	1	0	3	3	6	2	0	0	15
TOTAL	101	48	57	67	61	63	62	39	52	89	207	166	165	136	148	106	1567

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	13	4	1	5	8	8	3	5	6	3	2	7	8	7	4	3	87
3.50 - 7.49	16	22	21	21	22	18	13	10	19	13	18	30	21	18	10	6	278
7.50 - 12.49	12	6	15	22	9	12	13	12	13	18	23	16	25	14	17	12	239
12.50 - 18.49	8	7	3	0	0	3	17	8	9	18	32	11	13	0	1	4	134
18.50 - 23.99	0	0	0	0	0	0	6	0	6	0	4	2	0	0	0	0	18
> 23.99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL	49	39	40	48	39	41	52	35	53	52	79	67	67	39	32	25	757

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	5	5	9	7	7	5	8	4	7	1	4	6	7	7	11	7	100
3.50 - 7.49	15	13	19	24	26	13	9	12	15	11	24	24	35	28	20	9	297
7.50 - 12.49	1	3	5	14	6	10	11	10	6	20	16	7	9	9	8	2	137
12.50 - 18.49	1	0	1	2	1	1	9	2	2	9	7	1	1	1	2	1	41
18.50 - 23.99	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22	21	34	47	40	29	38	29	30	41	51	38	52	45	41	19	579

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	2	0	5	10	2	0	3	1	3	2	2	1	3	1	3	2	40
3.50 - 7.49	2	3	3	2	5	8	7	3	4	2	6	5	3	3	1	2	59
7.50 - 12.49	0	2	1	0	1	1	0	4	1	7	3	6	4	0	1	1	32
12.50 - 18.49	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	3
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	5	9	12	8	9	10	9	8	11	14	12	10	4	5	5	136

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	26	18	23	28	24	16	17	12	19	8	14	20	27	22	22	16	312
3.50 - 7.49	64	59	72	82	77	67	45	41	56	49	95	103	96	75	70	43	1094
7.50 - 12.49	87	32	51	67	43	48	59	48	45	92	116	92	96	91	99	73	1139
12.50 - 18.49	38	14	13	10	16	20	48	19	22	49	117	77	84	48	57	44	676
18.50 - 23.99	3	0	0	0	4	1	8	2	7	4	22	4	20	16	2	2	95
> 23.99	0	0	0	0	0	0	0	0	1	0	3	5	6	5	0	0	20
TOTAL	218	123	159	187	164	152	177	122	150	202	367	301	329	257	250	178	3339

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

MAY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3339

TOTAL NUMBER OF MISSING OBSERVATIONS: 381

PERCENT DATA RECOVERY FOR THIS PERIOD: 89.8%

MEAN WIND SPEED FOR THIS PERIOD: 9.0 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.81	2.55	5.63	46.93	22.67	17.34	4.07

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	4	1	2	3	5	0	1	1	2	0	0	0	1	5	0	2	0
B	15	4	7	5	3	3	6	5	2	3	1	5	7	6	9	4	0
C	23	5	10	5	8	7	8	4	3	6	15	13	27	22	15	17	0
D	101	48	57	67	61	63	62	39	52	89	207	166	165	136	148	106	0
E	49	39	40	48	39	41	52	35	53	52	79	67	67	39	32	25	0
F	22	21	34	47	40	29	38	29	30	41	51	38	52	45	41	19	2
G	4	5	9	12	8	9	10	9	8	11	14	12	10	4	5	5	1
Total	218	123	159	187	164	152	177	122	150	202	367	301	329	257	250	178	3

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	3	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	7
7.50 - 12.49	5	1	0	1	1	3	2	2	3	3	0	2	2	1	5	3	34
12.50 - 18.49	0	0	0	0	0	1	1	3	1	1	0	0	1	2	2	0	12
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	1	1	1	1	4	3	5	5	5	0	2	3	3	8	3	53

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	4	1	3	2	3	1	1	3	2	0	1	2	2	0	0	2	27
7.50 - 12.49	3	0	1	9	7	3	2	4	4	5	3	5	3	9	6	5	69
12.50 - 18.49	1	0	0	0	0	0	0	2	3	3	2	0	1	3	0	1	16
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	1	2	1	3	0	0	7
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	8	1	5	11	10	4	3	9	9	8	8	9	7	15	6	8	121

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
3.50 - 7.49	1	0	3	1	1	1	5	3	9	1	3	3	8	7	6	2	54
7.50 - 12.49	7	3	1	5	4	0	1	5	9	6	8	11	13	9	12	12	106
12.50 - 18.49	2	1	0	0	0	0	0	0	2	5	7	4	7	2	9	3	42
18.50 - 23.99	0	0	0	0	0	0	0	0	1	1	3	5	7	5	1	0	23
> 23.99	0	1	0	0	0	0	0	0	0	2	4	4	0	0	1	0	12
TOTAL	10	5	4	6	5	1	6	8	21	15	25	27	36	23	29	17	238

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	0	3	4	4	1	4	1	3	3	6	6	8	6	3	2	57
3.50 - 7.49	11	14	16	10	7	8	12	16	18	27	25	32	32	15	24	29	296
7.50 - 12.49	43	9	5	9	12	3	5	17	41	56	69	49	25	30	53	59	485
12.50 - 18.49	15	1	1	0	1	1	3	7	22	45	80	47	35	23	41	23	345
18.50 - 23.99	1	0	0	0	0	0	0	0	3	9	13	7	12	10	6	3	64
> 23.99	1	0	0	0	0	0	0	0	0	1	3	3	2	1	0	1	12
TOTAL	74	24	25	23	24	13	24	41	87	141	196	144	114	85	127	117	1259

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	6	6	9	3	9	17	12	8	4	6	12	4	14	5	5	3	123
3.50 - 7.49	10	12	15	13	14	22	16	17	25	25	20	19	38	21	11	15	293
7.50 - 12.49	17	5	4	5	6	5	9	6	20	44	40	30	22	12	9	10	244
12.50 - 18.49	5	4	0	0	0	1	2	6	25	32	25	18	7	1	16	4	146
18.50 - 23.99	0	0	0	0	0	0	1	0	1	3	4	0	1	0	0	1	11
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	38	27	28	21	29	45	40	37	75	110	101	71	82	39	41	33	821

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	10
0.75 - 3.49	7	6	6	9	26	7	4	8	10	9	11	17	22	8	9	7	166
3.50 - 7.49	12	10	11	17	23	12	6	15	17	22	29	36	48	20	15	6	299
7.50 - 12.49	3	3	1	1	1	4	6	3	8	20	16	15	11	1	2	3	98
12.50 - 18.49	0	0	0	0	1	1	2	3	4	9	6	0	1	0	0	1	28
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22	19	18	27	51	24	18	29	39	60	62	68	83	29	26	17	602

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	0	0	1	0	2	1	3	0	1	0	0	0	0	0	0	0	8
3.50 - 7.49	0	0	0	1	1	1	2	6	3	0	2	0	0	0	0	0	16
7.50 - 12.49	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	7
12.50 - 18.49	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	1	4	3	8	8	5	1	3	0	0	0	0	0	35

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	15
0.75 - 3.49	16	12	20	16	41	26	23	17	18	18	29	27	45	19	17	12	356
3.50 - 7.49	41	37	49	44	49	45	42	60	75	76	80	92	128	63	57	54	992
7.50 - 12.49	78	21	12	30	32	19	26	38	86	135	137	112	76	62	87	92	1043
12.50 - 18.49	23	6	1	0	2	4	10	22	57	95	120	69	52	31	68	32	592
18.50 - 23.99	1	0	0	0	0	0	1	0	5	13	21	14	22	18	7	4	106
> 23.99	1	1	0	0	0	0	0	0	0	3	8	7	2	1	1	1	25
TOTAL	160	77	82	90	124	94	102	137	241	340	395	321	325	194	237	195	3129

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JUNE

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3129

TOTAL NUMBER OF MISSING OBSERVATIONS: 471

PERCENT DATA RECOVERY FOR THIS PERIOD: 86.9%

MEAN WIND SPEED FOR THIS PERIOD: 8.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
1.69	3.87	7.61	40.24	26.24	19.24	1.12

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	8	1	1	1	1	4	3	5	5	5	0	2	3	3	8	3	0
B	8	1	5	11	10	4	3	9	9	8	8	9	7	15	6	8	0
C	10	5	4	6	5	1	6	8	21	15	25	27	36	23	29	17	0
D	74	24	25	23	24	13	24	41	87	141	196	144	114	85	127	117	0
E	38	27	28	21	29	45	40	37	75	110	101	71	82	39	41	33	4
F	22	19	18	27	51	24	18	29	39	60	62	68	83	29	26	17	10
G	0	0	1	1	4	3	8	8	5	1	3	0	0	0	0	0	1
Total	160	77	82	90	124	94	102	137	241	340	395	321	325	194	237	195	15

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	2	1	3	1	1	0	1	0	2	1	0	2	4	0	1	0	19
7.50 - 12.49	3	3	1	3	0	1	0	1	5	2	3	3	0	0	0	2	27
12.50 - 18.49	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	4
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	4	5	4	1	1	1	1	8	5	4	5	4	0	1	2	51

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	2	0	3	1	3	0	1	3	1	2	3	0	1	0	1	3	24
7.50 - 12.49	8	1	1	1	0	2	0	1	7	4	10	7	4	0	5	1	52
12.50 - 18.49	5	0	0	0	0	0	0	1	0	3	3	4	0	8	2	0	26
18.50 - 23.99	0	0	0	0	0	0	0	0	0	1	1	1	0	0	2	0	5
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	1	4	2	3	2	1	5	8	10	17	12	5	8	10	4	108

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
3.50 - 7.49	10	5	1	3	3	2	5	2	7	3	8	9	6	3	3	5	75
7.50 - 12.49	6	0	1	1	0	0	0	2	8	12	12	11	8	6	6	2	75
12.50 - 18.49	2	1	0	0	0	0	0	0	1	5	6	6	3	3	2	1	30
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	18	6	2	4	4	2	5	4	17	20	26	27	17	14	11	8	185

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	11	5	9	12	6	7	6	3	2	5	8	11	11	7	8	4	115
3.50 - 7.49	34	16	17	12	11	8	9	12	21	18	39	62	29	32	24	33	377
7.50 - 12.49	60	5	14	16	32	6	6	8	33	81	78	68	61	28	41	55	592
12.50 - 18.49	7	1	1	2	0	0	3	1	9	32	71	55	45	22	9	18	276
18.50 - 23.99	0	2	0	0	0	0	1	0	3	1	6	8	4	4	1	1	31
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
TOTAL	112	29	41	42	49	21	25	24	68	137	203	204	151	93	83	111	1395

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	8	9	12	13	6	9	4	10	23	7	17	11	27	14	12	8	190
3.50 - 7.49	19	13	24	17	11	12	19	12	23	27	36	56	63	33	18	9	392
7.50 - 12.49	20	4	5	5	2	0	6	4	25	51	51	31	34	16	10	15	279
12.50 - 18.49	6	0	0	1	1	0	0	1	7	40	24	7	9	4	5	6	111
18.50 - 23.99	0	0	0	0	0	1	0	0	1	2	3	0	1	0	0	0	8
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	53	26	41	36	20	22	29	27	79	127	132	105	134	67	45	38	982

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	6
0.75 - 3.49	11	7	10	11	17	9	8	9	12	12	17	22	21	7	11	11	195
3.50 - 7.49	15	13	7	8	10	3	7	10	14	21	21	26	24	21	7	11	218
7.50 - 12.49	6	1	0	1	0	2	3	1	5	10	7	4	14	8	7	6	75
12.50 - 18.49	2	0	0	0	0	0	1	0	4	2	4	0	0	1	3	1	18
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	34	21	17	20	27	14	19	20	35	45	49	52	59	37	28	29	512

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	2	1	1	0	0	2	0	0	0	0	0	0	6
3.50 - 7.49	0	0	0	0	0	0	1	1	2	0	0	0	0	1	0	0	5
7.50 - 12.49	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	2	1	2	1	3	2	0	0	0	1	0	0	12

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	9
0.75 - 3.49	31	21	32	36	32	26	19	22	38	26	42	44	59	28	31	23	510
3.50 - 7.49	82	48	55	42	39	25	43	40	70	72	107	155	127	90	54	61	1110
7.50 - 12.49	103	14	22	27	34	11	15	17	84	160	161	124	121	58	69	81	1101
12.50 - 18.49	22	2	1	3	1	0	4	3	22	84	109	72	57	38	21	26	465
18.50 - 23.99	0	2	0	0	0	1	1	0	4	4	10	10	5	6	3	1	47
> 23.99	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3
TOTAL	238	87	110	108	106	63	82	82	218	346	431	405	370	220	178	192	3245

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

JULY

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3245

TOTAL NUMBER OF MISSING OBSERVATIONS: 475

PERCENT DATA RECOVERY FOR THIS PERIOD: 87.2%

MEAN WIND SPEED FOR THIS PERIOD: 7.8 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
1.57	3.33	5.70	42.99	30.26	15.78	0.37

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	5	4	5	4	1	1	1	1	8	5	4	5	4	0	1	2	0
B	16	1	4	2	3	2	1	5	8	10	17	12	5	8	10	4	0
C	18	6	2	4	4	2	5	4	17	20	26	27	17	14	11	8	0
D	112	29	41	42	49	21	25	24	68	137	203	204	151	93	83	111	2
E	53	26	41	36	20	22	29	27	79	127	132	105	134	67	45	38	1
F	34	21	17	20	27	14	19	20	35	45	49	52	59	37	28	29	6
G	0	0	0	0	2	1	2	1	3	2	0	0	0	1	0	0	0
Total	238	87	110	108	106	63	82	82	218	346	431	405	370	220	178	192	9

PROGRAM: JFD REVISION: 4P

BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	1	2	0	2	1	1	0	0	2	1	1	0	0	0	0	0	11
7.50 - 12.49	0	0	1	6	4	3	0	0	5	5	1	1	0	0	0	0	26
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	5
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	2	1	8	5	4	0	0	7	6	2	3	3	0	0	0	42

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	1	3	3	2	2	0	2	0	0	0	2	6	1	0	1	2	25
7.50 - 12.49	3	3	3	3	1	2	0	0	0	10	9	6	3	4	0	0	47
12.50 - 18.49	0	0	0	0	0	0	0	0	0	2	3	3	2	2	1	0	13
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	6	6	5	3	2	2	0	0	12	14	15	6	6	2	2	85

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	4
3.50 - 7.49	2	1	1	4	2	4	1	1	3	2	3	7	9	1	3	3	47
7.50 - 12.49	1	1	1	1	2	1	2	0	5	8	13	11	0	1	4	2	53
12.50 - 18.49	0	0	1	1	0	0	0	0	0	4	10	5	2	5	1	0	29
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	2	3	7	4	6	3	1	9	14	26	23	11	7	8	5	133

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	7	8	7	13	15	9	10	10	12	8	8	6	4	9	9	9	144
3.50 - 7.49	28	18	13	27	24	19	11	14	24	28	50	60	24	19	21	27	407
7.50 - 12.49	52	27	21	9	9	8	9	5	21	65	131	104	65	36	45	32	639
12.50 - 18.49	6	5	4	0	0	1	3	2	3	39	140	48	32	11	9	8	311
18.50 - 23.99	0	0	0	0	0	0	0	0	1	4	5	3	1	0	1	0	15
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL	93	58	45	49	48	37	33	31	61	144	335	221	126	75	85	76	1519

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	20	13	18	18	19	13	7	18	20	13	20	30	28	18	17	13	285
3.50 - 7.49	15	12	40	34	18	22	23	20	28	36	57	50	56	33	10	9	463
7.50 - 12.49	16	5	6	6	13	5	5	5	31	70	41	31	31	6	11	9	291
12.50 - 18.49	7	0	0	0	0	2	0	0	16	39	55	3	6	1	5	10	144
18.50 - 23.99	0	0	0	0	0	0	0	0	1	2	4	0	0	0	1	0	8
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	58	30	64	58	50	42	35	43	96	160	177	114	121	58	45	41	1195

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	7	10	9	12	15	5	2	6	8	12	13	17	22	9	10	9	166
3.50 - 7.49	12	11	10	11	21	9	11	4	4	19	30	22	14	17	8	4	207
7.50 - 12.49	5	3	0	2	3	5	2	0	13	15	17	0	2	2	3	3	75
12.50 - 18.49	1	0	0	0	0	0	0	0	5	7	8	0	0	0	0	0	21
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	25	24	19	25	39	19	15	10	30	53	68	39	38	28	21	16	472

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	35	31	34	44	49	28	20	34	41	33	41	53	54	36	36	31	600
3.50 - 7.49	59	47	67	80	68	55	48	39	61	86	143	145	104	70	43	45	1160
7.50 - 12.49	77	39	32	27	32	24	18	10	75	173	212	153	101	49	63	46	1131
12.50 - 18.49	14	5	5	1	0	3	3	2	24	91	216	61	45	19	16	18	523
18.50 - 23.99	0	0	0	0	0	0	0	0	2	6	9	3	1	0	2	0	23
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
TOTAL	185	122	138	152	149	110	89	85	203	389	622	415	305	174	161	140	3447

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

AUGUST

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3447

TOTAL NUMBER OF MISSING OBSERVATIONS: 273

PERCENT DATA RECOVERY FOR THIS PERIOD: 92.7%

MEAN WIND SPEED FOR THIS PERIOD: 7.7 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
1.22	2.47	3.86	44.07	34.67	13.69	0.03

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	2	1	8	5	4	0	0	7	6	2	3	3	0	0	0	0
B	4	6	6	5	3	2	2	0	0	12	14	15	6	6	2	2	0
C	4	2	3	7	4	6	3	1	9	14	26	23	11	7	8	5	0
D	93	58	45	49	48	37	33	31	61	144	335	221	126	75	85	76	2
E	58	30	64	58	50	42	35	43	96	160	177	114	121	58	45	41	3
F	25	24	19	25	39	19	15	10	30	53	68	39	38	28	21	16	3
G	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Total	185	122	138	152	149	110	89	85	203	389	622	415	305	174	161	140	8

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3.50 - 7.49	1	0	0	0	2	3	1	0	0	0	0	0	0	0	0	1	8
7.50 - 12.49	8	0	0	0	2	2	0	2	0	0	0	2	2	0	0	1	19
12.50 - 18.49	0	0	0	0	0	1	1	1	0	0	0	3	1	0	0	0	7
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	0	0	0	4	7	2	3	0	0	0	5	3	0	0	2	35

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
3.50 - 7.49	4	2	1	1	4	1	1	1	4	0	1	4	0	1	2	1	28
7.50 - 12.49	8	1	1	1	0	1	0	1	0	0	5	3	2	2	0	2	27
12.50 - 18.49	0	0	0	0	0	0	0	1	2	0	1	4	7	0	0	0	15
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	3	2	2	4	2	1	3	6	0	7	11	10	3	2	4	72

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	5
3.50 - 7.49	4	1	4	1	0	3	2	3	3	2	6	8	3	6	2	3	51
7.50 - 12.49	3	0	5	3	1	1	2	1	2	3	9	13	9	2	2	7	63
12.50 - 18.49	1	0	0	0	0	0	0	0	1	0	4	2	2	5	1	1	17
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	9	1	9	4	1	4	5	4	6	5	19	23	16	14	5	12	137

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	12	8	8	6	8	5	4	0	2	2	9	7	12	5	4	7	99
3.50 - 7.49	24	17	20	7	13	21	19	5	19	21	40	41	27	16	19	28	337
7.50 - 12.49	56	21	10	18	29	16	17	14	28	50	74	76	63	33	61	61	627
12.50 - 18.49	10	10	9	3	6	2	7	8	17	31	64	33	55	29	20	10	314
18.50 - 23.99	0	0	1	0	0	0	1	0	4	1	8	7	11	3	2	3	41
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	7
TOTAL	102	56	48	34	56	44	48	27	70	105	195	164	173	88	106	109	1425

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	10	9	11	10	14	14	10	11	9	13	13	11	23	10	3	3	174
3.50 - 7.49	14	22	33	38	29	22	17	13	17	16	42	36	45	19	10	7	386
7.50 - 12.49	10	7	15	10	7	5	19	19	18	38	67	44	27	9	8	15	318
12.50 - 18.49	7	3	0	0	0	4	15	16	10	33	51	25	4	5	1	2	176
18.50 - 23.99	0	0	0	0	0	0	4	0	0	2	2	2	0	0	0	0	10
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	41	41	59	58	50	45	65	59	54	102	175	118	99	43	22	27	1063

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	7
0.75 - 3.49	9	10	10	12	10	5	8	4	9	7	11	16	15	12	15	5	158
3.50 - 7.49	6	5	24	39	11	19	17	10	13	15	55	48	20	7	10	5	304
7.50 - 12.49	3	2	4	5	5	1	4	4	18	17	13	3	13	1	2	5	100
12.50 - 18.49	1	0	0	1	0	1	6	2	1	10	4	1	3	3	0	0	33
18.50 - 23.99	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	19	17	38	57	26	26	36	21	41	49	84	68	51	23	27	15	605

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2	2	6
3.50 - 7.49	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	4
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	4	0	0	0	1	0	1	2	2	10

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	12
0.75 - 3.49	32	27	29	28	32	25	23	16	20	22	33	34	51	29	24	19	444
3.50 - 7.49	53	47	82	86	59	69	57	35	56	64	144	138	95	49	43	45	1112
7.50 - 12.49	88	31	35	37	44	26	42	41	66	108	168	141	116	47	73	91	1154
12.50 - 18.49	19	13	9	4	6	8	29	28	31	74	124	68	72	42	22	13	562
18.50 - 23.99	0	0	1	0	0	0	6	1	4	3	11	9	13	3	2	3	56
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	7
TOTAL	192	118	156	155	141	128	157	121	177	261	480	390	352	172	164	171	3347

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

SEPTEMBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3347

TOTAL NUMBER OF MISSING OBSERVATIONS: 253

PERCENT DATA RECOVERY FOR THIS PERIOD: 93.0%

MEAN WIND SPEED FOR THIS PERIOD: 8.3 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
1.05	2.15	4.09	42.58	31.76	18.08	0.30

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	9	0	0	0	4	7	2	3	0	0	0	5	3	0	0	2	0
B	12	3	2	2	4	2	1	3	6	0	7	11	10	3	2	4	0
C	9	1	9	4	1	4	5	4	6	5	19	23	16	14	5	12	0
D	102	56	48	34	56	44	48	27	70	105	195	164	173	88	106	109	0
E	41	41	59	58	50	45	65	59	54	102	175	118	99	43	22	27	5
F	19	17	38	57	26	26	36	21	41	49	84	68	51	23	27	15	7
G	0	0	0	0	0	0	0	4	0	0	0	1	0	1	2	2	0
Total	192	118	156	155	141	128	157	121	177	261	480	390	352	172	164	171	12

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
12.50 - 18.49	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	4

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
7.50 - 12.49	2	1	1	3	0	1	1	0	0	3	0	0	0	0	0	0	12
12.50 - 18.49	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
18.50 - 23.99	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	1	1	3	0	2	2	0	0	3	1	0	1	0	0	0	18

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	1	0	1	0	1	1	3	0	0	0	0	0	0	1	1	1	10
7.50 - 12.49	2	0	0	2	2	2	4	1	0	1	3	3	3	1	1	0	25
12.50 - 18.49	0	0	0	0	1	3	3	0	0	1	3	0	1	0	0	0	12
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
TOTAL	3	0	1	2	4	6	10	1	0	2	6	3	5	3	2	1	49

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	5	5	3	2	4	1	3	1	2	4	2	1	2	1	6	45
3.50 - 7.49	29	19	26	19	19	4	12	14	18	17	23	20	19	13	14	16	282
7.50 - 12.49	56	20	9	21	18	10	12	18	31	35	103	64	74	64	38	48	621
12.50 - 18.49	24	13	4	4	0	6	14	20	23	45	118	134	156	99	35	13	708
18.50 - 23.99	0	2	0	0	0	4	6	2	1	5	20	29	56	23	3	1	152
> 23.99	0	0	0	0	0	0	1	1	0	1	1	10	13	1	0	0	28
TOTAL	112	59	44	47	39	28	46	58	74	105	269	259	319	202	91	84	1836

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	2	7	4	7	5	5	3	7	10	2	6	9	12	12	3	3	97
3.50 - 7.49	13	16	22	13	22	7	13	24	23	7	41	30	42	15	7	10	305
7.50 - 12.49	14	9	4	23	27	10	15	14	23	22	46	29	37	16	9	8	306
12.50 - 18.49	6	1	1	1	6	8	13	8	8	32	58	19	9	12	2	1	185
18.50 - 23.99	0	1	0	0	0	0	6	2	1	1	7	0	3	1	0	0	22
> 23.99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTAL	35	34	31	44	60	30	50	55	65	65	158	87	103	56	21	22	916

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	1	1	2	2	2	2	5	12	1	5	10	5	8	2	2	0	60
3.50 - 7.49	13	6	19	22	11	8	9	16	22	26	47	10	10	6	5	6	236
7.50 - 12.49	2	3	17	15	8	9	9	11	17	20	24	3	11	0	4	1	154
12.50 - 18.49	0	0	0	0	2	3	3	3	11	17	22	0	0	0	0	0	61
18.50 - 23.99	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	10	38	39	23	22	28	43	51	68	103	18	29	8	11	7	516

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	3	1	2	0	0	0	0	0	6
3.50 - 7.49	0	0	0	1	0	1	4	4	6	7	4	0	0	1	0	0	28
7.50 - 12.49	0	0	0	0	0	0	1	4	5	4	4	0	0	0	0	0	18
12.50 - 18.49	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	5
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	1	0	1	7	8	14	12	13	0	0	1	0	0	57

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	6	13	11	12	9	11	9	22	15	10	22	16	21	16	6	9	208
3.50 - 7.49	58	41	68	55	53	21	41	58	69	57	115	60	72	36	27	33	864
7.50 - 12.49	77	33	31	65	55	32	42	48	76	85	180	99	125	81	52	57	1138
12.50 - 18.49	30	14	6	5	9	21	36	31	42	95	205	153	166	111	37	14	975
18.50 - 23.99	0	3	0	0	0	5	14	5	2	6	27	29	60	24	3	1	179
> 23.99	0	0	0	0	0	0	1	1	0	2	1	10	13	2	0	0	30
TOTAL	171	104	116	137	126	90	143	165	204	255	550	367	457	270	125	114	3396

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

OCTOBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3396

TOTAL NUMBER OF MISSING OBSERVATIONS: 324

PERCENT DATA RECOVERY FOR THIS PERIOD: 91.3%

MEAN WIND SPEED FOR THIS PERIOD: 10.5 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.12	0.53	1.44	54.06	26.97	15.19	1.68

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
B	4	1	1	3	0	2	2	0	0	3	1	0	1	0	0	0	0
C	3	0	1	2	4	6	10	1	0	2	6	3	5	3	2	1	0
D	112	59	44	47	39	28	46	58	74	105	269	259	319	202	91	84	0
E	35	34	31	44	60	30	50	55	65	65	158	87	103	56	21	22	0
F	16	10	38	39	23	22	28	43	51	68	103	18	29	8	11	7	2
G	0	0	0	1	0	1	7	8	14	12	13	0	0	1	0	0	0
Total	171	104	116	137	126	90	143	165	204	255	550	367	457	270	125	114	2

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	1	1	1	0	1	0	1	0	0	0	1	0	0	1	7
12.50 - 18.49	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	1	1	0	3	0	1	0	0	0	1	0	0	1	9

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	9	6	11	10	8	4	1	4	2	3	1	3	4	1	1	6	74
3.50 - 7.49	22	27	35	49	15	23	13	11	11	10	16	26	26	18	22	13	337
7.50 - 12.49	40	21	17	38	64	24	20	22	20	54	55	45	73	81	79	32	685
12.50 - 18.49	2	2	4	8	29	18	11	15	14	62	148	110	177	90	50	5	745
18.50 - 23.99	0	0	0	0	0	2	5	6	3	11	26	57	76	25	1	0	212
> 23.99	0	0	0	0	0	0	0	0	0	0	3	7	11	5	0	0	26
TOTAL	73	56	67	105	116	71	50	58	50	140	249	248	367	220	153	56	2079

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	5	2	4	6	3	2	3	6	1	2	8	3	11	3	9	2	70
3.50 - 7.49	3	7	8	12	15	15	8	14	13	7	11	19	25	10	6	6	179
7.50 - 12.49	4	1	5	22	13	13	11	9	18	26	30	23	27	11	2	4	219
12.50 - 18.49	0	0	0	1	2	19	7	7	11	11	49	13	13	2	0	0	135
18.50 - 23.99	0	0	0	0	0	4	6	0	0	5	7	2	1	0	0	0	25
> 23.99	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2
TOTAL	12	10	17	41	33	53	36	36	43	51	105	60	78	26	17	12	632

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	1	0	3	3	1	5	7	7	4	1	4	7	8	4	7	0	62
3.50 - 7.49	2	2	8	7	9	7	12	12	18	16	24	15	20	7	0	0	159
7.50 - 12.49	0	0	1	4	5	1	9	17	8	11	21	10	8	7	2	0	104
12.50 - 18.49	0	0	0	0	0	0	1	4	2	6	7	3	3	1	0	0	27
18.50 - 23.99	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	4
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	12	14	15	13	30	40	33	34	58	35	39	19	9	0	357

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	1	0	0	1	0	1	1	0	1	2	3	1	0	1	0	13
3.50 - 7.49	0	0	0	0	0	0	0	2	4	5	8	5	1	2	0	0	27
7.50 - 12.49	0	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	6
12.50 - 18.49	0	0	0	0	0	0	0	0	1	5	2	0	0	0	0	0	8
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	0	0	1	0	1	5	5	13	14	8	2	2	1	0	54

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	3
0.75 - 3.49	16	9	18	19	13	11	12	18	7	7	15	16	24	8	18	8	219
3.50 - 7.49	27	36	51	68	39	45	33	39	46	38	59	65	72	37	28	19	702
7.50 - 12.49	44	22	24	65	83	38	41	50	47	93	108	78	109	99	83	37	1021
12.50 - 18.49	2	2	4	9	31	37	21	26	28	84	206	126	193	93	50	5	917
18.50 - 23.99	0	0	0	0	0	6	12	6	4	16	35	59	77	25	1	0	241
> 23.99	0	0	0	0	0	0	1	0	0	0	3	7	12	5	0	0	28
TOTAL	89	69	97	161	166	137	120	139	132	238	426	351	487	267	180	69	3131

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

NOVEMBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3600

TOTAL NUMBER OF VALID OBSERVATIONS: 3131

TOTAL NUMBER OF MISSING OBSERVATIONS: 469

PERCENT DATA RECOVERY FOR THIS PERIOD: 87.0%

MEAN WIND SPEED FOR THIS PERIOD: 10.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.29	66.40	20.19	11.40	1.72

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	1	1	1	0	3	0	1	0	0	0	1	0	0	1	0
D	73	56	67	105	116	71	50	58	50	140	249	248	367	220	153	56	0
E	12	10	17	41	33	53	36	36	43	51	105	60	78	26	17	12	2
F	3	2	12	14	15	13	30	40	33	34	58	35	39	19	9	0	1
G	1	1	0	0	1	0	1	5	5	13	14	8	2	2	1	0	0
Total	89	69	97	161	166	137	120	139	132	238	426	351	487	267	180	69	3

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.50 - 12.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.50 - 7.49	0	0	0	1	3	0	0	0	0	0	1	0	0	0	0	0	5
7.50 - 12.49	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	3
12.50 - 18.49	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	3	3	0	0	0	0	0	1	0	2	0	0	0	9

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	4	8	3	3	7	3	5	2	3	3	2	1	2	1	0	50
3.50 - 7.49	18	9	16	35	37	20	18	8	9	12	38	21	21	5	12	24	303
7.50 - 12.49	46	8	7	22	31	20	11	20	51	43	81	95	87	48	57	47	674
12.50 - 18.49	13	2	0	3	3	6	2	5	18	84	164	111	173	59	40	12	695
18.50 - 23.99	0	1	0	0	0	0	0	1	6	13	38	42	100	43	6	1	251
> 23.99	0	0	0	0	0	0	0	0	0	1	5	22	63	20	0	0	111
TOTAL	80	24	31	63	74	53	34	39	86	156	329	293	445	177	116	84	2084

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	4
0.75 - 3.49	2	2	5	0	3	6	3	5	5	3	1	2	3	4	2	3	49
3.50 - 7.49	1	5	5	4	30	19	18	24	22	10	15	8	4	1	3	2	171
7.50 - 12.49	2	0	3	15	21	31	20	31	36	40	41	32	23	2	3	1	301
12.50 - 18.49	0	0	0	0	0	0	3	3	12	47	49	11	8	0	0	0	133
18.50 - 23.99	0	0	0	0	0	0	1	0	0	1	6	1	0	0	1	0	10
> 23.99	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
TOTAL	5	7	13	19	54	56	45	63	75	103	112	54	38	7	9	6	670

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
0.75 - 3.49	2	1	2	1	5	0	3	3	2	0	6	1	1	1	0	1	29
3.50 - 7.49	0	0	7	20	16	3	6	12	11	10	7	3	0	4	1	0	100
7.50 - 12.49	0	0	0	5	5	5	6	11	30	18	18	3	0	0	0	0	101
12.50 - 18.49	0	0	0	0	0	3	2	0	6	10	9	0	0	0	0	0	30
18.50 - 23.99	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	1	9	26	26	11	17	26	49	39	40	7	1	5	1	1	262

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
3.50 - 7.49	0	0	0	1	1	0	0	0	5	0	1	0	0	0	0	0	8
7.50 - 12.49	0	0	0	1	1	0	0	0	1	5	5	0	0	0	0	0	13
12.50 - 18.49	0	0	0	0	0	0	0	0	1	6	1	0	0	0	0	0	8
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	2	2	0	0	0	8	13	7	0	0	0	0	0	32

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	5
0.75 - 3.49	7	7	15	4	11	13	9	13	10	8	10	5	5	7	3	4	131
3.50 - 7.49	19	14	28	61	87	42	42	44	47	32	62	32	25	10	16	26	587
7.50 - 12.49	48	8	10	45	58	56	37	62	118	106	145	130	111	50	60	48	1092
12.50 - 18.49	13	2	0	3	3	9	7	8	37	147	223	122	182	59	40	12	867
18.50 - 23.99	0	1	0	0	0	0	1	1	6	15	44	43	100	43	7	1	262
> 23.99	0	0	0	0	0	0	0	0	0	3	5	22	63	20	0	0	113
TOTAL	87	32	53	113	159	120	96	128	218	311	489	354	486	189	126	91	3057

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

DECEMBER

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 3720

TOTAL NUMBER OF VALID OBSERVATIONS: 3057

TOTAL NUMBER OF MISSING OBSERVATIONS: 663

PERCENT DATA RECOVERY FOR THIS PERIOD: 82.2%

MEAN WIND SPEED FOR THIS PERIOD: 11.8 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.00	0.00	0.29	68.17	21.92	8.57	1.05

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	3	3	0	0	0	0	0	1	0	2	0	0	0	0
D	80	24	31	63	74	53	34	39	86	156	329	293	445	177	116	84	0
E	5	7	13	19	54	56	45	63	75	103	112	54	38	7	9	6	4
F	2	1	9	26	26	11	17	26	49	39	40	7	1	5	1	1	1
G	0	0	0	2	2	0	0	0	8	13	7	0	0	0	0	0	0
Total	87	32	53	113	159	120	96	128	218	311	489	354	486	189	126	91	5

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS A

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
3.50 - 7.49	7	3	4	3	4	4	2	0	5	3	1	2	4	0	2	1	45
7.50 - 12.49	19	4	8	14	10	10	3	6	13	10	4	8	5	3	5	8	130
12.50 - 18.49	2	1	1	0	3	3	3	4	4	3	1	5	5	5	2	0	42
18.50 - 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28	8	14	17	17	18	8	10	22	16	6	15	14	8	9	9	219

STABILITY CLASS B

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	1	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	5
3.50 - 7.49	17	7	12	7	14	6	8	9	8	2	8	12	6	1	4	9	130
7.50 - 12.49	37	11	16	20	11	14	8	9	11	25	29	28	23	20	15	14	291
12.50 - 18.49	14	2	2	4	1	2	5	4	6	8	10	11	17	16	8	3	113
18.50 - 23.99	0	0	0	0	0	1	0	0	0	1	2	3	3	4	2	1	17
> 23.99	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	4
TOTAL	69	20	32	31	26	23	21	22	25	36	50	54	50	43	30	28	560

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS C

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
0.75 - 3.49	3	0	0	1	1	2	1	0	2	0	0	0	4	2	0	2	18
3.50 - 7.49	37	13	19	13	19	25	22	9	23	11	26	30	38	24	19	18	346
7.50 - 12.49	51	8	15	21	16	11	15	13	27	35	51	59	68	37	44	42	513
12.50 - 18.49	14	2	4	5	2	5	10	1	4	17	35	28	36	33	30	24	250
18.50 - 23.99	0	0	0	0	0	0	0	0	1	1	4	7	17	20	5	1	56
> 23.99	0	1	0	0	0	0	0	0	0	2	4	5	4	5	1	0	22
TOTAL	105	24	38	40	38	43	48	23	57	66	120	129	167	121	99	87	1205

STABILITY CLASS D

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	8
0.75 - 3.49	77	62	79	76	74	57	43	43	46	41	58	58	66	53	47	61	941
3.50 - 7.49	286	195	278	386	250	208	176	139	194	196	392	410	287	191	288	297	4093
7.50 - 12.49	633	204	188	283	335	181	157	171	308	528	925	885	814	687	783	591	7673
12.50 - 18.49	145	55	78	77	94	105	123	88	163	480	1236	1069	1323	731	437	182	6386
18.50 - 23.99	6	5	10	7	7	27	38	21	40	85	268	349	567	232	37	16	1715
> 23.99	1	1	5	1	0	2	6	2	4	16	61	137	228	83	8	1	556
TOTAL	1148	522	638	750	760	580	543	464	755	1346	2940	2908	3285	1977	1600	1148	21372

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS E

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	23
0.75 - 3.49	79	60	89	75	91	89	61	81	89	66	96	91	145	85	68	52	1317
3.50 - 7.49	136	154	211	201	227	200	185	165	228	172	289	296	350	188	102	99	3203
7.50 - 12.49	122	48	73	160	163	128	165	158	249	362	404	323	326	136	102	105	3024
12.50 - 18.49	44	17	7	10	18	62	98	76	147	311	417	175	110	40	41	31	1604
18.50 - 23.99	0	1	1	1	3	10	37	7	16	27	75	24	19	2	2	1	226
> 23.99	0	0	0	0	1	0	3	0	0	5	2	2	4	0	2	0	19
TOTAL	381	280	381	447	503	489	549	487	729	943	1283	911	954	451	317	288	9416

STABILITY CLASS F

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	36
0.75 - 3.49	55	50	67	74	100	48	59	63	71	64	101	106	123	58	76	52	1167
3.50 - 7.49	98	81	148	189	165	123	109	129	153	163	279	230	215	130	88	54	2354
7.50 - 12.49	27	21	42	79	48	67	71	73	142	177	172	85	105	48	36	27	1220
12.50 - 18.49	6	0	3	3	4	16	31	23	50	115	92	16	13	7	7	5	391
18.50 - 23.99	0	0	0	0	0	1	13	3	1	2	7	0	1	0	0	0	28
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	186	152	260	345	317	255	283	291	417	521	651	437	457	243	207	138	5196

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY CLASS G

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	2
0.75 - 3.49	4	8	11	15	11	6	10	5	8	10	10	5	4	4	7	6	124
3.50 - 7.49	3	6	14	18	13	11	16	21	36	23	33	22	5	10	1	3	235
7.50 - 12.49	0	2	1	2	6	3	9	15	26	36	24	19	11	0	1	2	157
12.50 - 18.49	1	0	0	0	2	3	7	5	4	25	10	0	0	0	0	0	57
18.50 - 23.99	0	0	0	0	0	0	1	2	0	1	4	0	0	0	0	0	8
> 23.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8	16	26	35	32	23	43	48	74	95	81	46	20	14	9	11	583

STABILITY CLASS ALL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 500.00 FEET

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	69
0.75 - 3.49	219	180	249	241	277	203	174	192	216	181	265	260	342	202	199	174	3574
3.50 - 7.49	584	459	686	737	692	577	518	472	647	570	1028	1002	905	544	504	481	10406
7.50 - 12.49	889	298	343	579	589	414	428	445	776	1173	1609	1407	1352	931	986	789	13008
12.50 - 18.49	226	77	95	99	124	196	277	201	378	959	1801	1304	1504	832	525	245	8843
18.50 - 23.99	6	6	11	8	10	39	89	33	58	117	360	383	607	258	46	19	2050
> 23.99	1	2	5	1	1	2	9	2	4	23	68	144	237	90	11	1	601
TOTAL	1925	1022	1389	1665	1693	1431	1495	1345	2079	3023	5131	4500	4947	2857	2271	1709	38551

PROGRAM: JFD REVISION: 4P
BEAVER VALLEY JFD-500 FOOT LEVEL FOR CY1976 TO 1980
SITE IDENTIFIER: LBV2
DATA PERIOD EXAMINED: 1/1/76 - 12/31/80

ANNUAL

STABILITY BASED ON: DELTA T BETWEEN 500.0 AND 35.0 FEET
WIND MEASURED AT: 500.0 FEET
WIND THRESHOLD AT: 0.75 MPH

TOTAL NUMBER OF OBSERVATIONS: 43848

TOTAL NUMBER OF VALID OBSERVATIONS: 38551

TOTAL NUMBER OF MISSING OBSERVATIONS: 5297

PERCENT DATA RECOVERY FOR THIS PERIOD: 87.9%

MEAN WIND SPEED FOR THIS PERIOD: 9.9 MPH

TOTAL NUMBER OF OBSERVATIONS WITH BACKUP DATA: 0

PERCENTAGE OCCURRENCE OF STABILITY CLASSES

A	B	C	D	E	F	G
0.57	1.45	3.13	55.44	24.42	13.48	1.51

DISTRIBUTION OF WIND DIRECTION VS STABILITY

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM
A	28	8	14	17	17	18	8	10	22	16	6	15	14	8	9	9	0
B	69	20	32	31	26	23	21	22	25	36	50	54	50	43	30	28	0
C	105	24	38	40	38	43	48	23	57	66	120	129	167	121	99	87	0
D	1148	522	638	750	760	580	543	464	755	1346	2940	2908	3285	1977	1600	1148	8
E	381	280	381	447	503	489	549	487	729	943	1283	911	954	451	317	288	23
F	186	152	260	345	317	255	283	291	417	521	651	437	457	243	207	138	36
G	8	16	26	35	32	23	43	48	74	95	81	46	20	14	9	11	2
Total	1925	1022	1389	1665	1693	1431	1495	1345	2079	3023	5131	4500	4947	2857	2271	1709	69

APPENDIX 2B

GEOLOGICAL CONSIDERATIONS

Influencing the Proposed

BEAVER VALLEY POWER STATION

Shippingport, Beaver County, Pennsylvania

June 3, 1968

John R. Rand
Consulting Geologist
Little Flying Point
Freeport, Maine

Paul J. Mayrose
Stone & Webster Engineering Corporation
225 Franklin Street
Boston, Massachusetts

Appendix 2B was retyped/reformatted as part of the Update of the FSAR.

Stone & Webster Engineering Corporation
225 Franklin Street
Boston, Massachusetts 02107

June 3, 1968

Gentlemen:

In accordance with your request, we have investigated the geology of an area within several miles of Shippingport Borough, Beaver County, Pennsylvania, where Duquesne Liqht Company proposes to construct a second atomic power plant and allied facilities immediately adjacent to the present Shippingport Nuclear Power Station.

Our investigations conclude that,

1. The proposed power plant will be constructed on a 100 foot thick terrace of unconsolidated stratified sand and gravel outwash of medium to high density and low compressibility. These valley-fill gravels exhibit moderate to high permeability, and they drain freely.

2. The valley-fill gravels in which the plant is to be built will not be subject to excessive settlement under heavy loading.

3. Bedrock underlying the 100-foot thick gravel terrace in the plant area is characterized by flat-lying unmetamorphosed sedimentary rocks predominantly consisting of shales and sandstones. Several thin coal seams and occasional thin limestone units are interbedded in the sedimentary sequence.

4. While the Upper Freeport coal seam is mined in the general plant area at an elevation about 200 feet higher than that of the plant, no coal seams underlying the plant elevation have been mined in the area, and none is of sufficient thickness, quality or lateral continuity to merit commercial development.

5. Other mineral resources in Beaver County which lie at elevations below that of the plant include oil, gas, rock salt and limestone. None of these commodities has been exploited at depth beneath the plant, and none is inferred to be of commercial potential for future development.

6. The plant is to be built in an area of tectonic stability, and no faults are known or inferred to have occurred within many tens of miles of the plant area.

7. Groundwater in the plant area occurs in both bedrock and valley-fill gravels. In bedrock, groundwater flow is normally less than 10 gallons per minute. In the gravels, groundwater flow ranges to more than 1000 gallons per minute. Most public and industrial water supplies along the Ohio River in Beaver County are drawn from valley-fill gravels. Groundwater migration in bedrock is from the upland areas downward toward the Ohio River; migration in gravels is downstream to the west.

8. The proposed plant is located on a gravel terrace well isolated from other more heavily populated terraces by the open flow of the Ohio River, and no migration of potential contaminants from the plant through the ground to municipal or industrial water supplies is to be expected.

It is our opinion based on currently available information that the proposed new plant is favorably situated geologically, and that no unusual design, construction or maintenance techniques should be required because of geologic features.

Yours very truly,

(Originally signed by)

Paul J. Mayrose
Stone & Webster Engineering Corporation
225 Franklin Street
Boston, Massachusetts

(Originally signed by)

John R. Rand
Consulting Geologist
Little Flying Point
Freeport, Maine

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INTRODUCTION

It is proposed by Duquesne Light Company to construct a second atomic power plant, the Beaver Valley Power Station, and allied service facilities immediately adjacent to the present Shippingport Nuclear Power Station on the south shore of the Ohio River at Shippingport Borough, central Beaver County, Pennsylvania.

Discontinuously during the period of February 15 to May 10, 1968, we have conducted field reconnaissance and technical literature surveys relating to the geology and groundwater characteristics of the general plant area; and have studied records of 28 borings put down in 1954 and 16 borings put down in March-April, 1968, in the immediate location of the proposed new power plant.

Our analysis of available geologic information indicates that the proposed new power plant will be constructed on a 100-foot thick terrace of unconsolidated stratified sand and gravel which lies in the bedrock trough of the Ohio River. A detailed analysis of the soil conditions in the terrace will be presented by Stone & Webster Engineering Corporation in a separate report.

Immediately underlying the plant site, the deposits consist principally of poorly-sorted, medium-brown sands with gravel, occasional cobbles and angular sandstone fragments. There are infrequent layers of medium-grained brown sand, and the silt-clay content of the sand is variable. Standard penetration tests in this material were in the range of 10 to 50 blows per foot, with the majority falling in the 20-40 blows-per-foot category. These sands and gravels are moderately to highly permeable. Considering their gradation and the relatively low groundwater level, they are unlikely to be subject to liquefaction. They are of such density that excessive settlement will not occur under loading.

In the portion of the area subject to flooding by the Ohio River, the sands and gravels are overlain by a layer of brown silty clay about 30 feet deep. Blow counts in the clay are low, averaging about one blow per foot. It appears that the river has eroded the sand and gravel, the older material, and has partially replaced the eroded material locally with silt deposited during flood stages. The silt appears to be unsuitable foundation material for heavy structures.

Bedrock underlying the project area, and forming the hills which rise to an elevation of about 1100 feet adjacent to the plant to the north and south of the Ohio River valley, is characterized by sandstones and shales of Pennsylvanian age, interbedded with several thin coal seams and occasional thin limestone beds. Structurally, the sedimentary formations in central Beaver County are very nearly horizontal, and are not metamorphosed. No faults are known or inferred to occur within many tens of miles of the project area.

The only comercial coal seam in the area is the Upper Freeport seam which lies at elevation 900 feet, approximately 150 feet above the plant elevation. Coal seams underlying the plant are too thin or discontinuous to be of commercial value, and no coal seam has been mined in the area at an elevation below that of the plant. Relatively minor oil production has been realized within about 3 miles of the plant site, drawing from the Berea sandstone member of the Pocono formation of Mississippian age. This unit lies some 750 feet below the land surface and is not inferred to have commercial potential for oil or gas in the immediate plant area.

Groundwater occurs in large volume in the stratified gravels in the Ohio River valley, and is drawn heavily for municipal and industrial use at various places along the river upstream from the plant site. Well yields in valley-fill gravels commonly range from 500 to 1000 gallons per minute, and pumping tests indicate that recharge of gravel waters is supplied directly and rapidly by inflow of river water filtered through the gravels. Groundwater migrates downstream through the gravels, and where these gravels form thin remnant veneers against bedrock valley walls, groundwater flows directly outward from the gravels into the river water.

Groundwater occurs in bedrock in joints in shales and in joints and permeable lithologies in sandstone. Water well records indicate that normal groundwater flow potential in these rocks is less than 10 gallons per minute, with only occasional wells yielding up to 60 gallons per minute. Limestone beds and coal seams also have been found occasionally to produce comparable volumes of water. Because the plant is located on thick and very permeable gravels which interconnect freely with the Ohio River, potential contaminants from the plant would migrate away from bedrock through the gravels and into the open water of the river.

BEDROCK GEOLOGY

Bedrock geology in the area of the proposed power facility is characterized by a sequence of flat-lying sedimentary rocks, predominantly shales and sandstone, of Pennsylvanian age. Five thin coal seams are interbedded in the sedimentary sequence at elevations higher than the plant site, and at least six thin seams underlie the plant at depths ranging from about 100 feet to 400 feet. No coal seam underlying the plant has been mined in the area, and none is believed to be of sufficient thickness, lateral continuity, or quality to merit future consideration for commercial development. A single thin limestone bed is inter-preted from regional studies to underlie the plant elevation by about 75 feet, cropping out against valley-fill gravels to the south of the plant site. Since there is no detailed deep drill-hole information available for the immediate vicinity of the power plant site, the following lithologic data are generalized and have been assembled from regional information.

A. Lithologies (See Figure 2B-1)

Lithologic characterics of the sedimentary rocks in Beaver County are known to vary considerably from place to place, and Figure 2B-1 and the following written descriptions represent only a broad approximation of the stratigraphic sequence in the plant area.

1. Conemaugh Formation - Pennsylvanian

The Conemaugh formation in the plant area lies above the Upper Freeport coal seam at elevation 900 feet, and forms hilltops along the Ohio River and underlies the broad dissected uplands away from the river to the north and to the south of the plant. The formation in the plant area is predominantly shaley. Because the Conemaugh lies more than 150 feet above the power plant elevation, it does not influence engineering or maintenance considerations with respect to new construction.

2. Allegheny Formation - Pennsylvanian

The Allegheny formation is estimated from regional studies to be about 350 feet thick in the plant area, consisting of about two-thirds shale and one-third sandstone, with seven interbedded coal seams and associated underclays, and a thin bed of fossiliferous Vanport limestone. The Upper Freeport coal seam, at elevation 900 feet, is mined commercially in the vicinity of the plant. Only the lower 175-foot section of the Allegheny formation, underlying the Lower Kittanning coal seam, lies below the power plant elevation. No coal seam has been mined in the plant area at elevations below that of the plant, and no seam is considered to have commercial potential at elevations below that of the plant.

The Lower Kittanning coal seam lies at about elevation 725 feet in the plant area. This is approximately ground surface elevation at the plant site. Where seen in Haden Run, about 1 mile to the northeast of the plant site, the coal is only about 1 foot thick and of no commercial value. Underlying the Lower Kittanning seam, the Allegheny formation is predominantly flat-lying shale or sandy shale interbedded with the Vanport limestone, the Clarion and Brookville coal seams, and probably a thin sandstone bed.

The Vanport limestone is reported to range in thickness from a few feet up to about 20 feet in the general area, and where thickest is interbedded with calcareous shale beds. The Vanport has not been encountered in shallow test borings in the plant area; if it exists, it may be expected to crop out against valley-fill gravels well beneath surface to the south of the plant.

The Vanport limestone is quarried and mined commercially in northern Beaver County, but not in the plant area. It is reported to be a hard, brittle rock which breaks with an irregular fracture. While the nature and thickness of the Vanport in the plant area are not known; the unit is normally made up of competent rock not notably subject to groundwater solution.

The Clarion and Brookville coal seams are considered to be too thin and discontinuous in central Beaver County to be any commercial interest. The Clarion seam is reported to be 6 to 12 inches thick near Beaver Falls, about 10 miles northeast of the plant site, and elsewhere is very thin or absent.

3. Pottsville Formation - Pennsylvanian

The Pottsville formation is reported to be on the order of 250 feet thick in Beaver County, made up of about equal parts of shale and sandstone, and interbedded with 4 or 5 thin coal seams. None of the coal seams is of commercial interest in the plant area.

The Pottsville sandstones are described as normally quite massive, hard and light colored, and usually coarse-grained or conglomeratic. Locally the sandstones are reported to become thin-bedded and shaley.

The Pottsville is estimated to lie at a depth of from 170 to 420 feet below the plant area, and is not considered to be of material influence in plant design or other considerations.

4. Pocono Formation - Mississippian

The Pocono formation in Beaver County is reported to be on the order of 500 feet in thickness, more than 80% made up of shale, sandy shale or shaley sandstone. At the base of the Pocono formation, estimated to underlie the plant area by some 750 feet, the Berea sandstone is a minor oil producing horizon at Hookstown, 3 to 4 miles southwest of the plant site; and at Smith's Ferry, 4 miles west northwest of the plant site. Regional test drilling suggests that the Berea sandstone will not be productive of oil or gas beneath the immediate plant area.

5. Chemung Formation - Upper Devonian

The Chemung formation, lying more than 800 feet below the plant site, is composed of shale with thin sandstone or siltstone interbeds. The rocks in this formation are not considered to influence plant design or maintenance considerations.

6. Oriskany Formation - Lower Devonian

Underlying Beaver County by about 4500 feet, (not shown on Figure 2B-1) the Oriskany sandstone has locally been found to be an important gas producer. The nearest gas production in the general plant area is about 8 miles north northwest of the plant site, at the South Beaver pool. No gas production potential is known or inferred for the immediate plant area.

7. Cayuga Series - Upper Silurian

Underlying the Oriskany formation by some 250 feet, the Salina group of the Cayuga Series contains rock salt in beds ranging in thickness from less than 5 feet to nearly 200 feet in parts of western Pennsylvania, with groups of salt beds ranging up to 1200 feet in total thickness locally. The uppermost salt bed occurs at a depth of about 4700 feet below the plant site.

The combined thickness of salt beds immediately beneath the plant site is probably not more than 100 feet, and the thickest single bed may be on the order of 20 to 40 feet thick. Salt has not been recovered by mining or solution extraction in the plant area, and the presence of salt beds at great depth below the project area is not considered to be of material importance to project considerations.

B. Structure

1. Folding

The sedimentary rocks in Beaver County are generally flat- lying, with a slight regional dip to the south or southeast of about 15 to 20 feet per mile. Locally, very small flexures interrupt this broad flat structure, and wide northeast-trending anticlines and synclines of low amplitude are superimposed on the gentle regional structure. For practical purposes, rocks in the plant area may be considered to be essentially horizontal.

2. Faulting

No faults are reported or inferred to occur in the bedrock in the plant area. Structure-contour maps constructed on the Oriskany formation at a depth of some 4500 feet below the plant site show a uniformly gently-dipping structure, comparable to that of the surface formation, extending for at least 20 miles from the plant site. The surface of the Precambrian crystalline basement, about 10,500 feet below the plant site, also generally parallels that of the over- lying Paleozoic sedimentary rocks, with a dip of about 100 feet to the mile to the southeast. The nearest known faulting appears to have occurred on the order of 60 miles southeast of the plant site, and strikes northeasterly tangentially away from the plant area.

C. Weathering

Borings put down at the plant site in March-April, 1968, show only slight weathering in the shales underlying the valley-fill alluvial gravels in the project area. The depth of weathering is variable but has not been found to extend more than 6 feet below the rock surface. In all cases, the weathering is slight and is characterized mainly by the tendency of the shale to separate easily along bedding planes, and to separate into small (0.5 to 4 inch) pieces. Core recovery was in the 85% to 100% range, approaching 100% at depths of 10 to 20 feet below the rock surface. Occasionally, the weathered zone contains rock which is slightly softer than the underlying fresh bedrock.

VALLEY-FILL DEPOSITS

The proposed new power plant facility is to be built on uncon-solidated granular deposits which lie in the bedrock trough of the Ohio River. Figure 2B-1 shows a generalized section of the river valley at the plant site (note vertical exaggeration of l0x). Figures 2B-2 and 2B-3 show respectively the locations of 1954 and 1968 test borings in the project area, and a typical cross-section of the valley-fill deposits derived from these test borings.

In general, the unconsolidated deposits in the Ohio River valley in the plant area are made up of stratified sand and gravel outwash derived from the melting of glacial ice at the end of Pleistocene time, overlain locally by thin deposits of mud, silt, and sand deposited by flood water on the Ohio River and tributary streams.

Test borings show the total thickness of the valley-fill deposits to be 90 to 100 feet in the plant area, from approximately elevation 735 to 635 feet. The major portion of the terrace in the plant area is made up of variably silty or clayey poorly sorted sands and gravels. These sands and gravels contain cobbles and angular fragments of rock which appear to have been plucked from bedrock by glacial ice and subsequently deposited at the site by the waters of the Ohio River.

The valley-fill deposits show only the crudest stratification. Samples from the borings show only three clearly-defined layers of material: A) a 10-20 foot thick layer of gray sand, gravel, and rock fragments immediately overlying the shale bedrock; B) an 80-90 foot layer of brown sand, gravel and cobbles overlying the basal gray material, forming the highest level of the terrace; and C) a 20-30 foot layer of brown silty clay which has been deposited by the Ohio River in Recent geologic time. The brown sands and gravels were partially eroded away along the river bank at some time after deposition, and the eroded portion has subse- quently been partially refilled with the silty clay during flood stages of the river.

The sand-gravel deposits show poorly-defined layers or lenses of relatively clean sand with occasional silt and clay streaks. Deposition of sand layers was too discontinuous to permit meaningful correlation of individual beds from borehole to borehole.

The valley-filled deposits of sand and gravel are of medium to high density and low compressibility, and they drain freely. It would appear that heavy structures founded in these materials will not be subject to excessive settlement. Further, considering their gradations and the low groundwater levels, these soils will not be subject to liquefaction during earth- quakes.

GROUNDWATER

In the project area, groundwater in bedrock migrates downward from the upland areas and outward into the granular valley-fill deposits bordering the Ohio River. Groundwater in the valley- fill deposits migrates downstream to the westward. Figure 2B-4 shows the aerial relationships of the plant location to the upland bedrock areas and lowland valley-fill deposits.

Downstream from the plant site groundwater in valley-fill deposits moves outward into the open flow of the river where the valley-fill deposits have been eroded away to a thin veneer south of Phillis Island. The river itself prevents waters from beneath the plant area from entering the valley-fill deposits beneath the City of Midland or the Town of Georgetown.

A. Bedrock Groundwater

Because of the large-volume availability of groundwater in the valley-fill gravels lying in the troughs of the major river and stream valleys in Beaver County, groundwater in bedrock aquifers is generally sought primarily for small-consumption domestic use in upland areas away from major streams.

In 1966, the Pennsylvania Bureau of Topographic and Geologic Survey, Department of Internal Affairs, initiated a statutory water well reporting system, whereby water well drillers were licensed and were required to report results of all wells drilled. From June 1, 1966, through March 14, 1968, 180 "Water Well Completion Reports" for Beaver County have been received by the Geologic Survey at Harrisburg, and 161 reports contain sufficient information to use in analyzing bedrock groundwater flow characteristics.

Of the usable reports, 94 described wells completed in shale; 58 in sandstone; 6 in limestone; and 3 in coal seams. None of these wells was in the immediate vicinity of the power plant site. Most were drilled in eastern Beaver County, in the Aliquippa area, 7 to 10 miles east of the plant site. Several were drilled near Hookstown, 3 to 6 miles south and southeast of the plant site. Although well collar elevations are not reported, it appears that all wells drilled since 1966 were bottomed at elevations above that of the power plant site.

The 3 coal wells yielded I/2, 3, and 50 gallons per minute, and the waters were high in iron. Normally, drillers case off water encountered in coal seams because of the poor quality of these waters. The 6 limestone wells yielded an average of 26 gallons per minute, with a range of from 1/2 to 10 gallons per minute for 5 wells, and with one well reporting 132 gallons per minute. Limestone is not normally a good producer of water in Beaver County, and is not specifically sought by the drillers. An abandoned well in Midland, a little under 2 miles northwest of the plant site, was reported to have been drilled in Vanport limestone in 1920 for use in ice-making. No yield data are available, but it probably was a low-yield well since a 5 horse- power plunger pump was used to recover water from the well.

The most useful information for purposes of this study is taken from the shale and sandstone well records. Sandstones are the more porous and permeable rocks, but grain size and sorting and degree of cementing appears to vary widely and rapidly from place to place, and no sandstone unit is considered uniformly to be an important aquifer throughout the area. Most shale wells are considered to derive water from joints, joint sets or bedding plane channelways, and occasionally may actually draw from thin sandstone units or sandy shales not detected as such by the driller.

The following table compares yields from shale and sandstone wells, and shows generally that sandstone wells yield appreciably more water than shale wells.

	No. of Wells	Yield Range	Wells Yielding <2 1/2 GPM	<5 GPM	<10 GPM
Shale Wells	94	0 to 30 GPM	45%	60%	86%
Sandstone Wells	58	1/2 to 60 GPM	33%	55%	71%

Only 14% of the shale wells yielded 10 GPM or more, while 29% of the sandstone wells yielded 10 GPM or more.

There is a definite decline in yield, or in groundwater flow, with depth. It appears likely that there is normally an insigni- ficant flow potential in bedrock at depths greater than a few hundred feet below the plant, as indicated by the following table:

TABLE: Decrease in Well Yield with Depth

	Shale Holes		Sandstone Holes	
Hole Depth	No. of Holes	Ave. GPM	No. of Holes	Ave. GPM
0 to 50'	3	13	3	15
51 to 100'	32	5	26	11
101 to 150'	29	5	15	8
151 to 200'	16	2	11	5
201 to 250'	5	2	1	2
251 to 300'	4	1	2	2
301 to 350'	2	2	-	-
351 to 400'	1	2	-	-
401 to 450'	1	0	-	-
451 to 500'	1	0	-	-

It should be pointed out that in the course of drilling most of the shale holes encountered one or more sandstones beds which were not found by the driller to be water-bearing.

In 5 shale holes, ranging in depth from 161 to 500 feet, no usable volume of water was encountered. Some one dozen wells reported in the Hookstown area, 3 to 5 miles southwest of the plant site, encountered water in shale or sandstone at depths of from 60 to 150 feet, with yields ranging from 1/2 to 10 gallons per minute. These wells all bottomed above plant elevation.

It does not appear likely that potential contaminants from the power plant could migrate into bedrock groundwater passages, or that movement of groundwater in bedrock is sufficiently extensive to transport such contaminants appreciable distances. Groundwater migration in bedrock in upland areas in the vicinity of the plant will migrate toward the river valleys and down the hillside slopes into the valley-fill deposits adjacent to the Ohio River.

B. Groundwater in Unconsolidated Valley-Fill Deposits

Most of the municipal and other public water supplies along the Ohio River within a few miles of the plant site are derived either directly from the river or are from wells and well fields in the stratified glacial outwash deposits in the river valley. Beneath the active river bed near the plant, the major part of the outwash gravels originally deposited in the river's bedrock trough have been removed by subsequent river erosion, and the gravels are only about 30 feet thick in this area. The bedrock surface is estimated to lie at about elevation 617 feet beneath the river bed opposite the plant site, and appears to slope downstream at about 0.6 feet per mile. Groundwater migration in the gravels is also downstream to the west.

Underlying the flat terraces along the sides of the river valley, as beneath the Crucible Steel Company plant at Midland one mile downstream and across the river from the plant site, stratified gravels approach 120 feet in thickness, and are overlain by 30 to 40 feet of Recent silts and clays.

The terrace gravels in the Ohio River valley in the area of the plant site yield large quantities of groundwater. Van Tuyl and Klein (1951) report on eleven wells (most are 12-inch in diameter) in gravels along the Ohio River from Beaver for 9 miles downstream to Midland, with yields ranging from 195 to 1380 gallons per minute, and averaging 765 gallons per minute. The well in Midland in this series is a 10-inch well 1 mile west north-west of the power plant site, drawing water from gravel at an elevation of about 660 feet. Water in the well was tested in 1941 and showed:

1.	Iron (Fe)	0.1 PPM
2.	Sulfite (SO_3)	54 PPM
3.	Chloride (Cl)	49 PPM
4.	Free CO_2	17 PPM
5.	Hardness (as $CaCO_3$)	334 PPM
6.	pH	7.4
7.	Temperature	53 F
8.	Yield	195 GPM

Pumping tests on gravel wells at various locations along the Ohio River indicate that groundwater recharge in gravels derives principally and rapidly from river inflow into and through the gravels.

The plant site is located on an isolated terrace remnant (see Figure 2B-4) which interconnects only at depth beneath the Ohio River with other terraces at the communities of Industry, upstream, and Midland and Georgetown, downstream.

Midland has by far the largest population to be served, and in 1948 was reported to use Ohio River water directly for its public water supply, after chemical and filtration cleaning. The river itself forms a natural barrier against migration of potential contaminants from the power plant site into the Midland system. Industry cannot be affected by the plant because river and groundwater flow is downstream from the plant, away from the village. Within one-half mile downstream from the plant site, the valley-fill gravel terrace on which the plant will be situated pinches to a thin veneer against the bedrock wall of the Ohio River trough, effectively blocking groundwater migration in the gravels from moving into the gravel terrace 3 miles to the west at Georgetown. It does not appear, accordingly, that a potential water supply contamination problem exists in the proposed power plant area.

References

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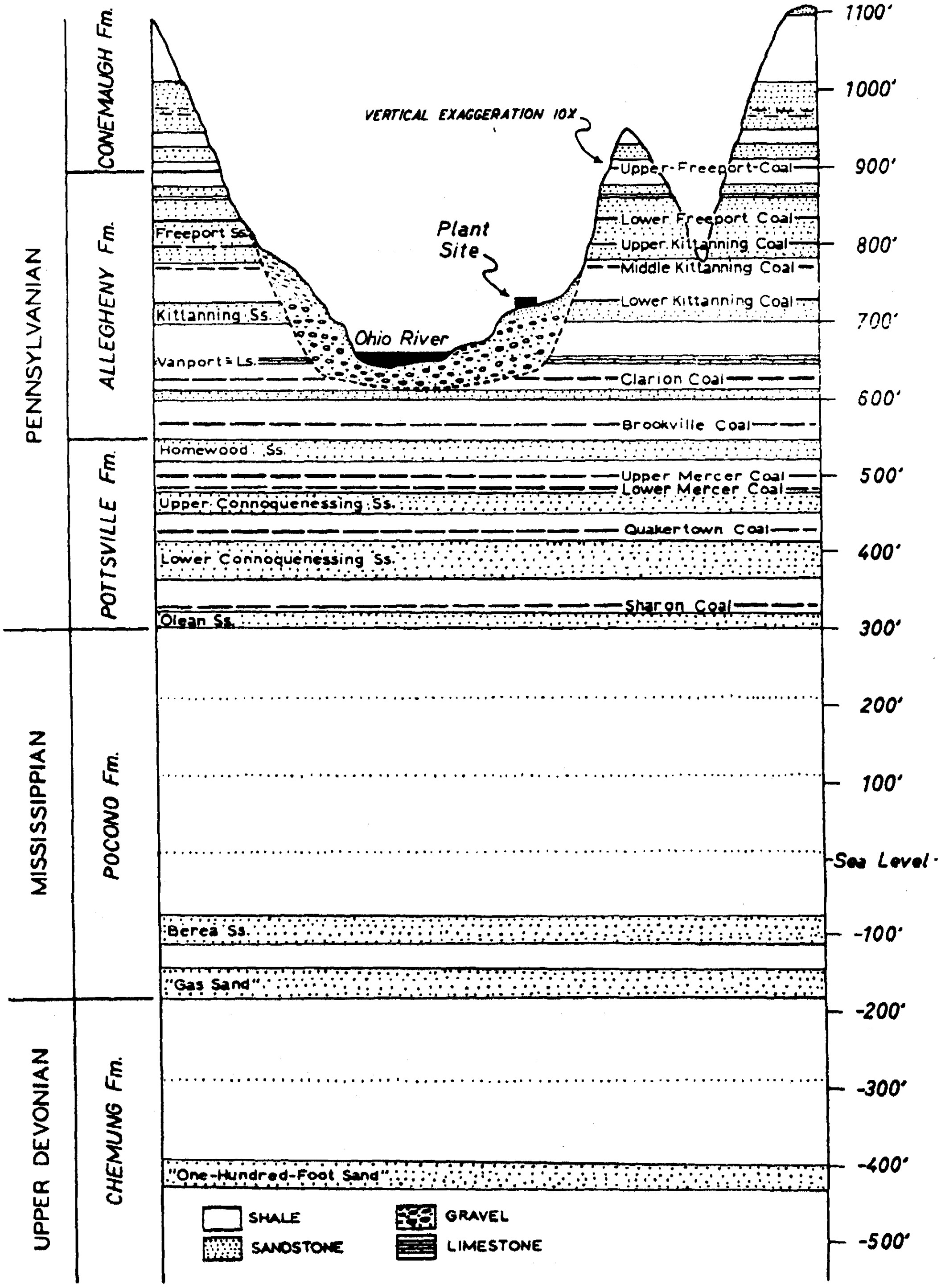

FIGURE 2B-1
GENERALIZED STRATIGRAPHIC
SECTION IN PLANT AREA
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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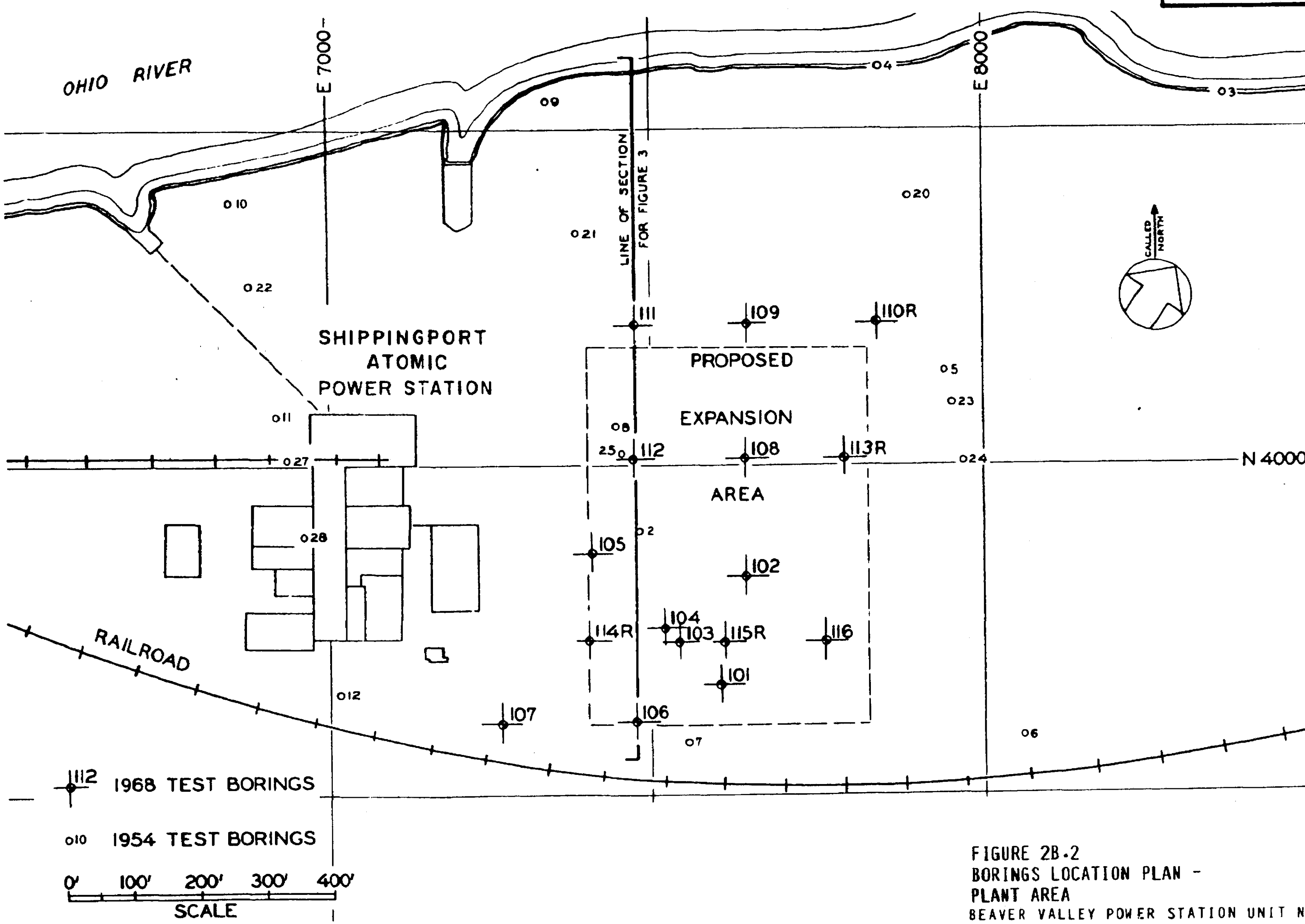

FIGURE 2B-2
BORINGS LOCATION PLAN -
PLANT AREA
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

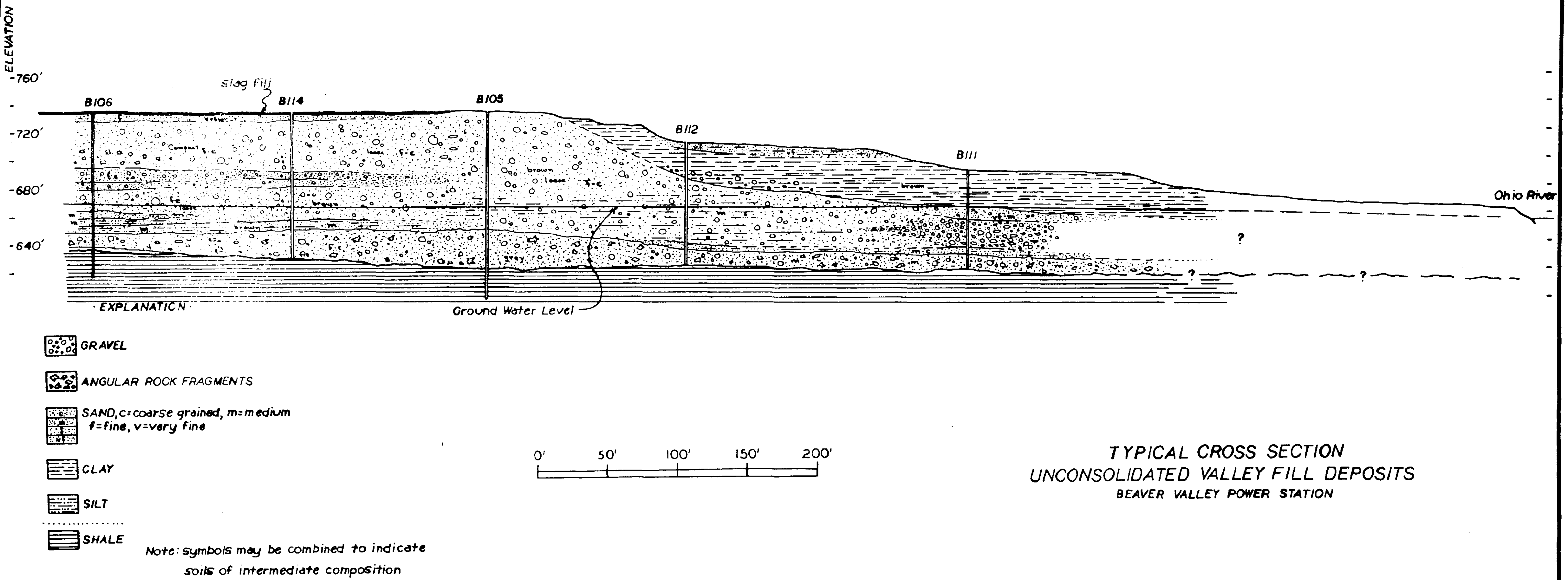

FIGURE 2B.3
TYPICAL CROSS SECTION
UNCONSOLIDATED VALLEY FILL DEPOSITS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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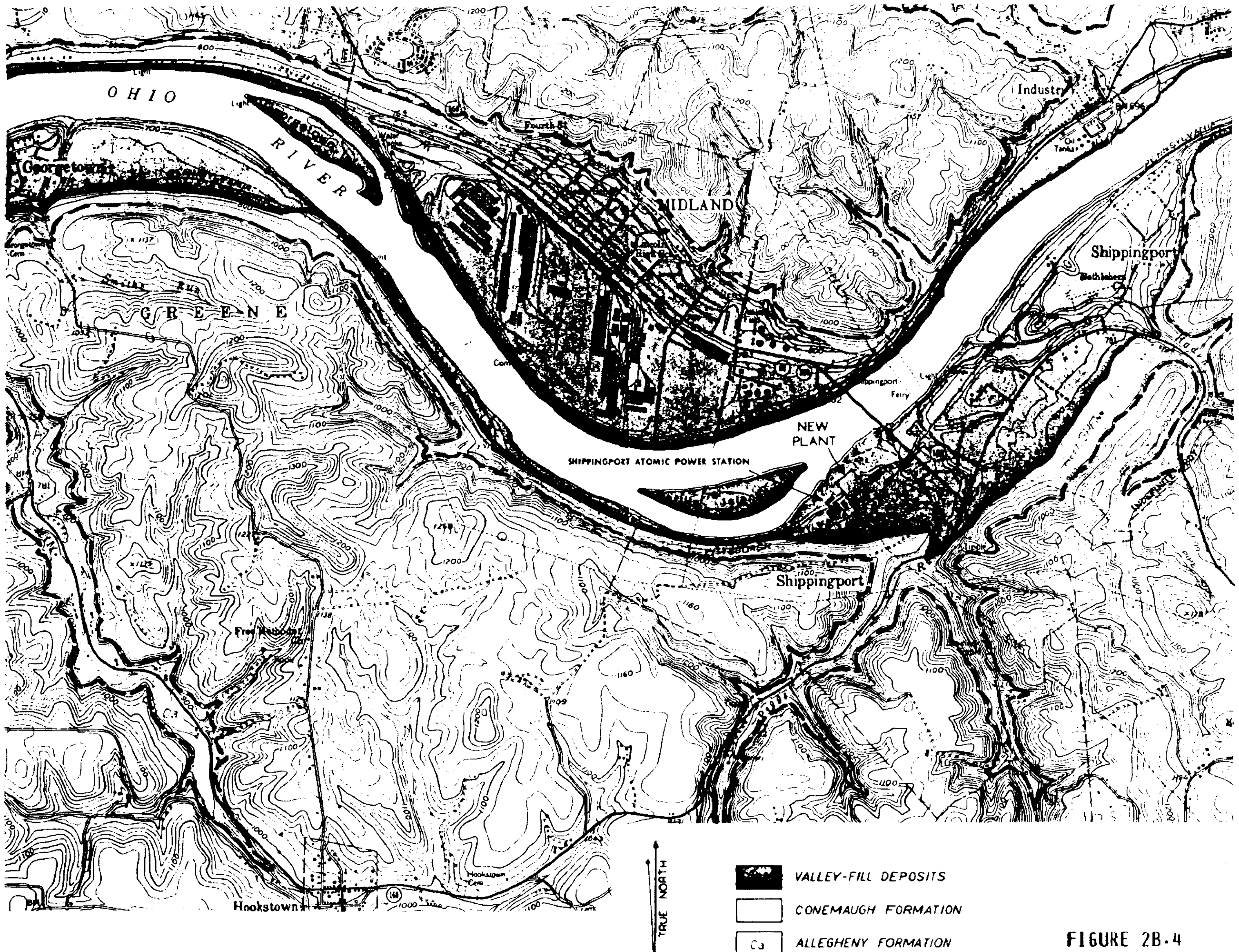

FIGURE 2B-4
GENERALIZED BEDROCK AND SURFICIAL GEOLOGY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2C

SEISMICITY ANALYSIS

BEAVER VALLEY POWER STATION

of the

DUQUESNE LIGHT COMPANY

SHIPPINGPORT, PENNSYLVANIA

Prepared for

STONE & WEBSTER ENGINEERING CORPORATION

Prepared by

WESTON GEOPHYSICAL RESEARCH, INC.

WESTON, MASSACHUSETTS

The Weston Geophysical Engineers Inc. report was retyped/reformatted as part of the Update of the FSAR.

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INTRODUCTION

A seismicity study of the Beaver Valley Power Station was performed under the direction and guidance of Stone & Webster Engineering Corporation.

The purpose of the seismicity study is the determination of the "operational" and "design" earthquakes to be used in the engineering design of the plant.

A seismic field investigation was conducted by Weston Geophysical Engineers, Inc. The results of the field measurements and the soils amplification curves constructed from field data were used as a guide in performing this seismicity analysis.

Reverend Daniel Linehan, S. J., Director of Weston Observatory, was retained as the chief consultant for the seismicity study by Weston Geophysical Research, Inc.

SEISMICITY

The seismicity of an area is a function of the time and areal distribution of earthquake epicenters and the strength of focal depth and relation to regional tectonic features of the earthquake. The purpose of this seismicity analysis is the evaluation of earthquakes which have been recorded historically and instrumentally in order to determine the "operational" and "design" earthquakes that might affect the site of the power station.

There are two measures of the strength of an earthquake, magnitude and intensity. The magnitude of an earthquake is determined from the records of calibrated seismographs and yields an approximation of the amount of energy released by the earthquake (Richter, 1958). The intensity of an earthquake is a measure of the earthquake's affect on both buildings and people. The intensity depends upon the strength of the earthquake, the depth of focus, the foundation conditions of the structures affected, the design and quality of construction of these structures, as well as an accurate and complete record of human observations.

Important in the prediction of an intensity at some distance from an earthquake epicenter is the attenuation of the earthquake force with distance. This attenuation is governed by the local and regional geologic environment and depth of focus.

Several relationships of intensity to ground acceleration have been proposed. These are shown in Figure 2C-1. All of these relationships are based on data in active earthquake areas where such data is readily available. These areas are not typical of all geologic environments or types of construction; in many cases they are not representative of other areas. In the United States most of the data that is used for the empirical relationship of earthquake intensity versus acceleration is from the California area.

Although it is convenient for the engineer to use accelerations or particle velocities in relationship to a predicted earthquake intensity, the earthquake relationship to damage of the structure and its components is dependent upon other factors such as time duration and frequency content of the earthquake energy to arrive at the site under consideration.

An approximate relationship between the Modified Mercalli Intensity Scale currently used in the United States and Europe, the earlier Rossi-Forel Intensity Scale, magnitude, and ground acceleration is shown on Figure 2C-2. It should be mentioned that any relationship given between intensity and/or magnitude and ground acceleration should be applied with great caution, since soils and structure conditions vary considerably. The prediction of the effects of ground acceleration or particle velocity from an earthquake should be the combined effort of an engineer familiar with the dynamics of structures, a person knowledgeable in soils mechanics, a seismologist, and a geologist.

GEOLOGIC AND TECTONIC SETTING

The Beaver Valley Power Station is located in an unglaciated area on sand and gravel deposits along the Ohio River, west of Pittsburgh and a few miles east of the Pennsylvania - Ohio line. Physiographically, the site is located in the Appalachian Plateau Province. The bedrock in the area is the Allegheny formation of Pennsylvanian Age. It consists of approximately two-thirds shale and one-third sandstone with several interbedded coal seams and a thin bed of fossiliferous Vanport limestone.

Structurally, the bedrock is generally flat lying. It has a regional dip of approximately 15 to 20 feet per mile to the south and southeast with a low amplitude anticlines and synclines. The regional dip and structure were imposed by orogenic movements which formed the Appalachian Mountains, 100 miles southeast of the site, at the close of the Paleozoic Era (approximately 225 million years ago). There are no known faults in the site area; the nearest area of considerable faulting is in the Appalachian Mountain region. A Regional Tectonic Map is shown on Figure 2C-3.

REGIONAL SEISMICITY

The site is located in an inactive seismic area. No earthquake of Intensity V (M.M.) or greater has occurred within 80 miles of the site (see Figure 2C-4). The nearest earthquake of Intensity V or greater (M.M.) took place at Fairport, Ohio near Cleveland, 80 miles northwest of the site. It occurred on June 27, 1906. The nearest areas of repetitive seismic activity to the site are Fairport - Cleveland, Ohio area, the Attica, New York area, and the Anna, Ohio area. The activity in the Fairport - Cleveland, Ohio area has been minor. The largest earthquakes associated with this area are of Intensity V (M.M.). The Attica, New York area, 180 miles northeast of the site, experienced an earthquake of Intensity VIII (M.M.) (August 12, 1929) and two earthquakes of Intensity VI (M.M.). In the Anna, Ohio area, approximately 200 miles west of the site, one earthquake of Intensity VII - VIII (M.M.) (March 8, 1937) and three earthquakes of Intensity VII (M.M.) have occurred.

LOCAL SEISMIC ACTIVITY

Only one earthquake has been reported as having its epicenter within 60 miles of the site (see Figure 2C-5). This earthquake reportedly took place at Sharon, Pennsylvania, approximately 40 miles north of the site, on August 17, 1873. Rockwood reports that the earthquake lasted ten seconds but gives no other details (Rockwood, 1874). Since Rockwood's reports of other earthquakes usually include the degree of motion which was felt, this earthquake is interpreted as being slight, probably of Intensity III (M.M.) and certainly no greater than Intensity IV (M.M.).

EARTHQUAKE EFFECTS AT THE SITE

There have been very few earthquakes which have been felt at the site. The only earthquake effects at the site have been from large, distant events. Isoseismal information indicates that the strongest earthquakes from the Attica, New York, and the Anna, Ohio areas were barely perceptible at the site. The Attica earthquake of August 12, 1929 was felt with Intensity IV (M.M.) (windows rattled) at New Castle, 25 miles north of the site, and at Butler, 35 miles northeast of the site. It was felt only slightly at Pittsburgh which is 25 miles southeast of the site (United States Earthquakes, 1929). The maximum estimated intensity at the site is III (M.M.).

An isoseismal map prepared by Westland and Heinrich (1940) for the Anna, Ohio earthquake of March 8, 1937, shows that Shippingport is at the eastern limit of the area of perceptibility. The intensity at the site as determined from the isoseismal map was Intensity II (M.M.). Canadian and northeastern United States earthquakes which have affected the site area include the St. Lawrence River Valley earthquake of March 1, 1925 with an epicentral Intensity of IX (M.M.), the Timiskaming, Canada earthquake of November 1, 1935, epicentral Intensity VII (M.M.), and the Cornwall-Massena earthquake of September 5, 1944, epicentral intensity VIII (M.M.). The maximum result of these earthquakes at the site area was an estimated Intensity of II to III.

It appears that the earthquake which has most affected the site area was the Charleston, South Caroline earthquake of August 31, 1886, which had an epicentral Intensity of IX-X (M.M.). Dutton's isoseismal map indicates a Rossi-Forel Intensity of approximately IV which would correspond to a Modified Mercalli Intensity of a middle IV at the site area. Descriptions contained in Dutton's article indicate intensities may have been slightly higher, possibly as high as low Intensity V along the rivers. However, the descriptions contained in articles are somewhat suspect, especially at a distance of 565 miles from the earthquake epicenter.

It is possible that the New Madrid, Missouri earthquakes of 1811 and 1812 may have had intensities similar to those of the Charleston earthquake in the site area. Fuller (1912) reports that the earthquake "was severe at Pittsburgh being greater than any previously experienced. Many persons left their houses." The nearest significant damage from the New Madrid earthquake was at Cincinnati, Ohio, approximately 330 miles from the epicenter or about 250 miles closer to the epicenter than Shippingport.

OPERATIONAL EARTHQUAKE

Considering attenuation data shown in Figure 2C-6 of the north-eastern United States area, an "operational" acceleration value of 5% of gravity would correspond to an Intensity of high V to low VI for the site area. Working backwards to the nearest areas of activity, we would have an Intensity of VIII-IX in the Cleveland, Ohio area or an Intensity X in the Anna, Ohio or Attica, New York areas. Since none of these areas have displayed any intensities this high, it would appear that an "operational" acceleration of .05g is conservative.

DESIGN EARTHQUAKE

It has been a practice in the past to use a maximum earthquake for design of critical structures in the nuclear power plant complex. This earthquake design must be such as to assure safe shutdown of the plant. In areas of known seismicity, the selection of the "design" earthquake usually has been made on the basis of selecting the largest earthquake which has occurred along the fault at its nearest point to the nuclear power plant site. This application is valid in an area where faults can be associated with earthquake activity such as the St. Lawrence River Valley and areas of California. In lieu of a known fault system to guide the seismologist in the selection of a "design" earthquake, the selection of such a quake must be made on some other basis. One such basis is a simple doubling of "operational" earthquake acceleration or the selecting of an earthquake one intensity higher than the "operational base” intensity. At this particular site, this procedure would result in a "design" acceleration of 10% of gravity corresponding to a high Intensity VI or a low Intensity VII which is about two intensities higher than the intensity estimated from historical data at the site area.

Considering the minor seismicity of this area such a procedure is considered conservative. Accordingly, a "design" earthquake of 0.10g Modified Mercalli Intensity is recommended.

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APPENDIX to 2C

EARTHQUAKES WHICH HAVE AFFECTED

THE BEAVER VALLEY POWER STATION

SHIPPINGPORT, PENNSYLVANIA

<u>The Earthquake of 1811 and 1812</u> (36.6°N, 89.6°W - Intensity XII)

The New Madrid Missouri earthquakes of December 16, 1811, January 23, 1812, and February 7, 1812 were each felt over most of the eastern two-thirds of the United States, an affected area of at least two million square miles. Topographic changes including uplifts, landslides and fissures took place over an area of 30,000 to 50,000 square miles, principally along the Mississippi and Ohio Rivers. The Nuclear Power Plant Site is located about 585 miles from the epicenter. The nearest report of significant damage from these earthquakes came from the Cincinnati, Ohio area, about 330 miles from the epicenter and 250 miles from the site. In the Cincinnati area, the tops of chimneys were thrown down and some walls were cracked; a probable Intensity of VI, perhaps low VII, when considering the type and quality of construction and the foundation conditions. Fuller (1912) reports that "the earthquake was severe at Pittsburgh, being greater than any previously experienced. Many persons left their houses." Eppley (1965) reports that the earthquake was "strongly felt in Butler County, Pennsylvania." Butler, in the center of Butler County, is about 35 miles east-northeast of the site. Based upon the available data and intensity attenuation characteristics, the intensity at the site is estimated at low to middle V.

<u>The Earthquake of August 31, 1886</u> (32.9°N, 80.0°W - Intensity IX-X)

This earthquake was felt over a two million square mile area of eastern United States. In the epicentral area, located a few miles north and west of Charleston, South Carolina, chimneys and fireplaces collapsed, railroad tracks were bent and laterally displaced, and fissures occurred in the ground with ejection of some water, sand, and mud. The area within 100 miles of the epicenter was strongly affected with damage to plaster and chimneys. C. E. Dutton (1886-1887) conducted a thorough investigation of the effects of this earthquake in the epicentral area and throughout the eastern United States. Dutton prepared an isoseismal map which showed a Rossi-Forel Intensity of V in the vicinity of the site (see Figure 2C-7). A Rossi-Forel Intensity V is equivalent to a Modified Mercalli Intensity of middle IV (see Figure 2C-2 of text). Reports from Pittsburgh and other towns in the site area indicate a similar intensity except along and near the rivers where somewhat stronger effects were noted. In towns located along rivers, dishes were thrown from shelves and clocks were stopped; an approximate intensity of low V (M.M). The site, located adjacent to the Ohio River, may have experienced a similar intensity.

<u>The Earthquake of February 10, 1914</u> (45.0°N, 76.9°W - Intensity VII - Magnitude 5.5)

The epicenter was located about 25 miles west Lanark, Ontario. The quake was felt over a 200,000 square mile area including New England, New York State, and Pennsylvania. Cities and towns located at similar distances from the epicenter (345 miles) experienced intensities of III to IV. A similar intensity is estimated at the site area (Smith, 1962; Eppley, 1965).

<u>The Earthquake of February 28, 1925</u> (47.6°N, 70.1°W - Intensity IX - Magnitude 7.0)

The epicenter was located in the St. Lawrence River Valley northeast of Quebec City, a distance of 700 miles from the site. The quake was felt over an area of approximately two million miles, extending south to Virginia and west to the Mississippi River. Important damage was confined to a narrow belt along the St. Lawrence River Valley. Isoseismals prepared by the Dominion Observatory and the United States Coast and Geodetic Survey (see Figure 2C-8) show that the estimated intensity at the site was II.

Other earthquakes of Intensity IX and X have originated in the St. Lawrence River Valley near the epicenter of the February 28, 1925 earthquake. Nearly all of these earthquakes took place during colonial times when reporting of earthquakes effects may be accurate in some cases and inaccurate and exaggerated in others. Based on attenuation data and the effects of the February 28, 1925 earthquake, it is estimated that some of these historical earthquakes may have had an intensity of III in the site area.

The Earthquake of August 12, 1929 (42.9°N, 78.3°W - Intensity VIII - Magnitude 5.8)

The quake was centered near Attica, New York, about 180 miles northeast of the site. The quake was felt over a 100,000 square mile area of the northeastern United States and Ontario, Canada, extending from Cleveland, Ohio and Port Huron, Michigan on the west; to Montreal and the Connecticut River Valley on the east. The maximum intensity of VIII was confined to the eastern part of the city of Attica and the immediate area to the east, where many chimneys were thrown down and some buildings were structurally damaged. Intensity VI or greater was noted at Batavia, Dale, East Bethany, Johnsonburg, Warsaw, and Wyoming, New York. All of these localities are within ten miles of the epicenter.

In the vicinity of the site, intensities ranged from IV at New Castle (25 miles north) and Butler (35 miles northeast) where windows rattled, to III at Pittsburgh (25 miles southeast) where the earthquake was only slightly felt. Similar intensities are estimated for the site. (United States Earthquakes, 1929) .

The Earthquake of November 1, 1935 (46.8°N, 79.1°W - Intensity VII - Magnitude 6.25)

The epicenter was located about 425 miles north of the site near Timiskaming Station, Quebec, where some damage was reported. The quake was felt over a one million square mile area of the north-eastern United States and eastern Canada. The quake was felt as far south as Virginia and Kentucky and as far west as Wisconsin. Damage in the epicentral region was relatively small when compared to the large area affected. Isoseismals prepared by the Dominion Observatory of Canada and the United States Coast and Geodetic Survey (see Figure 2C-9) show that the intensity in the vicinity of the site was III.

The Earthquake of March 8, 1937 (40.6°N, 84.0°W - Intensity VII-VIII)

This earthquake occurred in western Ohio in the vicinity of Anna where walls of brick buildings cracked, chimneys were thrown down and furniture was upset. The earthquake was felt over a 150,000 square mile area including all of Ohio, most of Indiana and adjacent areas of Michigan, Kentucky, West Virginia, and south-eastern Ontario, Canada. The site is located at the eastern limit of the perceptible area and may possibly have experienced an intensity of II. (Westland and Heinrich, 1940) (See Figure 2C-10)

The Earthquake of September 4, 1944 (44.95°N, 74.9°W - Intensity VIII - Magnitude 5.9)
The epicenter was located in the vicinity of Massena, New York and Cornwall, Ontario, about 405 miles northeast of the site. Damage was estimated at two million dollars. The quake was felt over an estimated area of 175,000 square miles. Isoseismals prepared by the Dominion Observatory of Canada (see Figure 2C-11) show that the area of damage (Intensity VI or greater) was elongated along the St. Lawrence River Valley. The isoseismals show that the intensity in the vicinity of the site was II.

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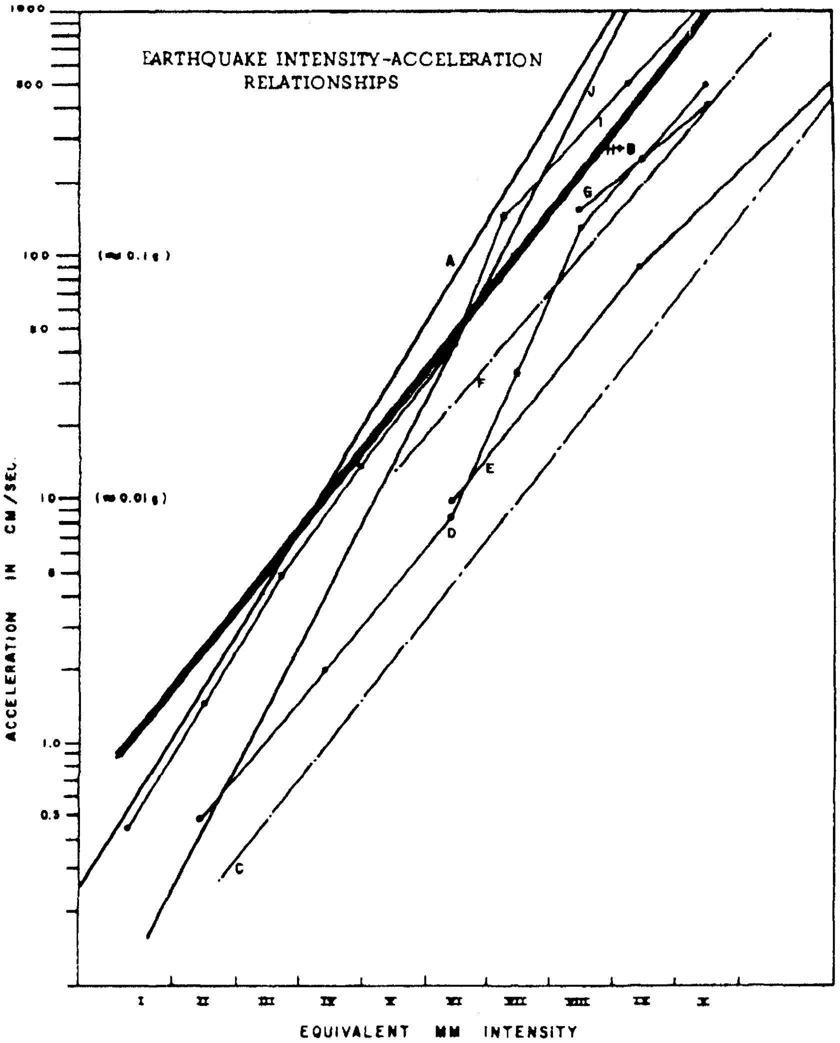


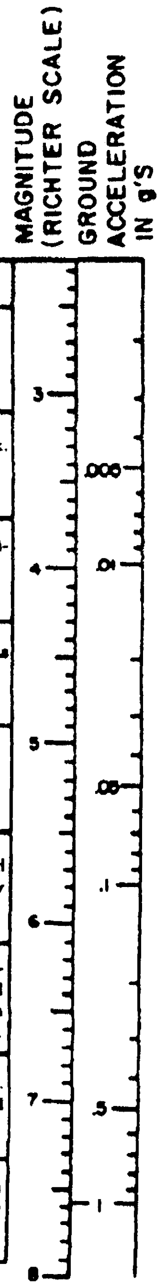
A- HERSHBERGER (1956)
B- GUTENBERG & RICHTER (1942)
*C- CANCANI (1904)
*D- ISHIMOTO (1932)
*E- SAVARENSKY & KIRNOS (1955)
*F- MEDVEDEV ET AL. (1963)
*G- N.Z. DRAFT BY-LAW
H- TID-7024 (1963)
*I- KAWASUMI (1951)
*J- PETERSCHMITT (1951)

*DATA FROM G.A. EIBY (1965)
Weston Geophysical Research, Inc.

FIGURE 2C-1
EARTHQUAKE INTENSITY - ACCELERATION RELATIONSHIPS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

ABRIDGED MODIFIED MERCALLI INTENSITY SCALE

ROSSI-FOREL INTENSITY SCALE	MODIFIED MERCALLI	
I	I	Not felt except by a very few under especially favourable circumstances.
II	II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognise it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
IV, V	IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
VI	V	Felt by nearly everyone; many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbance of trees, poles and other tall objects sometimes noticed. Pendulum clocks may stop.
VII	VI	Felt by all; many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VIII	VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
IX	VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
	IX	Damage considerable in specially designed structures; well designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X	X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations, ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.



Modified Mercalli Intensity Scale and relationship with Rossi-Forel Scale after Wood and Neumann, 1931 (Modified Mercalli Intensities XI and XII not included).

Magnitude and acceleration values taken from Nuclear Reactors and Earthquakes, TID-7024, United States Atomic Energy Commission.

FIGURE 2C-2
MODIFIED MERCALLI INTENSITY SCALE
APPROXIMATE RELATIONSHIP WITH
MAGNITUDE, GROUND ACCELERATION
AND ROSSI-FOREL INTENSITY SCALE

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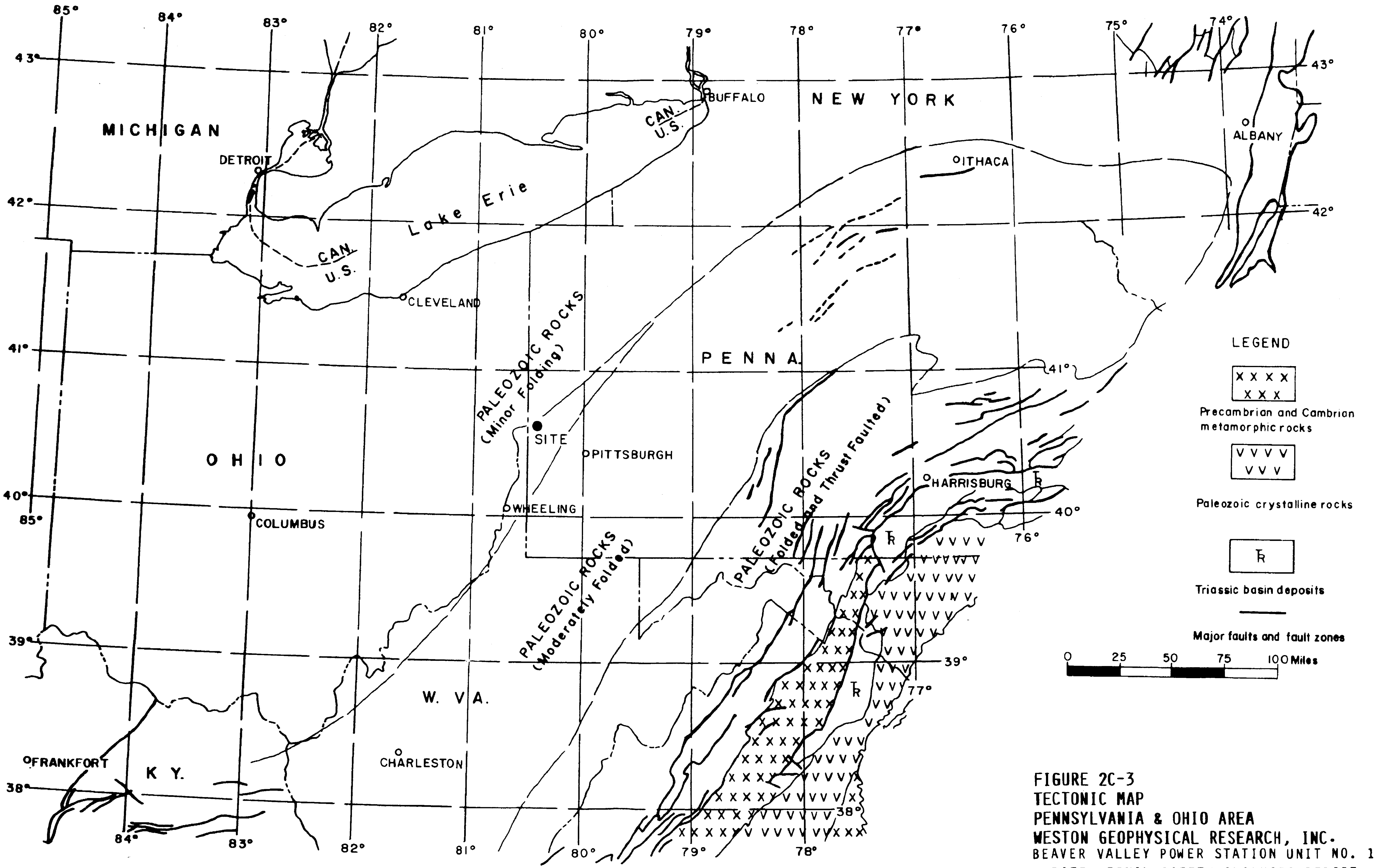

FIGURE 2C-3
TECTONIC MAP
PENNSYLVANIA & OHIO AREA
WESTON GEOPHYSICAL RESEARCH, INC.
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

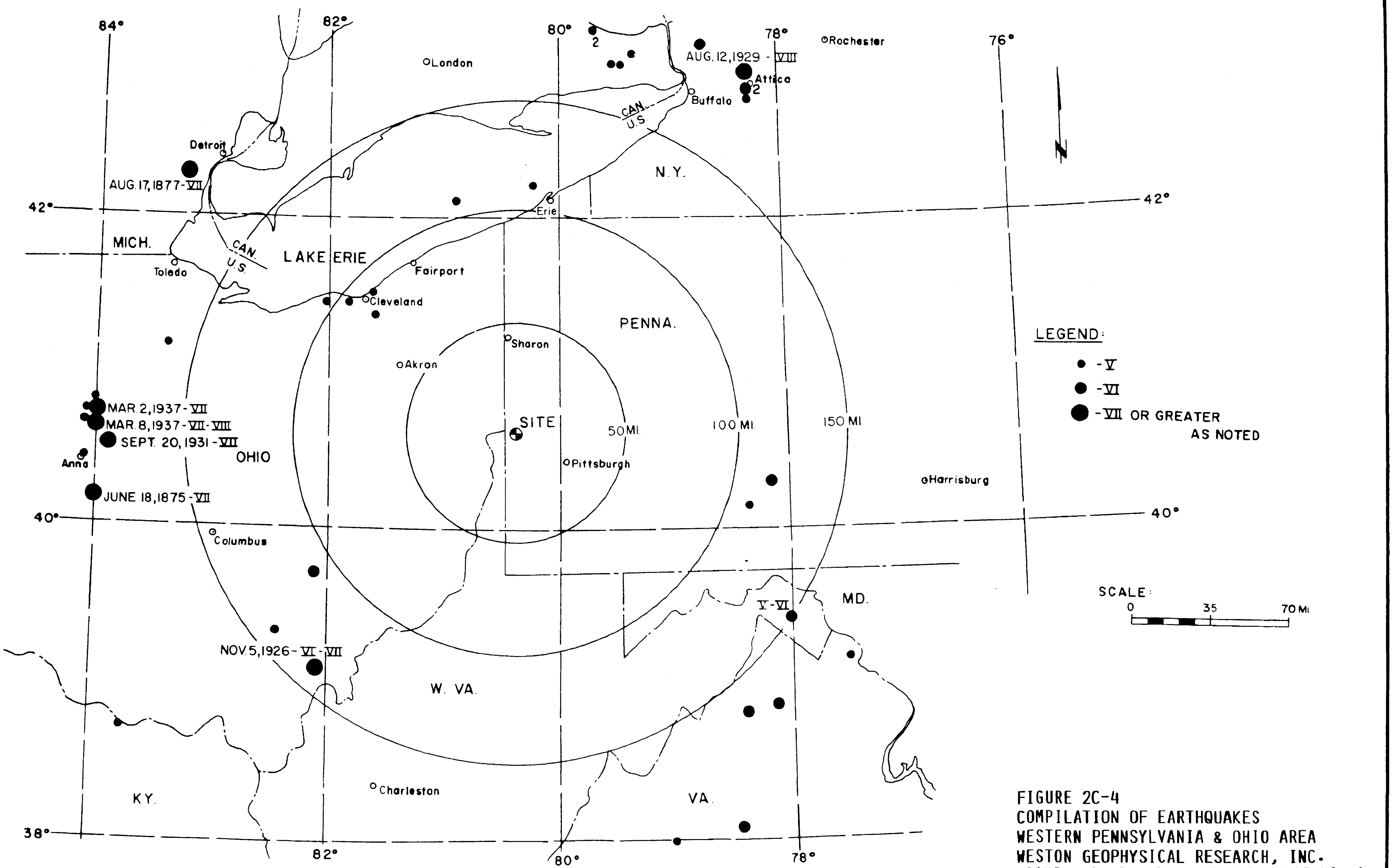

FIGURE 2C-4
COMPILATION OF EARTHQUAKES
WESTERN PENNSYLVANIA & OHIO AREA
WESTON GEOPHYSICAL RESEARCH, INC.
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

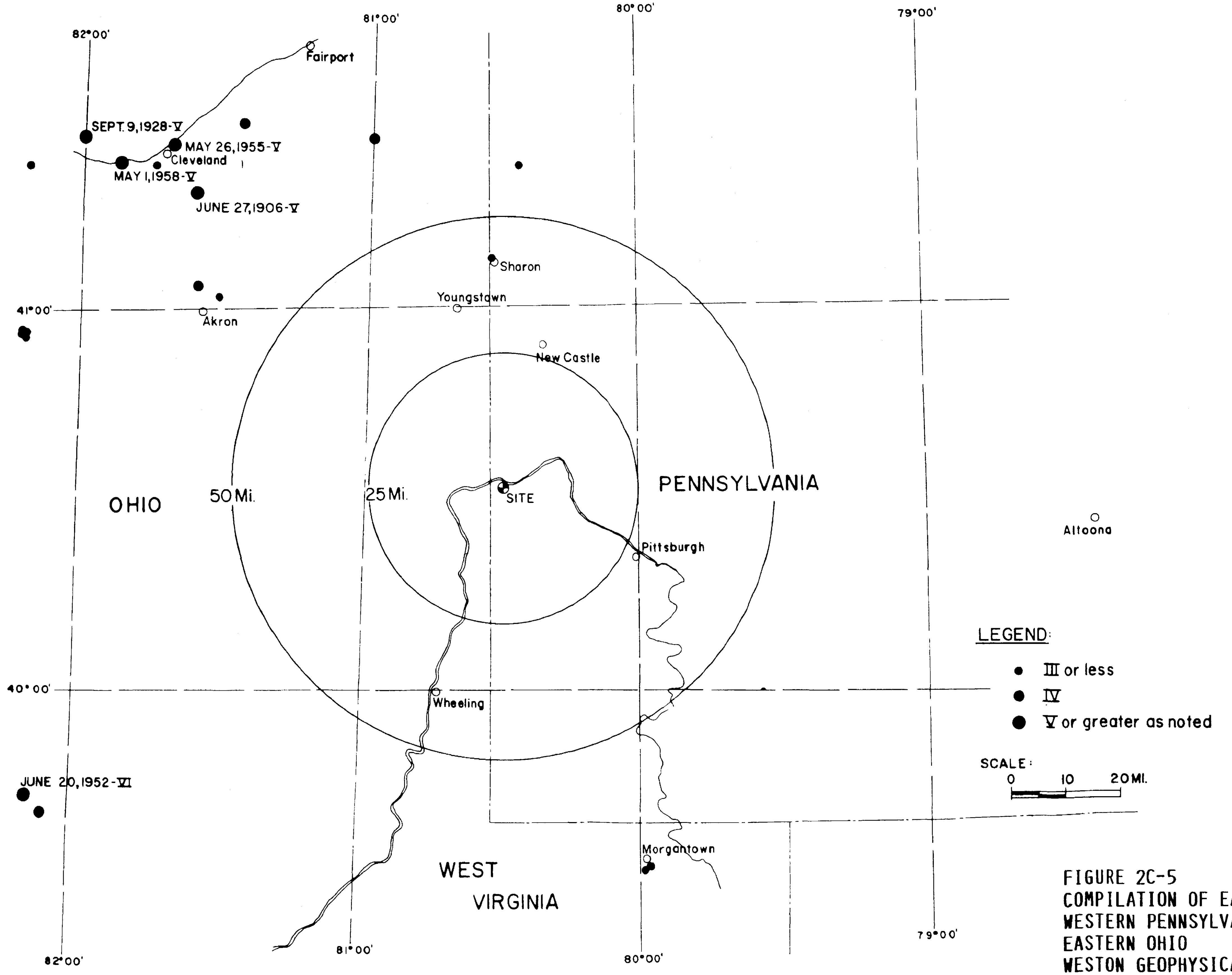

FIGURE 2C-5
COMPILATION OF EARTHQUAKES
WESTERN PENNSYLVANIA
EASTERN OHIO
WESTON GEOPHYSICAL RESEARCH, INC.
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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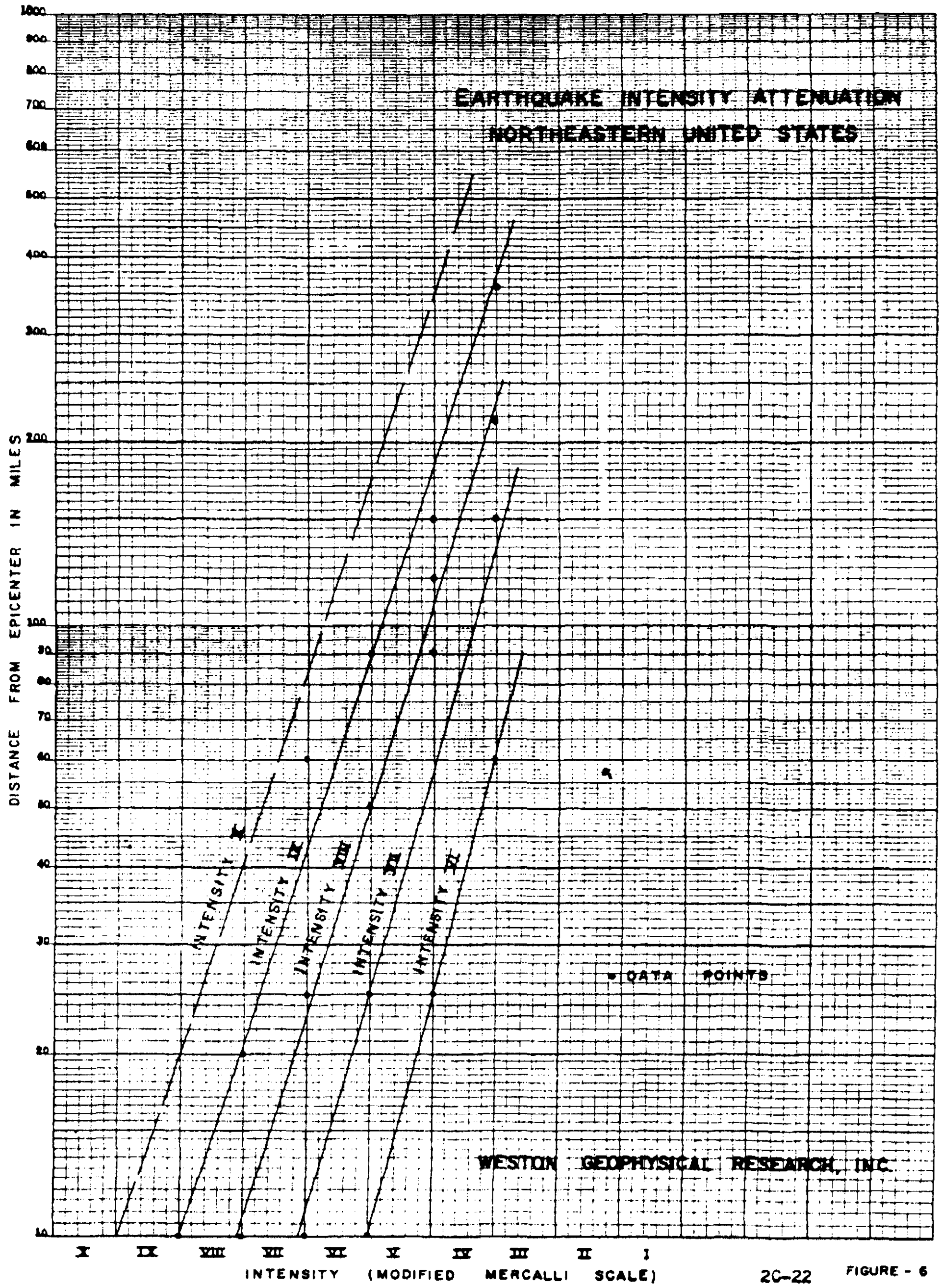

FIGURE 2C-6
EARTHQUAKE INTENSITY ATTENUATION
NORTHEASTERN UNITED STATES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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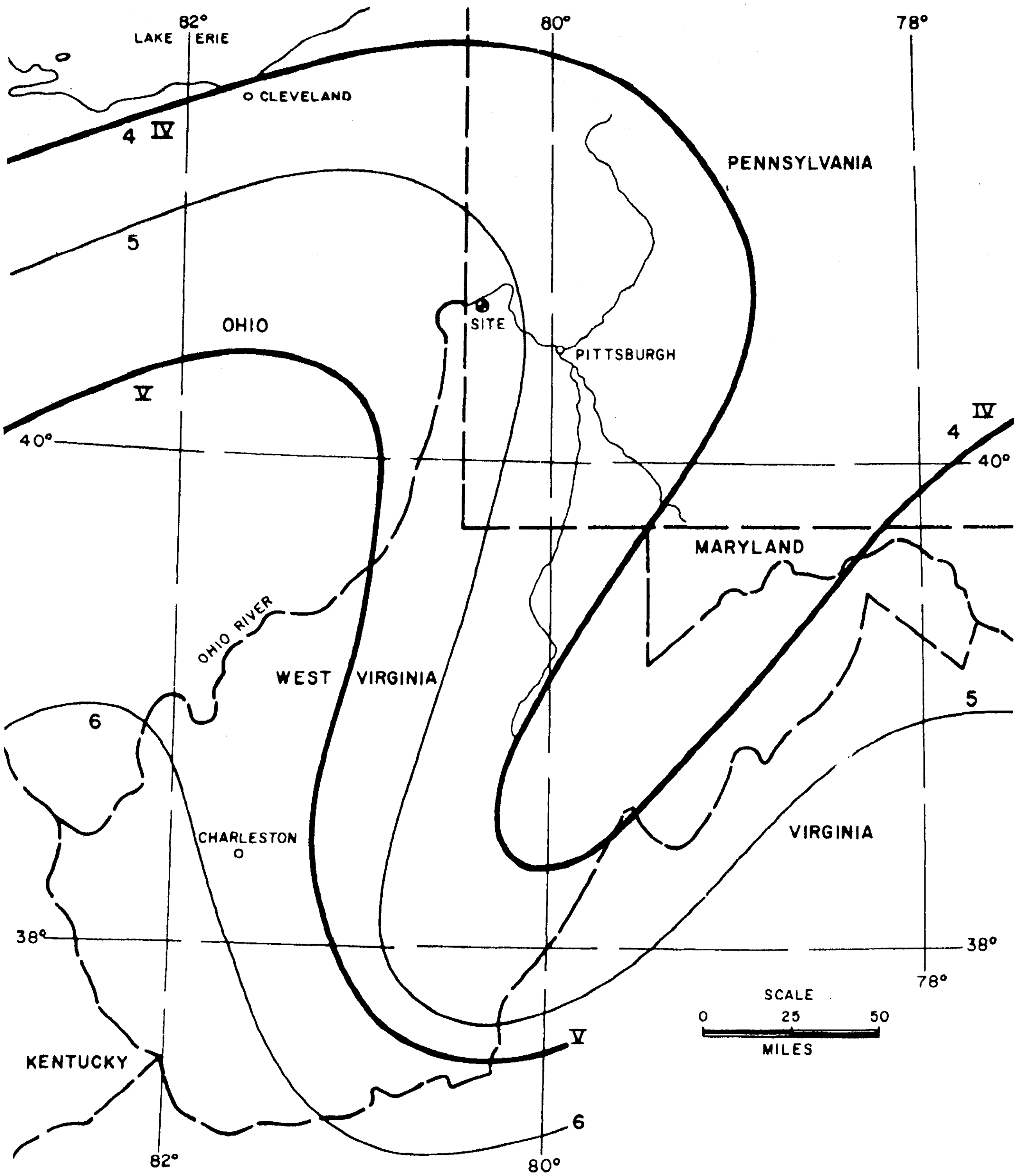
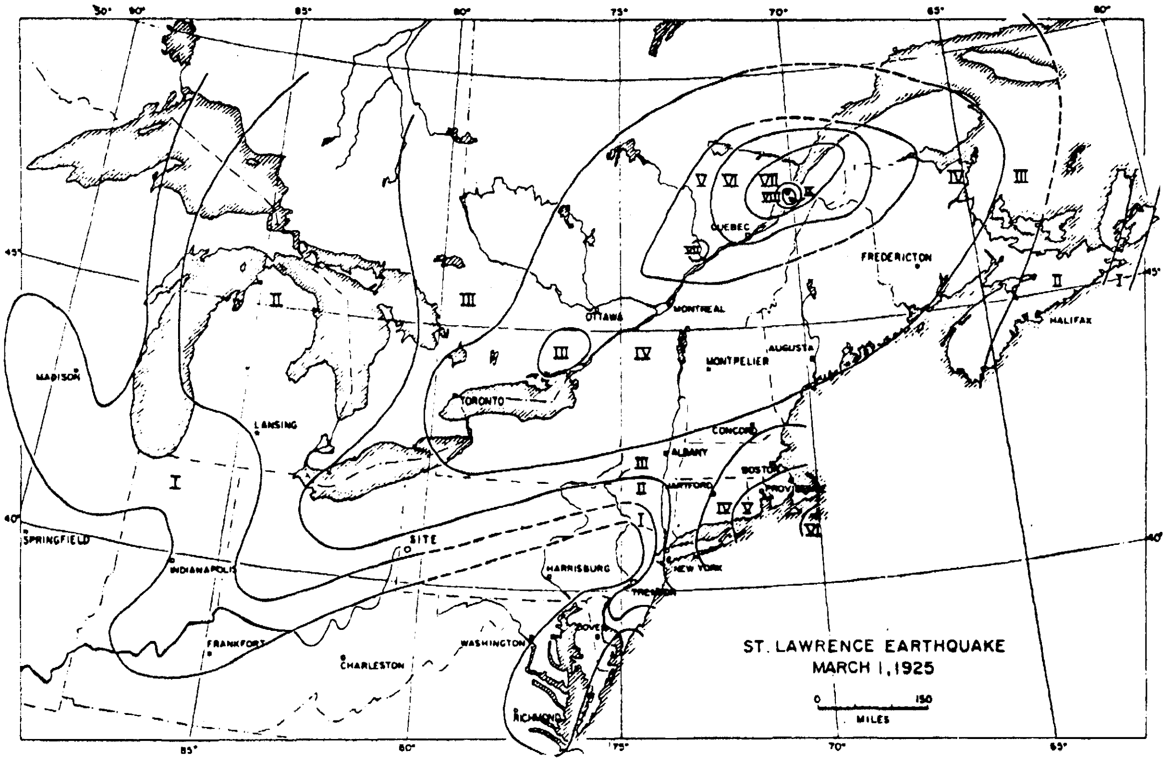


LEGEND.

3 - ROSSI-FOREL INTENSITY, AFTER DUTTON 1887-88

V - MODIFIED MERCALLI INTENSITY. RELATIONSHIP OF MODIFIED MERCALLI TO ROSSI-FOREL INTENSITY AFTER NEUMANN AND WOOD (1931).

FIGURE 2C-7
ISOSEISMAL MAP
CHARLESTON, SO. CAROLINA EARTHQUAKE
OF AUGUST 31, 1886
WESTON GEOPHYSICAL RESEARCH, INC.
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

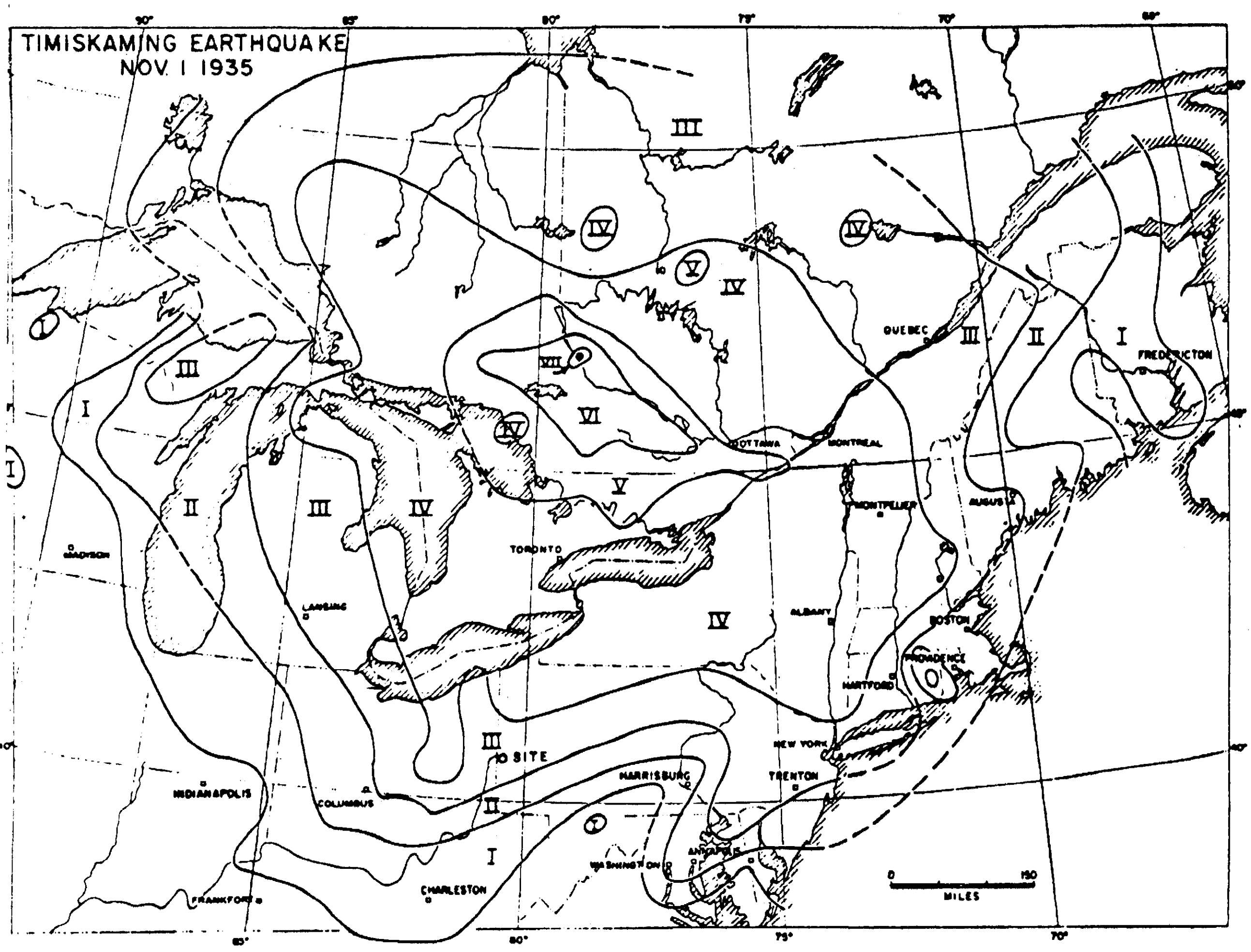


ISOSEISMAL MAP*
EARTHQUAKE OF MARCH 1, 1925
(February 28, 1925 EST)

* Smith, W. E. T., "Earthquakes of Eastern Canada and Adjacent Areas, 1928-1959," <u>Publications of the Dominion Observatory, Ottawa</u>, Vol. 32, No. 3, Canada: Department of Mines and Technical Surveys, 1966, p. 119.

FIGURE 2C-8
ISOSEISMAL MAP
EARTHQUAKE OF MARCH 1, 1925
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



ISOSEISMAL MAP*
EARTHQUAKE OF NOVEMBER 1, 1935

* Smith, W. E. T., "Earthquakes of Eastern Canada and Adjacent Areas, 1928-1959," <u>Publications of the Dominion Observatory, Ottawa</u>, Vol. 32, No. 3, Canada: Department of Mines and Technical Surveys, 1966, p. 95.

FIGURE 2C-9
ISOSEISMAL MAP
EARTHQUAKE OF NOVEMBER 1, 1935
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

ISOSEISMAL MAP OF THE EARTHQUAKE OF MARCH 8TH. 1937.

ROMAN NUMERALS INDICATE INTENSITIES ON THE WOOD NEUMANN SCALE

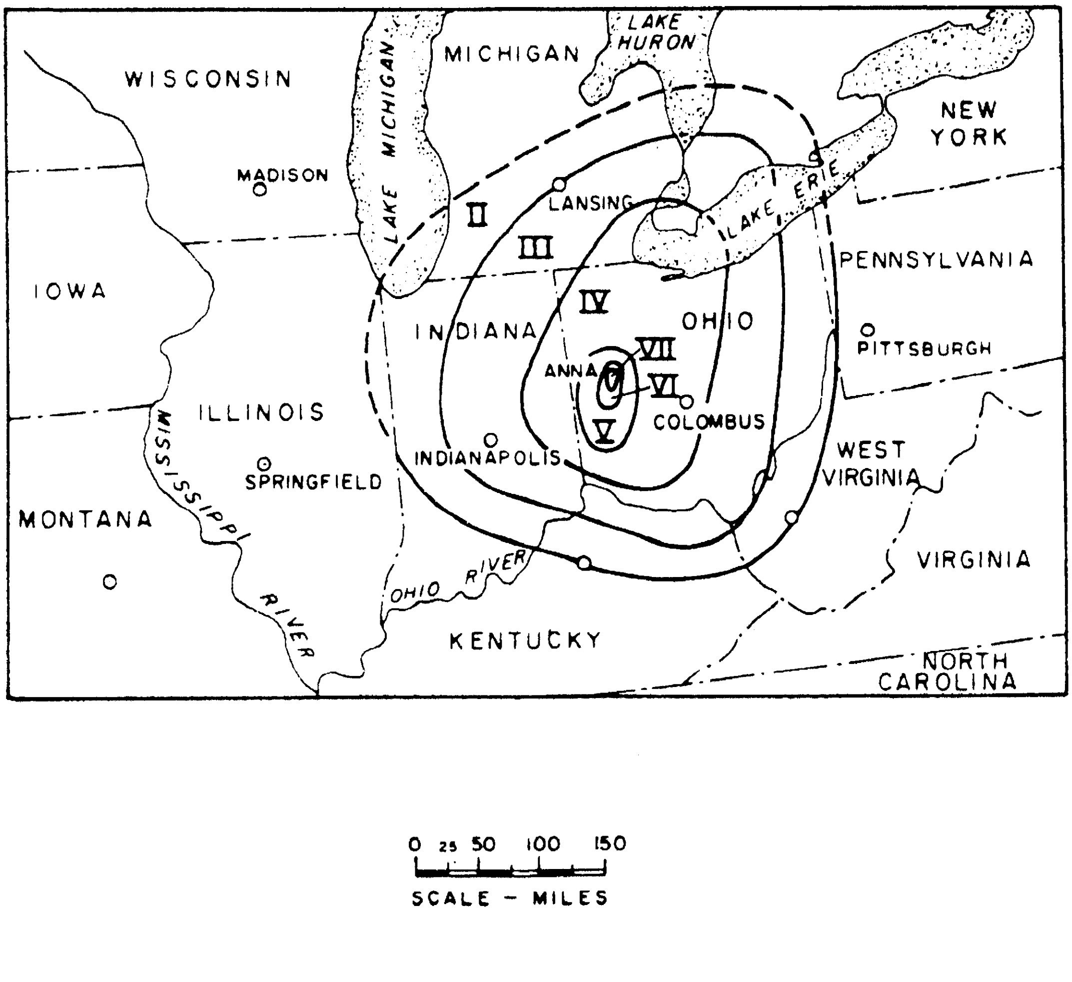
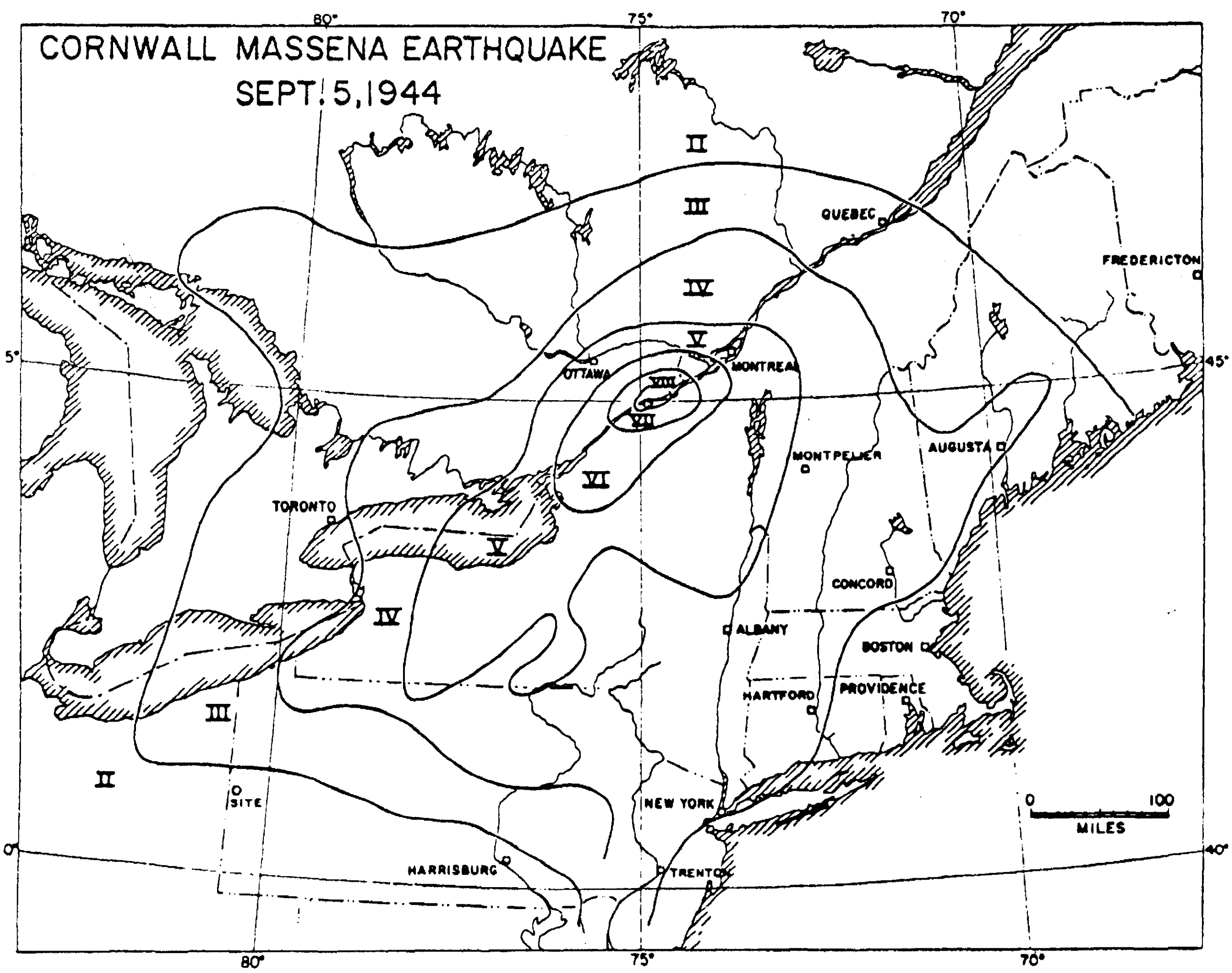


FIGURE 2C-10
ANNA OHIO EARTHQUAKE
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



ISOSEISMAL MAP*
EARTHQUAKE OF SEPTEMBER 5, 1944
(September 4, 1944 EST)

* Smith, W. E. T., "Earthquakes of Eastern Canada and Adjacent Areas, 1928-1959," <u>Publications of the Dominion Observatory</u>, Ottawa, Vol. 32, No. 3, Canada: Department of Mines and Technical Surveys, 1966, p. 115.

FIGURE 2C-11
ISOSEISMAL MAP
EARTHQUAKE OF SEPTEMBER 5, 1944
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2D

EFFECT OF LOCAL SOIL CONDITIONS UPON SEISMIC THREAT TO BEAVER VALLEY POWER STATION

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

ROBERT V. WHITMAN

The R. V. Whitman report was retyped/reformatted as part of the Update of the FSAR.

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LIST OF FIGURES

1. INTRODUCTION

The seismicity study for the proposed Beaver Valley Power Station has indicated that earthquakes of interest cause different intensities of ground motion in the uplands and lowlands of the region.

For the uplands, where structures would be founded on firm shale encountered at shallow depth, the maximum credible seismic threat (design basis earthquake) is a Modified Mercalli intensity V^+ or VI^-. The corresponding maximum ground acceleration is 0.035g, and the appropriate corresponding response spectra are Housner's average smoothed curves (AEC TID -7024) normalized to this acceleration.

The proposed power station will actually be founded upon a gravel terrace along the Ohio River. This report considers the seismic threat appropriate for such foundation conditions.

2. METHODS FOR ESTIMATING EFFECT OF LOCAL SOIL CONDITIONS

Recently, several methods have been developed for computing the possible modifying effect of local soil conditions upon earthquake ground motions. These include a continuous wave reflection and refraction procedure developed by workers at U.C.L.A. (Ref. 1) and a lumped mass-spring method of analysis used by Professor Seed of Berkeley (Ref. 2). These procedures are described in detail in the report "Effect of Local Soil Conditions upon the Seismic Threat to Nuclear Power Plants" by the Consultant (Ref. 3). For comparable assumptions regarding the input and for comparable forms of output, both procedures give the same result.

Reference 3 also discusses the relative advantages of the two procedures with regard to specific types of problems. It is recommended that response spectra for facilities founded upon soil be obtained by multiplying the response spectra suitable for firm ground by a quantity called the ratio of response spectra. The appropriate ratio of response spectra is most conveniently determined using the lumped mass-spring method of analysis, with modal superposition. This involves (see Figure 2D-1):

1. Selecting suitable time-histories of acceleration as input to the bottom of the soil profile, and computing for several values of structural damping the response spectra corresponding to each of these input ground motions.

2. Computing the time-history of acceleration at the top of the soil, or at various levels within the soil, corresponding to each of these input ground motions.

3. Computing for several values of structural damping the response spectra for each of these computed time-histories of acceleration at the top of or within the soil.

4. Dividing each response spectrum from step 3 by the corresponding response spectrum for step 1, to obtain the ratio of response spectra.

For these calculations, it is necessary to select suitable values for the stiffness and internal damping of the soil, and an additional amount of damping to account for the energy which escapes back into the firm ground as the overlying soil vibrates. Since, as will be seen in Section 3, the soil properties depend upon strain, a trial-and-error approach is necessary until the average of the peak strains computed during the analysis are consistent with the soil properties used as input to the analysis.

3. <u>SOIL PROPERTIES</u>

Shear wave velocities as determined from surface and cross bore-hole field investigations by Weston Geophysical Engineering Co.are shown in Figure 2D-2.

Also shown in this figure are shear wave velocities computedusing the following equations derived from laboratory studies by Hardin and Richart (Refs. 4, 5):

$$G = 1230 \frac{(3-e)^2}{1+e} \bar{\sigma}_o^{1/2} \quad G, \bar{\sigma}_o \text{ in psi}$$

$$= 14{,}760 \frac{(3-e)^2}{1+e} \bar{\sigma}_o^{1/2} \quad G, \bar{\sigma}_o \text{ in psf} \qquad \text{(2D-1)}$$

$$C_S = 87.2 \frac{3-e}{\sqrt{G_s + Se}} \bar{\sigma}_o^{1/4} \ ; \ \bar{\sigma}_o \text{ in psf}, C_S \text{ in ft/sec.} \qquad \text{(2D-2)}$$

where:

G = shear modulus

e = void ratio

$\bar{\sigma}_o$ = average principal effective stress

C_S = shear wave velocity

G_S = specific gravity of mineral particles

S = degree of saturation

Two different assumptions were made concerning the total unit weight Υ_t of the soil and the specific gravity G_S and corresponding values of e were derived. It was assumed that:

$$\bar{\sigma}_o = \bar{\sigma}_v$$

where: σ_v = the vertical effective stress

With this information the shear wave velocity was computed from Eq. 2D-2, and the results are also plotted in Figure 2D-2. The various assumptions concerning unit weight, etc., led to only a small spread in computed values of wave velocity.

There is good agreement between the velocities measured insitu and those computed from the empirical equation. This agreement leads to considerable confidence in the values for seismic shear wave velocity. The values of seismic shear wave velocity finally selected for the analysis are shown in the upper diagram of Figure 2D-3.

The results in Figure 2D-2 and the upper part of Figure 2D-3 are applicable for very small strains. Since soil is a non-linear material, the value of wave velocity which should be used in an analysis must be adjusted taking into consideration the actual magnitude of strain to be expected. The middle diagram in Figure 2D-3 shows the relationship between effective shear wave velocity and shear strain. This relationship was derived by the consultant, based upon a review of the results of many dynamic, repeated loading tests upon granular soils.

The internal damping of soil is also a function of the level of strain, as indicated by the lower diagram in Figure 2D-3. Damping is expressed as the ratio of the actual damping to the critical damping. The curve in this diagram also is based upon a review of the results of many dynamic, repeated loading tests on granular soils.

The additional damping to account for the energy which escapes from the soil back into the rock is computed by methods described in Reference 3. This additional damping depends primarily upon the ratio of the average effective wave velocity in the soil to the wave velocity in the rock. For purposes of determining this additional damping, the rock was assumed to have a unit weight of 160 pcf and a shear wave velocity of 6000 fps.

4. RESULTS

The most appropriate calculated values for the ratio of response spectra are given in Figure 2D-4. For this analysis, the soil was represented by 22 masses and springs, and the first three modes were retained for the calculation. These results were computed using as input the 1952 Taft accelerogram, N69W component, normalized to a peak acceleration of 0.035g. The effective wave velocity, determined after several trials, is given in Figure 2D-5.

The corresponding average peak strains ranged from 1 x 10^{-4} in/in to 1.45 x 10^{-4} in/in, except for values as low as 0.6 x 10^{-4} in/in very near to ground surface. For these strains, the average internal damping of the soil was 5.6%. The additional damping term, computed as described in Reference 3, was 7% for the first mode, 2.6% for the 2nd mode, and 1.6% for the 3rd mode. Thus the total damping was 12.6% in the first mode, etc. The peak shear stresses, and the average of the 10 largest peaks of shear stress, are plotted vs. depth in Figure 2D-6. The peak surface acceleration was computed to be 0.098g.

Figure 2D-4 is based upon the computed motions at a depth of 40 feet below the surface of the soil; that is, approximately at the founding level for the reactor containment structure. Since the mass and flexibility of the containment structure are roughly the same as the mass and flexibility of the soil replaced by the structure, the motions computed at this depth give the best estimate for the input to the structure.

The curves in Figure 2D-4 show a peak ratio of about 3.5 at a period of about 0.45 seconds. That is to say, a structure with a natural period of 0.45 seconds founded in the soil would experience accelerations 3.5 times greater than the same structure founded directly upon firm ground. This amplification effect occurs when the natural period of the structure coincides with the natural period of the stratum of soil. However, the ampli-fication is much less for structures having natural periods different from the natural period of the soil.

A special set of calculations were made to determine whether the ratio of response spectra is dependent upon the assumed transient motion. The results of these calculations are given in Figures 2D-7, 2D-8, 2D-9, and 2D-10. (The soil profile used for these preliminary calculations differed slightly, primarily by having more damping, from that leading to the results in Figure 2D-4, but the conclusion is still valid.) It may be seen that the results, especially the peak amplification, are for all practical purposes independent of the assumed input transient motion.

Several other calculations were made using different assumed soil properties, to determine the possible range of the natural period of the soil. The range was from about 0.3 seconds to about 0.6 seconds.

5. RECOMMENDED RESPONSE SPECTRA

Based upon a study of all these results, it is recommended that response spectra for design of the Beaver Valley Power Station be obtained by multiplying Housner's smoothed average curves normalized to 0.035g by the ratio of response spectra given in Figure 2D-11.

It would be conservative to multiply by 3.5 over the entire range of periods, and hence to simply use Housner's curves normalized to 3.5 x 0.035g = 0.121g, or, say, to 0.125g.

References

1. N.C. Donovan, and R.B. Matthiesen, "Effects of Site Conditions on Ground Motions During Earthquakes," State-of-the-Art Symposium, Earthquake Engineering of Buildings, San Francisco (1968).

2. H.B. Seed, and I.M. Idriss, "The Influence of Soil Conditions on Ground Motions During Earthquakes," Proc. ASCE, Soil Mechanics Journal (in publication) (1968).

3. R.V. Whitman, "Effect of Local Soil Conditions upon the Seismic Threat to Nuclear Power Plants," Report to Stone & Webster Engineering Corporation (1968).

4. B.O. Hardin, and F.E. Richart, "Elastic Wave Velocities in Granular Soils," Proc. ASCE, Vol. 89, No. SM1, pp. 33-65 (1963).

5. B.O. Hardin, and W.L. Black, "Vibration Modulus of Normally Consolidated Clay," Proc. ASCE, Vol. 94, No. SM2, pp. 353-369 (1968).

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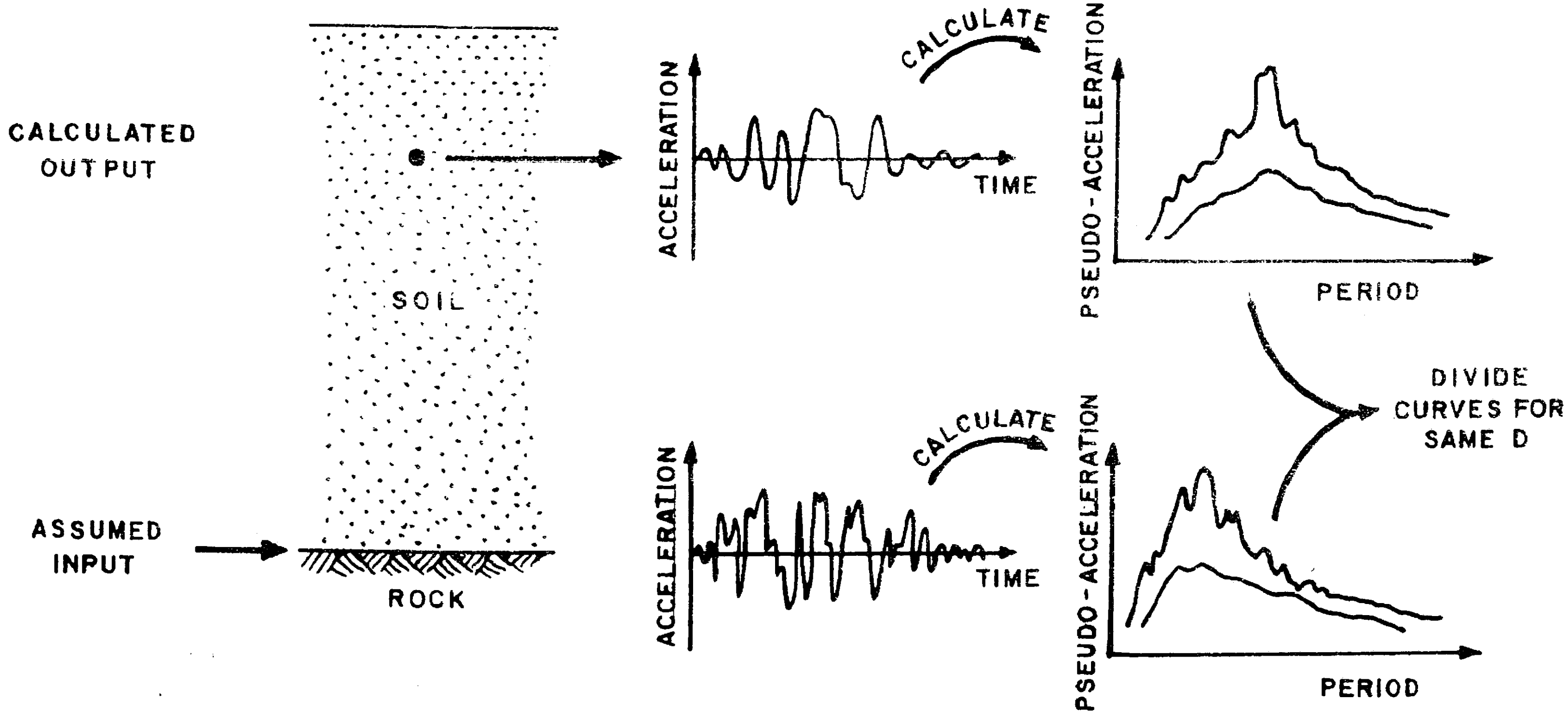

FIGURE 2D-1
COMPUTING RATIO OF RESPONSE SPECTRA
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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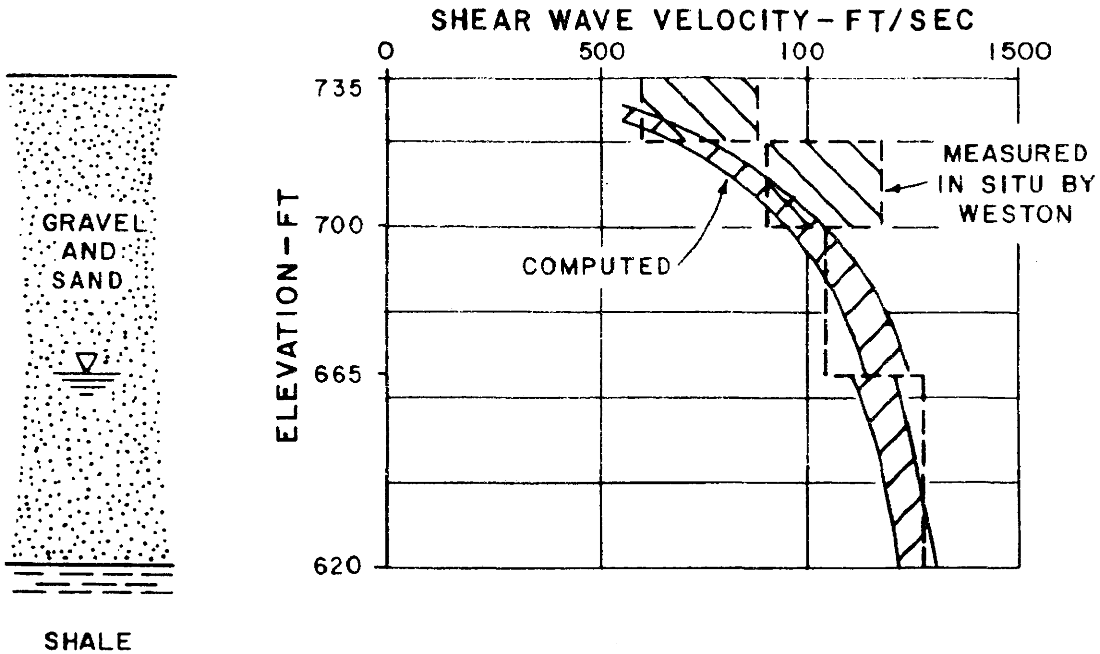

VALUES ASSUMED FOR COMPUTING C_S

e = 0.58	e = 0.46
S = 50% γ_t = 120 pcf	S = 50% γ_t = 125 pcf
S = 100% γ_t = 130 pcf	S = 100% γ_t = 135 pcf
G_s = 2.70	

FIGURE 2D-2
MEASURED AND COMPUTED VALUES OF
SHEAR WAVE VELOCITY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

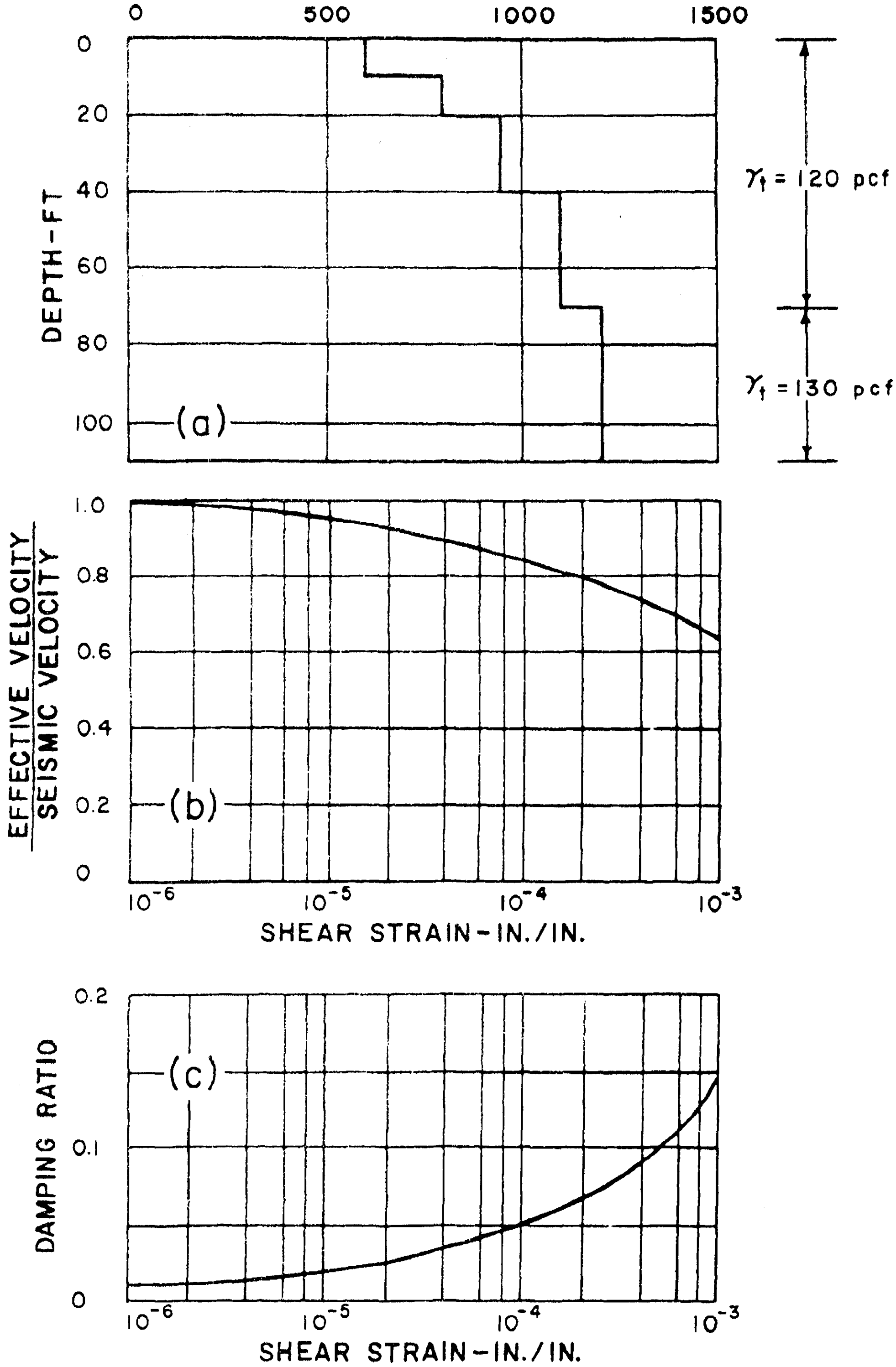

FIGURE 2D-3
PROPERTIES USED FOR ANALYSIS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

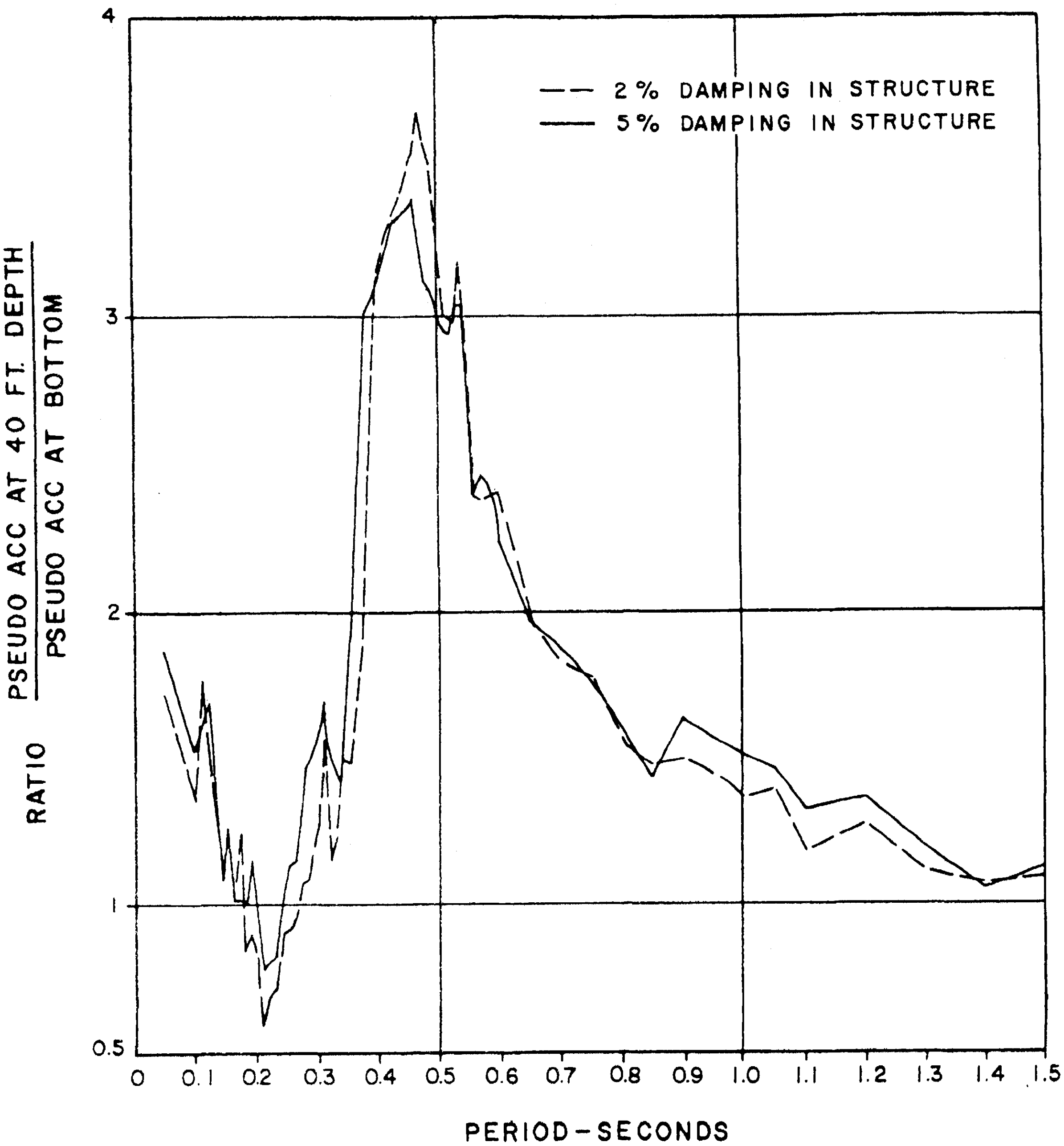

FIGURE 2D-4
RATIO OF RESPONSE SPECTRA AT
40-FOOT DEPTH TO RESPONSE
SPECTRA FOR BEDROCK

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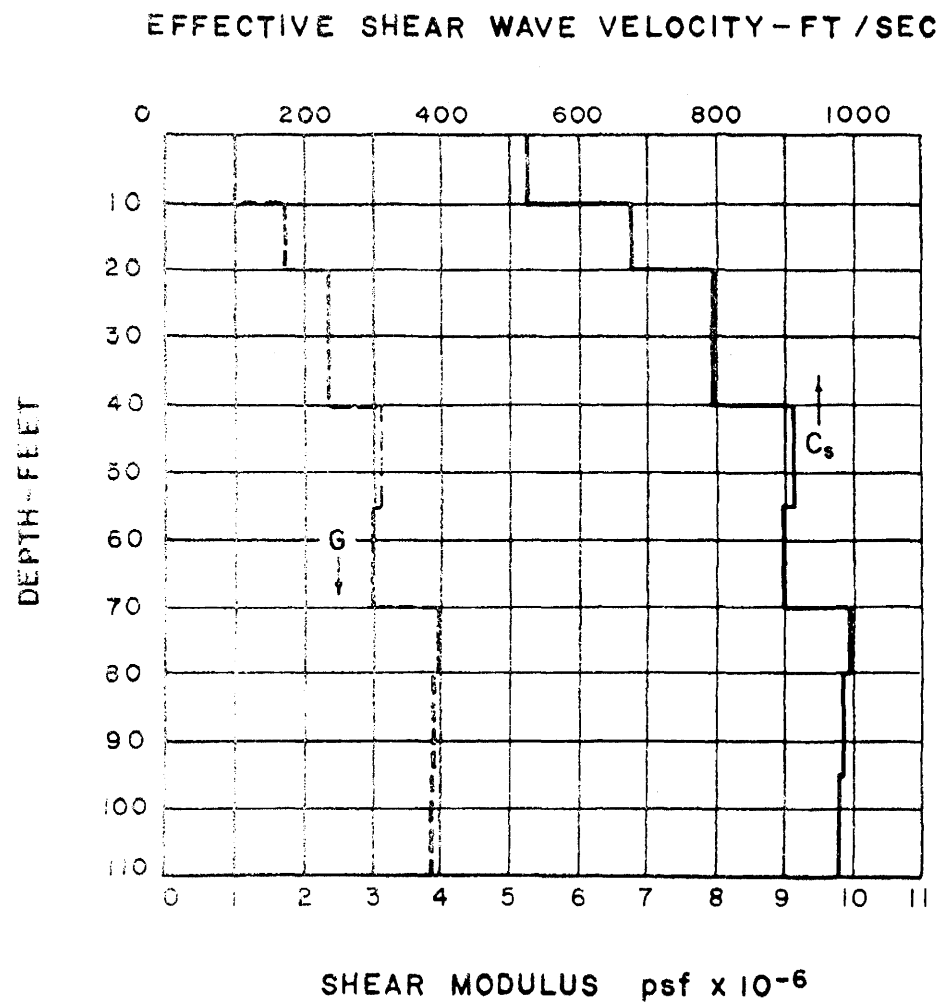

FIGURE 2D-5
EFFECTIVE SHEAR WAVE VELOCITY
AND SHEAR MODULUS APPLICABLE FOR
COMPUTED AVERAGE PEAK STRAIN
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

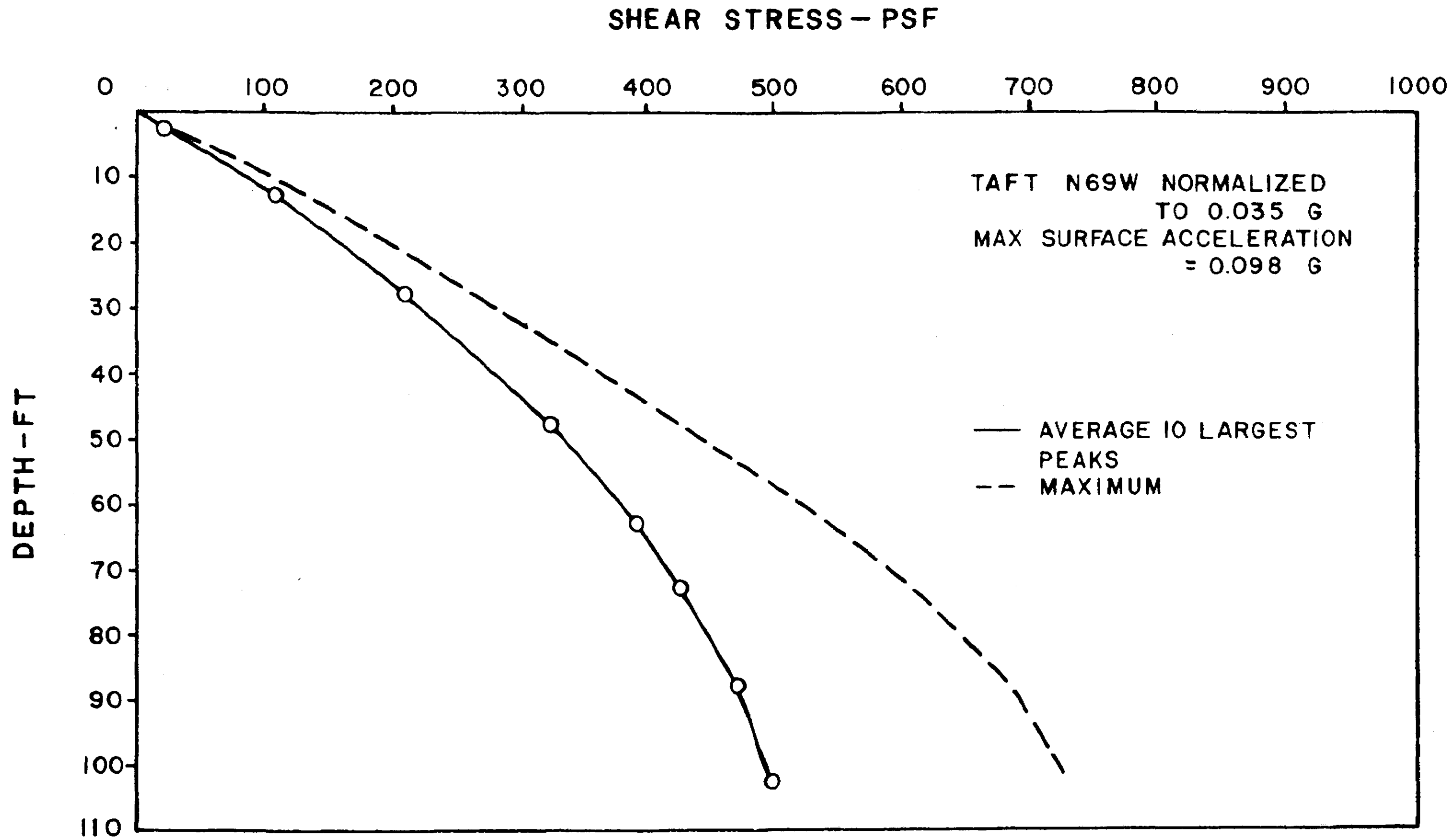

FIGURE 2D-6
COMPUTED SHEAR STRESS AS
FUNCTION OF DEPTH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

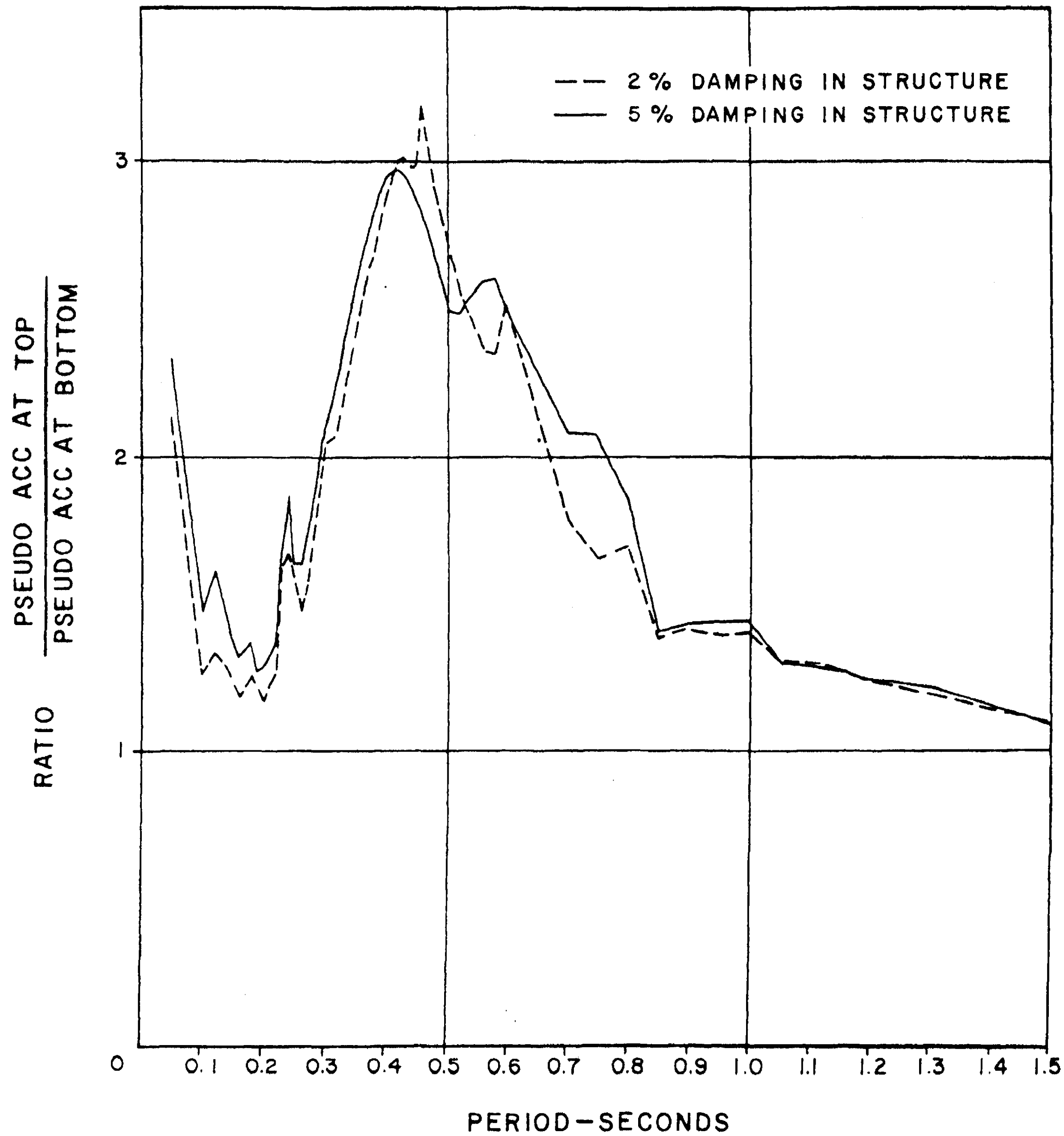

FIGURE 2D-7
RATIO OF RESPONSE SPECTRA
EL CENTRO 1940 N-S EARTHQUAKE RECORD
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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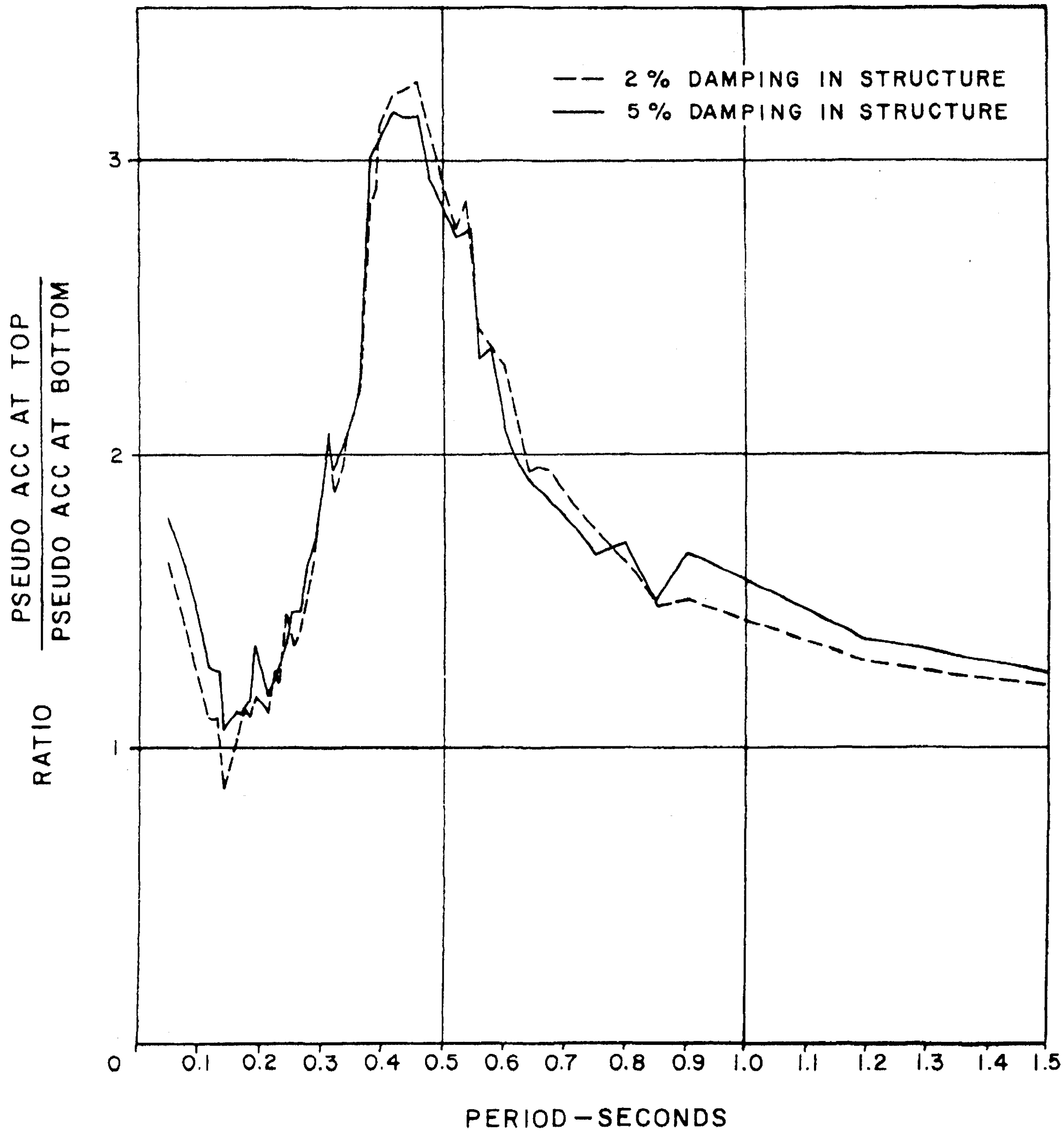

FIGURE 2D-8
RATIO OF RESPONSE SPECTRA
TAFT EARTHQUAKE N69W RECORD
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

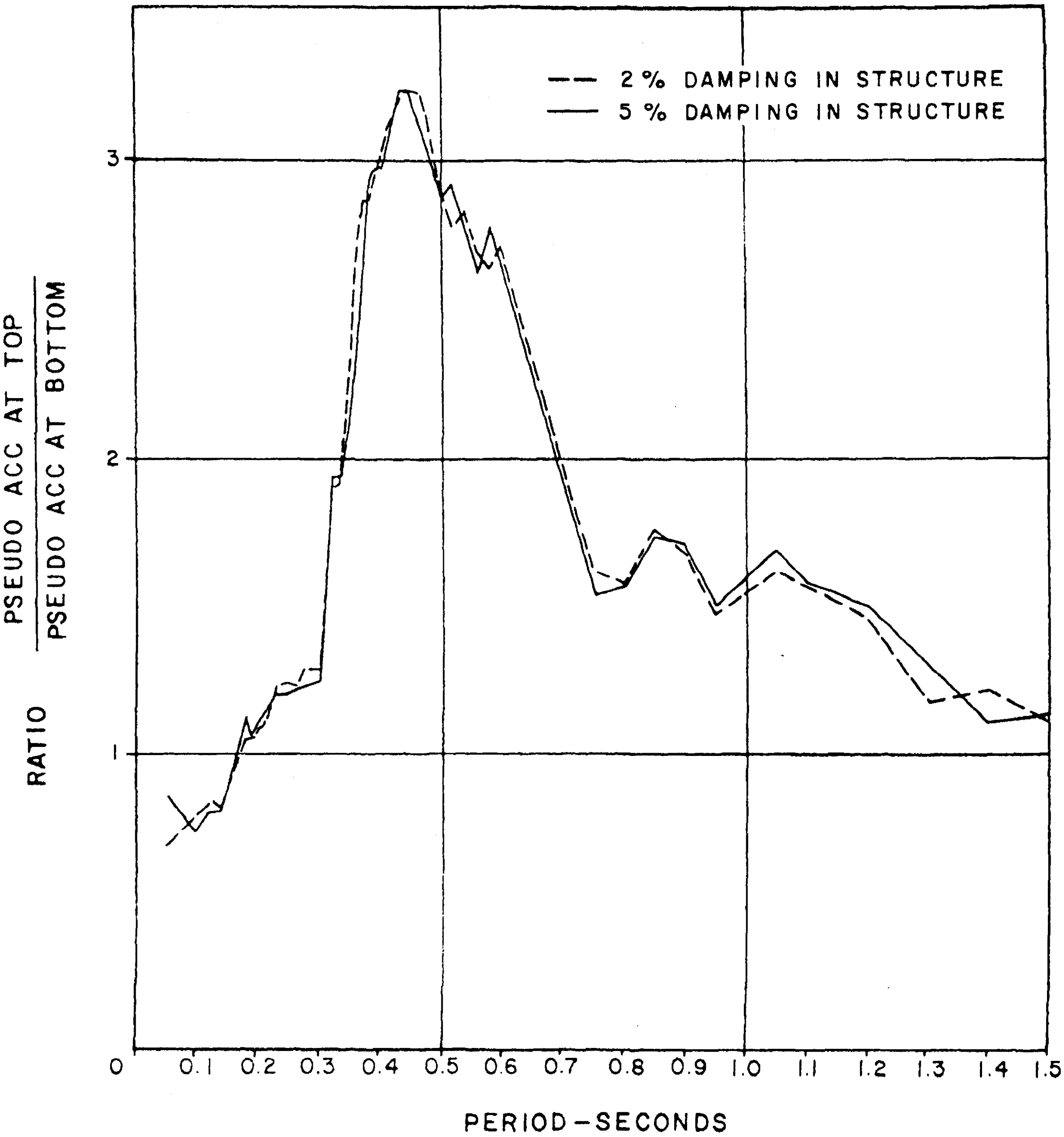

FIGURE 2D-9
RATIO OF RESPONSE SPECTRA
GOLDEN GATE PARK EARTHQUAKE RECORD
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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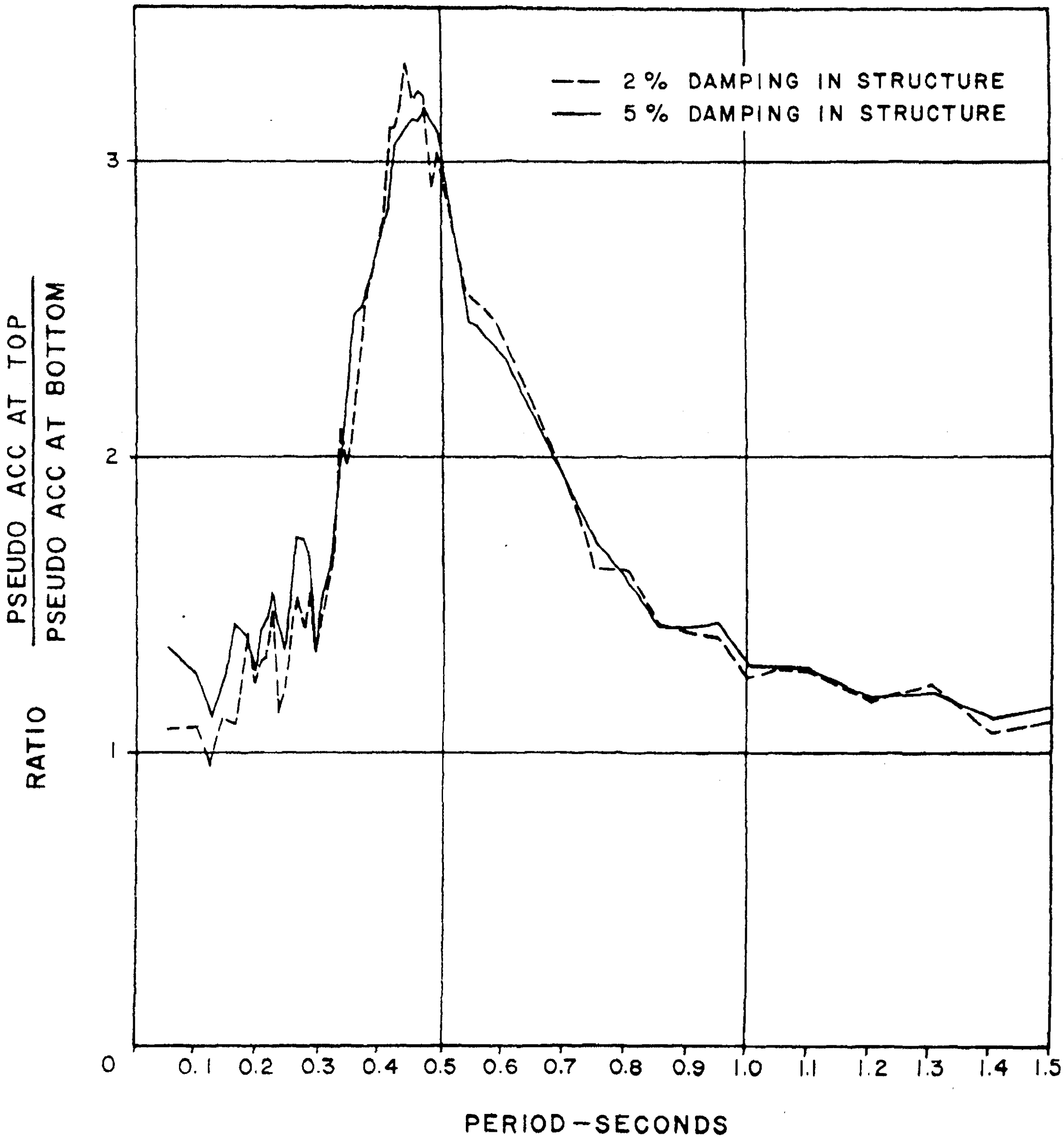

FIGURE 2D-10
RATIO OF RESPONSE SPECTRA
10 SECONDS OF STATIONARY
RANDOM PROCESS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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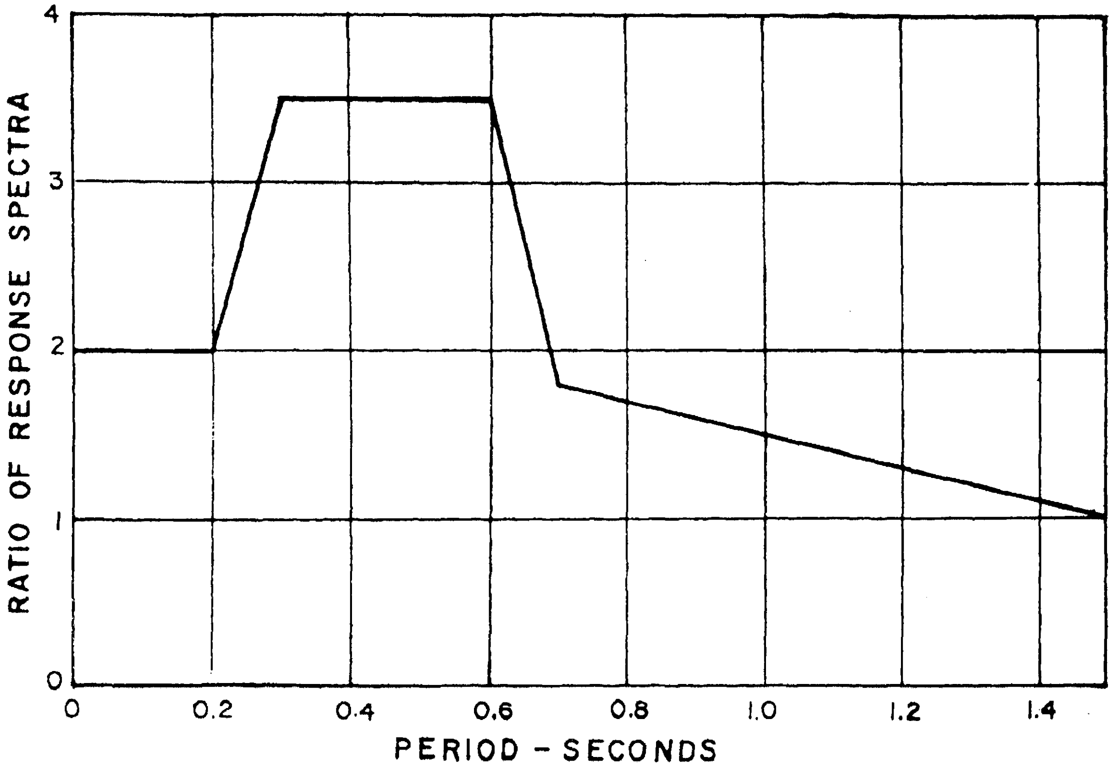

FIGURE 2D-11
RECOMMENDED RATIO OF
RESPONSE SPECTRA
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2E

REPORT ON

SUBSURFACE CONDITIONS - SHIPPINGPORT SITE

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

STONE & WEBSTER ENGINEERING CORPORATION

The Stone & Webster Engineering Corporation Report was retyped/reformatted as part of the Update of the FSAR.

STONE & WEBSTER ENGINEERING CORPORATION

225 FRANKLIN STREET BOSTON, MASSACHUSETTS 02107

August 9, 1954

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REPORTS
APPRAISALS
EXAMINATIONS
CONSULTING
ENGINEERING

Mr. C. T. Sinclair,
Vice President,
Duquesne Light Company,
435 Sixth Avenue,
Pittsburgh 19, Pennsylvania.

Dear Sir:

In accordance with your authorization of April 29, 1954, we have carried out investigations of subsurface conditions at the Shippingport Site of the Duquesne Light Company in order to determine the general soil profiles and significant variations therein, and to establish the general type of foundations and appropriate soil values which would be suitable for these conditions.

A total of 28 borings were made, the logs being shown in the attached report. They show that the site may be divided into three provinces, each with its characteristic soil profile. Immediately to the north of the New Cumberland and Pittsburgh Railway Co. right of way is a high level terrace, called Area A, composed of sand and sand and gravel. This terrace slopes gently toward the Ohio River and the top is about 70 to 90 ft above normal pool level. The upper 10 to 20 ft of material in this area is composed principally of medium sands, and the underlying materials down to the bedrock are sands and gravels of medium density.

Immediately north of Area A is a lower terrace with a surface about 20 ft above normal pool level; this will be called Area B. It is believed that this area was originally occupied by terrace deposits of sand and gravel similar to that of Area A to an elevation well above the level of the present ground. This sand and gravel was eroded by the Ohio River to a depth of 20 to 30 ft and replaced to present ground level by silts, clays and very fine sands. These recent deposits are variable in character, strength and depth. Underlying them and extending to the bedrock are sand and gravel.

Sloping downward from the edge of Area B to the Ohio River, and varying in width from approximately 110 ft at the westerly end of the site to about 440 ft near the easterly end, is an area which has been subject to erosion and redeposition within a very recent geological time; this will be termed Area C. Surface soils in this area, to a depth of about 15 ft, consist of silt and clay with some sand members. These deposits contain considerable organic matter and are soft and highly compressible. Underlying them and extending down to the bedrock is sand and gravel.

Bedrock throughout the site is a gray, thinly bedded shale with occasional sandy shale or sandstone members. It is horizontally bedded and in general shows only a small amount of weathering along its surface.

In Area A, structures may be founded either in the surface sands or in the underlying sand and gravel. The surface deposits of silt, clay and fine silty sands blanketing Area B are not considered satisfactory for the support of major structures such as the reactor or the turbine building. Foundations for such structures should be carried through these soils to the underlying sand and gravel. This may be done by dropping the footings, by using short piles, or by removing the unsatisfactory material and replacing it with carefully compacted fill. Fill may be placed over Area B to provide yard area above flood levels adjacent to the station; and small structures not subject to distress from moderate settlement such as switchgear, transformers and transmission towers may be found on the surface soils of Area B. The surface soils of Area C are not suitable for the support of structures or equipment. Foundations in this area should be carried through the surface deposits to the underlying sands and gravel or to the bedrock. Bearing values for footings on sand and for sand and gravel throughout the site are given in graphical form in the attached report.

Studies of flood grades made by your organization indicate that under extreme conditions flood waters may rise to about 20 ft above the ground level of Area B. Thorough consideration and care must be given to the problem of erosion or undermining of foundations of structures located in Area B or C or in the bank between Areas A and B. The brush, grass and trees that blanket portions of the site afford considerable protection against erosion, and these should not be disturbed or destroyed except where unavoidable.

The site is located in a seismically stable area and a review of the earthquake history of the United States, dating back to the 18th Century, indicates that no earthquakes of sufficient intensity to be felt have epicentered near the Pittsburgh area. Considering the stable character of the soil underlying the site, and this freedom from seismic shocks, it is our opinion that it is not necessary to design structures or equipment for seismic resistance.

Samples of soil recovered from the site were analyzed by The Thompson & Lichtner Co., Inc. to determine whether the ground water contained material deleterious to concrete or which would result in accelerated corrosion of steel. Their report indicated that the ground waters are nearly neutral and are low in dissolved solids with insignificant amounts of compounds which would attack either steel or concrete.

The borings of this investigation developed general soil conditions over the site. Significant variations from the subsurface profiles shown in this report are believed improbable. However, after the plant layout has been established, additional borings should be taken at the location of the major elements of the proposed station to determine with greater accuracy the grades of the bearing strata under the important structures.

For greater detail and for the reasoning which supports the findings, you are referred to the following pages of this report.

Yours very truly,

(Originally signed by)

F. W. Argue
Engineering Manager

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LIST OF FIGURES

SCOPE AND PURPOSE

This report presents the findinqs of investigations made of the subsurface conditions at the Shippingport site of the Duquesne Light Company. The purpose of these studies was as follows:

1. To determine general soil profiles over the area considered.

2. To establish significant variations in these soil profiles.

3. To establish general types of foundations which would be suitable for the structures considered and appropriate soil loading values.

SUBSURFACE STRUCTURE

A total of 28 borings were made. The locations are shown on the Boring Plan, Figure 2E-1, attached. The logs of each of these borings as classified by the driller, and as classified in the Stone & Webster Engineering Corporation Soils Laboratory, and based on the samples submitted, are shown on Figures 2E-2, 2E-3, 2E-4, 2E-5, 2E-6, 2E-7 and 2E-8. On the basis of these borings, approximate soil profiles have been prepared and are shown on Figure 2E-9, 2E-10, 2E-11 and 2E-12. These profiles are, of necessity, accurate only at the boring locations, but show, based upon geological reasoning, the probable conditions between borings. Investigations were limited to the portion of the site lying between the New Cumberland & Pittsburgh Railway Co. right of way and the Ohio River.

The borings indicate that the site may be divided into three distinct provinces, each with its own typical soil stratification. The boundaries of each province are marked by slopes or changes in slope. At the southerly portion of the site, immediately to the north of the railroad, is a relatively high bench with ground surface varying between approximately El. 730 and El. 750, which for convenience will be called Area A. It slopes gently to the north and to the west, but all portions are well above extreme floodwater of the Ohio River. The soils of Area A are terrace deposits of sand, and sand and gravel laid down by the Ohio River, probably at the close of the last glacial period. The top 10 or 20 ft are generally finer than the lower lying material, being composed principally of medium sands with occasional gravel, and the top few feet of this material are very silty. This sand is of a medium loose density judging from the blows required to drive the sampling spoon. There are some apparent variations in density which would be typical of river deposited materials.

Underlying these sands and extending downward to the bedrock are sands and gravels. As is characteristic of river deposited materials, these are locally variable in character and density, and range from medium sands with occasional gravel to well graded material ranging from silt sizes through heavy gravel. Variations in density were noted. Based upon the blows required to drive the sampling spoon, and from previous studies made of similar deposits, it is believed these sands and gravels are generally of about medium density, although some members may be medium loose and others quite dense.

Area A ends abruptly in a steep bank which runs essentially parallel to the Ohio River. Immediately north of it lies a low terrace which will be called Area B. The surface of this area is nearly level, with the river edge slightly higher than the middle portion. The surface elevation varies from approximately El. 685 to El. 688. It is believed that this area was originally occupied by terrace deposits which extended well above the level of the present ground. These were eroded by the Ohio River to a depth of 20 to 30 ft below present ground level and replaced to ground level with more recent deposits of silt, clay and very fine sand. These recent deposits are variable in character and in depth.

Blanketing the surface of Area B are a series of clays. At some locations these clay deposits, for example, borings 2 and 14, extend downward to the underlying sand and gravel. At others, for example, boring 8, they merge to fine, brown, silty sands which then extend down to the sand and gravel. These clays vary erratically in strength, but generally the upper portions have been strengthened and preconsolidated drying, which also altered the color from its original gray when first laid down to its present brown. The deeper lying clay members are generally gray in color and are soft, but occasional stiffer brown clays were found at depth. The variations in shear strength are shown in the results of unconfined compression tests made upon relatively undisturbed samples of these clay soils recovered from borings 21 and 22 which are shown in graphical from on Figure 2E-13. The quick shearing strength of clay at rupture is approximately equal to half the unit compressive stress at failure of samples tested in unconfined compression.

Underlying these surface deposits and extending downward to the bedrock are silty sands and gravels of the same character as those found in Area A. The top of this sand and gravel stratum apparently slopes gently downward toward the north, and in the westerly portion of the site, as at boring 14, it slopes toward the west also.

Immediately along the Ohio River, and extending back from the edge of the water at normal pool level about 110 ft near the westerly end of the site to about 440 ft near the easterly end, is an area which has been subject to erosion and redeposition within very recent geological time, this will be called Area C. Surface soils in this area, to a depth of about 15 ft, consist of soft recent deposits, usually of silt or clay grain sizes, but frequently including loosely deposited fine sands. These soils which contain considerable organic matter are termed organic silts on the soil profiles and are low in shearing strength, as shown by the results of unconfined compression tests made on samples from boring 20, Figure 2E-13; they are very compressible. Underlying these recent surface deposits and extending down to bedrock are sands and gravels typical of those found underlying Areas A and B.

Bedrock throughout the site is a hard, gray, thinly bedded shale with occasional sandy shale or sandstone members. This material is horizontally bedded. It shows a small amount of weathering at its surface, generally only about a foot being of a character which could be removed with a chopping bit. It was core bored at a number of locations and recovery as shown on the attached logs was generally good to excellent. The surface of the shale sloped to the north and east.

SUPPORT OF STRUCTURES

Foundation conditions in Area A are generally excellent. Structures may be founded either in the surface sands or upon the underlying denser sand and gravel. However, since the surface materials are somewhat looser than the deeper lying materials and consequently will compress slightly more under load, the foundations of any individual structure should be placed wholly in one stratum or in the other, or provision made by means of slip joints or other structural discontinuities for slight differential settlement between the portions of the structure founded on the higher lying sand.

The surface silts, silty clays and fine loose silty sands found blanketing Area B are not considered satisfactory for the support of the reactor or the turbine building and foundations for these major structures should be carried through these soils to the underlying sand and gravel.

This may be accomplished by dropping the footings to these soils by using short piles driven to the underlying sand and gravel or by removing the unsatisfactory material and replacing it with carefully compacted fill.

Piles used for this purpose should be of a displacement type such as concrete or creosoted wood. Compacted fill used for the support of structures or equipment may be granulated slag, sand, or sand and gravel excavated from the high terrace. It should be compacted into place under careful control of moisture, lift thickness and compactive effort. The top edge of compacted fills should start not less than 5 ft outside the edge of the outside line of footings or mats. The bottom edge should be outside a line sloping one vertical on two horizontal and passing through the top edge of the fill.

The surface materials are satisfactory for the support of yard fill placed over Area B for access to the station or of small structures not susceptible to distress or damage from moderate settlements.

The very recent alluviums along the bank of the Ohio, shown generally as organic silts on the boring logs and soil profiles, are extremely compressible. Accordingly, any structure founded in or above these silts would be subject to excessive settlements. Examination of the surface profile, and of trees growing in this area, indicates that these organic silts are still consolidating, and there may be localized slippage toward the river. Foundations of all structures located in Area C should be carried to the underlying sands and gravel or to the bedrock.

Determination of the angle of internal friction of undisturbed deposits of sand and gravel is extremely difficult. Undisturbed sampling of such deposits is virtually impossible, and it is equally impossible to reproduce in the laboratory test specimens of the same density and particle orientation as exist in nature. Also because of the erratic variations in density and character in river deposits, values may vary appreciably within a single stratum. The range is not large and the angle of internal friction of such soils can be estimated with reasonable accuracy by trained observers. From examination of samples recovered and similar soils exposed in nearby excavations, it is recommended that the angle of internal friction of the higher lying sands in Area A be assumed to be about 32 deg and that of the sand and gravel about 34 deg.

The bearing value of soil to be used for the design of footings may be limited either by the shearing strength or by settlement. The unit soil pressure imposed must be kept below that which would cause a sudden shearing rupture of the soil mass under the footing. Consideration must also be given to the elastic and inelastic deformations of the soil under load, which may limit bearing value in order to prevent undesirably large settlement of the individual footings.

For soils such as uniform clay, in which the modulus of elasticity is approximately constant, settlement of individual footings is roughly proportional to the unit bearing value and the width of the footing. This is not the case for footings on sand or gravel. For such soils the settlement increased with the unit soil pressure, but it is virtually independent of footing width. This is because the modulus of elasticity of granular materials is roughly proportional to the minor principal stress. Thus while the soil is stressed to a greater depth under a large footing than under a small one, the modulus of elasticity of the soil under the large footing is proportionally greater, and for the same unit soil pressure the settlement of both large and small footings will be about the same.

The bearing value for footings on granular soil, as limited by shearing strength, is a function of the angle of internal friction of the soil, the unit weight of the soil, the depth of the footing below surrounding areas, and the footing widths. While for granular soils the angle of internal friction does not change with saturation, the unit weight of the soil is decreased by buoyancy below the ground water level. Consequently, footings located near or below ground water level must be more lightly loaded than footings well above ground water level, in order to have the same factor of safety against rupture of the soil mass.

These factors having been considered, graphs have been prepared and are given on Figure 2E-14, showing recommended bearing values for use with footings of various sizes located at various depths below the surrounding ground for the sand and sand and gravel. These curves have been prepared for the loose sands near the surface in Area A, and also for the sand and gravel underlying the entire site for conditions of ground water level well below the footing and for ground water level near, or above, footing grade. In using these graphs it should be noted that the depth of the footing should be measured as the vertical distance between the bottom of the footing and the lowest ground surface within about 3 1/2 times the width of the footing measured from the footing's edge. In this connection, interior basement floors, which consist essentially of a slab on fill, should be considered as a free ground surface.

The bearing values of footings located upon clay, when limited by the shearing strength of the soil, are independent of footing width and increase very slightly with increased depth of the footing below surrounding ground surface. Footings located in the surface clays or clayey silts blanketing Area B may be loaded to not exceeding 3,000 psf.

These surface clays are silty and have a crumbly structure. In periods of wet weather they may be rather easily disturbed and will readily become muddy. Accordingly, it is suggested that after each footing is fine graded a seal of concrete about 2 in. thick be placed to serve as a support for placing reinforcement. Such a seal mat should not be required for footings in sand or sand and gravel.

ACCESS BRIDGE

The access bridge over the New Cumberland and Pittsburgh Railway will be located in Area A. This structure may be founded upon spread footings in the sand, or sand and gravel. The railroad is presently single track. However, that it may be widened to two or more tracks must be considered. Footings located below track level may be designed at bearing values in accordance with Figure 2E-14. Footings at the bridge abutments should be carried to such a grade that they will not be undermined or disturbed by future track widening. They should be located not less than 4 ft below a line sloping one vertical on two horizontal which passes just below but does not intersect the line of excavation. When so located they may be loaded to not more than 4,000 psf, total of dead plus live load. These footings should be protected against erosion or washing by rain waters, and the road drainage system of the access bridge must be arranged so that the water collected does not discharge on the slope near these footings.

MINING

It is understood that coal measures underlying the site are so deep that mining would not be economical, and that there are no old mines or workings underlying the site.

EROSION

Studies by the Duquesne Light Company indicate the 1936 flood reached E1. 703 at the Shippingport site. This is not considered the probable maximum flood on the Ohio River. Studies by the Pittsburgh District of the U.S. Army Corps of Engineers are based on a design flood, assuming maximum effective usage of presently constructed dams, which would reach approximately El. 700.5 at the site. Area B will be flooded at frequent intervals, and under extreme conditions flood water may rise to about 20 ft above the present ground level. The surface soils and the underlying sands and gravels could be eroded by such flood flows, and careful consideration must be given to protective measures to insure the safety of the foundations of structures erected on, or immediately adjacent, to Area B.

It should be noted that the organic silts of Area C tend to be unstable and could be quickly eroded, which would expose the underlying sand and gravel to erosion. Protection of foundations of structures located in this area will be essential.

Brush, grass and trees all afford considerable protection against erosion and these should not be disturbed or destroyed, except where unavoidable. Care should be taken in laying out construction facilities to keep disturbance and damage of the natural cover to a minimum.

SEISMICITY

The site is located in a stable area free from seismic shocks. Heck[1] lists only five earthquakes of sufficient intensity to be noticeable epicentering in Pennsylvania, together with a few other quakes epicentering in the Appalachian system just to the north and south of Pennsylvania. All of the quakes listed epicentered in the Appalachian area or along its eastern flank at a considerable distance from the Pittsburgh area. While the early records which date back to the 18th and early 19th centuries are rather inconclusive, it would appear that none of the quakes were of sufficient intensity to damage even the masonry structures prevalent through the area.

[1] Heck, N. H., Earthquake History of the United States: U.S. Coast & Geodetic Survey Special Publication No. 149.

It should be noted that masonry structures, particularly of the type frequently constructed before 1900, are extremely susceptible to damage, even from earthquakes which would in no way affect a modern framed structure. All of these quakes were of very small areal extent, and it is doubtful that any of them were felt in an area in excess of about 5,000 sq miles. The record indicates no earthquakes epicentering in Western Pennsylvania or in the eastern portion of Ohio. It is possible that a few strong earthquakes epicentering in distant regions, such as the New Madrid, Missouri earthquake of December 1811, and January and February, 1812, or some of the earthquakes originating along the southern border of the Laurentian Shield were felt slightly in the Pittsburgh area.

Considering the stable character of the soils underlying the site, and the extreme improbability of an earthquake, of even slightly damaging intensity, occurring during the life of the station, it is not necessary to design structures or equipment on this site for seismic resistance.

GROUND WATER

Six representative samples of soil were submitted to The Thompson & Lichtner Co., Inc. for analysis of the ground water. A copy of their report is attached. Their studies show the ground water at this site to be nearly neutral, pH ranging from 6.8 to 7.1, and to be low in dissolved solids, with insignificant amounts of compounds deleterious to steel or concrete. These test data indicate there should be a minimum of deterioration of concrete and the corrosive effects on steel should be limited to that resulting from the usual moisture conditions or electrolysis by ground currents in the vicinity.

The ground water level as measured in an old well, located approximately as shown on Figure 2E-1, was El. 663.1 on June 23, 1954. River level on this date was El. 663.6.

FURTHER INVESTIGATIONS

The borings made in this study were deliberately widely spaced in order to develop the general soil conditions over the entire site. The soil profile disclosed by the borings agrees with the profile anticipated from general geologic history and surface examination. While significant variations from the profiles shown are improbable, it is considered prudent engineering to have additional borings taken when plant layout is decided upon. These borings should be taken adjacent to the power station and screen well in order to establish, with greater accuracy, the bearing strata under these important structures.

THE THOMPSON & LICHTNER CO. INC.

July 19, 1954

ANALYSIS OF SOILS

J.O. 9147

Test Number: Q 558

Date Received: 6-24-54

Source: Submitted by you, reference your letter dated June 22, 1954

Sample: Six sealed jar samples of soils identified as follows:

A - Duquesne Light Co., Shippingport Light Sta. O.F.E. 4939, Hole #19, 6-9-54 @ 85', 20 blows per foot, damp silt and sand medium

B - Hole #6, 6-11-54 @ 85', 28 blows per foot, damp brown sand and gravel

C - Hole #23, 6-15-54 @ 20', 26 blows per foot, damp brown silty sand and small gravel

D - Hole #ll, 5-25-54 @ 30', 10 blows per foot, wet brown sand and gravel

E - Hole #19, 6-10-54 @ 95', 25 blows per foot, wet silt, sand, some shale and small gravel, thin layers of silt and sand medium with soft layers.

F - Hole #28, 6-17-54 @ 35', 3 blows per foot, wet silt, sand and medium gravel, medium with soft layers

Test Procedure: Standard AOAC Methods

Results: The following data has been received:

THE THOMPSON & LICHTNER CO. INC.

All analyses on the air-dry sample basis

Sample	A	B	C	D	E	F
PH	7.6	7.7	6.9	6.8	7.1	7.5
Sulphates, as $Na_2 SO_4$ %	.015	.020	.005	.018	.005	.013
Chlorides, as Na Cl %	Trace	Trace	Trace	Trace	Trace	.0003
Carbonates, as $Na_2 CO_3$ %	Trace	Trace	Nil	Nil	Nil	Nil

The tests made on these soils show nothing of a chemical nature which would be deleterious to buried concrete or steel. The pH reactions are all substantially neutral, indicating absence of acid or alkali. The total soluble salts are in no case higher than 200 parts per million (.02%) due probably to an insignificant amount of gypsum.

This soil should present a minimum of deterioration to concrete, and the corrosive effect on steel would be limited to the usual moisture conditions, or electrolysis by ground currents in the vicinity.

In our opinion, no encasement of steel is required in strata represented by the soils tested.

Very truly yours,

THE THOMPSON & LICHTNER CO., INC.

(Originally signed by)

G. E. Jacobs

GEJ:C

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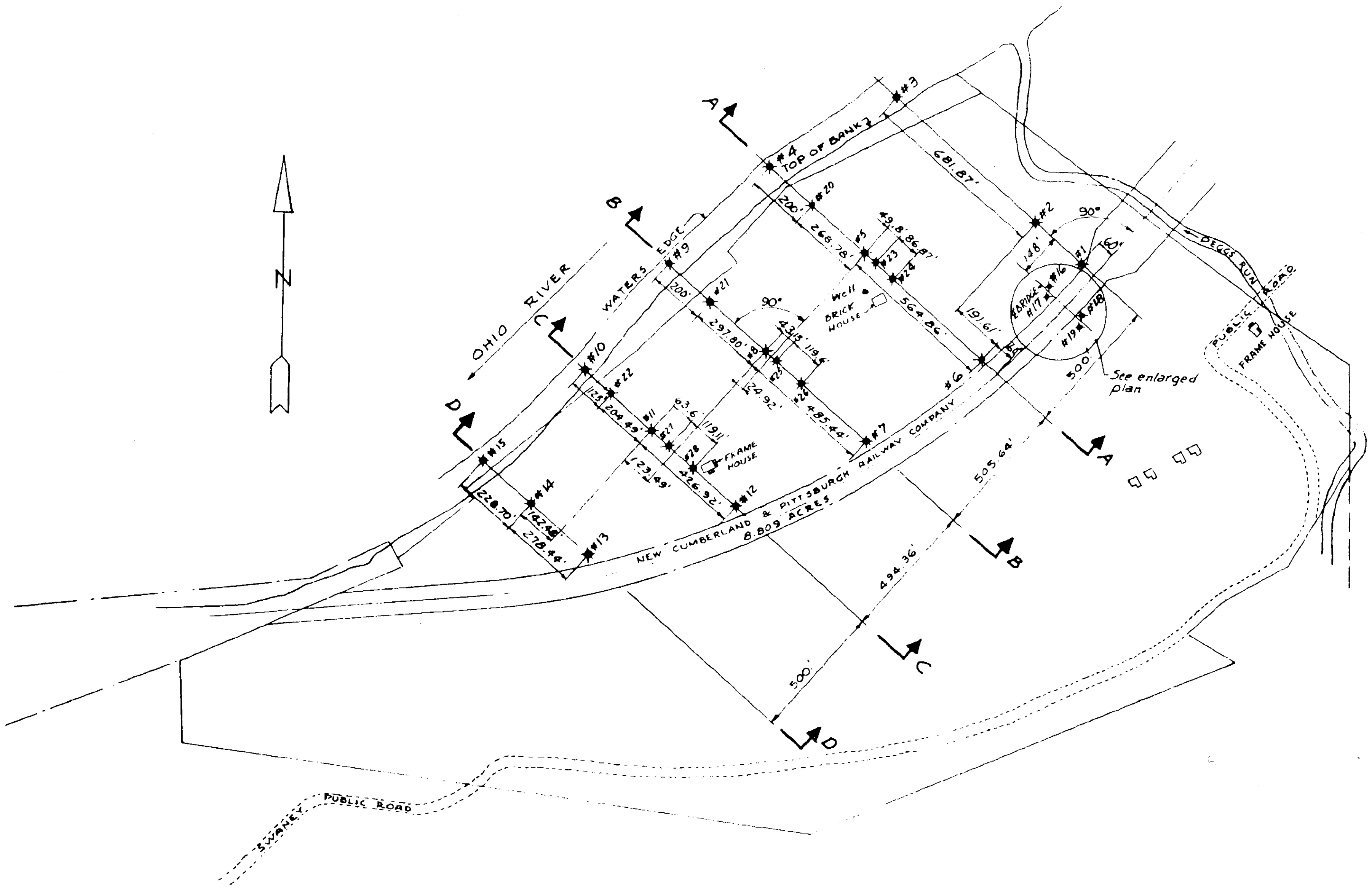
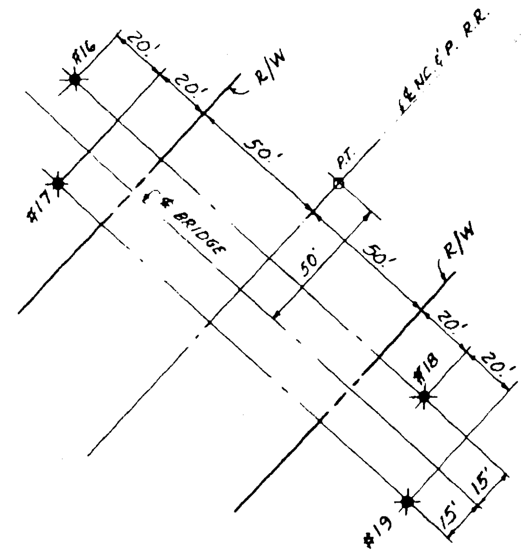




ENLARGED PLAN
Scale : 1" = 50'

BORING PLAN
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954
SCALE: 1" = 400'

FIGURE 2E-1
BORING PLAN
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

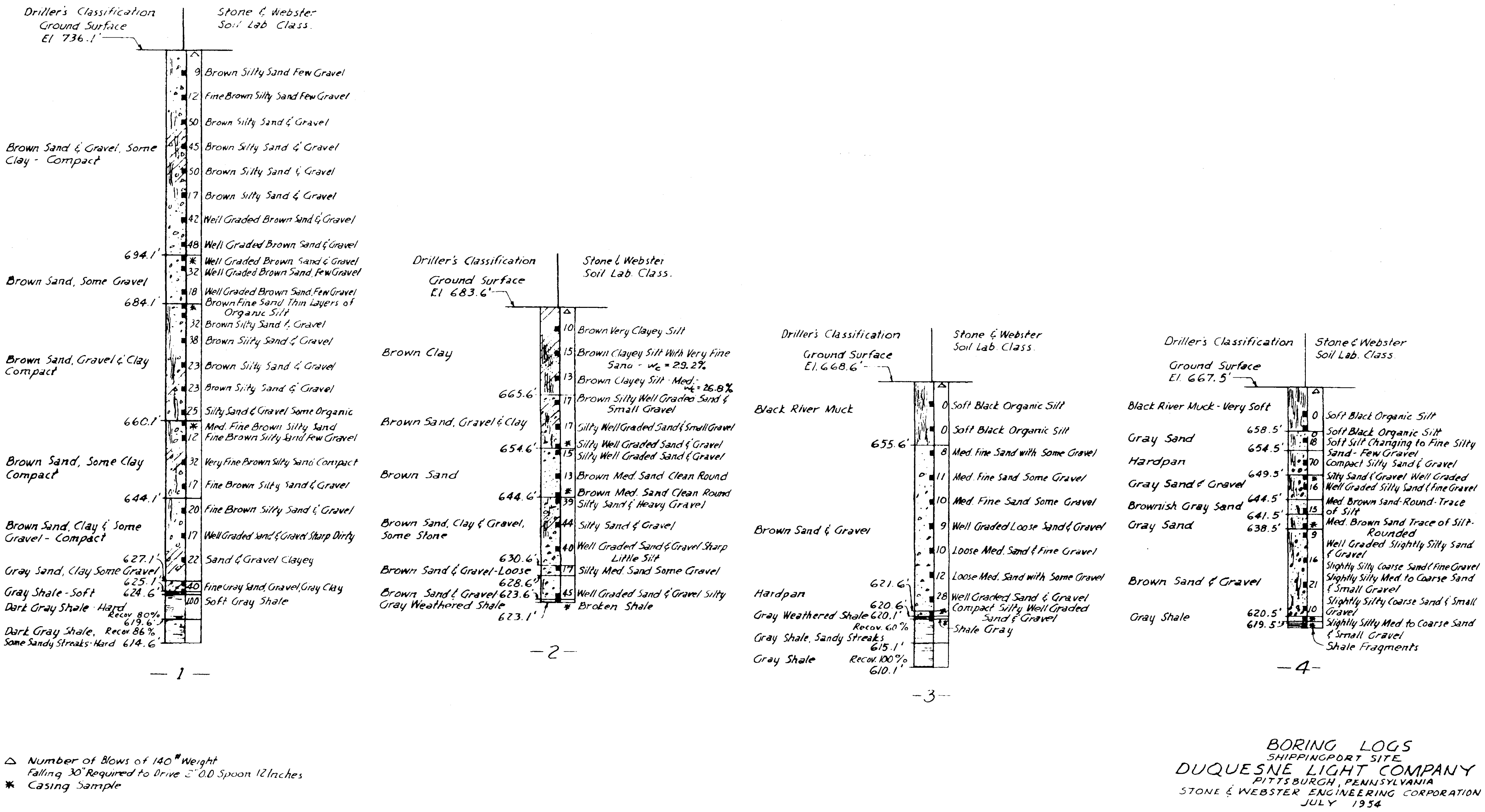


FIGURE 2E-2
BORING LOGS 1 THROUGH 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

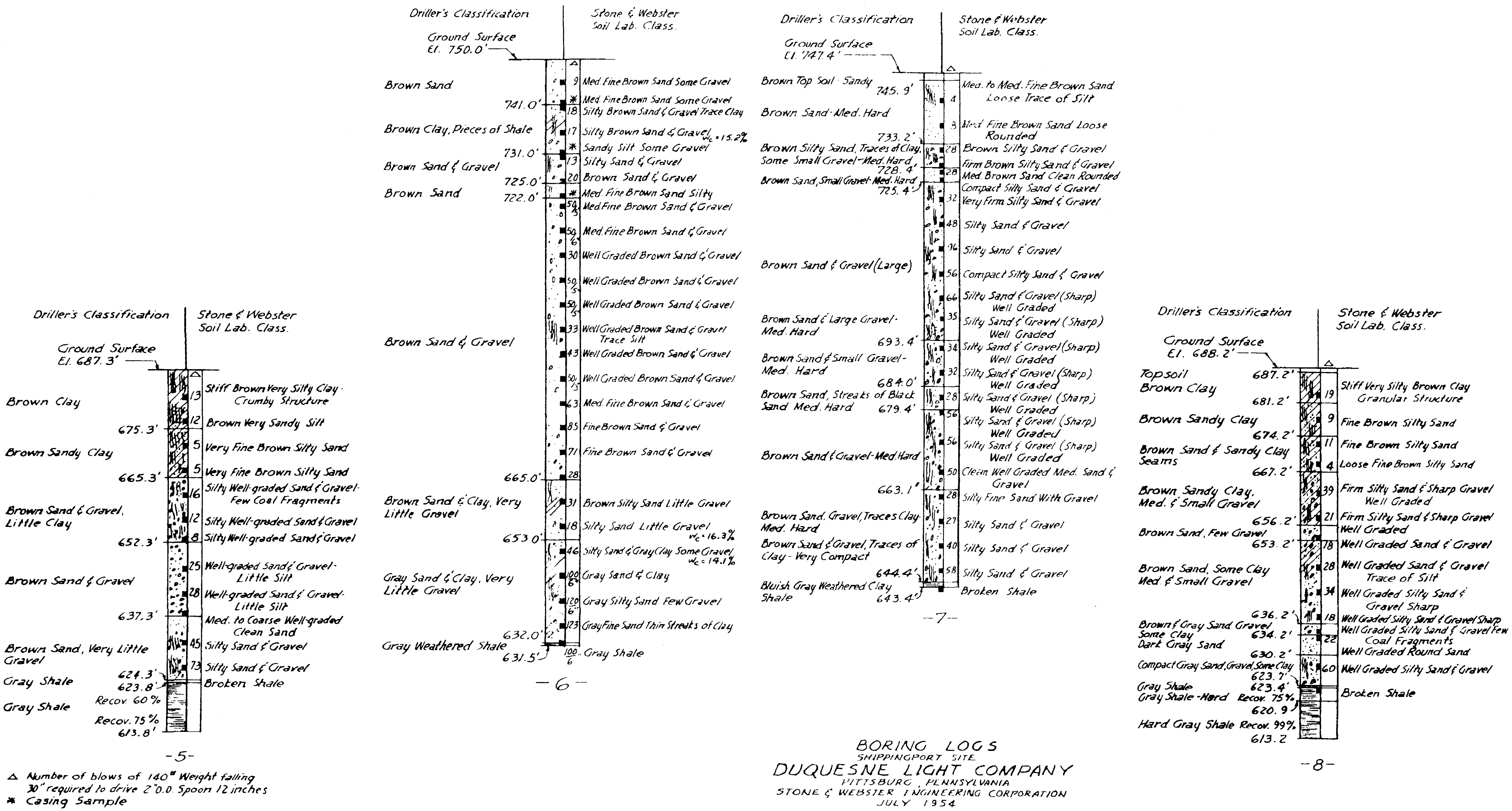


FIGURE 2E-3
BORING LOGS 5 THROUGH 8
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

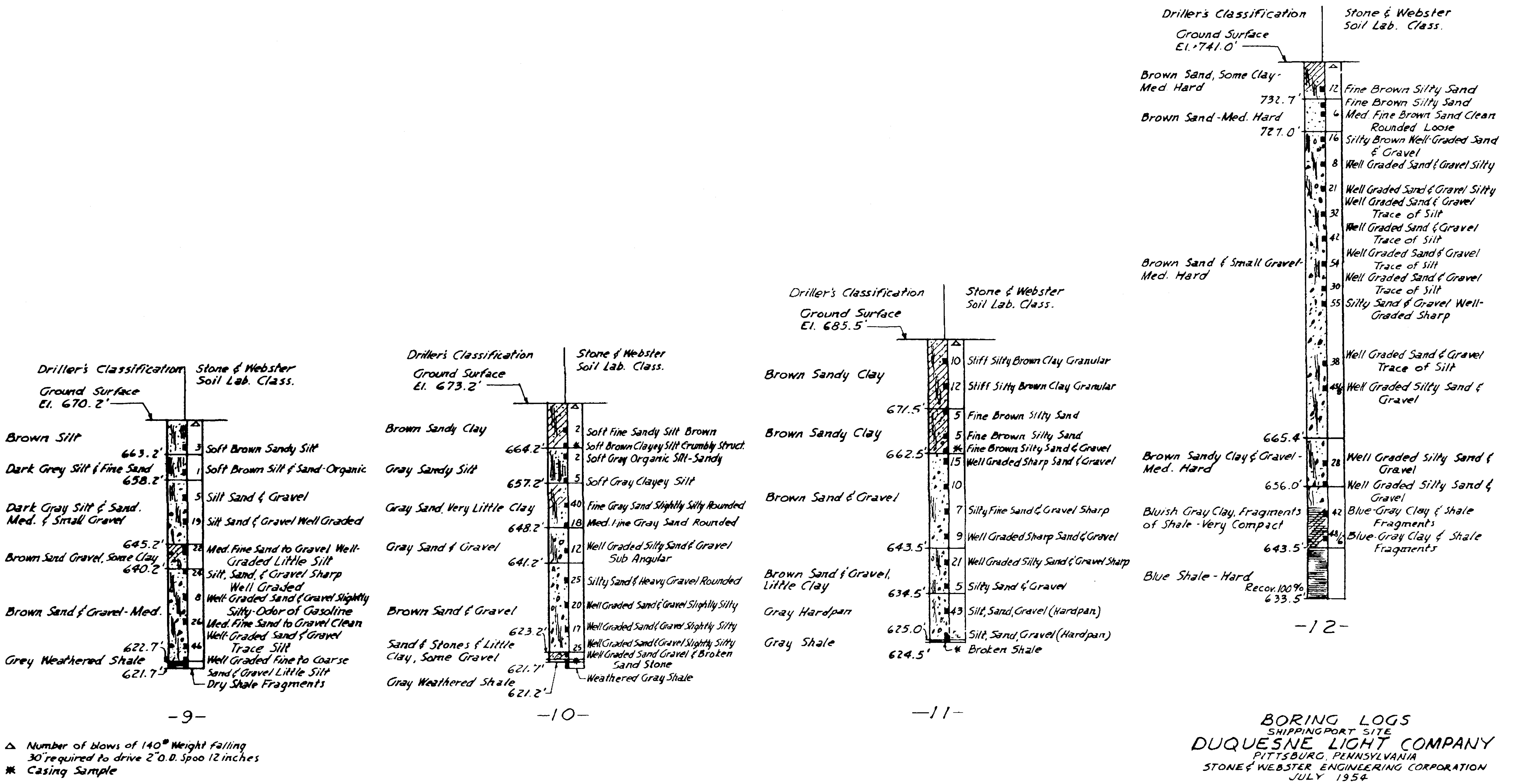


FIGURE 2E-4
BORING LOGS 9 THROUGH 12
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

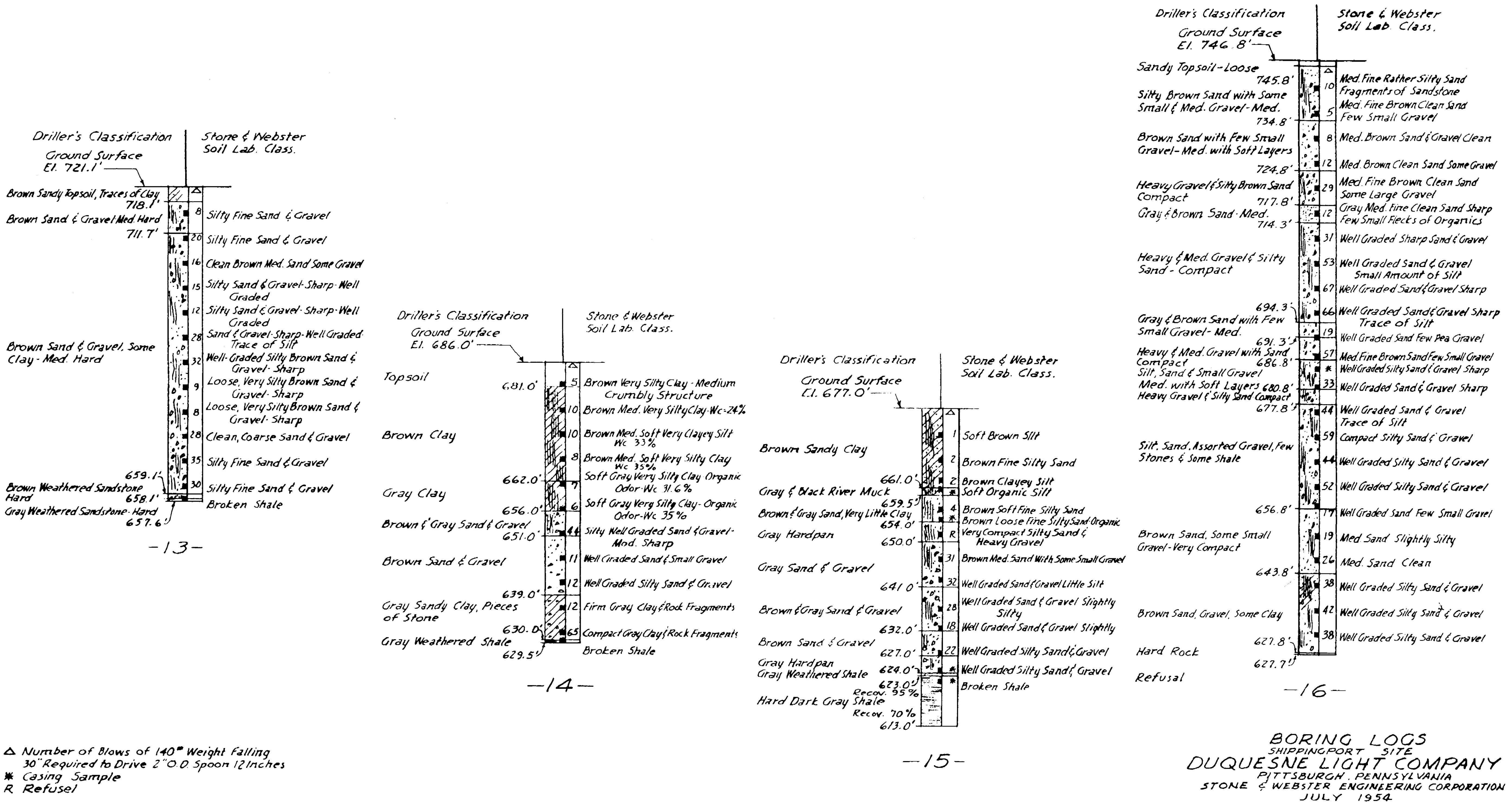


FIGURE 2E-5
BORING LOGS 13 THROUGH 16
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

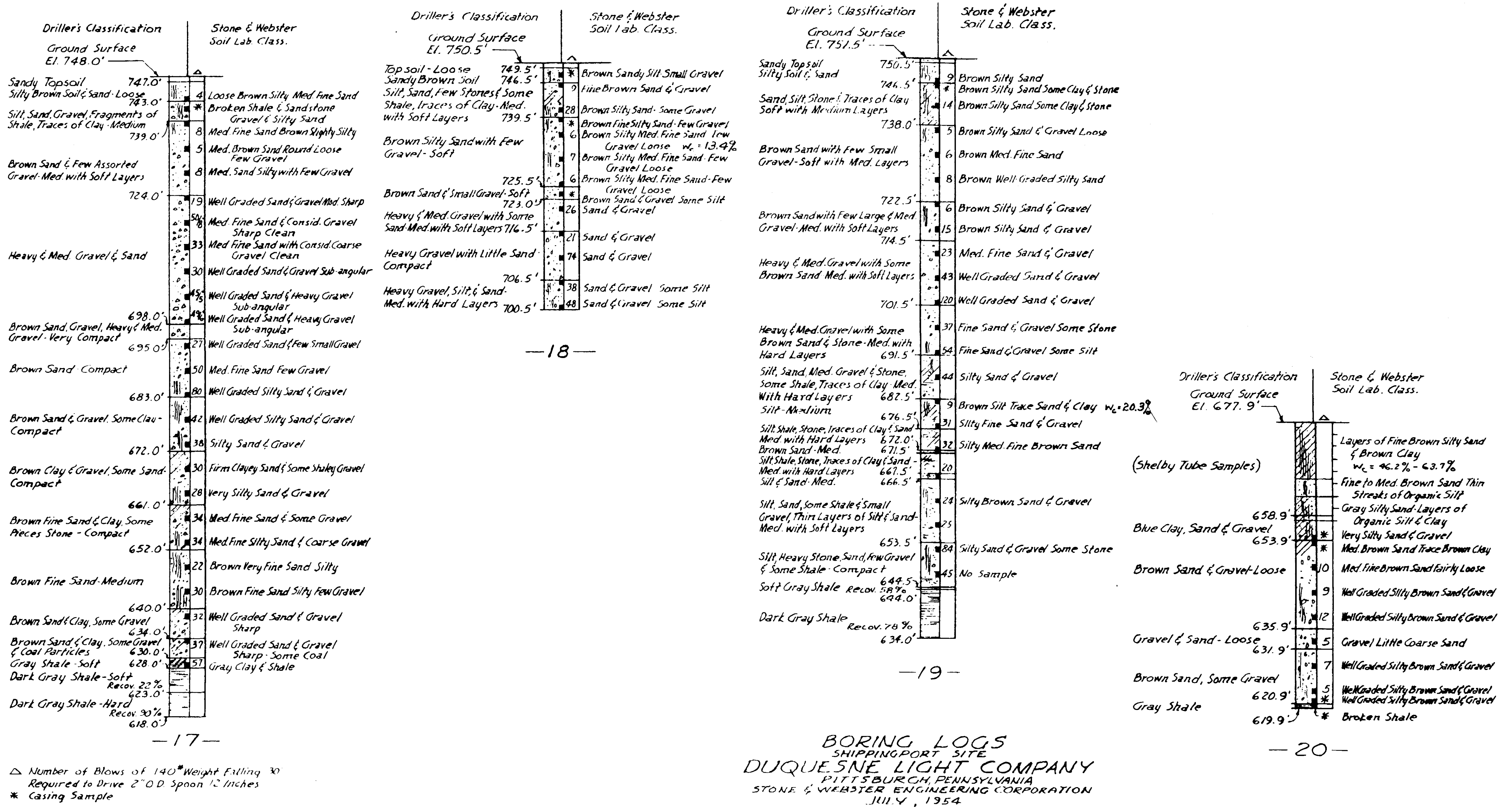
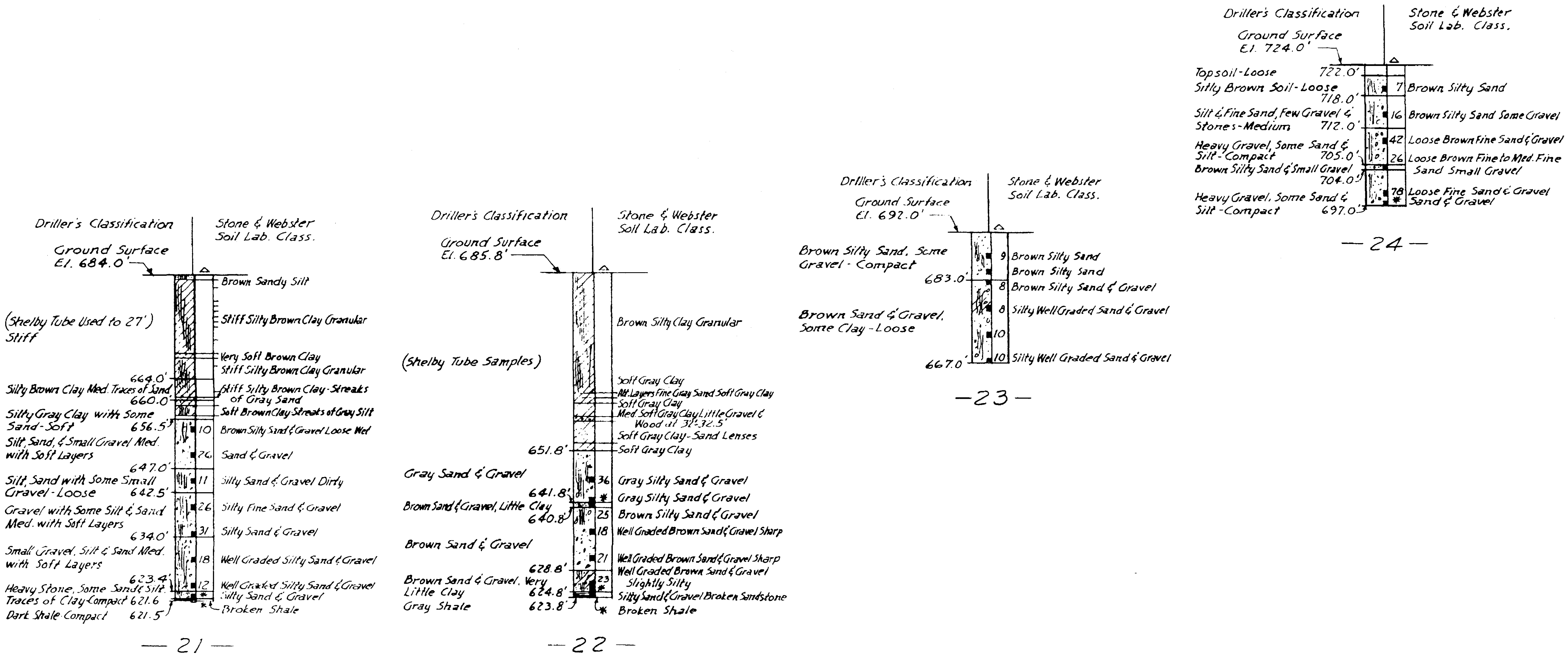


FIGURE 2E-6
BORING LOGS 17 THROUGH 20
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

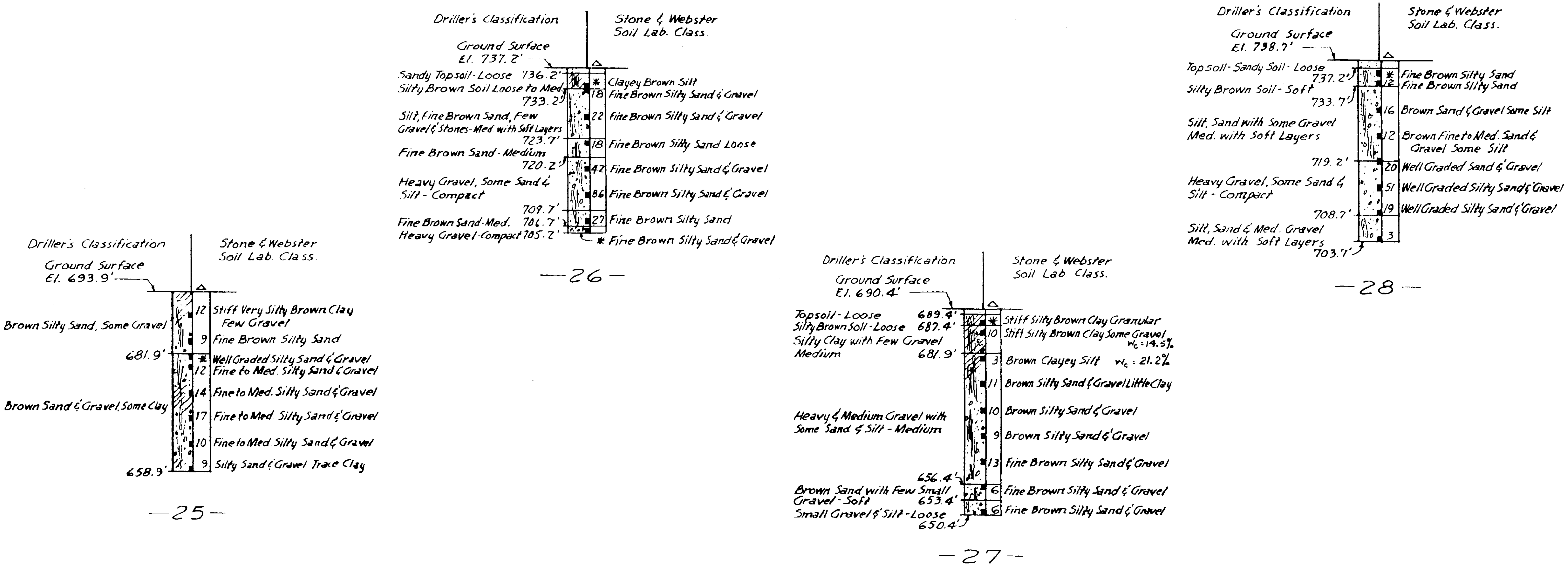
REV. 0 (1/82)



△ Number of Blows of 140# Weight Falling 30" Required to Drive 2" O.D. Spoon 12 Inches
✱ Casing Sample

BORING LOGS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954

FIGURE 2E-7
BORING LOGS 21 THROUGH 24
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

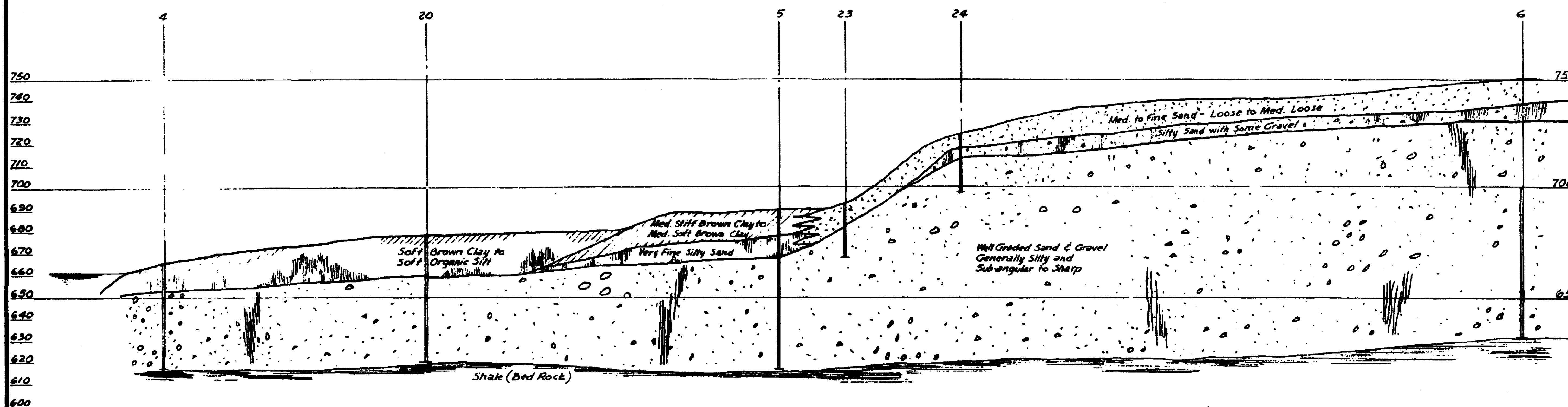


△ Number of Blows of 140# Weight Falling 30" Required to Drive 2" O.D. Spoon 12 Inches
* Casing Sample

BORING LOGS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954

FIGURE 2E-8
BORING LOGS 25 THROUGH 28
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



SOIL PROFILE - SECT. "A-A"
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954

FIGURE 2E-9
SOIL PROFILE - SECTION "A-A"
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

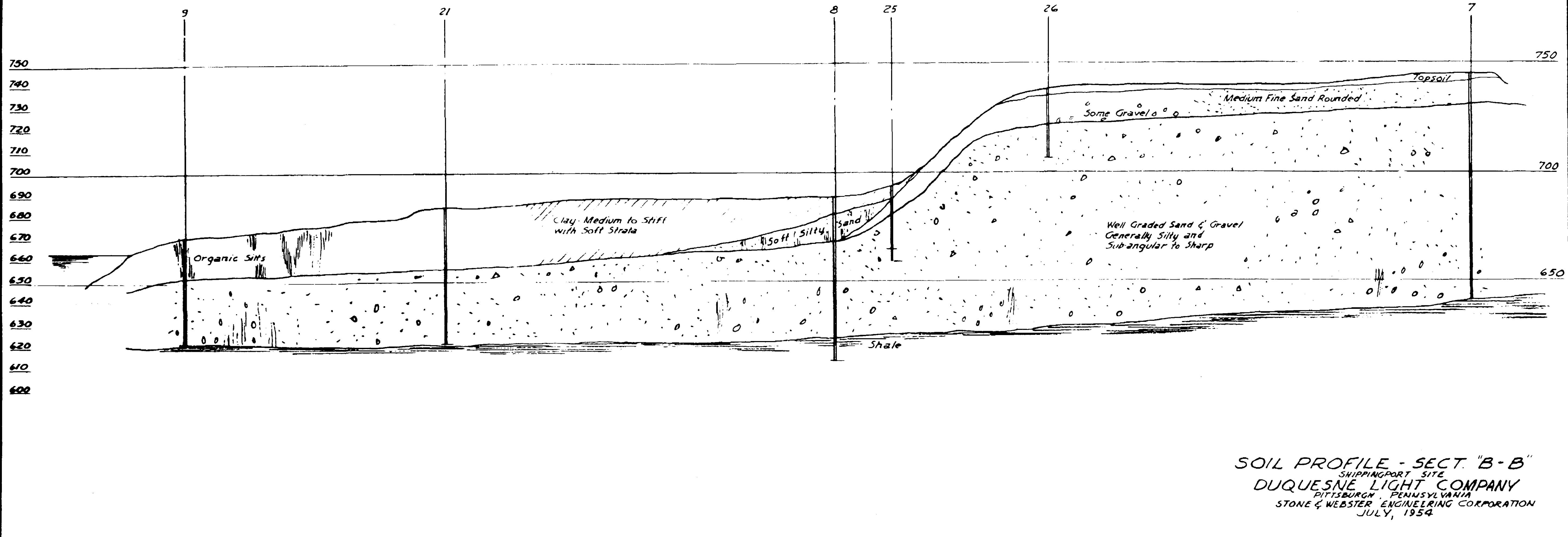


FIGURE 2E-10
SOIL PROFILE - SECTION "B-B"
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

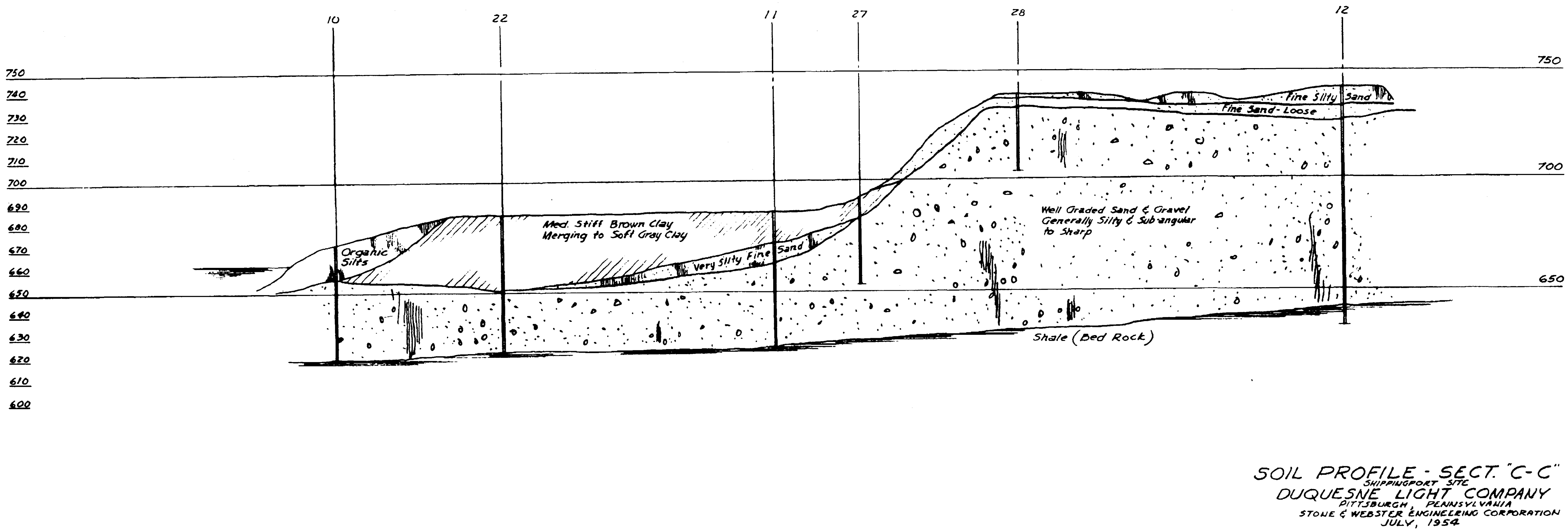
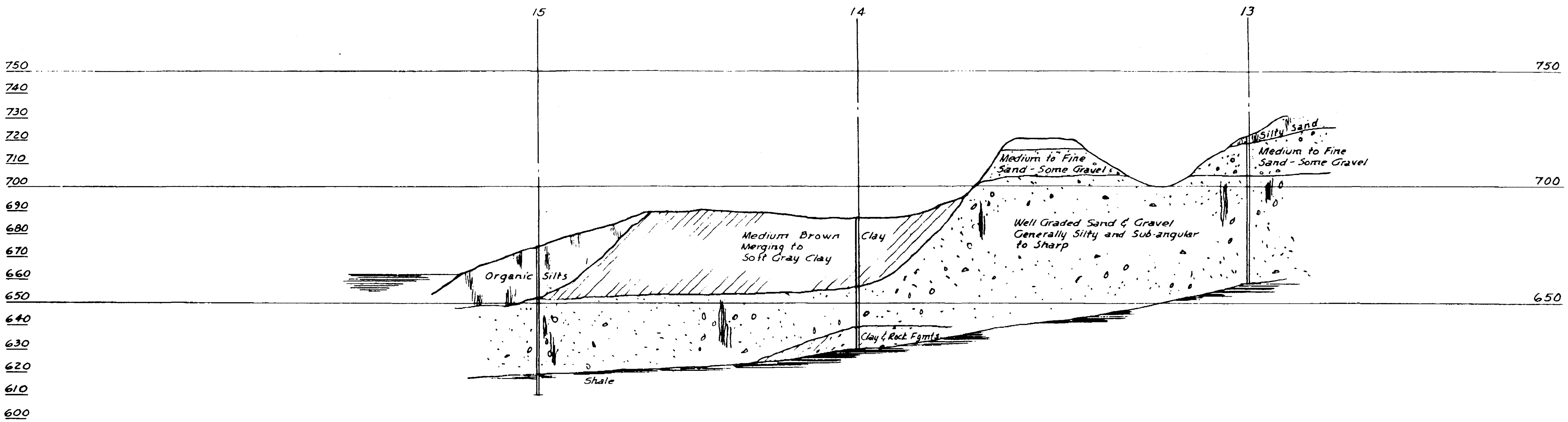


FIGURE 2E-11
SOIL PROFILE - SECTION "C-C"
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

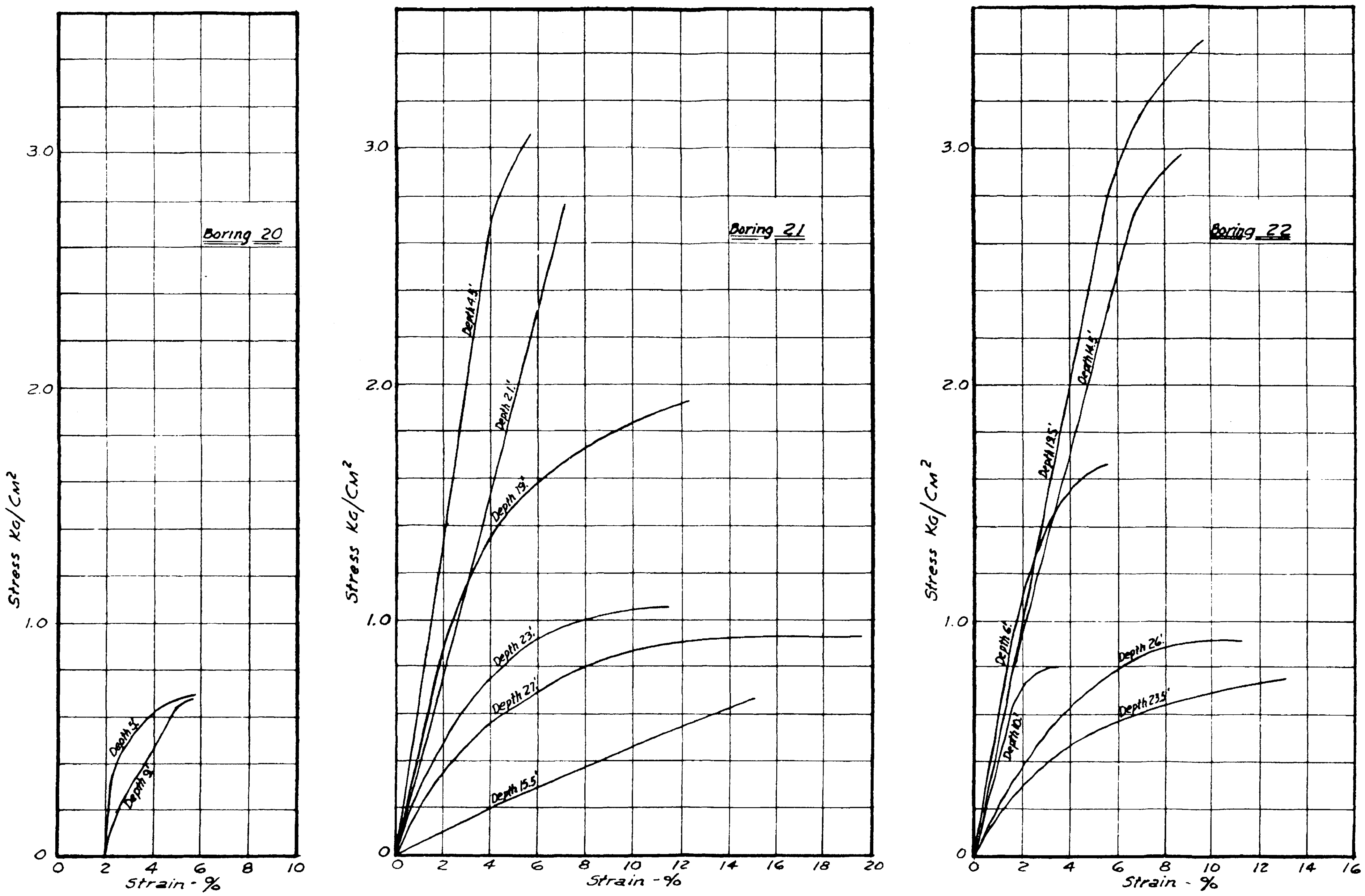
REV. 0 (1/82)



SOIL PROFILE SECT. "D-D"
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954

FIGURE 2E-12
SOIL PROFILE - SECTION "D-D"
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

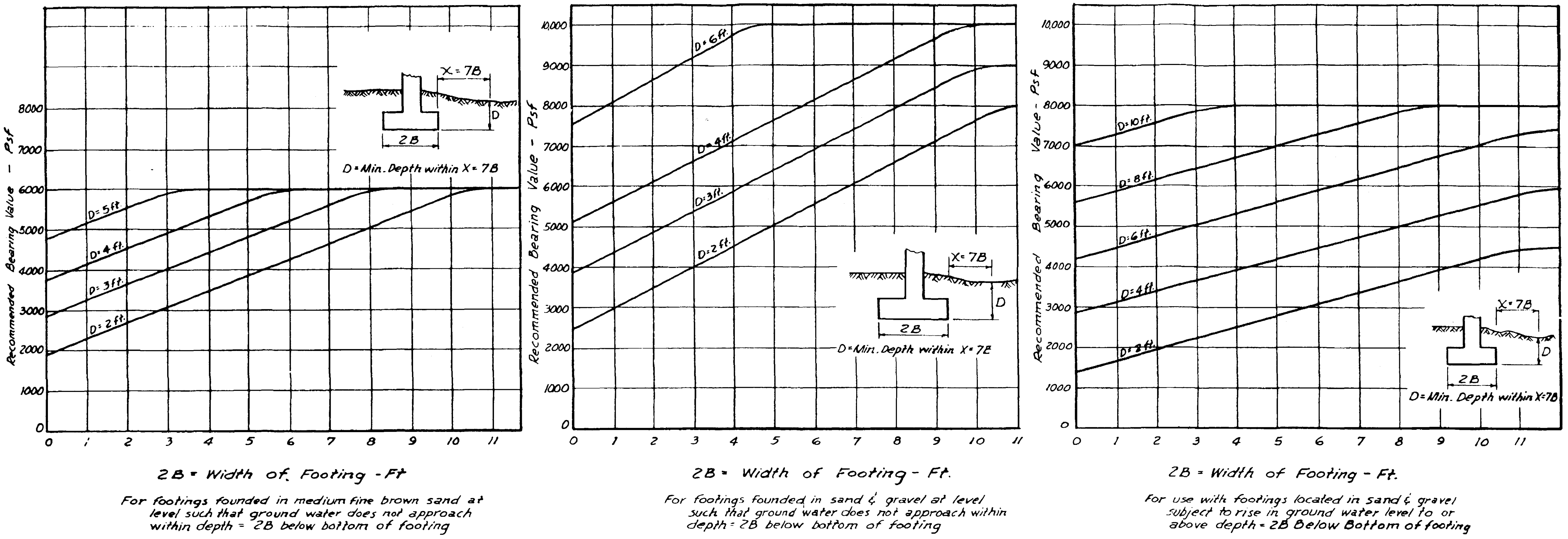
REV. 0 (1/82)



UNCONFINED COMPRESSION TESTS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954

FIGURE 2E-13
UNCONFINED COMPRESSION TESTS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



BEARING VALUES FOR SQUARE OR RECTANGULAR FOOTINGS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
JULY, 1954

FIGURE 2E-14
BEARING VALUES FOR SQUARE OR RECTANGULAR FOOTINGS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2F

BORING LOGS AND CALCULATION SHEETS

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

STONE & WEBSTER ENGINEERING CORPORTION

BOSTON, MASSACHUSETTS

LIST OF FIGURES

LIST OF FIGURES (CONT'D)

LIST OF FIGURES (CONT'D)

LIST OF FIGURES (CONT'D)

LIST OF FIGURES (CONT'D)

Sheet 1 of 3

DUQUESNE LIGHT COMPANY — SH 1 OF 3

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE: 4-20-68 J.O. NO.: 11700 BORING NO.: 101
TYPE OF BORING: DRIVE/CORE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV.: 735.4'
DATE DRILLED: 3-15-68 DRILLED BY: RAYMOND INT'L, INC. LOGGED BY: E.B. & M.S.
SUMMARY OF BORING:

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
	GROUND EL. 735.4' BORING NO. 101				
	FILL-SLAG, CLAY, GRAVEL				
	BROWN FINE MEDIUM SAND, TRACE OF CLAY, DAMP	SS1	13		FINE SAND, TRACE OF CLAY AND COARSE SAND AND SMALL GRAVEL, [illegible]
730					
		SS2	8	M.A.	MEDIUM SAND, SOME CLAY AND GRAVEL, WELL GRADED, SUBROUNDED, MEDIUM BROWN
	BROWN CLAYEY FINE, MEDIUM, COARSE SAND AND GRAVEL	SS3	17		SAME AS SS2, MORE GRAVEL
720					
		SS4	15	M.A.	SAME AS SS3
		SS5	37		SAME AS SS3
710					
		SS6	46	M.A.	SAME AS SS3
		SS7	42	M.A.	SAME AS SS3
700	BROWN FINE, COARSE SAND AND GRAVEL, TRACE OF CLAY COMPACT DAMP	SS8	15	M.A.	SAME AS SS3, BUT SMALLER GRAVEL
		SS9	[illegible]		SAME AS SS8
690		SS10	51	M.A.	SAME AS SS8
		SS11	37		SAME AS SS8
680		SS12	157	M.A.	SAME AS SS8

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_l LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. - MECHANICAL ANALYSIS

BORING LOG 101
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-2A

Sheet 2 of 3

DUQUESNE LIGHT COMPANY — SH 2 OF 3

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE: 4-20-68 J.O. NO.: 11700 BORING NO.: 101
TYPE OF BORING: DRIVE/CORE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV.: 735.4'
DATE DRILLED: 3-15-68 DRILLED BY: RAYMOND INT'L, INC. LOGGED BY: E.B. & M.S.
SUMMARY OF BORING:

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
680	BORING NO. 101 (CONT'D)					
		SS13	29		M.A.	SAME AS SS8, GRAVEL IS WEATHERED
670	BROWN FINE, COARSE SAND AND GRAVEL, TRACE OF CLAY COMPACT DAMP	SS14	18			SAME AS ABOVE, BROKEN GRAVEL SHOWS SANDSTONE
				∇ 72		
		SS15	25			SAME AS ABOVE
660		SS16	27			MORE SILTY-CLAYEY
		SS17	30		M.A.	SAME AS ABOVE
650	GRAY SILTY FINE, COARSE SAND AND GRAVEL, SAND-STONE FRAGMENTS, MOIST	SS18	26			SAME AS ABOVE WITH PIECES OF BLUE GRAY SANDSTONE, AND SOME STRATIFIED RUSTY SAND
	BROWN FINE, COARSE SAND	SS19	41		M.A.	FINE TO MEDIUM SAND, SLIGHT SILT, UNIFORM, SUBROUNDED, BROWN-RUSTY
640		SS20	69			FINE TO COARSE SAND, SILTY, SOME SUB-ROUNDED GRAVEL, WELL GRADED, ISOLATED COAL INCLUSIONS, BROWN-RUSTY
	COMPACT GRAY SILTY FINE, COARSE SAND AND GRAVEL, SHALE SANDSTONE FRAGMENT	SS21	107			WEATHERED SANDSTONE, FRAGMENTS OF DIFFERENT COLORS, WEAK, NOT IN PLACE
630		SS22	98		M.A.	SAME BUT MOSTLY BLUE-GRAY SANDSTONE, WEAK
	GRAY SHALE WEATHERED	SS23	100/2"			DARK GRAY SHALE, SLIGHTLY SANDY, THINLY LAMINATED, HORIZONTAL

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_l LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. - MECHANICAL ANALYSIS

BORING LOG 101 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-2B

Sheet 3 of 3

DUQUESNE LIGHT COMPANY — SH 3 OF 3

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE: 4-20-68 J.O. NO.: 11700 BORING NO.: 101
TYPE OF BORING: DRIVE/CORE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV.: 735.4'
DATE DRILLED: 3-15-68 DRILLED BY: RAYMOND INT'L, INC. LOGGED BY: E.B. & M.S.
SUMMARY OF BORING:

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
	BORING NO. 101 (CONT'D)			
				UNIFORM SOUND DARK GRAY SHALE
		NX	100%	108'.7"-112'5" RECOVERY IN PIECES 0.5-1.5" PARTINGS ON FOLIATION. FOLIATION HORIZONTAL OR ALMOST
620		NX	[illegible]	112'.5"-118.7 SAME BUT BREAKS IN 1"-4" PIECES, TWO THIN (1/2") COAL SEAMS SMOOTH PEELING
	HARD GRAY SHALE	NX	100%	118.7"-123.7" SAME BUT BREAKS TO 6" PIECES
610		NX	100%	SAME ROCK ON PARTINGS TRACES OF SHELLS, LEAVES OF PLANTS AND FINE DISSEMINATED PYRITE FILMS. WATER LEVELS AT 20'10" AT COMPLETION OF BORING
600				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_l LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 101 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-2C

FIGURE 2F-1
BORING LOG 101
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY SH 1 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. No. 11700 BORING No. 102
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.8'
DATE DRILLED 3/19/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY F. KRUKI & H.S.
SUMMARY OF BORING

GROUND EL. 734.8' BORING NO. 102

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
	CONCRETE PAVEMENT AND BROKEN STONE - FILL			CONCRETE SLAB AND FILL
730		SS1	15	MEDIUM TO COARSE SAND, TRACE OF CLAY, PIECES OF BROKEN ROCK, MEDIUM BROWN (FILL)
		SS2	15	FINE TO MEDIUM SAND, TRACE OF COARSE SAND AND GRAVEL, SOME CLAY AND SILT, WELL GRADED, SUBROUNDED TO ROUNDED. MEDIUM BROWN
720		SS3	13	SAME AS SS2, BUT DARKER
		SS4	29	SAME AS SS2
	MEDIUM COMPACT COARSE BROWN SAND AND GRAVEL (DAMP)			
710		SS5	215	SAME AS SS2, BUT WITH LARGE PIECES OF BROKEN GRAVEL
		SS6	115	SAME AS SS2
700		SS7	27	SAME AS SS2
		SS8	104	SAME AS SS2
690		SS9	52	SAME AS SS2
		SS10	380	SAME AS SS2
680		SS11	82	SAME AS SS2

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL

BORING LOG 102
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-3A

DUQUESNE LIGHT COMPANY SH 2 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE [illegible] J.O. No. [illegible] BORING No. 102
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.8'
DATE DRILLED [illegible] DRILLED BY RAYMOND INT'L. INC. LOGGED BY F. KRUKI & H.S.
SUMMARY OF BORING

BORING NO. 102 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	GROUND WATER	LABORATORY OR GEOLOGIST'S DESCRIPTION
680					
	MEDIUM COMPACT COARSE BROWN SAND AND GRAVEL (DAMP)	SS12	77		FINE TO MEDIUM SAND, TRACE OF COARSE SAND AND GRAVEL, SOME CLAY AND SILT, WELL GRADED, SUBROUNDED TO ROUNDED. MEDIUM BROWN
670		SS13	24	▽ 72	SAME AS SS12
		SS14	28		SAME AS SS12
660		SS15	11		SAME AS SS12
	LOOSE FINE TO COARSE BROWN SAND & GRAVEL (WET)				
		SS16	31		FINE TO MEDIUM SAND, TRACE OF SILT AND CLAY, UNIFORM, SUBROUNDED, BROWN
650		SS17	20		FINE TO COARSE SAND, TRACE OF SILT & CLAY SOME SMALL GRAVEL, SUBROUNDED, WELL GRADED BROWN
		SS18	38		SAME AS SS17
		SS19	58		SAME AS SS17
640		SS20	33		SAME AS SS17 BUT WITH SMALL PIECES OF WEATHERED SANDSTONE, BLUE-GRAY, BROWN AND ISOLATED ORANGE SPECKS
	MEDIUM COMPACT COARSE BROWN SAND AND GRAVEL, WITH SANDSTONE FRAGMENTS (WET)	SS21	30		SAME AS SS20 BUT WITH PIECES OR SPECKS OF DARK GRAY COAL
630		SS22	53		SAME AS SS21
	HARD GRAY SHALE (DRY)	SS23	150/3"		DARK GRAY SHALE THINLY LAMINATED 3"

BORING LOG 102 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-3B

DUQUESNE LIGHT COMPANY SH 3 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. No. 11700 BORING No. 102
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.8'
DATE DRILLED 3/19/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY F. KRUKI & H.S.
SUMMARY OF BORING

BORING NO. 102 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
		NX	100%	111'-116' ROCK BREAKS IN .5" TO 1.5" ON FOLIATION
620				
	HARD GRAY SHALE	NX	100%	116'-121' BREAKS TO 6" TWO THIN SEAMS OF COAL (.5") PYRITIZED. ALSO FREQUENT TRACES OF SHELLS AND LEAVES OF PLANTS. ALSO ISOLATED MICACEOUS LAYERS (.5") FOLIATION VISIBLE AND HORIZONTAL
610		NX	100%	121'-131' ONE PIECE OF CORE 4' LONG. ROCK IS SOUND THROUGHOUT ON THE WHOLE 20' LENGTH WHICH HAS BEEN RECOVERED 100%
		NX	100%	
600				

BORING LOG 102 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-3C

FIGURE 2F-2
BORING LOG 102
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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DUQUESNE LIGHT COMPANY — SH 1 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 103
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.1'
DATE DRILLED 4/8/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT, G. KUDITEK, M.S.
SUMMARY OF BORING

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	GROUND EL. 735.1' — BORING NO. 103					
	BROWN FINE, COARSE SAND AND GRAVEL	SS1	28			FINE SAND AND SMALL GRAVEL, PIECES OF BOULDERS, BROWN TO RUSTY
730	BROWN FINE, MEDIUM SAND	SS2	8			MEDIUM SAND, SLIGHT SILT, UNIFORM, SUB-ANGULAR, MEDIUM BROWN
	BROWN COARSE SAND AND GRAVEL	SS3	21		M.A.	MEDIUM SAND, TRACE OF SILT, SMALL GRAVEL AND PIECES OF BROKEN BOULDER, WELL GRADED SUBANGULAR TO SUBROUNDED, MEDIUM BROWN
		SS4	9		M.A.	SAME AS SS3
720	MEDIUM TO DENSE BROWN MEDIUM TO COARSE SAND SMALL TO LARGE GRAVEL AND BOULDERS	SS5	15			SAME AS SS3
	LARGE GRAVEL AND BOULDER	SS6	12			SAME AS SS3
710	LARGE GRAVEL	SS7	18			SAME AS SS3
	LARGE GRAVEL AND BOULDER	SS8	13			SAME AS SS3
700	GRAVEL AND SAND	SS9	33			SAME AS SS3
		SS10	66			SAME AS SS3
690		SS11	44			SAME AS SS3
		SS12	45		M.A.	SAME AS SS3
680						

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. - MECHANICAL ANALYSIS

BORING LOG 103
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-4A

DUQUESNE LIGHT COMPANY — SH 2 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 103
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.1'
DATE DRILLED 4/8/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT, G. KUDITEK, M.S.
SUMMARY OF BORING

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	BORING NO. 103 (CONT'D)					
680	LARGE GRAVEL AND COARSE SAND AND ROCK FRAGMENTS	SS13	33			SAME AS SS3
		SS14	36		M.A.	SAME AS SS3
670		SS15	17	∇ 72		SAME AS SS3
		SS16	18			SAME AS SS3
660		SS17	30		M.A.	SAME AS SS3
		SS18	27		M.A.	SAME AS SS3
650	MEDIUM TO COARSE GRAY SAND.	ST19	88%			SAND-FINE TO MEDIUM, SOME SILT, SOME FINE GRAVEL, POORLY GRADED, ROUNDED TO SUB-ROUNDED, GRAY
		ST20	0%			NO RECOVERY
		ST21	25%			SAME AS ST19
	MEDIUM TO DENSE BROWN AND GREEN COARSE SAND SOME SILT WITH ROCK FRAGMENTS	SS22	39			SAME AS SS3, BUT MEDIUM GRAY
640		SS23	20		M.A.	MEDIUM TO COARSE SAND, TRACE OF SILT, UNIFORM, SUBANGULAR TO SUBROUND, MEDIUM GRAY
		SS24	33		M.A.	SAME AS SS23 WITH SMALL GRAVEL, WELL GRADED
630		SS25	26		M.A.	SAME AS SS 24 WITH PIECES OF MEDIUM GRAY SHALE
	SHALE (USED ROCK BIT)					

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. MECHANICAL ANALYSIS

BORING LOG 103 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-4B

DUQUESNE LIGHT COMPANY — SH 3 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 103
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.1'
DATE DRILLED 4/8/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT, G. KUDITEK, M.S.
SUMMARY OF BORING

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	BORING NO. 103 (CONT'D)					
620	SHALE WITH SAND AND CLAY SEAMS	NX	50%			MEDIUM GRAY SHALE, HORIZONTAL FOLLIATION, TRACE OF SHELLS AND PLANT LEAVES ON PARTINGS AND PYRITE FILMS. ISOLATED THIN SANDY SHALE SEAMS. AVERAGE SPEED 9'/FOOT FIRST 2' OF RECOVERY PARTINGS 0.5"-1" THEN 1"-4" 120'-MEDIUM SANDSTONE 2" SEAM
610		NX	100%			LOWER INTERVAL PARTINGS TO 6" APPARENTLY MUD WAS LOST WHILE DRILLING THE 20' OF SHALE (NO EVIDENCE THAT LOSSES WERE IN SHALE) DARK GRAY THINLY - LAMINATED PAPER SHALE, FLAT-LYING
600						

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 103 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-4C

FIGURE 2F-3
BORING LOG 103
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY — SH 1 of 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 104
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.1'
DATE DRILLED 3/21/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & N.S.
SUMMARY OF BORING

GROUND EL. 735.1' BORING NO. 104

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	ASPHALT					
	BROWN CLAYEY FINE, MEDIUM COARSE SAND AND GRAVEL (DAMP)	SS1	16			FINE TO MEDIUM SAND, SILTY, SUBROUNDED TO ROUNDED, WELL GRADED, MEDIUM BROWN
730		SS2	6			SAME AS SS1
		SS3	8			SAME AS SS1
720		SS4	26		M.A.	SAME AS SS1
		SS5	30			SAME AS SS1 WITH PIECES OF BOULDERS BROKEN
710	COMPACT BROWN FINE, COARSE SAND AND GRAVEL (DAMP)	SS6	72		M.A.	SAME AS SS1 WITH LESS GRAVEL
		SS7	40		M.A.	FINE TO MEDIUM SAND, TRACE OF SILT AND GRAVEL AND PIECES OF BROKEN BOULDERS FROM WEATHERED SANDSTONE. WELL GRADED, SUBANGULAR, PART OF SAND APPEARS TO HAVE BEEN GROUND
700		SS8	46		M.A.	SAME AS SS7, MEDIUM BROWN
	BROWN FINE COARSE SAND	SS9	14			SAME AS SS7 WITH ISOLATED BLACK SPECKS (COAL)
690	BROWN FINE MEDIUM SAND	SS10	22			SAME AS SS9, THIN STREAKS OF COAL PRESENT
		SS11	33		M.A.	SAME AS SS10
680						

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. = MECHANICAL ANALYSIS

BORING LOG 104
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-5 A

DUQUESNE LIGHT COMPANY — SH 2 of 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 104
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.1'
DATE DRILLED 3/21/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & N.S.
SUMMARY OF BORING

BORING NO. 104 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
680	COMPACT BROWN FINE COARSE SAND AND GRAVEL	SS12	67		M.A.	FINE TO MEDIUM SAND, TRACE OF SILT AND GRAVEL AND PIECES OF BROKEN BOULDERS FROM WEATHERED SANDSTONE. WELL GRADED, SUBANGULAR, PART OF SAND APPEARS TO HAVE BEEN GROUND
		SS13	48		M.A.	SAME AS SS12
670		SS14	21			SAME AS SS12
				∇ 72		
		SS15	26			SAME AS SS12
660		SS16	32			SAME AS SS12
	BROWN FINE MEDIUM SAND, TRACE OF GRAVEL, SANDSTONE FRAGMENTS	SS17	31			SAME AS SS12, RUSTY AND YELLOW-BROWN
650	GRAY FINE MEDIUM SILTY SAND	SS18	40		M.A.	FINE TO MEDIUM SAND, SOME SILT, UNIFORM, SUBROUNDED, MEDIUM GRAY
	GRAY SILTY FINE COARSE SAND AND GRAVEL, SANDSTONE FRAGMENTS	SS19	49			PIECES OF WEATHERED SANDSTONE, SILTY SAND (ROUNDED) BLUE-GRAY AND BROWN
640		SS20	37		M.A.	MEDIUM SAND WITH TRACE OF SILT AND SMALL GRAVEL AND BROKEN PIECES OF ROCK (BOULDERS). SAND IS UNIFORM AND SUBANGULAR TO SUBROUNDED, MEDIUM GRAY
		SS21	47		M.A.	MEDIUM SAND AND SMALL GRAVEL, TRACE OF SILT, WELL GRADED, SUBANGULAR (SAND) TO ROUNDED(GRAVEL), BLUE-GRAY
630		SS22	43			FRAGMENTS OF WEATHERED ROCK, SMALL WELL ROUNDED GRAVEL, WITH BLUE-GRAY SAND
						SAME AS SS22 AND BEGINNING AT 109'-3" HIT ROCK.
		SS23	100/4"			

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. = MECHANICAL ANALYSIS

BORING LOG 104 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-5B

DUQUESNE LIGHT COMPANY — SH 3 of 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 104
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.1'
DATE DRILLED 3/21/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & N.S.
SUMMARY OF BORING

BORING NO. 104 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	GRAY SHALE WEATHERED	NX	93%			109'.5"-114'.5" RECOVERED IN SMALL PIECES, MUDDY. SAMPLE RETAINER WAS DAMAGED
620	HARD GRAY SHALE	NX	100%			114'.5"-119'.5" RECOVERED IN PIECES 1"-4", MOSTLY ON FOLIATION, HORIZONTAL
		NX	80%			119'.5"-124'.5" BREAKS TO 1" ISOLATED SANDY LAYERS
610		NX	100%			124'.5"-129'.5" RECOVERY IN PIECES 8"-12" ROCK IS SAME DARK GRAY SHALE WHICH BREAKS ON FOLIATION, MOSTLY HOMOGENEOUS BUT ALSO ISOLATED SANDY LAYERS. PYRITE AND ORGANIC FRAGMENTS ARE PRESENT (SHELLS AND LEAVES)

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
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5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 104 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-5C

FIGURE 2F-4
BORING LOG 104
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY — SH 1 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 105
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.6'
DATE DRILLED 3/26/68 DRILLED BY RAYMOND INT'L INC. LOGGED BY F.K. & M.S.
SUMMARY OF BORING

GROUND EL. 734.6' BORING NO. 105

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
				FILL
730	LOOSE COARSE BROWN SAND AND GRAVEL (DAMP)	SS1	18	MEDIUM TO COARSE SAND WITH SOME SILT AND GRAVEL, WELL GRADED, SUBANGULAR TO SUBROUND, MEDIUM BROWN
		SS2	12	FINE SAND WITH SOME MEDIUM SAND, SILTY, TRACE OF SMALL GRAVEL ROUNDED, SAND IS SUBANGULAR, UNIFORM, MEDIUM BROWN
720	COMPACT COARSE BROWN SAND & GRAVEL, SOME SMALL BOULDERS (DAMP)	SS3	50	MEDIUM TO COARSE SAND WITH GRAVEL AND BOULDERS, WELL GRADED, SUBANGULAR TO SUBROUNDED, LIGHT TO MEDIUM BROWN
	MEDIUM-COMPACT FINE TO COARSE BROWN SAND WITH SOME GRAVEL (DAMP)	SS4	24	SAME AS SS3
710		SS5	35	MEDIUM SAND, TRACE OF SILT AND SMALL GRAVEL AND PIECES OF BOULDERS, SAND IS UNIFORM, SUBANGULAR, MEDIUM BROWN
		SS6	15	FINE TO MEDIUM SAND, TRACE OF SILT, UNIFORM, SUBANGULAR, MEDIUM BROWN
700		SS7	60	SAME AS SS6 AND PIECES OF BOULDERS AND GRAVEL

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 105
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-6A

DUQUESNE LIGHT COMPANY — SH 2 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 105
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.6'
DATE DRILLED 3/26/68 DRILLED BY RAYMOND INT'L INC. LOGGED BY F.K. & M.S.
SUMMARY OF BORING

BORING NO. 105 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
		SS8	23		SAME AS SS5
690		SS9	39		SAME AS SS5
		SS10	59		SAME AS SS5
680		SS11	36		SAME AS SS5
	MEDIUM COMPACT COARSE BROWN SAND AND GRAVEL (WET)	SS12	27		SAME AS SS5
670		SS13	85		SAME AS SS5 AND MORE GRAVEL
		SS14	46	▽ 72	SAME AS SS5
660		SS15	35		SAME AS SS5
		SS16	28		SAME AS SS5
650					

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 105 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-6B

DUQUESNE LIGHT COMPANY — SH 3 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 105
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.6'
DATE DRILLED 3/26/68 DRILLED BY RAYMOND INT'L INC. LOGGED BY F.K. & M.S.
SUMMARY OF BORING

BORING NO. 105 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
650		SS17	143	SAND RESULTING FROM WEATHERED SANDSTONE WITH PIECES OF LIGHT GRAY SANDSTONE
		SS18	83	SAME AS SS17 WITH LESS SAND
640	COMPACT COARSE GRAY SAND AND GRAVEL WITH BROKEN SANDSTONE (WET)	SS19	100	SAME AS SS18
		SS20	80	SAME AS SS18 SOME GRAVEL PRESENT
630		SS21	44	MEDIUM SAND TRACE OF SILT AND GRAVEL, UNIFORM, SUBANGULAR MEDIUM GRAY.
	HARD GRAY SHALE (DRY)	SS22	117	DARK GRAY SHALE, THINLY LAMINATED
620		NX	100%	112'3"-117'3" - BREAKS IN PIECES 0.5"-3"
	HARD GRAY SHALE	NX	100%	117'3"-122'3" BREAKS IN PIECES 2"-8"
610		NX	100%	122'3"-127'3" BREAKS IN PIECES 6"-2'
		NX	100%	127'3"-132'3" BREAKS IN PIECES 2'-2" ROCK IS THE SAME DARK GRAY SHALE, BREAKING ON FOLIATION WITH TRACES OF SHELLS AND PLANTS. VISIBLE ALSO SOME THIN LIGHTER SANDY LAYERS.
600				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 105 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-6C

FIGURE 2F-5
BORING LOG 105
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY — SH 1 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 106
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.3'
DATE DRILLED 3/28/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & M.S.
SUMMARY OF BORING

GROUND EL. 735.3' — BORING 106

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
	FILL - CRUSHED SLAG AND GRAVEL			FILL
730	BROWN FINE MEDIUM SAND	SS1	15	FINE SILTY SAND, UNIFORM, SUBANGULAR, MEDIUM BROWN
720	BROWN FINE-COARSE SAND AND GRAVEL, LOOSE, MOIST	SS2	6	MEDIUM TO COARSE SAND, SOME SILT AND GRAVEL, SUBANGULAR (SAND), WELL GRADED, MEDIUM BROWN
		SS3	5	SAME AS SS2
		SS4	15	SAME AS SS2, GRAVEL IS MOSTLY WEATHERED SANDSTONE
710		SS5	23	SAME AS SS2, AND BROKEN PIECES OF ROCK, RED TO DARK BROWN
		SS6	28	BROKEN, ANGULAR PIECES OF WEATHERED ROCK AND SAND, RESULTED FROM WEATHERING (NO ROUNDED MATERIAL)
700		SS7	37	FINE SAND WITH SOME SILT AND TRACE OF COARSE SAND AND SMALL GRAVEL, SUBANGULAR, POORLY GRADED, MEDIUM BROWN
		SS8	27	MEDIUM TO COARSE SAND, SOME SMALL GRAVEL, SUBANGULAR, POORLY GRADED, MEDIUM BROWN
690	COMPACT BROWN FINE-COARSE SAND AND GRAVEL, DAMP	SS9	42	SAND RESULTED FROM WEATHERING, SOME GRAVEL AND PIECES OF COARSE ROCK, INCLUSIONS OF COAL
		SS10	41	SAME AS SS9, NO COAL INCLUSIONS
680	BROWN FINE-MEDIUM SAND TRACE OF GRAVEL, MOIST	SS11	27	SAME AS SS10

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL

BORING LOG 106
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-7A

DUQUESNE LIGHT COMPANY — SH 2 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 106
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.3'
DATE DRILLED 3/28/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & M.S.
SUMMARY OF BORING

BORING NO. 106 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
680	BROWN FINE COARSE SAND AND GRAVEL, TRACE OF CLAY, COMPACT	SS12	39		SAND RESULTED FROM WEATHERING, SOME GRAVEL AND PIECES OF COARSE ROCK
		SS13	85		FINE SAND, SILTY WITH FRAGMENTS OF BOULDERS AND SOME GRAVEL, ROCK IS WEATHERED, BROWN AND LIGHT GRAY
670		SS14	37	72 ▽	SAME AS SS13
	BROWN FINE COARSE SAND TRACE OF GRAVEL, WET	SS15	20		MEDIUM SAND, TRACE OF SILT AND GRAVEL, SUBROUNDED, UNIFORM, MEDIUM BROWN
660	BROWN FINE COARSE SAND AND GRAVEL, MOIST	SS16	42		MEDIUM SAND, SOME SILT AND CLAY AND GRAVEL, POORLY GRADED, SUBROUNDED TO SUBANGULAR, MEDIUM BROWN
	BROWN FINE MEDIUM SAND, WET	SS17	41		SAME AS SS15, MORE SILTY WITHOUT GRAVEL
650	COMPACT GRAY SILTY FINE COARSE SAND AND GRAVEL, SANDSTONE FRAGMENTS	SS18	70		PIECES OF BROKEN ROCK, SAND FROM WEATHERED SANDSTONE, SUBROUNDED GRAVEL, MEDIUM GRAY
		SS19	73		SAME AS SS18 WITHOUT GRAVEL, BLUE-GRAY
640	GRAY SILTY CLAY, SOME GRAVEL AND SANDSTONE FRAGMENTS, DAMP	SS20	59		MEDIUM SAND, SILTY, ISOLATED SMALL GRAVEL UNIFORM, SUBANGULAR, BLUE-GRAY, ROCK IS WEATHERED
	GRAY CLAYEY SHALE	SS21	85/6"		BLUE GRAY SHALE, SANDY, WEATHERED
		NX	100%		DRILLED 1' USING NX BIT, GROUND CORE AND BROKEN ROCK RECOVERED (CHANGED TO BX BIT)
		BX	92%		DARK GRAY SHALE THINLY LAMINATED, BREAKS ON FOLIATION, HORIZONTAL AT 0.5"-2" INTERVALS
630		BX	95%		FILMS OF PYRITE, SHELLS AND LEAVES OF PLANTS. THIN SEAMS OF COAL AND SANDY MEMBERS IN SHALE
620					

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
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5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL

BORING LOG 106 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-7B

DUQUESNE LIGHT COMPANY — SH 3 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 106
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.8'
DATE DRILLED 3/29/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & M.S.
SUMMARY OF BORING

BORING NO. 106 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
	GRAY CLAYEY SHALE	BX	87%	FILMS OF PYRITE, SHELLS AND LEAVES OF PLANTS. THIN SEAMS OF COAL AND SANDY MEMBERS IN SHALE
620		BX	100%	SAME AS ABOVE, BREAKS TO 4" INTERVALS (AVERAGE SPEED OF BX BIT. 3-5 MIN./6')

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES
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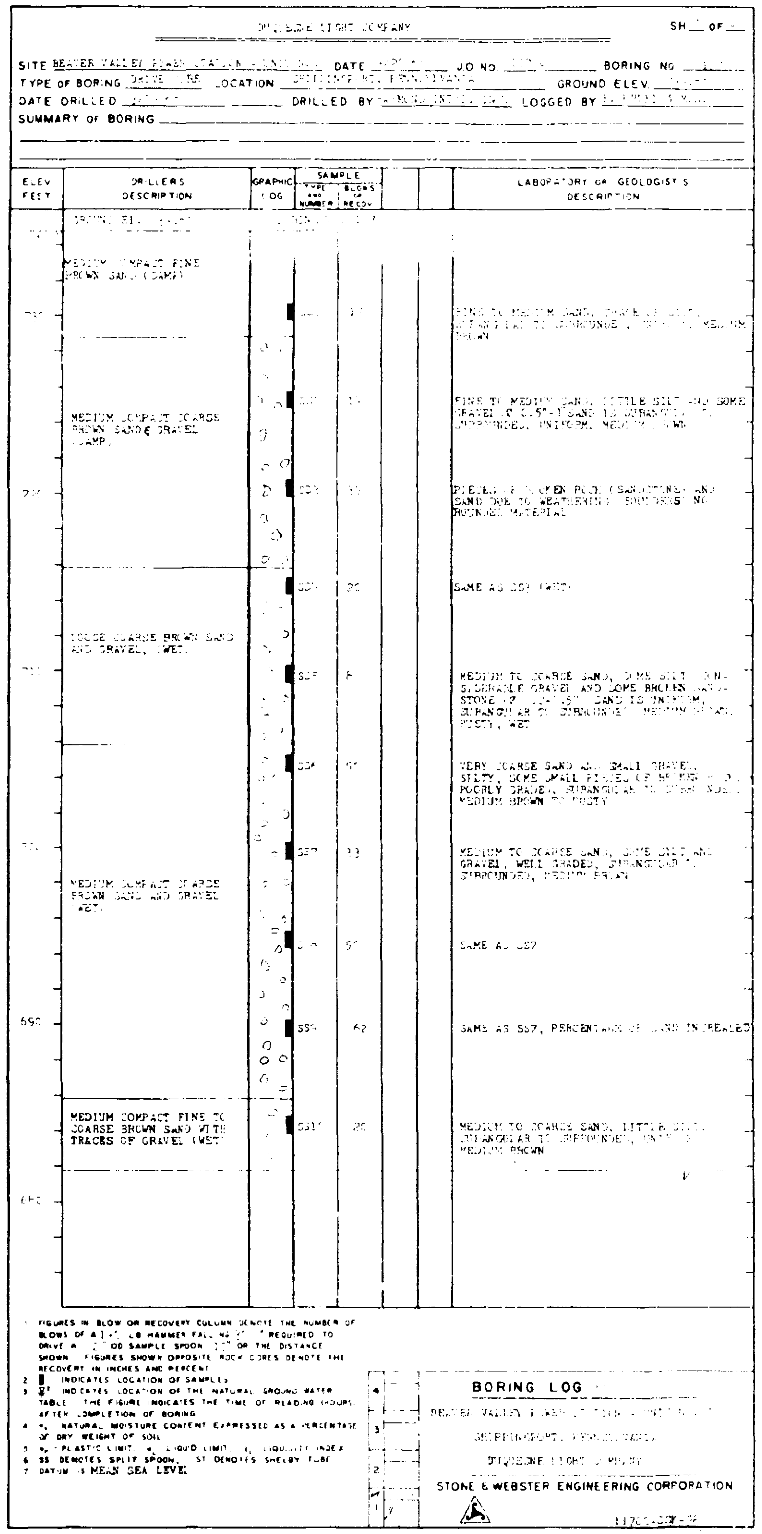
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL

BORING LOG 106 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-7C

FIGURE 2F-6
BORING LOG 106
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



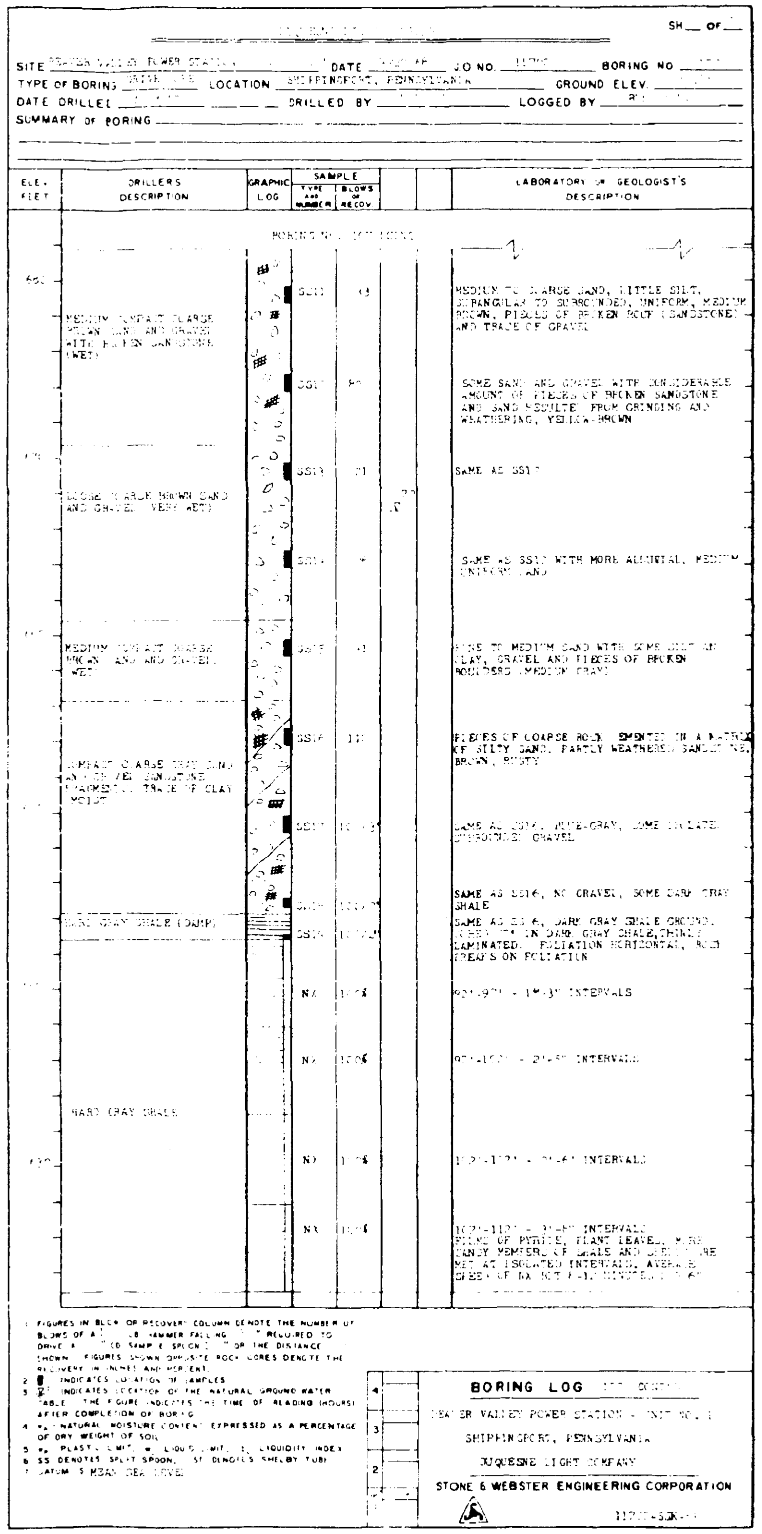
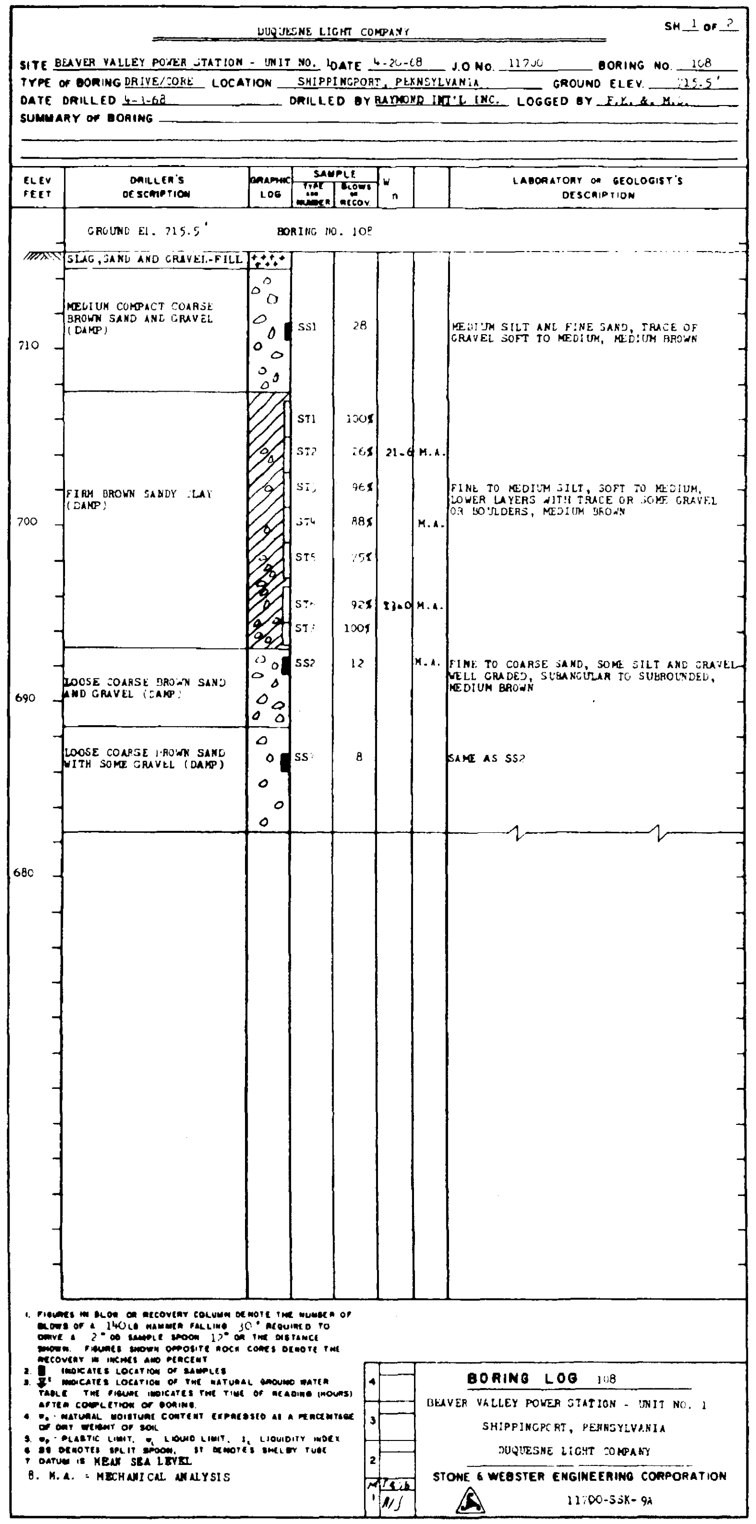


FIGURE 2F-7
BORING LOG 107
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



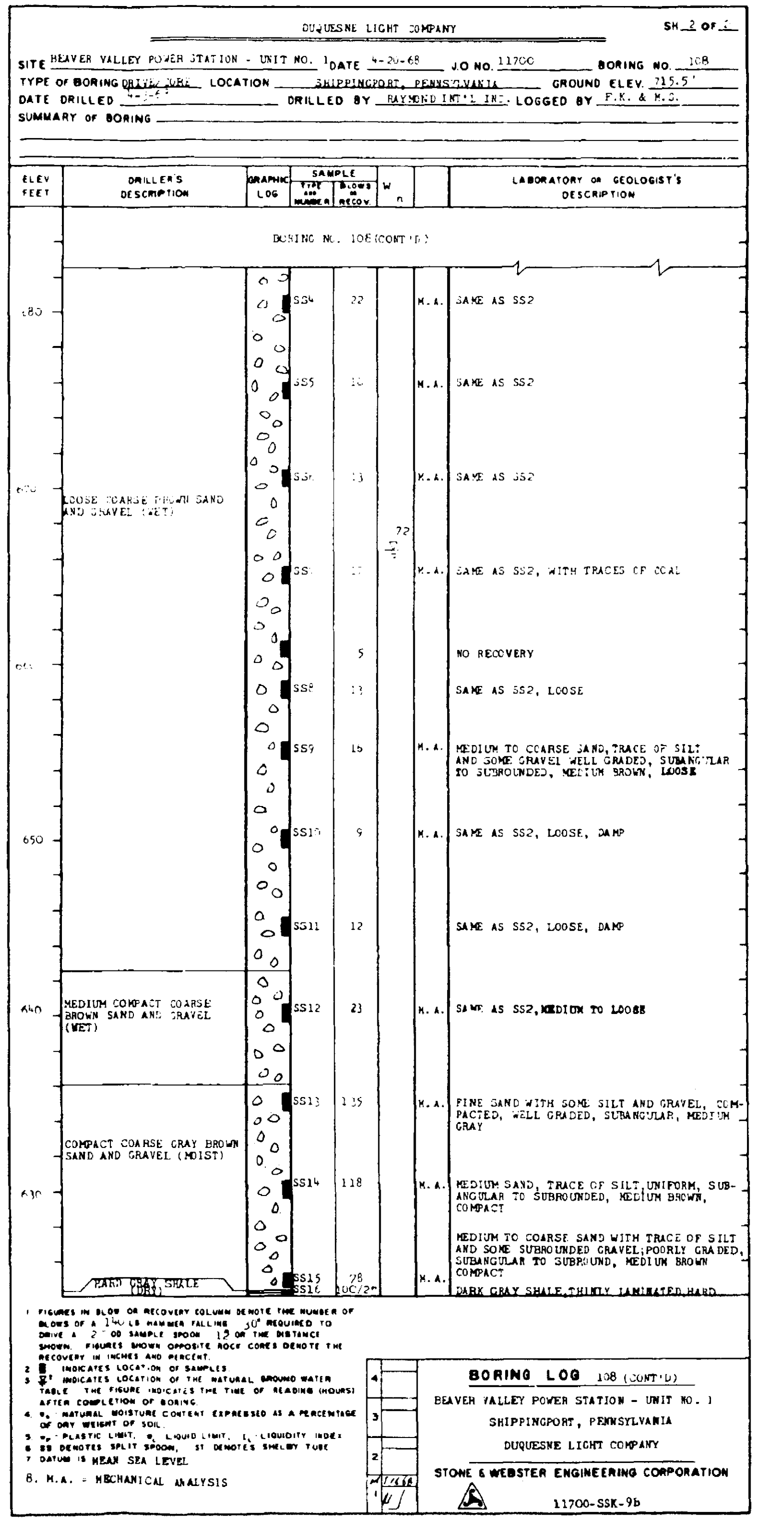


FIGURE 2F-8
BORING LOG 108
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

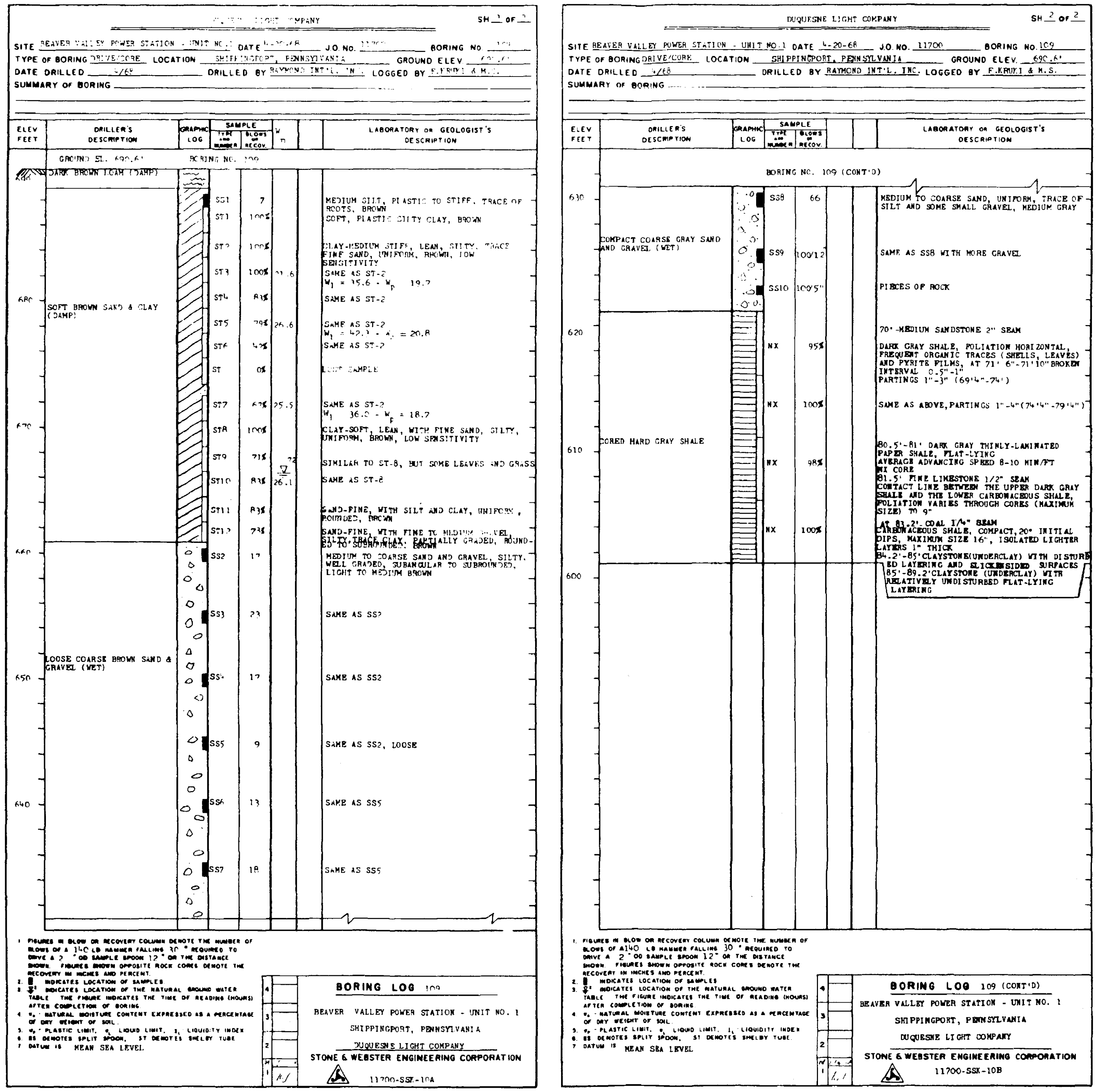
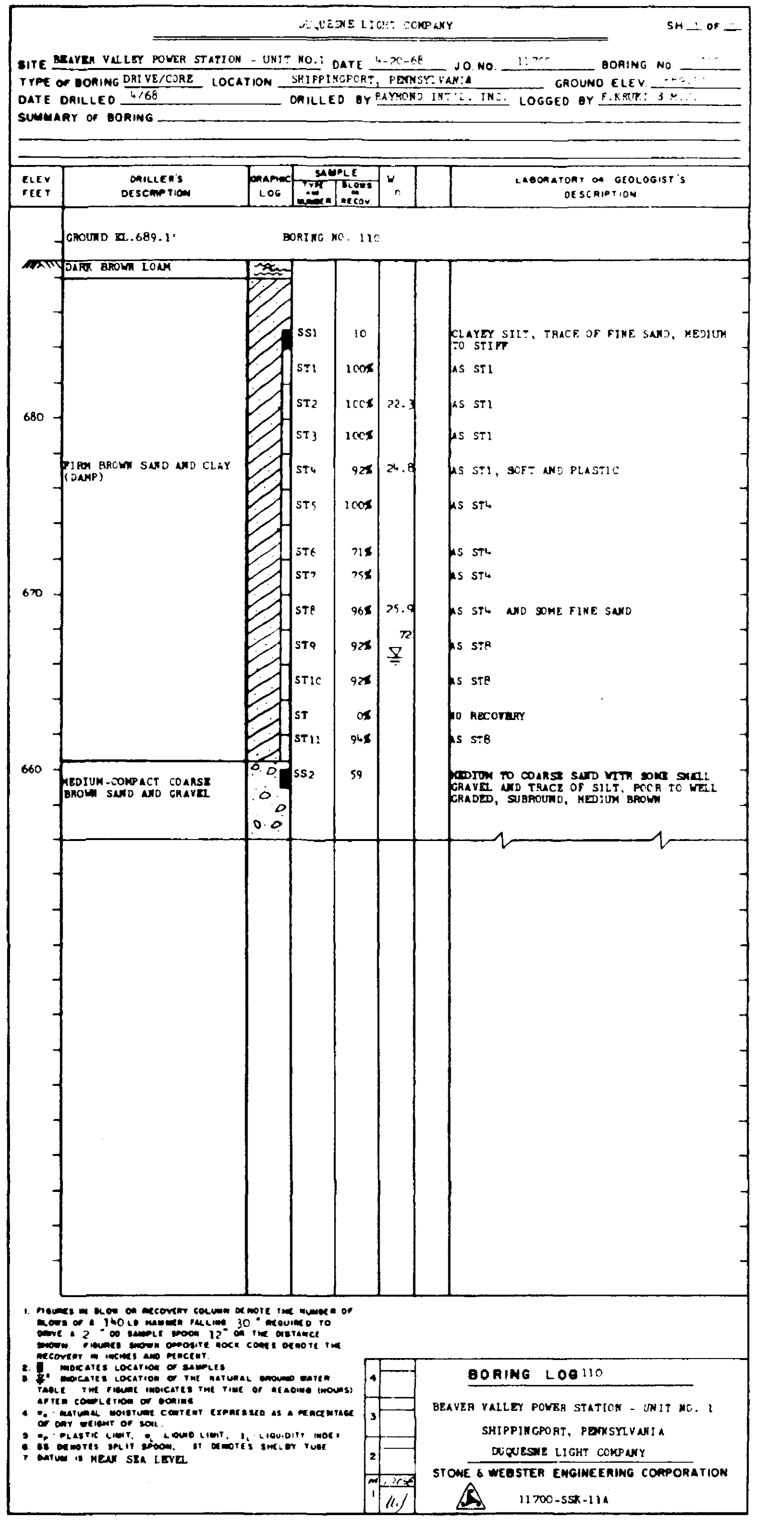


FIGURE 2F-9
BORING LOG 109
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



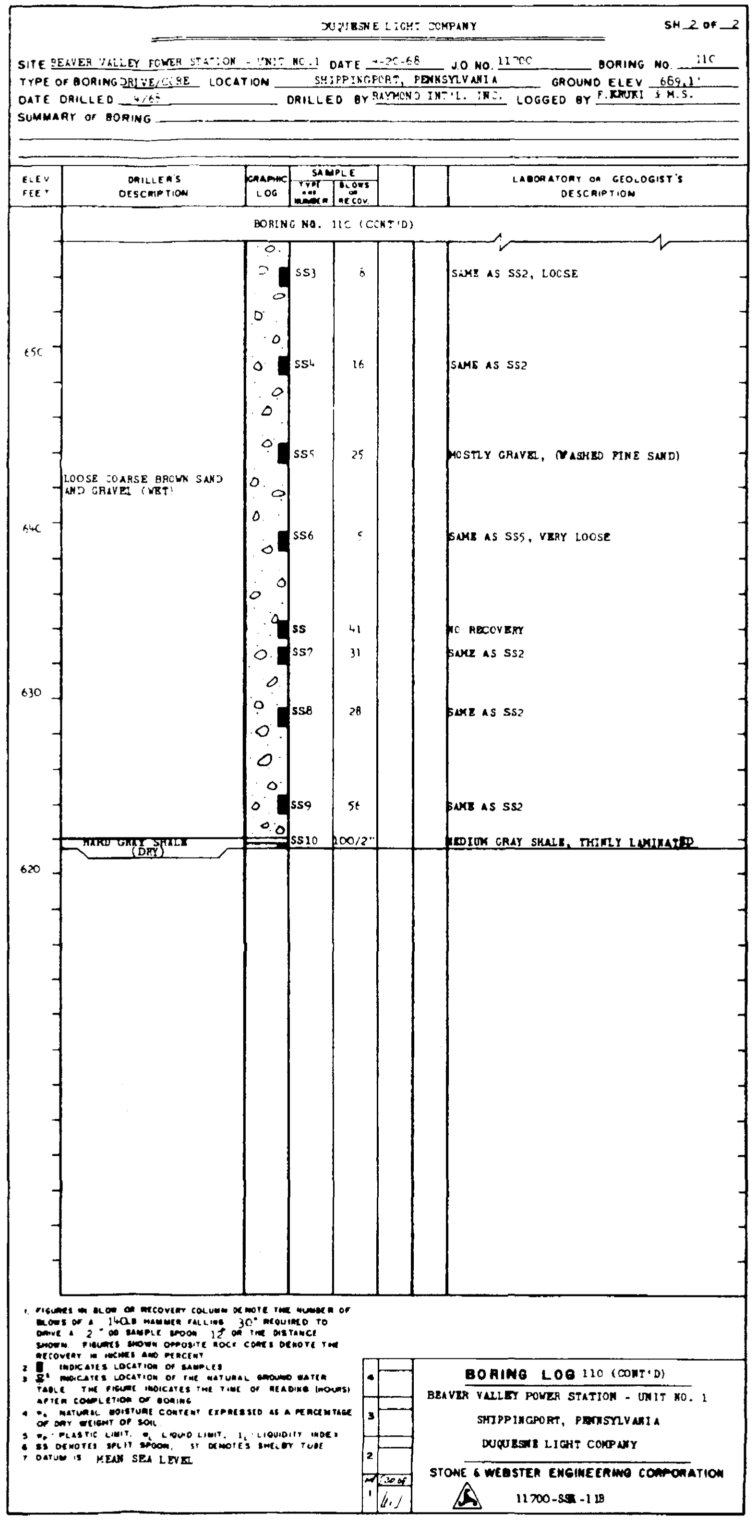
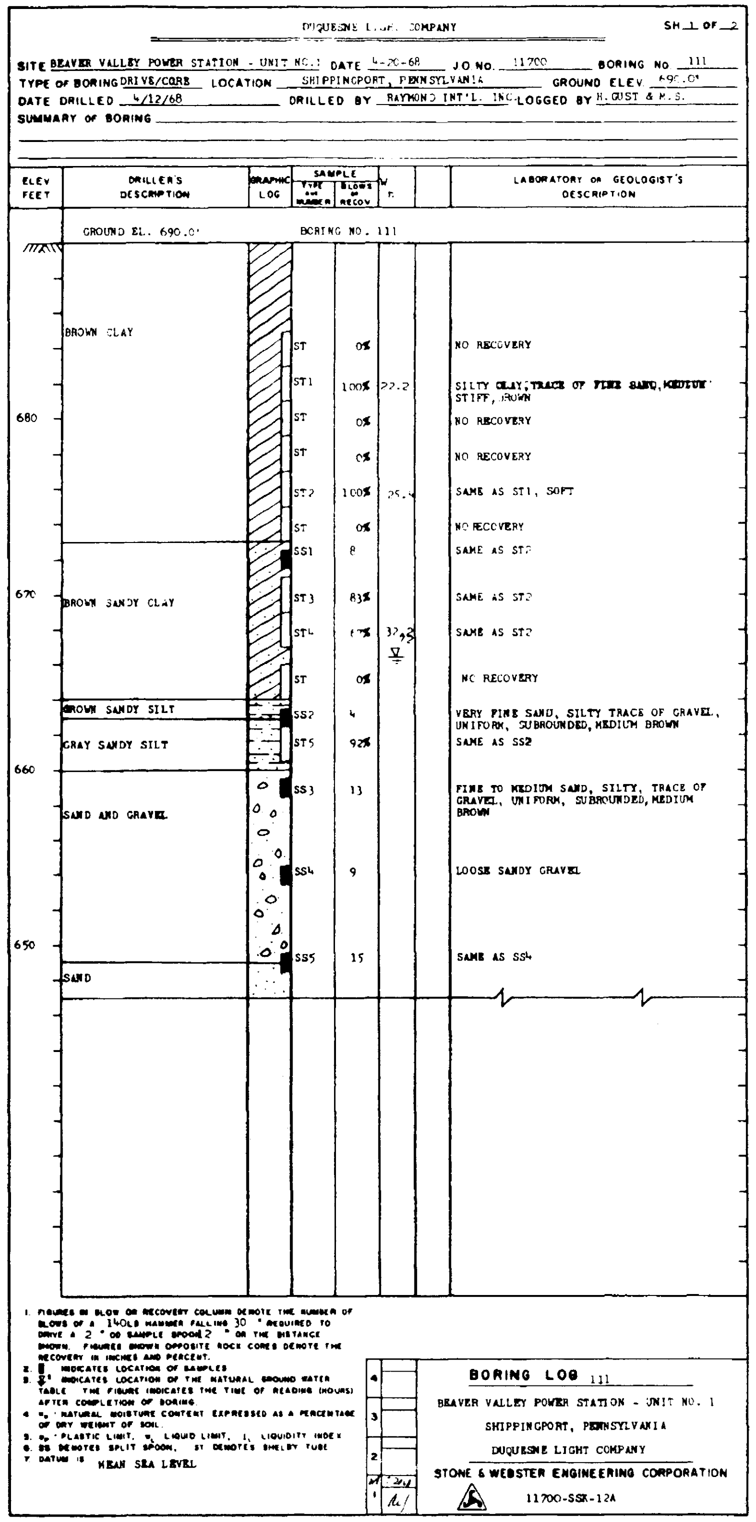


FIGURE 2F-10
BORING LOG 110
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



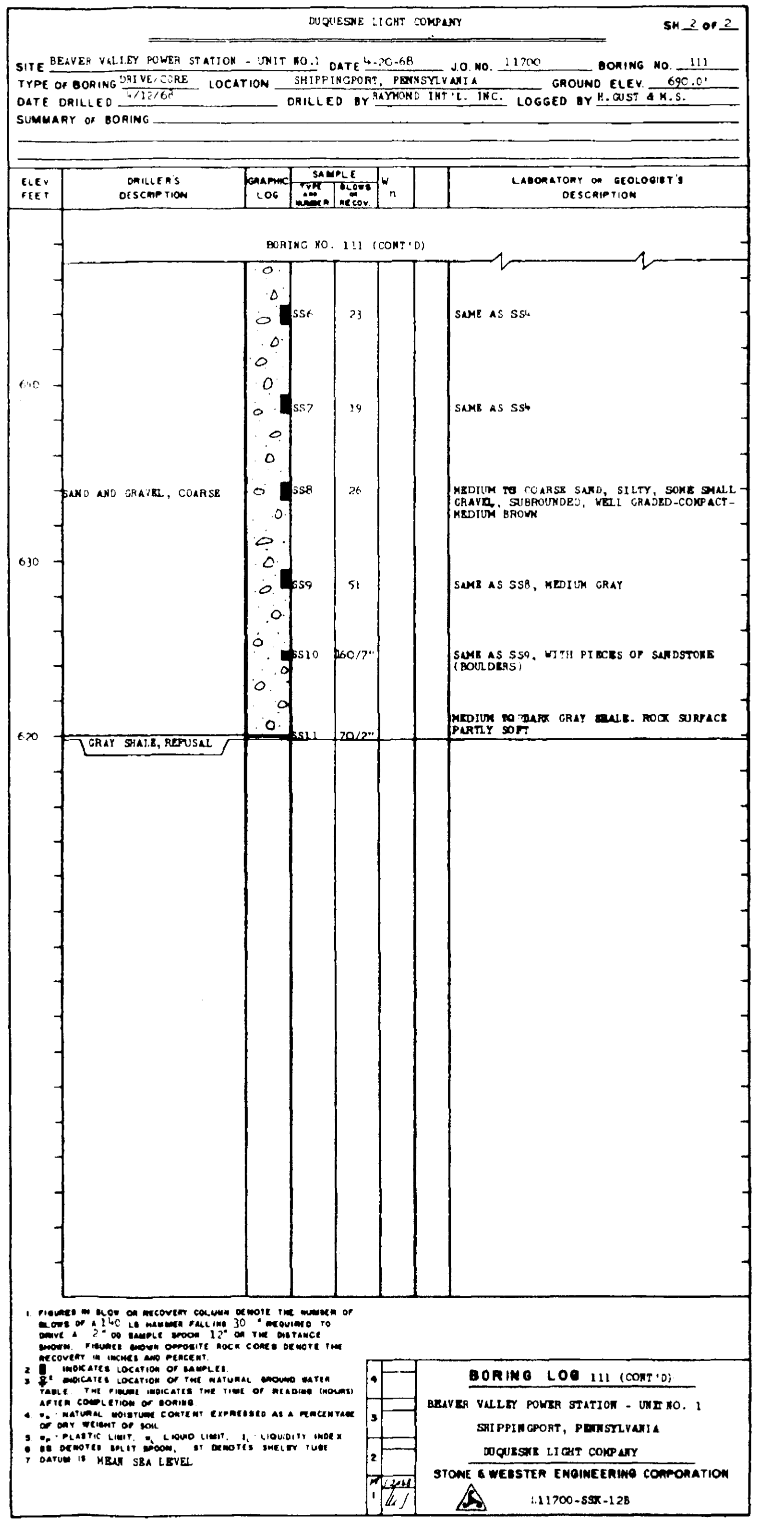


FIGURE 2F-11
BORING LOG 111
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY

SH 1 OF 2

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 112
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 710.4'
DATE DRILLED 4/15/68 DRILLED BY RAYMOND INT'L INC. LOGGED BY G. KEDITEK & M.S.
SUMMARY OF BORING

GROUND ELEVATION 710.4' BORING NO. 112

ELEV FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.		w_n	LABORATORY OR GEOLOGIST'S DESCRIPTION
	SANDY BROWN CLAY					
	MEDIUM BROWN FINE SAND SOME SILT	SS1	14			VERY FINE SAND, CONSIDERABLE SILT, SOME GRAVEL, POORLY GRADED, MEDIUM BROWN
		SS2	7			SAME AS SS1, TRACE OR SPECKS OF COAL
		SS3	3			SAME AS SS1, PIECES OF WOOD
		ST4	0%	*100		NO RECOVERY
		SS5	5			SAME AS SS1 (ORGANIC SMELL)
700	LOOSE GRAY FINE SAND SEAMS OF SILT WITH VEGETATION	ST6	100%	*100	19.5	SILTY CLAY, SOFT, SOME FINE SAND
		ST7	0%			NO RECOVERY
		SS8				SAME AS SS6
		ST9	92%	*0	22.2	SAME AS SS6
		ST10	75%	*300		SAME AS SS6
690	VERY STIFF BROWN SILTY SANDY CLAY, WITH GRAVEL	ST11	58%	*800	15.3	SAME AS SS6 AND GRAVEL
		ST12	50%	*1,200		SAME AS SS6 AND GRAVEL AND BOULDER
		ST13	25%	*1,200		SAME AS SS6 AND GRAVEL AND BOULDER
680	BROWN FINE TO COARSE SAND WITH SMALL TO LARGE GRAVEL	SS14	10			MEDIUM SAND, SOME SILT AND GRAVEL, POORLY GRADED, SUBROUNDED, MEDIUM BROWN
		SS15	9			SAME AS SS14, PIECES OF BOULDER
		SS16	13			SAME AS SS15, LOOSE
670		SS17	45			SAME AS SS15
		SS18	13			SAME AS SS15, LOOSE
		SS19	15	▽ 72		SAME AS SS14, LOOSE
		SS20	11			SAME AS SS14, LOOSE
660		SS21	16			SAME AS SS14, LOOSE

1 FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2 ▮ INDICATES LOCATION OF SAMPLES
3 ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING
4 w_n NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5 w_p PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6 SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7 DATUM IS MEAN SEA LEVEL
* 8. PRESSURE REQUIRED TO PUSH SHELBY TUBES (PSI)

BORING LOG 112
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-13A

DUQUESNE LIGHT COMPANY

SH 2 OF 2

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 112
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 710.4'
DATE DRILLED 4/15/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY G. KEDITEK & M.S.
SUMMARY OF BORING

BORING NO. 112 (CONT'D)

ELEV FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
660		SS22	17			SAME AS SS14, LOOSE
		SS23	9			SAME AS SS15, LOOSE
		SS24	26			SAME AS SS15
650	BROWN FINE TO COARSE SAND WITH SMALL TO LARGE GRAVEL	SS25	12			SAME AS SS14
		SS26	20			SAME AS SS15
		SS27	15			SAME AS SS15
		SS28	20			SAME AS SS15
		SS29	22			SAME AS SS15
640		SS30	26			SAME AS SS15
		SS31	29			SAME AS SS15
		SS32	200			SAND FROM WEATHERED SANDSTONE, NO GRAVEL BUT PIECES OF BOULDER BROKEN
630	VERY DENSE BROWN, SAND GRAVEL SILT AND ROCK FRAGMENTS	SS33	76			SAME AS SS15, MEDIUM GRAY
		SS34	94			SAME AS SS15, MEDIUM GRAY
		SS35	80			BROKEN PIECES OF ROCK IN CLAYEY SANDY DEPOSIT WELL GRADED
	SHALE	SS36	100/2"			REFUSAL, MEDIUM GRAY SHALE, THINLY FOLLIATED

1 FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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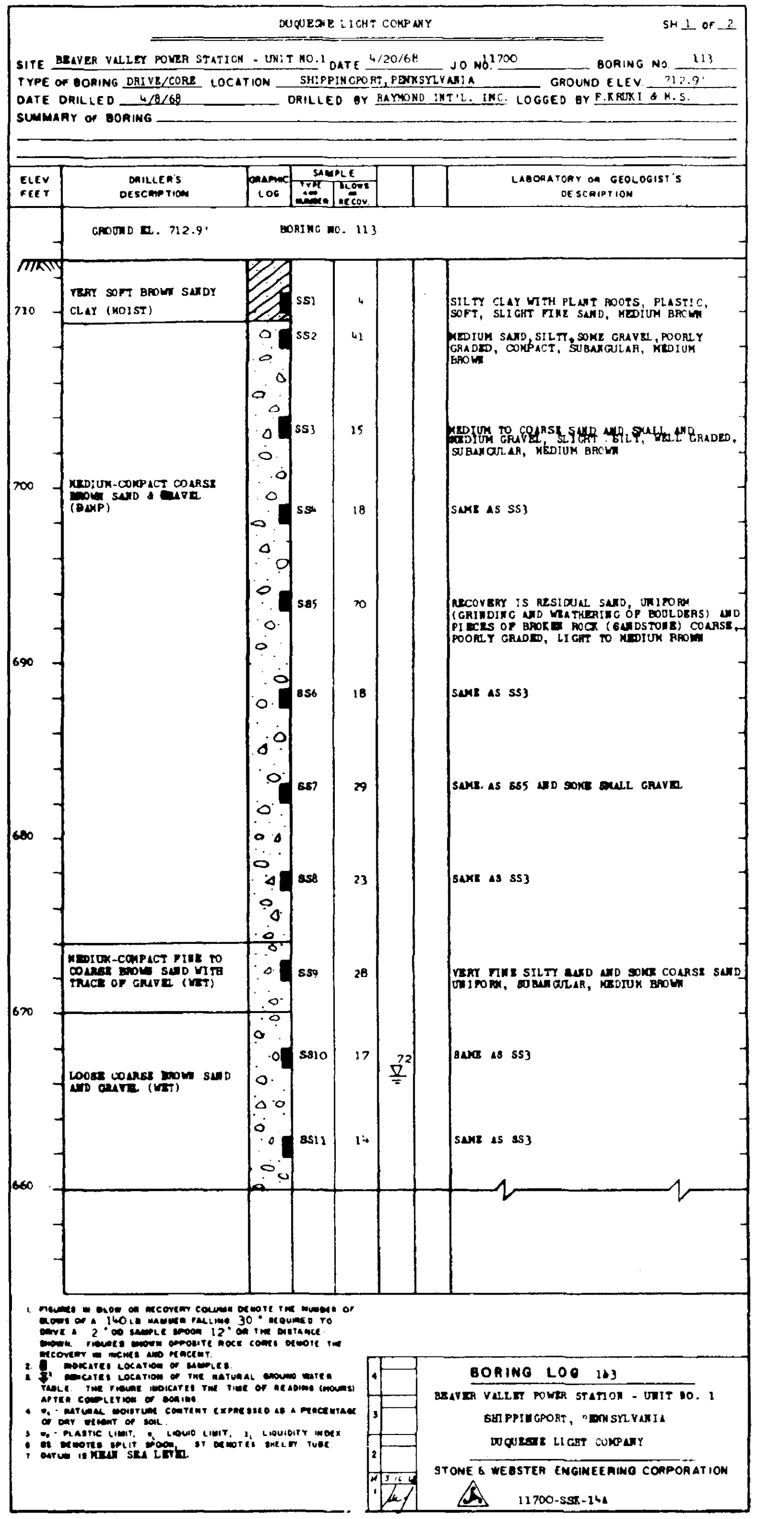
4 w_n NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5 w_p PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6 SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7 DATUM IS MEAN SEA LEVEL

BORING LOG 112 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-13B

FIGURE 2F-12
BORING LOG 112
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



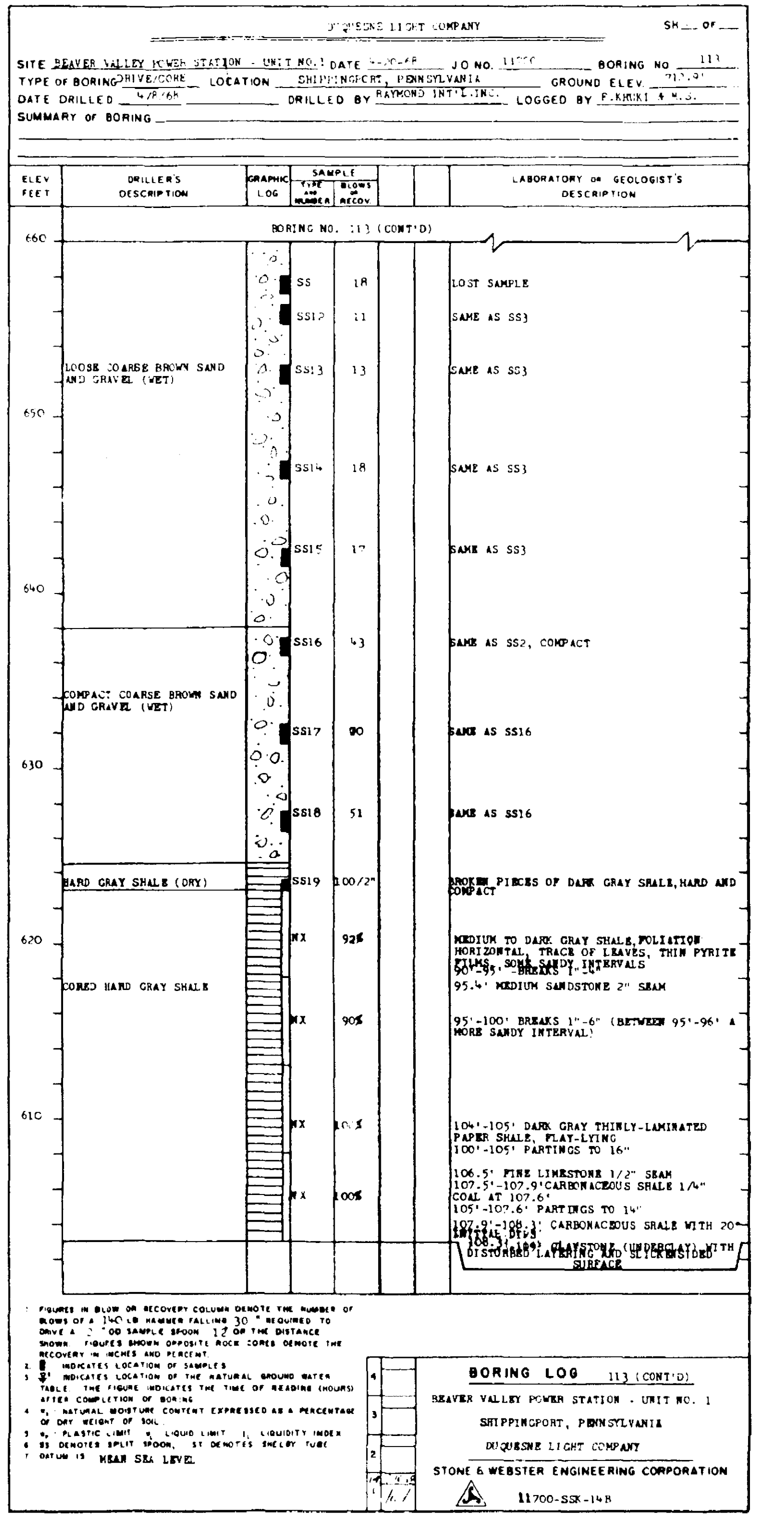


FIGURE 2F-13
BORING LOG 113
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY SH 1 OF 2

SITE BEAVER VALLEY POWER STATION - UNIT NO.1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 114
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV 734.4'
DATE DRILLED 4/3/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & M.S.
SUMMARY OF BORING

GROUND ELEVATION 734.4' BORING NO. 114

ELEV FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
	ASPHALT				
	CRUSHED SLAG				
730	BROWN FINE, MEDIUM SAND	SS1	14		MEDIUM SAND, TRACE OF SILT, UNIFORM, SUBANGULAR, MEDIUM BROWN
	BROWN COARSE SAND AND GRAVEL	SS2	10		MEDIUM TO COARSE SAND, SOME SILT, CLAY AND GRAVEL, VERY LOOSE, WELL GRADED, SUBANGULAR, BROWN
720	BROWN MEDIUM COMPACT COARSE SAND AND GRAVEL	SS3	22		MEDIUM TO COARSE SAND, TRACE OF SILT AND GRAVEL, MEDIUM COMPACT, WELL GRADED, SUBANGULAR, BROWN
		SS4	27		SAME AS SS3
710		SS5	32	M.A.	SAME AS SS3
		SS6	30		SAME AS SS3
700		SS7	64		SAME AS SS3
		SS8	33		SAME AS SS3
690	COMPACT BROWN FINE COARSE SAND AND GRAVEL	SS9	163	M.A.	SAME AS SS3, WITH BOULDER BROKEN
	BROWN MEDIUM COMPACT FINE MEDIUM SAND AND GRAVEL	SS10	24	M.A.	SAME AS SS9
680					

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w, NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. = MECHANICAL ANALYSIS

BORING LOG 114
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-15A

DUQUESNE LIGHT COMPANY SH 2 OF 2

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 114
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.4'
DATE DRILLED 4/3/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY E. BRIGHT & M.S.
SUMMARY OF BORING

BORING NO. 114 (CONT'D)

ELEV FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
680	MEDIUM COMPACT BROWN COARSE SAND AND GRAVEL	SS11	34			SAME AS SS9
		SS12	46			MEDIUM SAND (RESIDUAL AND ALLUVIAL) SILTY SOME GRAVEL AND PIECES OF BROKEN ROCK (BOULDER) AND GRAVEL AND WEATHERED SANDSTONE, WELL GRADED, MEDIUM BROWN
670		SS13	12		M.A.	SAME AS SS12, LOOSE
				▽ 72		
		SS14	26			MOSTLY PIECES OF BROKEN ROCK, SILTY SAND, MOIST, SOME GRAVEL, SUBROUNDED, LOOSE
660		SS15	21		M.A.	SAME AS SS3; LOOSE
	MEDIUM COMPACT BROWN CLAYEY COARSE SAND AND GRAVEL	SS16	26			SMALL GRAVEL, SUBROUNDED, AND SILTY SAND FINE TO MEDIUM, POORLY GRADED; SOME PIECES OF BROKEN ROCK, MEDIUM COMPACT, SUBROUNDED
650		SS17	42		M.A.	SAME AS SS16
	COMPACT GRAY SILTY FINE COARSE SAND AND GRAVEL	SS18	72			SAME AS SS16, MEDIUM GRAY
640	GRAY SILTY COARSE SAND, TRACE OF GRAVEL	SS19	51		M.A.	MEDIUM TO COARSE SAND, SOME SILT AND COAL INCLUSIONS, UNIFORM, SUBANGULAR, MEDIUM GRAY
	GRAY SILTY COARSE SAND, FINE, MEDIUM GRAVEL	SS20	40			SAME AS SS19, SOME GRAVEL
630		SS21	79		M.A.	SAME AS SS19, THINLY FOLLIATED SHALE AT BASE
		SS22	83/2"			LOST SAMPLE
	REFUSAL					

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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4. w, NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. M.A. = MECHANICAL ANALYSIS

BORING LOG 114 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-15B

FIGURE 2F-14
BORING LOG 114
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY SH 1 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4/20/68 J.O. NO. 11700 BORING NO. 115
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.5'
DATE DRILLED 4/12/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY G. [illegible] & M.S.
SUMMARY OF BORING

GROUND EL. 735.5' BORING NO. 115

ELEV. FEET	DRILLER'S DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	BROWN FINE TO COARSE SAND AND GRAVEL		SS1	16			FINE TO MEDIUM SAND, SILTY, SOME SMALL GRAVEL, POORLY GRADED, SUBROUNDED, MEDIUM BROWN
730			SS2	10			SAME AS SS1, WITH PIECES OF BOULDER, NO GRAVEL
			SS3	14		M.A.	SAME AS SS1, WITHOUT GRAVEL
720			SS4	12			SAME AS SS1, WITH PIECES OF BOULDER AND GRAVEL
	BROWN, COARSE SAND TRACE OF SILT WITH GRAVEL, SMALL TO LARGE		SS5	30		M.A.	SAME AS SS4
710			SS6	16		M.A.	SAME AS SS4
			SS7	15			SAME AS SS4
700			SS8	27		M.A.	MEDIUM TO COARSE SAND AND SMALL GRAVEL AND SOME SILT, WELL GRADED, SUBROUNDED, MEDIUM BROWN
			SS9	32			SAME AS SS8
			SS10	44			PIECES OF LIGHT GRAY WEATHERED SANDSTONE AND SUBROUNDED GRAVEL AND SOME SUBROUNDED SAND
690			SS11	40			MEDIUM SAND, TRACE OF SILT AND BROKEN BOULDER, UNIFORM, SOME GRAVEL, SUBANGULAR MEDIUM BROWN
			SS12	64		M.A.	SAME AS SS4
			SS13	41		M.A.	SAME AS SS8
			SS14	95			SAME AS SS11
			SS15	98			SAME AS SS11
680							

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. M.A. = MECHANICAL ANALYAIS

BORING LOG 115
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-16A

DUQUESNE LIGHT COMPANY SH 2 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 115
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.5'
DATE DRILLED 4/12/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY G. [illegible] & M.S.
SUMMARY OF BORING

BORING NO. 115 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
680							
			SS16	76			SAME AS SS11
			SS17	58		M.A.	SAME AS SS11
			SS18	38			SAME AS SS11
670			SS19	70			SAME AS SS11
	BROWN, COARSE SAND TRACE OF SILT WITH GRAVEL, SMALL TO LARGE		SS20	28		M.A.	SAME AS SS11
			SS21	54	▽ 72		SAME AS SS11
			SS22	16		M.A.	SAME AS SS11
			SS23	27			SAME AS SS11
660			SS24	15			SAME AS SS11
			SS25	20			SAME AS SS11
			SS26	18			SAME AS SS11
650			SS27	26			SAME AS SS11
	DENSE GREEN, SAND, GRAVEL BOULDERS, SOME SILT		SS28	34			SAME AS SS11
			SS29	47			MEDIUM SAND, SOME SILT, UNIFORM, SOME SMALL GRAVEL AND WEATHERED SHALE, MEDIUM GRAY
			SS30	23		M.A.	MEDIUM TO COARSE SAND, TRACE OF SILT, UNIFORM, SUBROUNDED, MEDIUM GRAY
640	GREEN MEDIUM TO COARSE SAND		SS31	26			SAME AS SS30
			SS32	39		M.A.	SAME AS SS29
			SS33	28			SAME AS SS29 AND SOME COAL INCLUSIONS
	GREEN FINE TO COARSE SAND WITH GRAVEL AND ROCK FRAGMENTS, SOME SILT		SS34	33			SAME AS SS29
630			SS35	28			SAME AS SS30
			SS36	32		M.A.	SAME AS SS30

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. MA = MECHANICAL ANALYSIS

BORING LOG 115(CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-16B

DUQUESNE LIGHT COMPANY SH 3 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 115
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 735.5'
DATE DRILLED 4/12/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY G. [illegible] & M.S.
SUMMARY OF BORING

BORING NO. 115 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NUMBER	SAMPLE BLOWS OR RECOV.			LABORATORY OR GEOLOGIST'S DESCRIPTION
	VERY DENSE COARSE SAND, SM. TO LG. GRAVEL AND BOULDER		SS37	196			SAME AS SS30, [illegible] LIT SHALE
	SHALE						
620	CORED SHALE		NX	100%			MEDIUM GRAY SHALE, HORIZONTAL FOLLIATION, IMPRESSIONS OF LEAVES AND SHELLS ON PARTINGS AND ALSO PYRITE FILMS. BETWEEN 110' 8"-112'8" BREAKS AT 0.5"-1" THEN 1"-4" TO 115'8"
			NX	100%			115'8"-118" PARTINGS 1"-4" 118"-120'8" PARTINGS TO 6" 119' MEDIUM SANDSTONE, 2" SEAM
610							

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_L LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL

BORING LOG 115 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-16C

FIGURE 2F-15
BORING LOG 115
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY — SH 1 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO.1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 116
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.6'
DATE DRILLED 3/30/68 DRILLED BY RAYMOND INT'L.INC. LOGGED BY E.B. & M.S.
SUMMARY OF BORING

GROUND EL. 734.6' BORING NO. 116

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
	FILL, [illegible] GRAVEL	SS1	13	FINE TO MEDIUM SAND, TRACE OF SILT, UNIFORM, SUBANGULAR TO SUBROUNDED, MEDIUM BROWN
730	BROWN FINE COARSE SAND TRACE OF GRAVEL, MOIST	SS2	13	MEDIUM TO COASE SAND, TRACE OF SILT AND SMALL GRAVEL, INCLUSIONS OF COAL, UNIFORM, SUBROUNDED, MEDIUM BROWN
		SS3	68	PARTLY BROKEN BOULDERS, TRACE OF SMALL GRAVEL AND SOME POORLY GRADED RESIDUAL SAND (SANDSTONE) AND ALLUVIAL SAND
720		SS4	83	SAME AS SS3, NO ROUNDED MATERIAL VISIBLE
		SS5	40	BROKEN LIGHT GRAY SANDSTONE, LIGHT GRAY RESIDUAL SAND, TRACE OF SMALL GRAVEL AND SOME ALLUVIAL SAND
710	COMPACT BROWN FINE, COARSE SAND AND GRAVEL, BOULDERS	SS6	51	MEDIUM TO COARSE SAND WITH SMALL GRAVEL AND SLIGHT SILT, WEATHERED, POORLY GRADED, SUBANGULAR: ISOLATED BROKEN BOULDERS.
		SS7	46	MEDIUM SILTY SAND, POORLY GRADED, WITH SMALL AND MEDIUM GRAVEL, SUBANGULAR TO COARSE, MEDIUM BROWN
700		SS8	72	BROKEN ROCK IN A MASS OF FINE SILTY SAND NO ROUNDED PARTS MOSTLY RESIDUAL SAND
		SS9	40	FINE TO MEDIUM SAND, SLIGHT SILT, TRACE OF SMALL GRAVEL AND RESIDUAL SAND (SANDSTONE) UNIFORM SUBANGULAR, MEDIUM BROWN
690		SS10	79	MEDIUM SILTY SAND, UNIFORM, SUBANGULAR TO COARSE, MEDIUM BROWN
		SS11	58	SAME AS SS7
680				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 116
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-17A

DUQUESNE LIGHT COMPANY — SH 2 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO.1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 116
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.6'
DATE DRILLED 3-30-68 DRILLED BY RAYMOND INT'L.INC. LOGGED BY E.B. & M.S.
SUMMARY OF BORING

BORING NO. 116 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.		LABORATORY OR GEOLOGIST'S DESCRIPTION
680		SS12	68		SAME AS SS7
		SS13	27		SAME AS SS7 AND SOME COAL INCLUSIONS
670	COMPACT BROWN FINE, COARSE SAND AND GRAVEL, BOULDERS	SS14	52	72 ∇	SAME AS SS13
		SS15	26		SAME AS SS13 WITH CONSIDERABLE BOULDERS
660		SS16	31		SAME AS SS7
		SS17	49		FINE TO COARSE SAND, SILTY, SOME SMALL AND MEDIUM GRAVEL, WELL GRADED, SUBANGULAR TO SUBROUND, MEDIUM BROWN AND DARK VARIGATED
650	BROWN FINE-MEDIUM SAND SOME SMALL GRAVEL, MOIST	SS18	40		SAME AS SS17
	GRAY SILTY FINE, MEDIUM SAND FINE GRAVEL	SS19	33		SAME AS SS17, MEDIUM GRAY
640		SS20	37		SAME AS SS17, MEDIUM GRAY
	GRAY FINE COARSE SILTY SAND, SMALL GRAVE, WET	SS21	29		FINE TO COARSE SAND, SOME SILT AND GRAVEL, WITH WELL GRADED SUBANGULAR TO SUBROUND, MEDIUM GRAY, IN THE LOWER LAYERS PIECES OF SHALE, BROKEN
630		SS22	28		

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. w_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 116 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-17B

DUQUESNE LIGHT COMPANY — SH 3 OF 3

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 116
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 734.6'
DATE DRILLED 3-30-68 DRILLED BY RAYMOND INT'L.INC. LOGGED BY E.B. & M.S.
SUMMARY OF BORING

BORING NO. 116 (CONT'D)

ELEV. FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
		SS23	100/2"	DARK GRAY SHALE, THINLY LAMINATED
		NX	100%	DARK GRAY SHALE BREAKING OF FOLIATION, HORIZONTAL, MOSTLY [illegible] PYRITE ; AND ORGANIC FRAGMENTS OF PARTINGS (SHELLS AND LEAVES) THIN SANDY LAYERS
620				110'-115' BREAKS AT 1"-3" INTERVALS LOWER 2' ROCK IS SOFTER, MUDDY (WEATHERED?)
	GRAY SHALE	NX	100%	115'-120' PIECES 2"-10", AT 118' MEDIUM SANDSTONE 2" SEAM
		NX	100%	120'-125' PARTING TO 1'4"
610				128' DARK GRAY THINLY LAMINATED PAPER SHALE, FLAT LYING 128.5' FINE LIMESTONE 1/2" SEAM 125'-130' LOST 1' OF CORE BECAUSE OF SLIPPING THE CORE CATCHER.
		NX	80%	
600				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
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5. w_p - PLASTIC LIMIT, w_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 116 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-17C

FIGURE 2F-16
BORING LOG 116
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY

SH 1 OF 2

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 117
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV [illegible]
DATE DRILLED 4/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY F.KRUKI & M.S.
SUMMARY OF BORING

GROUND EL. 692.1' BORING NO. 117

ELEV FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	w_n		LABORATORY OR GEOLOGIST'S DESCRIPTION
690	VERY SOFT DARK BROWN LOAM (WET)					
	COMPACT COARSE BROWN SAND AND GRAVEL SOME CLAY (DAMP)	SS1	41			VERY FINE SILTY SAND WITH SMALL GRAVEL, VERY COMPACT, WELL GRADED, MEDIUM BROWN
	SOFT DARK BROWN SILTY CLAY (MOIST)	ST1	100%			MEDIUM SOFT SILTY CLAY, BROWN
680	FIRM BROWN SANDY CLAY (DAMP)	SS2	15			SAME AS ST1
		ST2	42%			SAME AS ST1
		ST3	100%	23.6		SAME AS ST1
		ST4	100%			SAME AS ST1
		ST5	100%	27.7		SAME AS ST1, PLASTIC $W_1 = 44.2 - W_p = 28.8$
		ST6	100%			SAME AS ST1, PLASTIC
670		ST7	100%			SAME AS ST1, SOFT
		ST8	96%	72 ▽		SAME AS ST1, SOFT
		ST9	[illegible]			SAME AS ST1, SOFT
		ST10	100%	35.2		SAME AS ST1, SOFT $W_1 = 48.0 - W_p = 25.4$
	SOFT GRAY SILTY CLAY (MOIST)	ST11	92%			SAME AS ST1, SOFT, MEDIUM GRAY, MOIST, ORGANIC SMELL
660		ST12	92%	35.4		SAME AS ST11, SOFT, MEDIUM GRAY, MOIST, ... $W_p = 20.5$
		ST13	100%			SAME AS ST11
		ST14	50%			SAME AS ST11
		ST15	100%		M.A.	SAME AS ST11
	... COMPACT FINE TO COARSE GRAY SILTY SAND (WET)	SS3	18%			MEDIUM SILT WITH FINE SAND, FIRM, MEDIUM GRAY
690						

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. W_p - PLASTIC LIMIT, W_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. [illegible] MECHANICAL ANALYSIS

BORING LOG 117
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-18A

DUQUESNE LIGHT COMPANY

SH 2 OF 2

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 DATE 4-20-68 J.O. NO. 11700 BORING NO. 117
TYPE OF BORING DRIVE/CORE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV 692.1'
DATE DRILLED 4/68 DRILLED BY RAYMOND INT'L. INC. LOGGED BY F.KRUKI & M.S.
SUMMARY OF BORING

BORING NO. 117 (CONT'D)

ELEV FEET	DRILLER'S DESCRIPTION	SAMPLE TYPE AND NUMBER	BLOWS OR RECOV.	LABORATORY OR GEOLOGIST'S DESCRIPTION
650	MEDIUM COMPACT COARSE GRAY AND BROWN SAND AND GRAVEL	SS4	23	MEDIUM SAND WITH GRAVEL AND BOULDERS, SOME SILT, WELL GRADED, SUBROUND MEDIUM BROWN
640		SS5	36	MEDIUM SAND, SOME SILT, UNIFORM, SUB-ROUND, MEDIUM BROWN
		SS	16	NO RECOVERY
		SS6	16	SAME AS SS5
630		SS7	28	SAME AS SS5 AND SMALL GRAVEL
	COMPACT COARSE GRAY SAND AND GRAVEL (WET)	SS8	58	SAME AS SS5 AND PIECES OF SHALE
	REFUSAL			REFUSAL, ROCK SURFACE
620				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
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5. W_p - PLASTIC LIMIT, W_l LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS DENOTES SPLIT SPOON, ST DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG 117 (CONT'D)
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-18B

FIGURE 2F-17
BORING LOG 117
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 2.8
VISUAL CLASSIFICATION BROWN SILTY CLAY

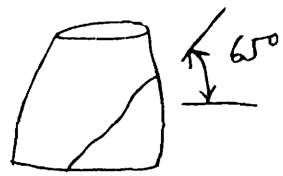
DATE 7/10/68

JOB SITE BEAVER VALLEY
INIT. DIA 1.4

TEST BY KLP

J.O. NO 11700
BORING 109
SAMPLE ST3
DEPTH 7 FT.
TEST NO 109-3N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP	MIDDLE	BOTTOM
CONTAINER NO		111	110	112
WT CONTAINER + WET SOIL	(G)	42.20	47.50	37.00
WT CONTAINER + DRY SOIL	(G)	37.40	41.50	32.60
WT WATER	(G)	4.80	6.00	4.40
WT CONTAINER	(G)	11.70	11.40	11.40
WT DRY SOIL	(G)	25.70	30.10	21.20
WATER CONTENT	PERCENT	18.68	19.93	20.75

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
1.00						
	0.0	0.0	0.01069	0.0	0.0	0.0
	0.040	9.218	0.01085	0.700	1.429	849.976
	0.060	14.530	0.01092	0.900	2.143	1330.084
	0.080	19.842	0.01100	1.100	2.857	1803.091
	0.100	22.498	0.01109	1.200	3.571	2029.418
	0.120	22.498	0.01117	1.200	4.286	2014.386
	0.140	22.498	0.01125	1.200	5.000	1999.353
	0.160	22.498	0.01134	1.200	5.714	1984.320
	0.180	22.498	0.01142	1.200	6.429	1969.288
	0.200	22.498	0.01151	1.200	7.143	1954.255

RATE OF STRAIN IS 7.143(PERCENT/MIN)

MAX COMP STRESS 2029.418

FIGURE 2F-18
UNCONFINED COMPRESSION TEST
BORING 109 - TEST NO. 109-3N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

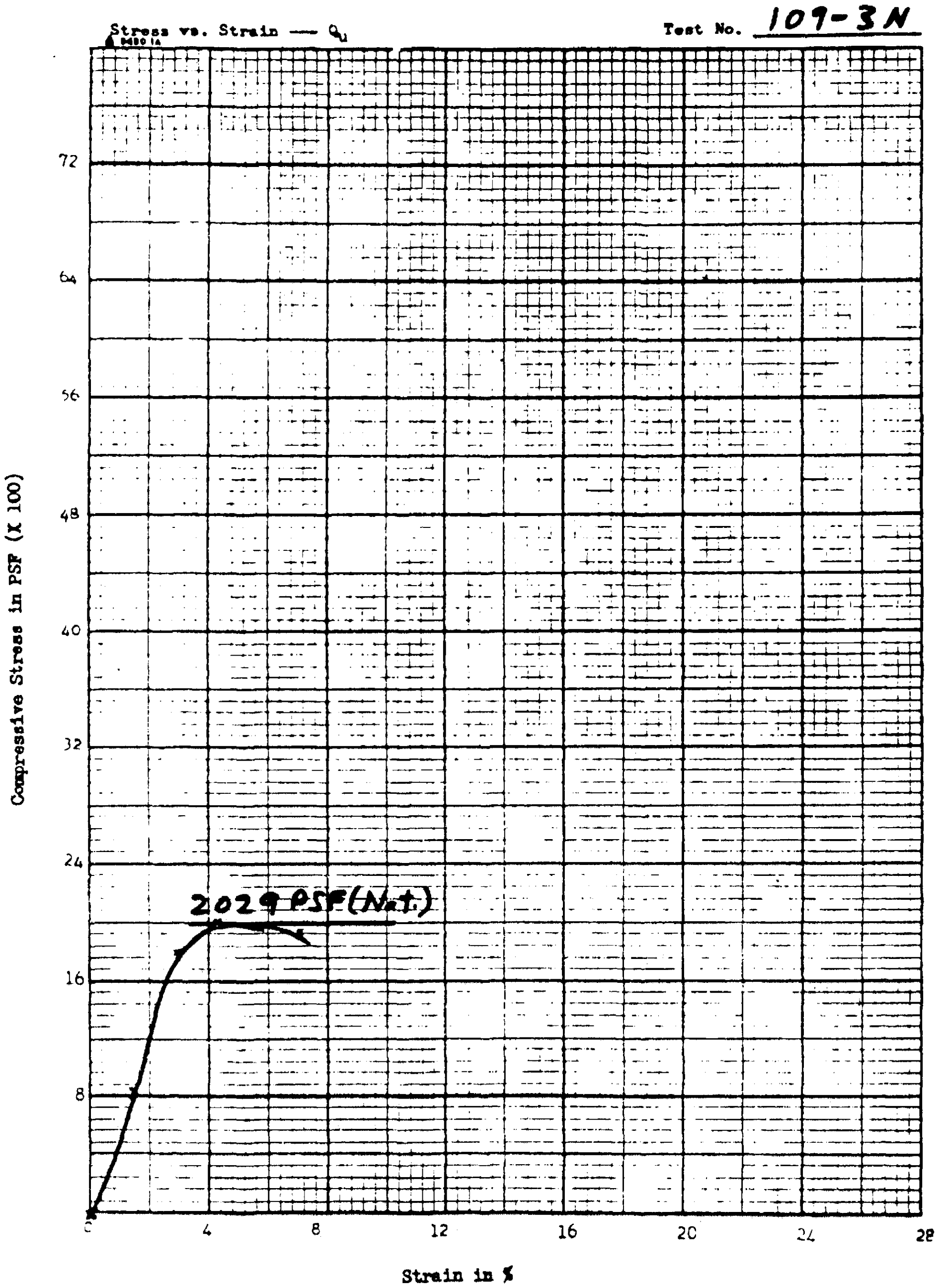


FIGURE 2F-19
COMPRESSIVE STRESS VS STRAIN
TEST NO. 109-3N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

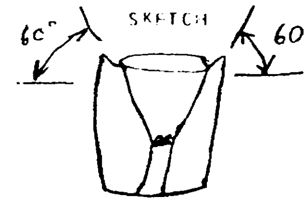
DATE 8/1/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 109
SAMPLE ST6
DEPTH 13-15 FT.
TEST NO 109-6 N

REV. 0 (1/82)



WATER CONTENT

SPECIMEN LOCATION	TOP	BOTTOM
CONTAINER NO	46	50
WT CONTAINER + WET SOIL (G)	153.90	116.20
WT CONTAINER + DRY SOIL (G)	131.80	97.40
WT WATER (G)	22.10	18.80
WT CONTAINER (G)	35.80	17.70
WT DRY SOIL (G)	96.00	79.70
WATER CONTENT PERCENT	23.02	23.59

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
5.80						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	30.466	0.04291	1.500	0.357	709.944
	0.040	54.371	0.04307	2.400	0.714	1262.436
	0.060	75.619	0.04322	3.200	1.071	1749.487
	0.080	96.867	0.04338	4.000	1.429	2232.936
	0.100	118.116	0.04354	4.800	1.786	2712.938
	0.120	136.708	0.04370	5.500	2.143	3128.559
	0.140	149.988	0.04386	6.000	2.500	3419.947
	0.160	165.925	0.04402	6.600	2.857	3769.458
	0.180	179.205	0.04418	7.100	3.214	4056.199
	0.200	187.173	0.04434	7.400	3.571	4220.910
	0.220	195.141	0.04451	7.700	3.929	4384.207
	0.240	203.109	0.04468	8.000	4.286	4546.355
	0.260	208.421	0.04484	8.200	4.643	4647.855
	0.280	216.389	0.04501	8.500	5.000	4807.473
	0.300	219.045	0.04518	8.600	5.357	4848.187
	0.320	227.014	0.04535	8.900	5.714	5005.586
	0.340	229.670	0.04552	9.000	6.071	5044.969 —
	0.360	229.670	0.04570	9.000	6.429	5025.785
	0.380	229.670	0.04587	9.000	6.786	5006.605
	0.400	227.014	0.04605	8.900	7.143	4929.742
	0.420	227.014	0.04623	8.900	7.500	4910.781
	0.440	224.357	0.04641	8.800	7.857	4834.590

RATE OF STRAIN IS 1.355 (PERCENT/MIN)

MAX COMP STRESS 5044.969

FIGURE 2F-20
UNCONFINED COMPRESSION TEST
BORING 109 - TEST NO. 109-6N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

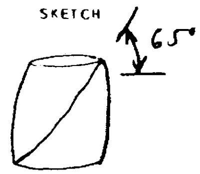
DATE 8/1/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 109
SAMPLE ST6
DEPTH 13-15 FT. ✓
TEST NO 109-6 R ✓

SKETCH



WATER CONTENT

SPECIMEN LOCATION	MIDDLE
CONTAINER NO	13
WT CONTAINER + WET SOIL (G)	232.50
WT CONTAINER + DRY SOIL (G)	192.60
WT WATER (G)	39.90
WT CONTAINER (G)	16.40
WT DRY SOIL (G)	176.20
WATER CONTENT PERCENT	22.64

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
9.20						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	9.219	0.04291	0.700	0.357	214.804
	0.040	14.530	0.04307	0.900	0.714	337.375
	0.060	19.842	0.04322	1.100	1.071	459.059
	0.080	25.154	0.04338	1.300	1.429	579.856
	0.100	30.466	0.04354	1.500	1.786	697.766
	0.120	33.122	0.04370	1.600	2.143	758.004
	0.140	38.434	0.04386	1.800	2.500	876.361
	0.160	43.747	0.04402	2.000	2.857	993.830
	0.180	49.059	0.04418	2.200	3.214	1110.413
	0.200	54.371	0.04434	2.400	3.571	1226.107
	0.220	59.683	0.04451	2.600	3.929	1340.914
	0.240	64.995	0.04468	2.800	4.286	1454.834
	0.260	70.307	0.04484	3.000	4.643	1567.867
	0.280	72.963	0.04501	3.100	5.000	1621.003
	0.300	78.275	0.04518	3.300	5.357	1732.483
	0.320	86.243	0.04535	3.600	5.714	1901.540
	0.340	88.899	0.04552	3.700	6.071	1952.781
	0.360	91.555	0.04570	3.800	6.429	2003.477
	0.380	96.867	0.04587	4.000	6.786	2111.629
	0.400	102.180	0.04605	4.200	7.143	2218.894
	0.420	107.492	0.04623	4.400	7.500	2325.271
	0.440	112.804	0.04641	4.600	7.857	2430.761
	0.460	112.804	0.04659	4.600	8.214	2421.340
	0.480	120.772	0.04677	4.900	8.571	2582.290
	0.500	123.429	0.04695	5.000	8.929	2628.771
	0.520	126.084	0.04714	5.100	9.286	2674.809
	0.540	128.740	0.04732	5.200	9.643	2720.403
	0.560	128.740	0.04751	5.200	10.000	2709.650
	0.580	131.396	0.04770	5.300	10.357	2754.579
	0.600	131.396	0.04789	5.300	10.714	2743.604
	0.620	131.396	0.04808	5.300	11.071	2732.630
	0.640	134.052	0.04828	5.400	11.429	2776.671 ✓
	0.660	134.052	0.04847	5.400	11.786	2765.475
	0.680	134.052	0.04867	5.400	12.143	2754.279
	0.700	134.052	0.04887	5.400	12.500	2743.093
	0.720	134.052	0.04907	5.400	12.857	2731.886
	0.740	134.052	0.04927	5.400	13.214	2720.690
	0.760	134.052	0.04947	5.400	13.571	2709.494
	0.780	134.052	0.04968	5.400	13.929	2699.298
	0.800	131.396	0.04989	5.300	14.286	2633.860

RATE OF STRAIN IS 1.553 (PERCENT/MIN)

MAX COMP STRESS 2776.671

FIGURE 2F-21
UNCONFINED COMPRESSION TEST
BORING 109, TEST NO. 109-6R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

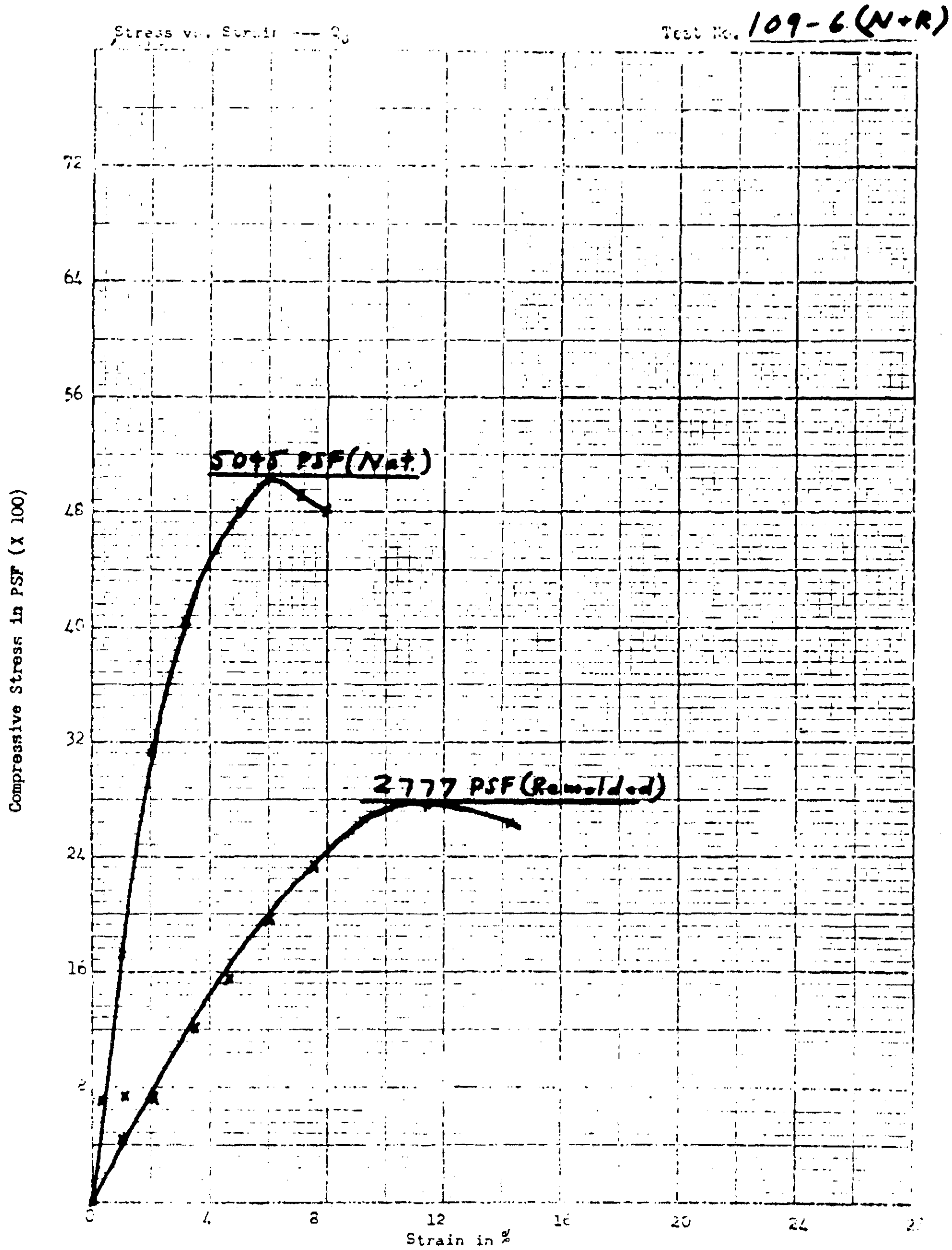


FIGURE 2F-22
COMPRESSIVE STRESS VS STRAIN
TEST NO. 109-6 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

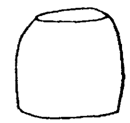
DATE 6/13/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 109
SAMPLE ST7
DEPTH 18-20 FT.
TEST NO 109-7N

SKETCH



WATER CONTENT

SPECIMEN LOCATION	TOP	BOTTOM
CONTAINER NO	SED.	117
WT CONTAINER + WET SOIL (G)	237.20	82.30
WT CONTAINER + DRY SOIL (G)	206.30	68.30
WT WATER (G)	30.90	14.00
WT CONTAINER (G)	94.20	13.00
WT DRY SOIL (G)	112.10	55.30
WATER CONTENT PERCENT	27.56	25.32

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
10.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.300	0.357	0.0
	0.040	1.781	0.04307	0.420	0.714	41.356
	0.060	4.703	0.04322	0.530	1.071	108.891
	0.090	6.562	0.04338	0.600	1.429	151.267
	0.100	9.218	0.04354	0.700	1.786	211.724
	0.120	11.874	0.04370	0.800	2.143	271.738
	0.140	13.202	0.04386	0.850	2.500	301.027
	0.160	16.655	0.04402	0.980	2.857	378.365
	0.180	17.983	0.04418	1.030	3.214	407.033
	0.200	19.842	0.04434	1.100	3.571	447.458
	0.220	21.170	0.04451	1.150	3.929	475.638
	0.240	23.029	0.04468	1.220	4.286	515.497
	0.260	24.623	0.04484	1.280	4.643	549.102
	0.280	25.154	0.04501	1.300	5.000	558.847
	0.300	27.279	0.04518	1.380	5.357	603.775
	0.320	28.341	0.04535	1.420	5.714	624.922
	0.360	30.466	0.04570	1.500	6.429	666.686
	0.380	32.591	0.04587	1.580	6.786	710.461
	0.400	33.122	0.04605	1.600	7.143	719.274
	0.420	34.185	0.04623	1.640	7.500	739.490
	0.440	35.247	0.04641	1.680	7.857	759.528
	0.460	35.778	0.04659	1.700	8.214	767.987
	0.480	36.044	0.04677	1.710	8.571	770.677
	0.500	37.903	0.04695	1.780	8.929	807.265
	0.520	38.434	0.04714	1.800	9.286	815.369
	0.540	39.231	0.04732	1.830	9.643	828.996
	0.560	40.559	0.04751	1.880	10.000	853.671
	0.580	41.091	0.04770	1.900	10.357	861.419
	0.600	41.887	0.04789	1.930	10.714	874.625
	0.620	43.747	0.04808	2.000	11.071	909.793
	0.640	44.278	0.04828	2.020	11.429	917.143
	0.660	44.809	0.04847	2.040	11.786	924.403
	0.680	45.871	0.04867	2.080	12.143	942.490
	0.700	47.199	0.04887	2.130	12.500	965.833
	0.720	49.059	0.04907	2.200	12.857	999.791
	0.740	49.324	0.04927	2.210	13.214	1001.074
	0.760	49.855	0.04947	2.230	13.571	1007.691
	0.780	49.855	0.04968	2.230	13.929	1003.527
	0.800	49.855	0.04989	2.230	14.286	999.363
	0.820	49.855	0.05010	2.230	14.643	995.199
	0.840	51.183	0.05031	2.280	15.000	1017.434
	0.860	51.183	0.05052	2.280	15.357	1013.159
	0.880	53.574	0.05073	2.370	15.714	1056.002
	0.900	54.105	0.05095	2.390	16.071	1061.954
	0.920	54.371	0.05117	2.400	16.429	1062.626
	0.940	54.371	0.05139	2.400	16.786	1058.085

RATE OF STRAIN IS 1.679(PERCENT/MIN)

MAX COMP STRESS 1062.626

FIGURE 2F-23
UNCONFINED COMPRESSION TEST
BORING 109 - TEST NO. 109-7N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 2.8
VISUAL CLASSIFICATION BROWN SILTY CLAY

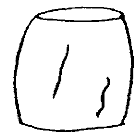
DATE 6/13/68

JOB SITE BEAVER VALLEY
INIT. DIA 1.4

TEST BY KLP

J.O. NO 11700
BORING 109
SAMPLE ST7
DEPTH 18-20 FT.
TEST NO 109-7R

SKETCH



WATER CONTENT 24.8 %
~~NO WATER CONTENT SECTION~~

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
11.00						
	0.0	0.0	0.01069	0.0	0.0	0.0
	0.020	0.0	0.01077	0.340	0.714	0.0
	0.040	0.187	0.01085	0.360	1.429	17.288
	0.060	0.719	0.01092	0.380	2.143	65.799
	0.080	1.250	0.01100	0.400	2.857	113.581
	0.100	2.047	0.01109	0.430	3.571	184.621
	0.120	2.578	0.01117	0.450	4.286	230.815
	0.140	3.375	0.01125	0.480	5.000	299.903
	0.160	3.906	0.01134	0.500	5.714	344.500
	0.180	4.703	0.0114[illegible]	0.530	6.429	411.636
	0.200	6.031	0.01151	0.580	7.143	523.849
	0.220	6.562	0.01160	0.600	7.857	565.606
	0.240	7.359	0.01169	0.630	8.571	629.371
	0.260	8.156	0.01178	0.660	9.286	692.070
	0.280	8.952	0.01188	0.690	10.000	753.704
	0.300	10.280	0.01197	0.740	10.714	858.641
	0.320	11.077	0.01207	0.770	11.429	917.791
	0.340	11.874	0.01217	0.800	12.143	975.875
	0.360	12.671	0.01227	0.830	12.857	1032.895
	0.380	13.999	0.01237	0.880	13.571	1131.798
	0.400	14.796	0.01247	0.910	14.286	1186.333
	0.420	16.389	0.01258	0.970	15.000	1303.161
	0.440	16.655	0.01268	0.980	15.714	1313.150
	0.460	17.186	0.01279	1.000	16.429	1343.551
	0.480	17.717	0.01290	1.020	17.143	1373.239
	0.500	18.249	0.01301	1.040	17.857	1402.219
	0.520	19.311	0.01313	1.080	18.571	1470.953
	0.540	19.842	0.01324	1.100	19.286	1498.156
	0.560	20.373	0.01336	1.120	20.000	1524.653
	0.580	20.905	0.01348	1.140	20.714	1550.437
	0.600	21.967	0.01361	1.180	21.429	1614.556
	0.620	22.764	0.01373	1.210	22.143	1657.911
	0.640	23.029	0.01386	1.220	22.857	1661.867
	0.660	23.295	0.01399	1.230	23.571	1665.469
	0.680	23.561	0.01412	1.240	24.286	1668.717
	0.700	23.826	0.01425	1.250	25.000	1671.609
	0.720	24.092	0.01439	1.260	25.714	1674.144
	0.740	24.357	0.01453	1.270	26.429	1676.326
	0.760	24.623	0.01467	1.280	27.143	1678.153
	0.780	24.889	0.01482	1.290	27.857	1679.626
	0.800	25.154	0.01497	1.300	28.571	1680.742
	0.820	25.685	0.01512	1.320	29.286	1699.074
	0.840	25.951	0.01527	1.330	30.000	1699.304
	0.860	26.482	0.01543	1.350	30.714	1716.392
	0.880	27.014	0.01559	1.370	31.429	1732.773
	0.900	27.279	0.01575	1.380	32.143	1731.581
	0.920	27.810	0.01592	1.400	32.857	1746.719

RATE OF STRAIN IS 2.987(PERCENT/MIN)

MAX COMP STRESS 1746.719

FIGURE 2F-24
UNCONFINED COMPRESSION TEST
BORING 109, TEST NO. 109-7R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

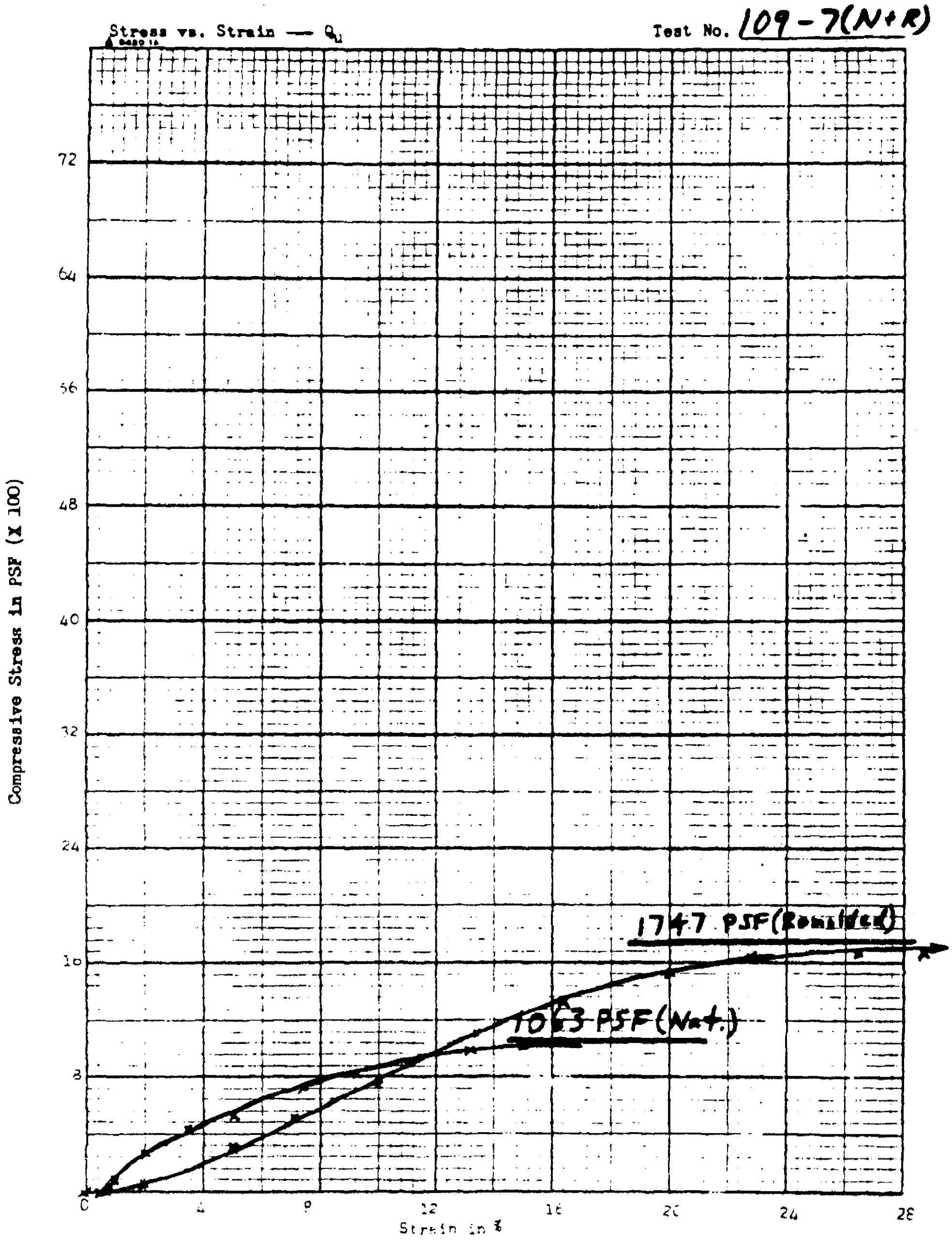


FIGURE 2F-25
COMPRESSIVE STRESS VS STRAIN
TEST NO. 109-7 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY FINE SAND ,TRACE CLAY

DATE 8/1/69

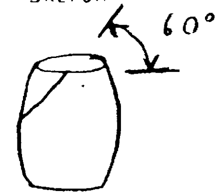
JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 109
SAMPLE ST9
DEPTH 22-24 FT.
TEST NO 109-9 N ✓

REV. 0 (1/82)

SKETCH



WATER CONTENT

SPECIMEN LOCATION	TOP	BOTTOM	MIDDLE
CONTAINER NO	26	19	36
WT CONTAINER + WET SOIL (G)	96.60	172.90	179.80
WT CONTAINER + DRY SOIL (G)	81.20	142.30	149.80
WT WATER (G)	15.40	30.60	30.00
WT CONTAINER (G)	15.80	16.60	16.70
WT DRY SOIL (G)	65.40	125.70	133.10
WATER CONTENT PERCENT	23.55	24.34	22.54

ELAPSED TIME (MINS) 4.60

VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
0.0	0.0	0.04276	0.0	0.0	0.0
0.020	1.250	0.04291	0.400	0.357	29.126
0.040	3.906	0.04307	0.500	0.714	90.692
0.060	3.906	0.04322	0.500	1.071	90.366
0.080	6.562	0.04338	0.600	1.429	151.267
0.100	9.218	0.04354	0.700	1.786	211.724
0.120	11.874	0.04370	0.800	2.143	271.738
0.140	14.530	0.04386	0.900	2.500	331.307
0.160	17.186	0.04402	1.000	2.857	390.433
0.180	19.842	0.04418	1.100	3.214	449.115
0.200	22.498	0.04434	1.200	3.571	507.354
0.220	22.498	0.04451	1.200	3.929	505.475
0.240	25.154	0.04468	1.300	4.286	563.049
0.260	25.154	0.04484	1.300	4.643	560.948
0.280	25.154	0.04501	1.300	5.000	558.847
0.300	27.810	0.04518	1.400	5.357	615.532
0.320	27.810	0.04535	1.400	5.714	613.210
0.340	27.810	0.04552	1.400	6.071	610.887
0.360	27.810	0.04570	1.400	6.429	608.564
0.380	27.810	0.04587	1.400	6.786	606.241
0.400	27.810	0.04605	1.400	7.143	603.919
0.420	27.810	0.04623	1.400	7.500	601.596
0.440	27.810	0.04641	1.400	7.857	599.273
0.460	30.466	0.04659	1.500	8.214	653.963

RATE OF STRAIN IS 1.786(PERCENT/MIN)

MAX COMP STRESS 653.963

IHC217I

TRACEBACK FOLLOWS- ROUTINE ISN REG. 14 REG. 15 REG. 0 REG. 1

FIGURE 2F-26
UNCONFINED COMPRESSION TEST
BORING 109 - TEST NO. 109-9N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

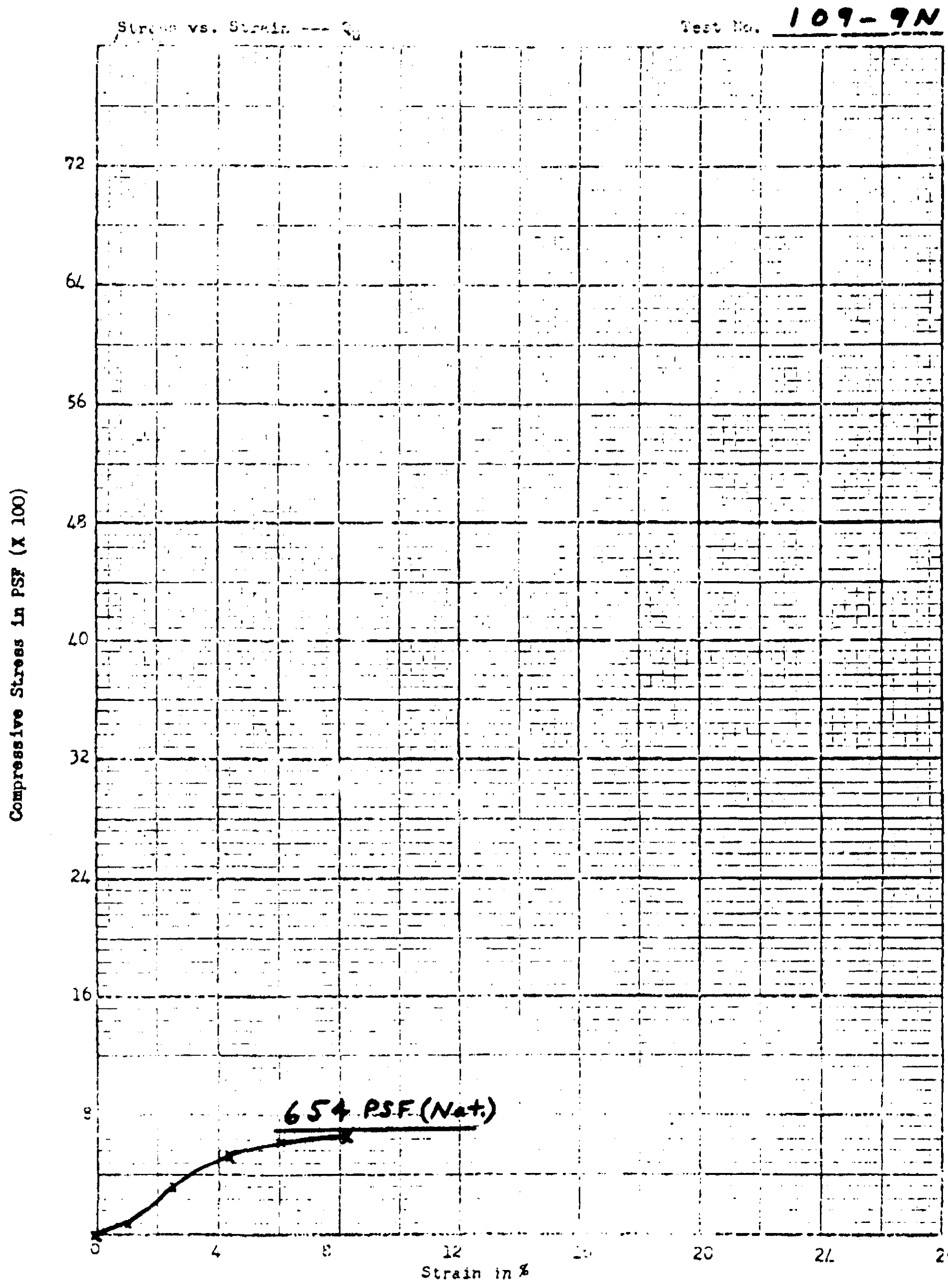
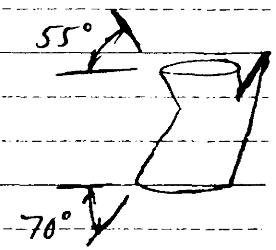


FIGURE 2F-27
COMPRESSIVE STRESS VS STRAIN
TEST NO. 109-9N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE | JOB SITE BEAVER VALLEY | J.O. NO 11799
INIT. LTH 5.6 | INIT. DIA 2.8 | BORING 110
VISUAL CLASSIFICATION BROWN CLAYEY SILT | SAMPLE ST2
DEPTH 7-9 FT.
DATE 8/4/69 | TEST BY KLP | TEST NO 110-2 N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP	BOTTOM
CONTAINER NO		57	51
WT CONTAINER + WET SOIL	(G)	175.80	109.20
WT CONTAINER + DRY SOIL	(G)	150.30	94.40
WT WATER	(G)	25.50	14.80
WT CONTAINER	(G)	17.10	16.80
WT DRY SOIL	(G)	133.20	77.60
WATER CONTENT	PERCENT	19.14	19.07

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
2.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	9.218	0.04291	0.700	0.357	214.804
	0.040	22.498	0.04307	1.200	0.714	522.387
	0.060	41.091	0.04322	1.900	1.071	950.650
	0.080	67.651	0.04338	2.900	1.429	1559.489
	0.100	91.555	0.04354	3.800	1.786	2102.886
	0.120	123.428	0.04370	5.000	2.143	2824.641
	0.140	147.332	0.04386	5.900	2.500	3359.395
	0.160	139.364	0.04402	5.600	2.857	3166.061
	0.180	173.893	0.04418	6.900	3.214	3935.954
	0.200	173.893	0.04434	6.900	3.571	3921.430
	0.220	168.581	0.04451	6.700	3.929	3787.558

RATE OF STRAIN IS 1.964(PERCENT/MIN) MAX COMP STRESS 3935.954

FIGURE 2F-28
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

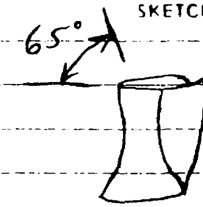
CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN CLAYEY SILT

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

J.O. NO 11700
BORING 110
SAMPLE ST2
DEPTH 7-9 FT.
TEST NO 110-2 R

DATE 8/4/65
TEST BY KLP

SKETCH



WATER CONTENT
NO WATER CONTENT SECTION

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
3.70						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	22.498	0.04291	1.200	0.357	524.266
	0.040	35.778	0.04307	1.700	0.714	830.741
	0.060	49.059	0.04322	2.200	1.071	1134.997
	0.080	59.683	0.04338	2.600	1.429	1375.808
	0.100	67.651	0.04354	2.900	1.786	1553.839
	0.120	80.931	0.04370	3.400	2.143	1852.106
	0.140	88.899	0.04386	3.700	2.500	2027.031
	0.160	96.867	0.04402	4.000	2.857	2200.625
	0.180	102.180	0.04418	4.200	3.214	2312.771
	0.200	110.148	0.04434	4.500	3.571	2483.925
	0.220	112.804	0.04451	4.600	3.929	2534.399 ←
	0.240	112.804	0.04468	4.600	4.286	2524.977
	0.260	112.804	0.04484	4.600	4.643	2515.556
	0.280	110.148	0.04501	4.500	5.000	2447.126
	0.300	107.492	0.04518	4.400	5.357	2379.139

RATE OF STRAIN IS 1.448(PERCENT/MIN)

MAX COMP STRESS 2534.399

FIGURE 2F-29
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-2R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

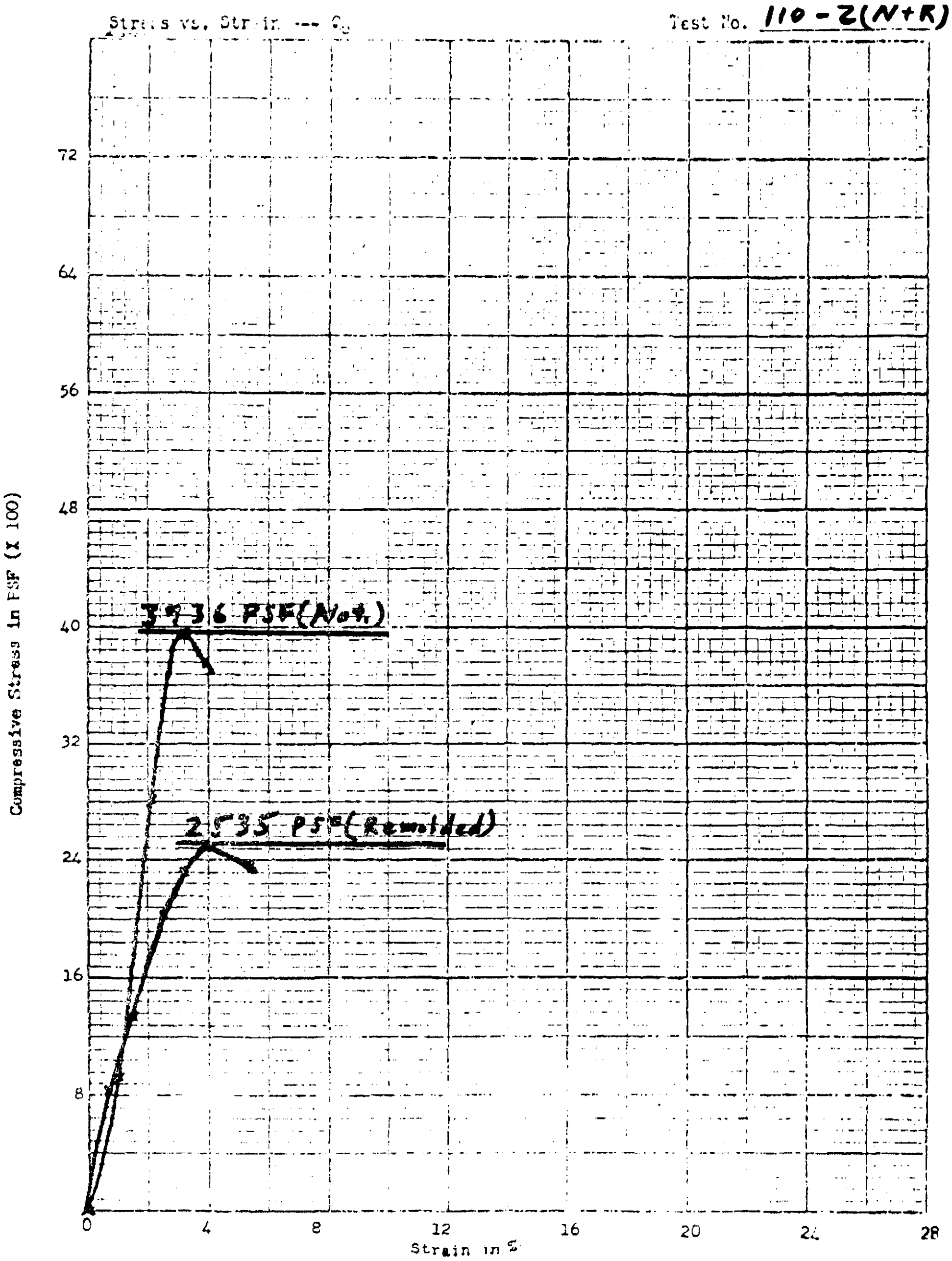


FIGURE 2F-30
COMPRESSIVE STRESS VS STRAIN
TEST NO. 110-2 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE — JOB SITE BEAVER VALLEY — J.O. NO 11700

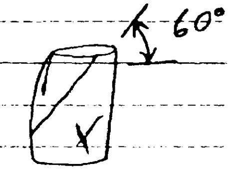
INIT. LTH 5.6 — INIT. DIA 2.8 — BORING 110

VISUAL CLASSIFICATION BROWN SILTY CLAY — SAMPLE ST6

DEPTH 15-17 FT.

DATE 8/4/69 — TEST BY KLP — TEST NO 110-6N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP	BOTTOM
CONTAINER NO		60	63
WT CONTAINER + WET SOIL	(G)	135.00	101.40
WT CONTAINER + DRY SOIL	(G)	113.30	87.30
WT WATER	(G)	21.70	14.10
WT CONTAINER	(G)	18.20	18.50
WT DRY SOIL	(G)	95.10	68.80
WATER CONTENT	PERCENT	22.82	20.49

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
6.20						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	22.498	0.04291	1.200	0.357	524.266
	0.040	41.091	0.04307	1.900	0.714	954.092
	0.060	59.683	0.04322	2.600	1.071	1380.793
	0.080	75.619	0.04338	3.200	1.429	1743.171
	0.100	88.899	0.04354	3.700	1.786	2041.881
	0.120	102.180	0.04370	4.200	2.143	2338.373
	0.140	112.804	0.04386	4.600	2.500	2572.085
	0.160	123.428	0.04402	5.000	2.857	2804.023
	0.180	128.740	0.04418	5.200	3.214	2913.949
	0.200	139.364	0.04434	5.600	3.571	3142.781
	0.220	147.332	0.04451	5.900	3.929	3310.164
	0.240	155.300	0.04468	6.200	4.286	3476.215
	0.260	163.268	0.04484	6.500	4.643	3640.937
	0.280	165.925	0.04501	6.600	5.000	3686.308
	0.300	176.549	0.04518	7.000	5.357	3907.598
	0.320	179.205	0.04535	7.100	5.714	3951.417
	0.340	181.861	0.04552	7.200	6.071	3994.793
	0.360	187.173	0.04570	7.400	6.429	4095.846
	0.380	192.485	0.04587	7.600	6.786	4196.012
	0.400	195.141	0.04605	7.700	7.143	4237.613
	0.420	200.453	0.04623	7.900	7.500	4336.223
	0.440	200.453	0.04641	7.900	7.857	4319.480
	0.460	200.453	0.04659	7.900	8.214	4302.742
	0.480	200.453	0.04677	7.900	8.571	4285.996
	0.500	192.485	0.04695	7.600	8.929	4099.551
	0.520	195.141	0.04714	7.700	9.286	4139.820
	0.540	197.797	0.04732	7.800	9.643	4179.645
	0.560	192.485	0.04751	7.600	10.000	4051.322

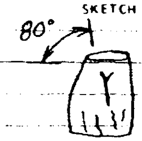
RATE OF STRAIN IS 1.613(PERCENT/MIN)

MAX COMP STRESS 4336.223

FIGURE 2F-31
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-6N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE	JOB SITE BEAVER VALLEY	J.O. NO 11700
INIT. LTH 5.6	INIT. DIA 2.8	BORING 110
VISUAL CLASSIFICATION BROWN SILTY CLAY		SAMPLE ST6
		DEPTH 15-17 FT.
DATE 8/4/69	TEST BY KLP	TEST NO 110-6 R

SKETCH



WATER CONTENT

SPECIMEN LOCATION		MIDDLE
CONTAINER NO		49
WT CONTAINER + WET SOIL	(G)	191.90
WT CONTAINER + DRY SOIL	(G)	162.70
WT WATER	(G)	29.20
WT CONTAINER	(G)	32.60
WT DRY SOIL	(G)	130.10
WATER CONTENT	PERCENT	22.44

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
8.20						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	11.874	0.04291	0.800	0.357	276.696
	0.040	14.530	0.04307	0.900	0.714	337.375
	0.060	17.186	0.04322	1.000	1.071	397.611
	0.080	19.842	0.04338	1.100	1.429	457.402
	0.100	22.498	0.04354	1.200	1.786	516.750
	0.120	25.154	0.04370	1.300	2.143	575.654
	0.140	30.466	0.04386	1.500	2.500	694.676
	0.160	33.122	0.04402	1.600	2.857	752.471
	0.180	35.778	0.04418	1.700	3.214	809.823
	0.200	41.091	0.04434	1.900	3.571	926.627
	0.220	43.747	0.04451	2.000	3.929	982.869
	0.240	46.403	0.04468	2.100	4.286	1038.667
	0.260	49.059	0.04484	2.200	4.643	1094.023
	0.280	54.371	0.04501	2.400	5.000	1207.942
	0.300	57.027	0.04518	2.500	5.357	1262.198
	0.320	62.339	0.04535	2.700	5.714	1374.555
	0.340	64.995	0.04552	2.800	6.071	1427.691
	0.360	67.651	0.04570	2.900	6.429	1480.385
	0.380	72.963	0.04587	3.100	6.786	1590.533
	0.400	75.619	0.04605	3.200	7.143	1642.117
	0.420	78.275	0.04623	3.300	7.500	1693.257
	0.440	83.587	0.04641	3.500	7.857	1801.187
	0.460	86.243	0.04659	3.600	8.214	1851.218
	0.480	88.899	0.04677	3.700	8.571	1900.806
	0.500	94.211	0.04695	3.900	8.929	2006.517
	0.520	99.523	0.04714	4.100	9.286	2111.342
	0.540	102.180	0.04732	4.200	9.643	2159.155
	0.560	104.836	0.04751	4.300	10.000	2206.523
	0.580	107.492	0.04770	4.400	10.357	2253.448
	0.600	112.804	0.04789	4.600	10.714	2355.389
	0.620	115.460	0.04808	4.700	11.071	2401.205
	0.640	118.116	0.04828	4.800	11.429	2446.577
	0.660	123.428	0.04847	5.000	11.786	2546.300
	0.680	128.740	0.04867	5.200	12.143	2645.135
	0.700	128.740	0.04887	5.200	12.500	2634.382
	0.720	128.740	0.04907	5.200	12.857	2623.630
	0.740	136.708	0.04927	5.500	13.214	2774.597
	0.760	136.708	0.04947	5.500	13.571	2763.178
	0.780	139.364	0.04968	5.600	13.929	2805.273
	0.800	142.020	0.04989	5.700	14.286	2846.824
	0.820	147.332	0.05010	5.900	14.643	2941.000
	0.840	147.332	0.05031	5.900	15.000	2928.695
	0.860	147.332	0.05052	5.900	15.357	2916.390
	0.880	149.988	0.05073	6.000	15.714	2956.438
	0.900	152.644	0.05095	6.100	16.071	2996.042
	0.920	152.644	0.05117	6.100	16.429	2983.293
	0.940	155.300	0.05139	6.200	16.786	3022.232
	0.960	155.300	0.05161	6.200	17.143	3009.261

RATE OF STRAIN IS 2.09L(PERCENT/MIN)

MAX COMP STRESS 3022.232

FIGURE 2F-32
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-6R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

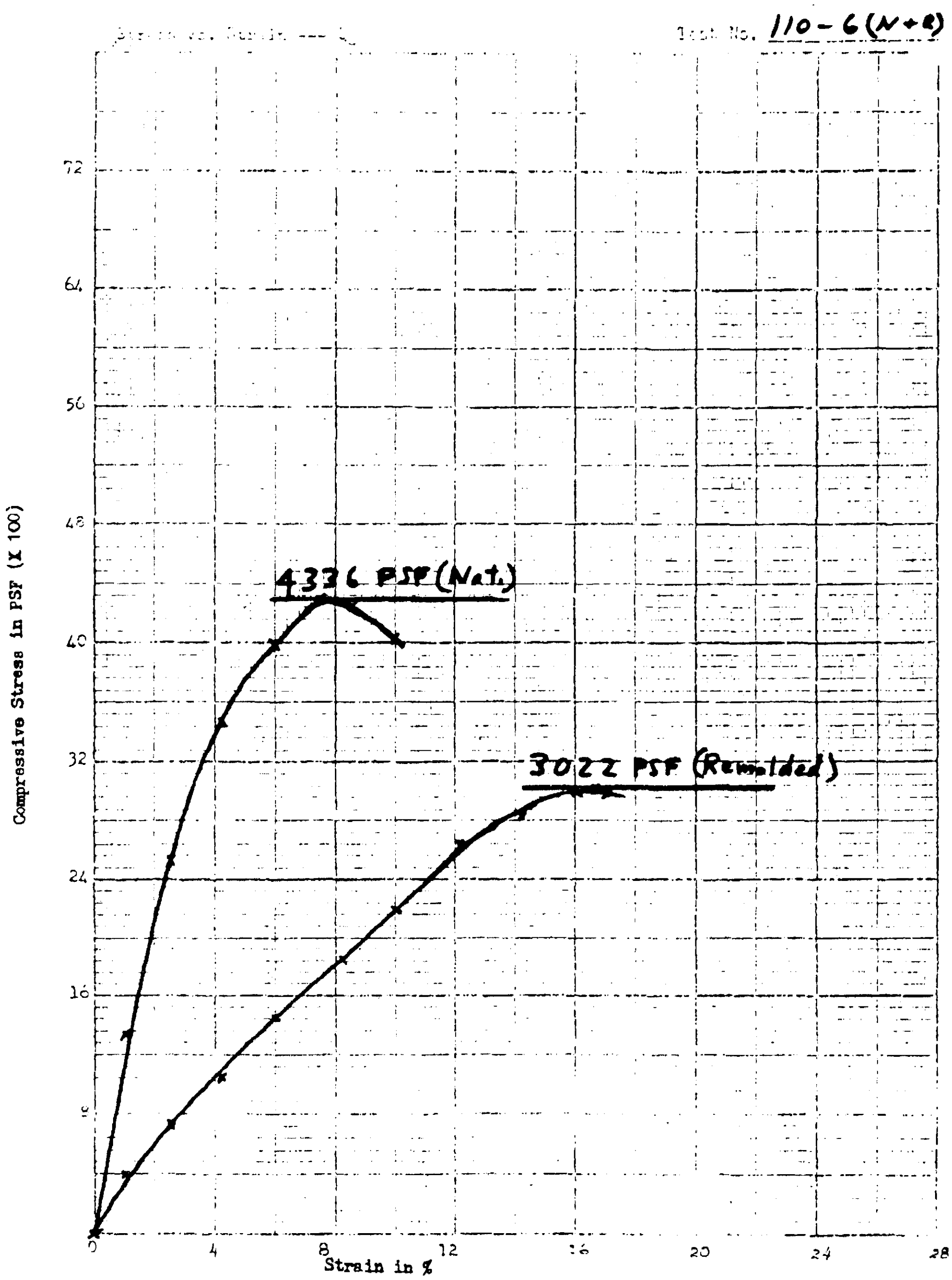
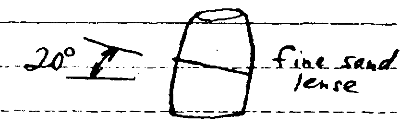


FIGURE 2F-33
COMPRESSIVE STRESS VS STRAIN
TEST NO. 110-6 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE | JOB SITE BEAVER VALLEY | J.O. NO 11700
INIT. LTH 5.6 | INIT. DIA 2.8 | BORING 110
VISUAL CLASSIFICATION BROWN SANDY CLAYEY SILT | SAMPLE ST9
DEPTH 21-22 FT.
DATE 8/4/69 | TEST BY KLP | TEST NO 110-9 N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP
CONTAINER NO		39
WT CONTAINER + WET SOIL	(G)	193.40
WT CONTAINER + DRY SOIL	(G)	159.40
WT WATER	(G)	34.00
WT CONTAINER	(G)	16.40
WT DRY SOIL	(G)	143.00
WATER CONTENT	PERCENT	23.78

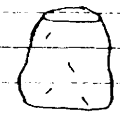
ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
2.70						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	6.562	0.04291	0.600	0.357	152.911
	0.040	19.842	0.04307	1.100	0.714	460.716
	0.060	22.498	0.04322	1.200	1.071	520.508
	0.080	30.466	0.04338	1.500	1.429	702.310
	0.100	33.122	0.04354	1.600	1.786	760.771
	0.120	41.091	0.04370	1.900	2.143	940.354
	0.140	49.059	0.04386	2.200	2.500	1118.607
	0.160	51.715	0.04402	2.300	2.857	1174.849
	0.180	54.371	0.04418	2.400	3.214	1230.648
	0.200	54.371	0.04434	2.400	3.571	1226.107
	0.220	54.371	0.04451	2.400	3.929	1221.566
	0.240	57.027	0.04468	2.500	4.286	1276.477
	0.260	59.683	0.04484	2.600	4.643	1330.945
	0.280	59.683	0.04501	2.600	5.000	1325.960
	0.300	59.683	0.04518	2.600	5.357	1320.975
	0.320	59.683	0.04535	2.600	5.714	1315.990
	0.340	59.683	0.04552	2.600	6.071	1311.005
	0.360	59.683	0.04570	2.600	6.429	1306.021
	0.380	59.683	0.04587	2.600	6.786	1301.036
	0.400	59.683	0.04605	2.600	7.143	1296.051

RATE OF STRAIN IS 2.646(PERCENT/MIN) | MAX COMP STRESS 1330.945

FIGURE 2F-34
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-9N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE	JOB SITE BEAVER VALLEY	J.O. NO 11700
INIT. LTH 5.6	INIT. DIA 2.8	BORING 110
VISUAL CLASSIFICATION BROWN SANDY CLAYEY SILT		SAMPLE ST9
		DEPTH 21-22 FT.
DATE 8/4/69	TEST BY KLP	TEST NO 110-9 R

SKETCH



WATER CONTENT

SPECIMEN LOCATION		MIDDLE
CONTAINER NO		52
WT CONTAINER + WET SOIL	(G)	184.20
WT CONTAINER + DRY SOIL	(G)	149.00
WT WATER	(G)	35.20
WT CONTAINER	(G)	17.70
WT DRY SOIL	(G)	131.30
WATER CONTENT	PERCENT	26.81

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
4.90						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.300	0.357	0.0
	0.040	0.0	0.04307	0.300	0.714	0.0
	0.060	0.0	0.04322	0.300	1.071	0.0
	0.080	1.250	0.04338	0.400	1.429	28.813
	0.100	1.250	0.04354	0.400	1.786	28.708
	0.120	1.250	0.04370	0.400	2.143	28.604
	0.140	1.250	0.04386	0.400	2.500	28.500
	0.160	3.906	0.04402	0.500	2.857	88.735
	0.180	3.906	0.04418	0.500	3.214	88.409
	0.200	3.906	0.04434	0.500	3.571	88.082
	0.220	3.906	0.04451	0.500	3.929	87.756
	0.240	6.562	0.04468	0.600	4.286	146.882
	0.260	6.562	0.04484	0.600	4.643	146.334
	0.280	6.562	0.04501	0.600	5.000	145.786
	0.300	9.218	0.04518	0.700	5.357	204.025
	0.320	9.218	0.04535	0.700	5.714	203.255
	0.340	9.218	0.04552	0.700	6.071	202.485
	0.360	9.218	0.04570	0.700	6.429	201.715
	0.380	11.874	0.04587	0.800	6.786	258.845
	0.400	11.874	0.04605	0.800	7.143	257.853
	0.420	11.874	0.04623	0.800	7.500	256.861
	0.440	14.530	0.04641	0.900	7.857	313.104
	0.460	14.530	0.04659	0.900	8.214	311.890
	0.480	14.530	0.04677	0.900	8.571	310.677
	0.500	17.186	0.04695	1.000	8.929	366.031
	0.520	17.186	0.04714	1.000	9.286	364.596
	0.540	19.842	0.04732	1.100	9.643	419.285
	0.560	19.842	0.04751	1.100	10.000	417.628
	0.580	19.842	0.04770	1.100	10.357	415.970
	0.600	19.842	0.04789	1.100	10.714	414.313
	0.620	19.842	0.04808	1.100	11.071	412.656
	0.640	19.842	0.04828	1.100	11.429	410.999
	0.660	19.842	0.04847	1.100	11.786	409.341
	0.680	22.498	0.04867	1.200	12.143	462.256
	0.700	22.498	0.04887	1.200	12.500	460.377
	0.720	22.498	0.04907	1.200	12.857	458.498
	0.740	22.498	0.04927	1.200	13.214	456.619
	0.760	22.498	0.04947	1.200	13.571	454.740
	0.780	22.498	0.04968	1.200	13.929	452.861
	0.800	25.154	0.04989	1.300	14.286	504.222

RATE OF STRAIN IS 2.915(PERCENT/MIN) MAX COMP STRESS 504.222

REV. 0 (1/82)

FIGURE 2F-35
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-9R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

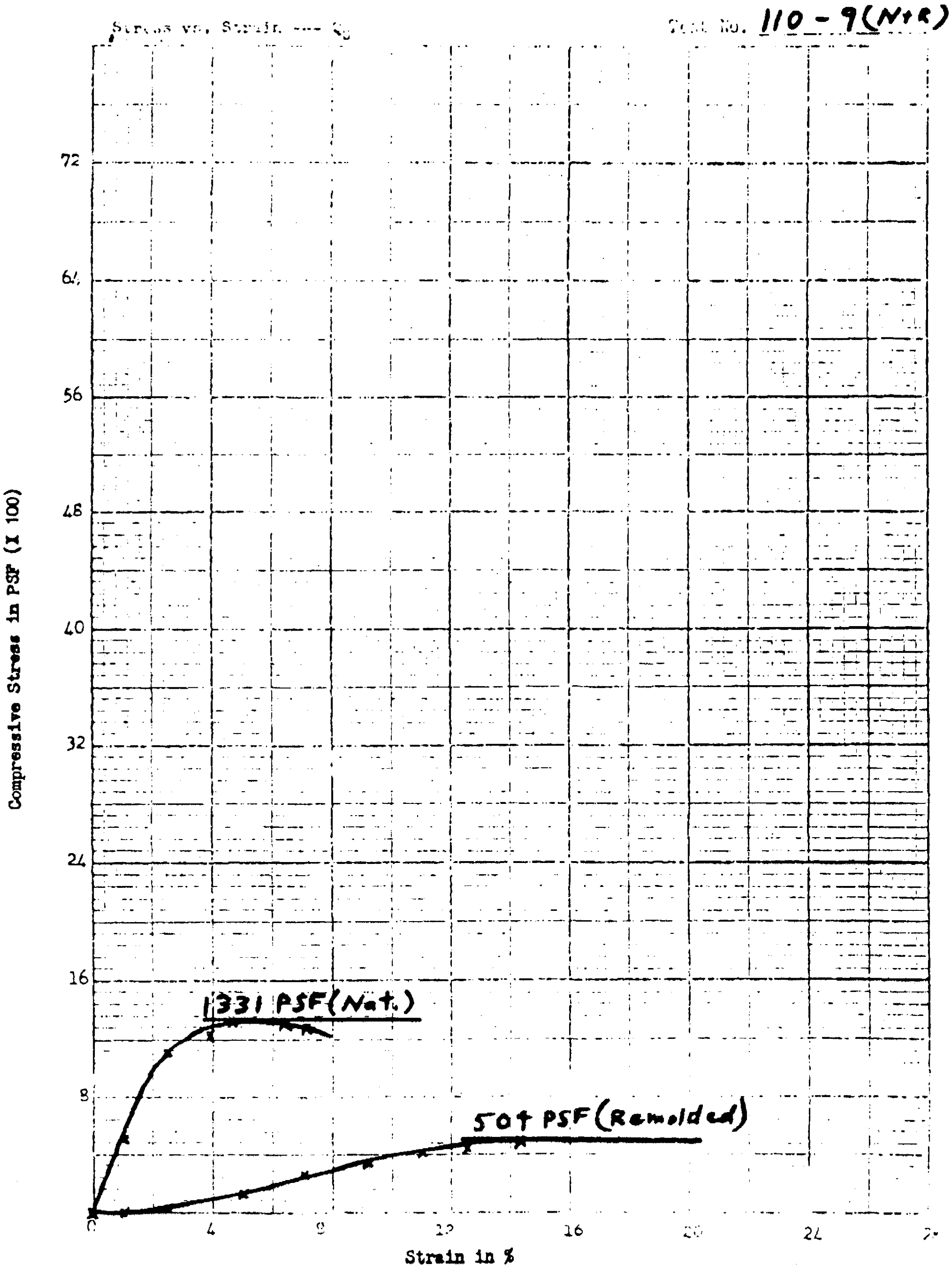


FIGURE 2F-36
COMPRESSIVE STRESS VS STRAIN
TEST NO. 110-9 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY SAND WITH CLAY LAYERS

DATE 8/5/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 110
SAMPLE ST11
DEPTH 27-28.5 FT.
TEST NO 110-11 N

SKETCH

WATER CONTENT

SPECIMEN LOCATION	TOP	BOTTOM	MIDDLE
CONTAINER NO	24	67	56
WT CONTAINER + WET SOIL (G)	163.30	127.60	180.70
WT CONTAINER + DRY SOIL (G)	135.00	109.30	148.00
WT WATER (G)	28.30	18.30	32.70
WT CONTAINER (G)	16.70	17.60	17.50
WT DRY SOIL (G)	118.30	91.70	130.50
WATER CONTENT PERCENT	23.92	19.96	25.06

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
4.10						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	6.562	0.04291	0.600	0.357	152.911
	0.040	11.874	0.04307	0.800	0.714	275.704
	0.060	19.842	0.04322	1.100	1.071	459.059
	0.080	25.154	0.04338	1.300	1.429	579.856
	0.100	33.122	0.04354	1.600	1.786	760.771
	0.120	38.434	0.04370	1.800	2.143	879.571
	0.140	43.747	0.04386	2.000	2.500	997.484
	0.160	49.059	0.04402	2.200	2.857	1114.510
	0.180	51.715	0.04418	2.300	3.214	1170.530
	0.200	54.371	0.04434	2.400	3.571	1226.107
	0.220	57.027	0.04451	2.500	3.929	1281.240
	0.240	59.683	0.04468	2.600	4.286	1335.929
	0.280	59.683	0.04501	2.600	5.000	1325.960
	0.300	59.683	0.04518	2.600	5.357	1320.975
	0.320	59.683	0.04535	2.600	5.714	1315.990
	0.340	59.683	0.04552	2.600	6.071	1311.005
	0.360	57.027	0.04570	2.500	6.429	1247.899
	0.380	57.027	0.04587	2.500	6.786	1243.136
	0.400	54.371	0.04605	2.400	7.143	1180.696
	0.420	51.715	0.04623	2.300	7.500	1118.698

RATE OF STRAIN IS 1.829(PERCENT/MIN)

MAX COMP STRESS 1335.929

FIGURE 2F-37
UNCONFINED COMPRESSION TEST
BORING 110 - TEST NO. 110-11N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

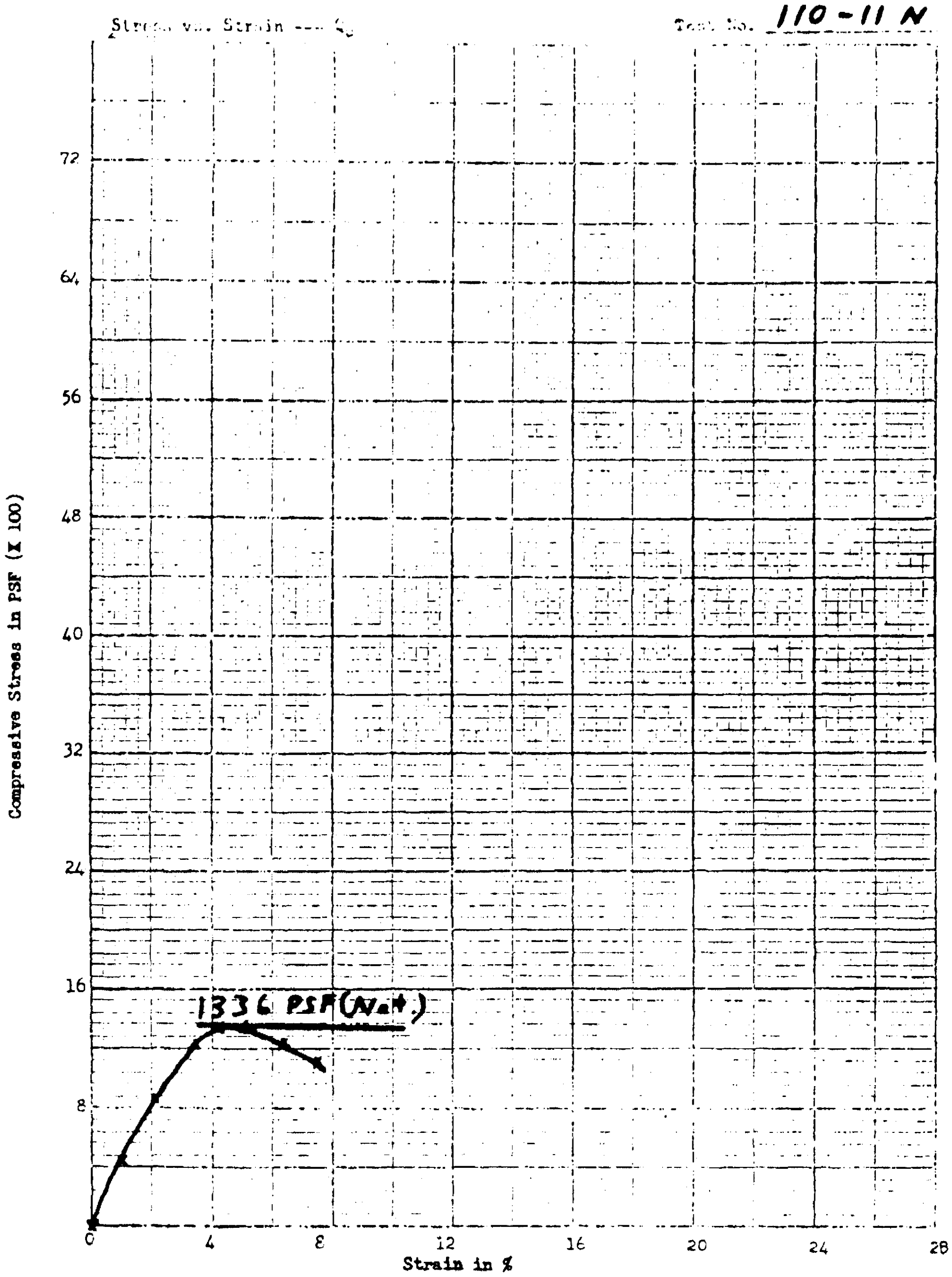


FIGURE 2F-38
COMPRESSIVE STRESS VS STRAIN
TEST NO. 110-11N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

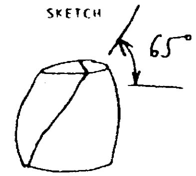
DATE 7/12/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.9

TEST BY KLP

J.O. NO 11700
BORING 111
SAMPLE ST1
DEPTH 7 FT.
TEST NO 111-1N

SKETCH



WATER CONTENT

SPECIMEN LOCATION	TOP	MIDDLE	BOTTOM
CONTAINER NO	106	105	107
WT CONTAINER + WET SOIL (G)	63.10	41.10	52.00
WT CONTAINER + DRY SOIL (G)	53.10	34.90	45.20
WT WATER (G)	10.00	6.20	6.80
WT CONTAINER (G)	11.40	11.40	11.40
WT DRY SOIL (G)	41.70	23.50	33.80
WATER CONTENT PERCENT	23.98	26.38	20.12

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
9.70						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.300	0.357	0.0
	0.040	1.250	0.04307	0.400	0.714	29.022
	0.060	3.906	0.04322	0.500	1.071	90.366
	0.080	6.562	0.04338	0.600	1.429	151.267
	0.100	10.015	0.04354	0.730	1.786	230.026
	0.120	13.202	0.04370	0.850	2.143	302.129
	0.140	17.186	0.04386	1.000	2.500	391.859
	0.160	20.639	0.04402	1.130	2.857	468.875
	0.180	22.498	0.04418	1.200	3.214	509.234
	0.200	26.482	0.04434	1.350	3.571	597.198
	0.220	30.466	0.04451	1.500	3.929	684.498
	0.240	33.122	0.04468	1.600	4.286	741.406
	0.260	35.778	0.04484	1.700	4.643	797.870
	0.280	37.638	0.04501	1.770	5.000	836.188
	0.300	39.762	0.04518	1.850	5.357	880.073
	0.320	42.419	0.04535	1.950	5.714	935.318
	0.340	45.075	0.04552	2.050	6.071	990.117
	0.360	49.059	0.04570	2.200	6.429	1073.535
	0.380	50.387	0.04587	2.250	6.786	1098.387
	0.400	53.043	0.04605	2.350	7.143	1151.857
	0.420	54.371	0.04623	2.400	7.500	1176.154
	0.440	58.355	0.04641	2.550	7.857	1257.464
	0.460	59.683	0.04659	2.600	8.214	1281.096
	0.480	59.683	0.04677	2.600	8.571	1276.112
	0.500	62.339	0.04695	2.700	8.929	1327.696
	0.520	63.667	0.04714	2.750	9.286	1350.662
	0.540	64.995	0.04732	2.800	9.643	1373.407
	0.560	67.651	0.04751	2.900	10.000	1423.881
	0.580	68.979	0.04770	2.950	10.357	1446.072
	0.600	70.307	0.04789	3.000	10.714	1468.040
	0.620	70.307	0.04808	3.000	11.071	1462.168
	0.640	70.307	0.04828	3.000	11.429	1456.296
	0.660	70.307	0.04847	3.000	11.786	1450.424
	0.680	72.963	0.04867	3.100	12.143	1499.123
	0.700	75.619	0.04887	3.200	12.500	1547.380
	0.720	75.619	0.04907	3.200	12.857	1541.064
	0.740	75.619	0.04927	3.200	13.214	1534.748
	0.760	75.619	0.04947	3.200	13.571	1528.432
	0.780	75.619	0.04968	3.200	13.929	1522.116
	0.800	76.416	0.04989	3.230	14.286	1531.772
	0.820	75.619	0.05010	3.200	14.643	1509.485
	0.840	74.291	0.05031	3.150	15.000	1476.770
	0.860	74.291	0.05052	3.150	15.357	1470.565
	0.880	75.066	0.05073	3.180	15.714	1490.066
	0.900	75.619	0.05095	3.200	16.071	1484.221
	0.920	75.619	0.05117	3.200	16.429	1477.906
	0.940	75.619	0.05139	3.200	16.786	1471.590

RATE OF STRAIN IS 1.730(PERCENT/MIN)

MAX COMP STRESS 1547.380

FIGURE 2F-39
UNCONFINED COMPRESSION TEST
BORING 111 - TEST NO. 111-1N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

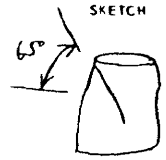
DATE 7/12/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.9

TEST BY KLP

J.O. NO 11700
BORING 111
SAMPLE ST1
DEPTH 7 FT.
TEST NO 111-1R

SKETCH



WATER CONTENT

SPECIMEN LOCATION	TOP	BOTTOM	COMPLETE
CONTAINER NO	108	109	13
WT CONTAINER + WET SOIL (G)	30.80	60.30	1171.00
WT CONTAINER + DRY SOIL (G)	27.30	51.30	963.00
WT WATER (G)	3.50	9.00	208.00
WT CONTAINER (G)	11.50	11.30	16.00
WT DRY SOIL (G)	15.80	40.00	947.00
WATER CONTENT PERCENT	22.15	22.50	21.96

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
10.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.300	0.357	0.0
	0.040	0.0	0.04307	0.350	0.714	0.0
	0.060	1.250	0.04322	0.400	1.071	28.917
	0.080	1.250	0.04338	0.400	1.429	28.813
	0.100	2.578	0.04354	0.450	1.786	59.211
	0.120	3.906	0.04370	0.500	2.143	89.387
	0.140	6.562	0.04386	0.600	2.500	149.623
	0.160	7.890	0.04402	0.650	2.857	179.245
	0.180	10.546	0.04418	0.750	3.214	238.703
	0.200	11.874	0.04434	0.800	3.571	267.771
	0.220	14.530	0.04451	0.900	3.929	326.453
	0.240	17.186	0.04468	1.000	4.286	384.692
	0.260	18.514	0.04484	1.050	4.643	412.871
	0.280	21.170	0.04501	1.150	5.000	470.334
	0.300	22.498	0.04518	1.200	5.357	497.959
	0.320	25.154	0.04535	1.300	5.714	554.645
	0.340	27.810	0.04552	1.400	6.071	610.887
	0.360	29.138	0.04570	1.450	6.429	637.625
	0.380	31.263	0.04587	1.530	6.786	681.511
	0.400	33.919	0.04605	1.630	7.143	736.577
	0.420	35.778	0.04623	1.700	7.500	773.964
	0.440	38.434	0.04641	1.800	7.857	828.209
	0.460	40.294	0.04659	1.870	8.214	864.908
	0.480	42.419	0.04677	1.950	8.571	906.975
	0.500	43.747	0.04695	2.000	8.929	931.716
	0.520	46.403	0.04714	2.100	9.286	984.409
	0.540	49.059	0.04732	2.200	9.643	1036.658
	0.560	50.918	0.04751	2.270	10.000	1071.693
	0.580	53.574	0.04770	2.370	10.357	1123.121
	0.600	54.902	0.04789	2.420	10.714	1146.376
	0.620	57.027	0.04808	2.500	11.071	1185.981
	0.640	59.683	0.04828	2.600	11.429	1236.233
	0.660	62.339	0.04847	2.700	11.786	1286.042
	0.680	64.198	0.04867	2.770	12.143	1319.036
	0.700	64.995	0.04887	2.800	12.500	1329.979
	0.720	67.651	0.04907	2.900	12.857	1378.679
	0.740	70.307	0.04927	3.000	13.214	1426.935
	0.760	71.635	0.04947	3.050	13.571	1447.905
	0.780	72.963	0.04968	3.100	13.929	1468.653
	0.800	74.291	0.04989	3.150	14.286	1489.180
	0.820	76.947	0.05010	3.250	14.643	1535.994
	0.840	78.275	0.05031	3.300	15.000	1555.966
	0.860	80.931	0.05052	3.400	15.357	1602.004
	0.880	83.587	0.05073	3.500	15.714	1647.598
	0.900	83.587	0.05095	3.500	16.071	1640.616
	0.920	83.587	0.05117	3.500	16.429	1633.635
	0.940	86.243	0.05139	3.600	16.786	1678.342

RATE OF STRAIN IS 1.6791PERCENT/MIN)

MAX COMP STRESS 1678.342

FIGURE 2F-40
UNCONFINED COMPRESSION TEST
BORING 111 - TEST NO. 111-1R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

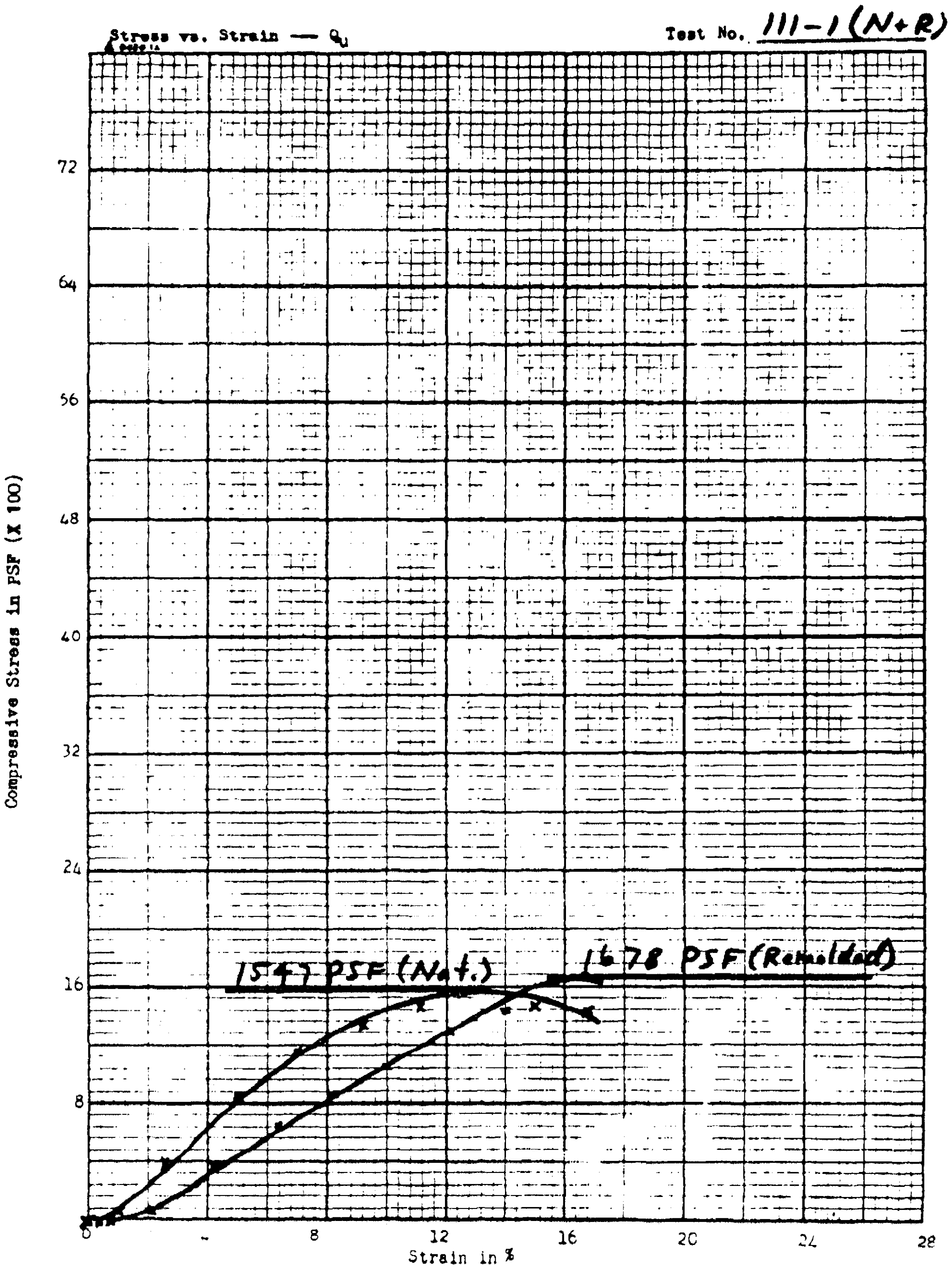


FIGURE 2F-41
COMPRESSIVE STRESS VS STRAIN
TEST NO. 111-1 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

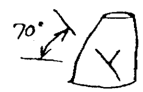
DATE 7/12/78

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 111
SAMPLE ST2
DEPTH 14 FT.
TEST NO 111-2N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		MIDDLE	TOP	BOTTOM
CONTAINER NO		110	111	112
WT CONTAINER + WET SOIL	(G)	38.20	64.10	77.90
WT CONTAINER + DRY SOIL	(G)	32.70	54.00	65.20
WT WATER	(G)	5.50	10.10	12.70
WT CONTAINER	(G)	11.40	11.70	11.40
WT DRY SOIL	(G)	21.30	42.30	53.80
WATER CONTENT	PERCENT	25.82	23.88	23.61

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
9.70						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	2.578	0.04291	0.450	0.357	60.072
	0.040	0.0	0.04307	0.200	0.714	0.0
	0.060	19.842	0.04322	1.100	1.071	459.059
	0.080	31.794	0.04338	1.550	1.429	732.923
	0.100	43.747	0.04354	2.000	1.786	1004.792
	0.120	54.371	0.04370	2.400	2.143	1244.271
	0.140	67.651	0.04386	2.900	2.500	1542.538
	0.160	75.619	0.04402	3.200	2.857	1717.997
	0.180	83.587	0.04418	3.500	3.214	1891.945
	0.200	91.555	0.04434	3.800	3.571	2064.652
	0.220	96.867	0.04451	4.000	3.929	2176.354
	0.240	102.190	0.04469	4.200	4.286	2287.168
	0.260	107.492	0.04484	4.400	4.643	2397.095
	0.280	112.804	0.04501	4.600	5.000	2506.134
	0.300	119.444	0.04518	4.850	5.357	2643.679
	0.320	122.100	0.04535	4.950	5.714	2692.269
	0.340	127.412	0.04552	5.150	6.071	2798.757
	0.360	131.396	0.04570	5.300	6.429	2875.297
	0.380	134.052	0.04587	5.400	6.786	2922.223
	0.400	134.052	0.04605	5.400	7.143	2911.026
	0.420	136.708	0.04623	5.500	7.500	2957.286
	0.440	142.020	0.04641	5.700	7.857	3060.336
	0.460	146.004	0.04659	5.850	8.214	3133.992
	0.480	148.660	0.04677	5.950	8.571	3178.588
	0.500	149.988	0.04695	6.000	8.929	3194.456
	0.520	152.644	0.04714	6.100	9.286	3239.275
	0.540	155.300	0.04732	6.200	9.643	3281.651
	0.560	159.284	0.04751	6.350	10.000	3352.534
	0.580	159.284	0.04770	6.350	10.357	3339.231
	0.600	159.284	0.04789	6.350	10.714	3325.927
	0.620	161.940	0.04808	6.450	11.071	3367.861
	0.640	164.596	0.04828	6.550	11.429	3409.351
	0.660	165.925	0.04847	6.600	11.786	3423.000
	0.680	168.581	0.04867	6.700	12.143	3463.714
	0.700	169.909	0.04887	6.750	12.500	3476.809
	0.720	169.909	0.04907	6.750	12.857	3462.619
	0.740	169.909	0.04927	6.750	13.214	3448.427
	0.760	168.581	0.04947	6.700	13.571	3407.394
	0.780	168.581	0.04968	6.700	13.929	3393.314
	0.800	165.925	0.04989	6.600	14.286	3325.992
	0.820	164.596	0.05010	6.550	14.643	3285.625
	0.840	164.596	0.05031	6.550	15.000	3271.877
	0.860	163.268	0.05052	6.500	15.357	3231.843
	0.880	157.956	0.05073	6.300	15.714	3113.498
	0.900	155.300	0.05095	6.200	16.071	3048.174
	0.920	151.316	0.05117	6.050	16.429	2957.338
	0.940	151.316	0.05139	6.050	16.786	2944.700
	0.960	151.316	0.05161	6.050	17.143	2932.062

RATE OF STRAIN IS 1.767(PERCENT/MIN)

MAX COMP STRESS 3476.809

IHC215I CONVERT - ILLEGAL DECIMAL CHARACTER U

TRACEBACK FOLLOWS- ROUTINE	ISN	REG. 14	REG. 15	REG. 0	REG. 1
IBCOM		000500CC	00050C60	00000051	0005009C
MAIN		00008702	01C4EDA8	F0000006	00066FF8

ENTRY POINT= 01C4EDA8

FIGURE 2F-42
UNCONFINED COMPRESSION TEST
BORING 111 - TEST NO. 111-2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

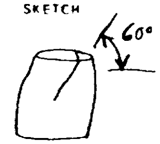
DATE 7/12/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 111
SAMPLE ST2
DEPTH 14 FT.
TEST NO 111-2R

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP	BOTTOM	COMPLETE
CONTAINER NO		113	114	19
WT CONTAINER + WET SOIL	(G)	54.00	64.40	1180.00
WT CONTAINER + DRY SOIL	(G)	45.60	54.50	960.00
WT WATER	(G)	8.40	9.90	220.00
WT CONTAINER	(G)	11.40	11.40	17.00
WT DRY SOIL	(G)	34.20	43.10	943.00
WATER CONTENT	PERCENT	24.56	22.97	23.33

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
9.70						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.300	0.357	0.0
	0.040	0.0	0.04307	0.350	0.714	0.0
	0.060	1.250	0.04322	0.400	1.071	28.917
	0.080	3.906	0.04338	0.500	1.429	90.040
	0.100	5.234	0.04354	0.550	1.786	120.216
	0.120	6.562	0.04370	0.600	2.143	150.171
	0.140	9.218	0.04386	0.700	2.500	210.184
	0.160	11.974	0.04402	0.800	2.857	269.754
	0.180	13.202	0.04418	0.850	3.214	298.821
	0.200	15.858	0.04434	0.950	3.571	357.615
	0.220	18.514	0.04451	1.050	3.929	415.964
	0.240	21.170	0.04468	1.150	4.286	473.870
	0.260	22.498	0.04484	1.200	4.643	501.717
	0.280	25.154	0.04501	1.300	5.000	558.847
	0.300	26.482	0.04518	1.350	5.357	586.139
	0.320	29.138	0.04535	1.450	5.714	642.492
	0.340	31.794	0.04552	1.550	6.071	698.402
	0.360	33.122	0.04570	1.600	6.429	724.807
	0.380	37.106	0.04587	1.750	6.786	808.890
	0.400	37.106	0.04605	1.750	7.143	805.791
	0.420	42.419	0.04623	1.950	7.500	917.603
	0.440	43.747	0.04641	2.000	7.857	942.677
	0.460	47.731	0.04659	2.150	8.214	1024.542
	0.480	51.715	0.04677	2.300	8.571	1105.740
	0.500	53.043	0.04695	2.350	8.929	1129.706
	0.520	55.699	0.04714	2.450	9.286	1181.622
	0.540	59.683	0.04732	2.600	9.643	1261.157
	0.560	63.667	0.04751	2.750	10.000	1340.027
	0.580	66.323	0.04770	2.850	10.357	1390.391
	0.600	68.979	0.04789	2.950	10.714	1440.311
	0.620	71.635	0.04808	3.050	11.071	1489.786
	0.640	74.291	0.04828	3.150	11.429	1538.819
	0.660	76.947	0.04847	3.250	11.786	1587.408
	0.680	79.603	0.04867	3.350	12.143	1635.553
	0.700	80.931	0.04887	3.400	12.500	1656.080
	0.720	84.915	0.04907	3.550	12.857	1730.512
	0.740	86.243	0.04927	3.600	13.214	1750.374
	0.760	90.227	0.04947	3.750	13.571	1823.698
	0.780	91.555	0.04968	3.800	13.929	1842.893
	0.800	94.211	0.04989	3.900	14.286	1888.487
	0.820	96.867	0.05010	4.000	14.643	1933.638
	0.840	99.523	0.05031	4.100	15.000	1978.344
	0.860	103.508	0.05052	4.250	15.357	2048.895
	0.880	103.509	0.05073	4.250	15.714	2040.250
	0.900	110.148	0.05095	4.500	16.071	2161.934
	0.920	111.476	0.05117	4.550	16.429	2178.689
	0.940	115.460	0.05139	4.700	16.786	2246.911
	0.960	116.768	0.05161	4.750	17.143	2263.001

RATE OF STRAIN IS 1.767(PERCENT/MIN)

MAX COMP STRESS 2263.001

FIGURE 2F-43
UNCONFINED COMPRESSION TEST
BORING 111 - TEST NO. 111-2R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

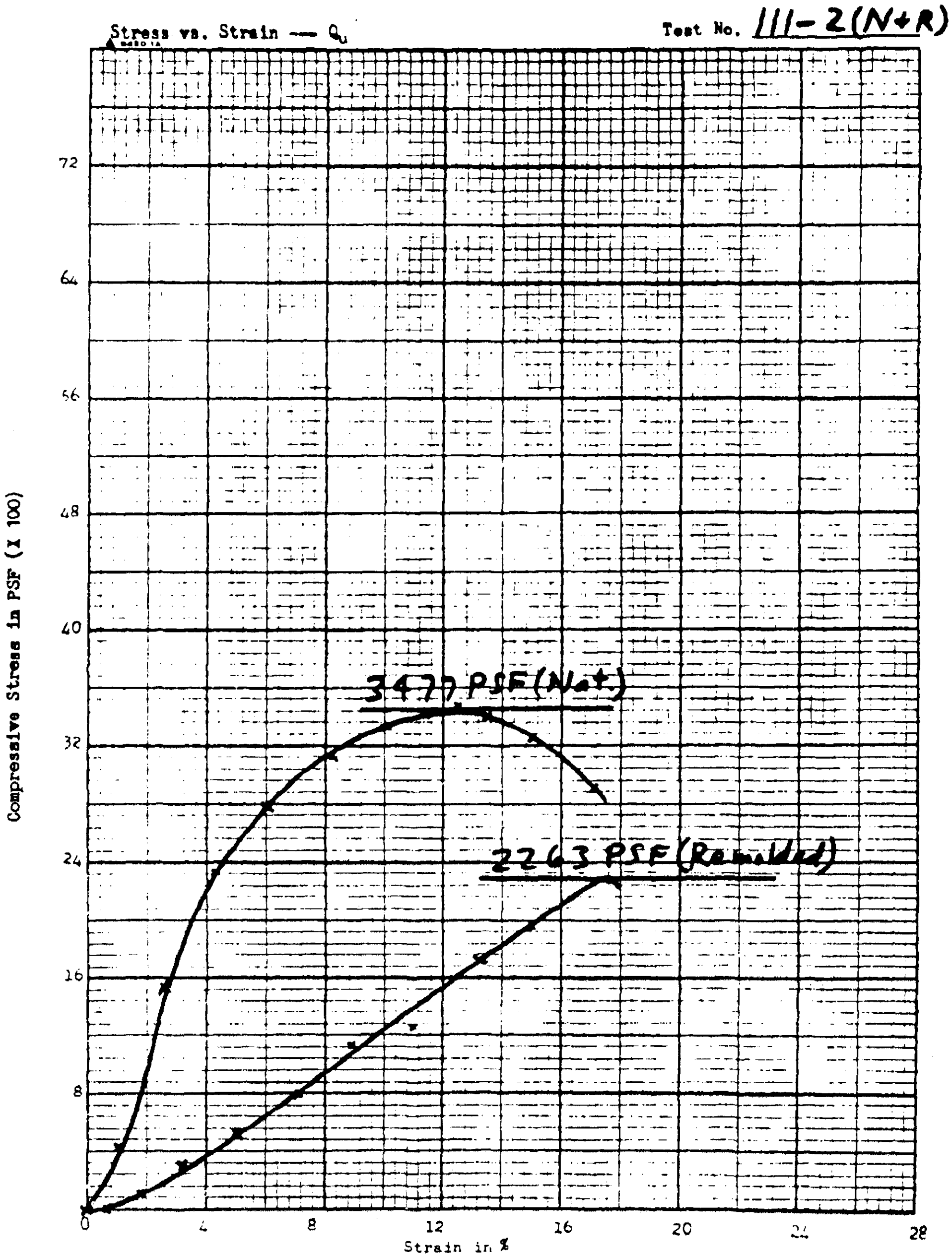


FIGURE 2F-44
COMPRESSIVE STRESS VS STRAIN
TEST NO. 11-2 (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 2.8
VISUAL CLASSIFICATION BROWN SILTY CLAY

DATE 7/11/68

JOB SITE BEAVER VALLEY
INIT. DIA 1.4

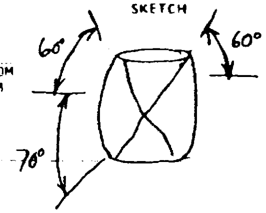
TEST BY KLP

J.O. NO 11700
BORING 111
SAMPLE ST2A
DEPTH 15 FT.
TEST NO 111-2AN

WATER CONTENT

SPECIMEN LOCATION	TOP	MIDDLE	BOTTOM
CONTAINER NO	101	102	103
WT CONTAINER + WET SOIL (G)	32.20	32.20	41.00
WT CONTAINER + DRY SOIL (G)	28.40	28.20	35.50
WT WATER (G)	3.80	4.00	5.50
WT CONTAINER (G)	11.40	11.40	11.40
WT DRY SOIL (G)	17.00	16.80	24.10
WATER CONTENT PERCENT	22.35	23.81	22.82

SKETCH



ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
4.00						
	0.0	0.0	0.01069	0.0	0.0	0.0
	0.020	2.578	0.01077	0.450	0.714	239.428
	0.040	0.0	0.01085	0.200	1.429	0.0
	0.060	17.186	0.01092	1.000	2.143	1573.218
	0.080	22.498	0.01100	1.200	2.857	2044.451
	0.100	29.138	0.01109	1.450	3.571	2628.379
	0.120	33.122	0.01117	1.600	4.286	2965.624
	0.140	37.106	0.01125	1.750	5.000	3297.545
	0.160	41.091	0.01134	1.900	5.714	3624.140
	0.180	43.747	0.01142	2.000	6.429	3829.171
	0.200	47.731	0.01151	2.150	7.143	4146.004
	0.220	49.059	0.01160	2.200	7.857	4228.582
	0.240	51.715	0.01169	2.300	8.571	4422.961
	0.260	53.043	0.01178	2.350	9.286	4501.102
	0.280	54.371	0.01188	2.400	10.000	4577.465
	0.300	57.027	0.01197	2.500	10.714	4762.973
	0.320	58.355	0.01207	2.550	11.429	4834.898
	0.340	59.683	0.01217	2.600	12.143	4905.055
	0.360	59.683	0.01227	2.600	12.857	4865.176
	0.380	61.011	0.01237	2.650	13.571	4932.664
	0.400	62.339	0.01247	2.700	14.286	4998.383
	0.420	63.667	0.01258	2.750	15.000	5062.324
	0.440	63.667	0.01268	2.750	15.714	5019.781
	0.460	63.667	0.01279	2.750	16.429	4977.242
	0.480	64.995	0.01290	2.800	17.143	5037.633
	0.500	64.995	0.01301	2.800	17.857	4994.203
	0.520	64.995	0.01313	2.800	18.571	4950.777
	0.540	64.995	0.01324	2.800	19.286	4907.348
	0.560	64.995	0.01336	2.800	20.000	4863.922
	0.580	64.995	0.01348	2.800	20.714	4820.492
	0.600	64.995	0.01361	2.800	21.429	4777.066
	0.620	64.995	0.01373	2.800	22.143	4733.637
	0.640	64.995	0.01386	2.800	22.857	4690.207
	0.660	63.667	0.01399	2.750	23.571	4551.836
	0.680	63.667	0.01412	2.750	24.286	4509.297
	0.700	62.339	0.01425	2.700	25.000	4373.586
	0.720	61.011	0.01439	2.650	25.714	4239.645
	0.740	59.683	0.01453	2.600	26.429	4107.484
	0.760	57.027	0.01467	2.500	27.143	3886.587
	0.780	57.027	0.01482	2.500	27.857	3848.483
	0.800	55.699	0.01497	2.450	28.571	3721.645
	0.820	55.699	0.01512	2.450	29.286	3684.429
	0.840	55.699	0.01527	2.450	30.000	3647.213
	0.860	54.371	0.01543	2.400	30.714	3523.922
	0.880	53.043	0.01559	2.350	31.429	3402.408
	0.900	53.043	0.01575	2.350	32.143	3366.966
	0.920	53.043	0.01592	2.350	32.857	3331.524

RATE OF STRAIN IS 8.214(PERCENT/MIN)

MAX COMP STRESS 5062.324

FIGURE 2F-45
UNCONFINED COMPRESSION TEST
BORING 111 - TEST NO. 111-2AN
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE
INIT. LTH 2.8
VISUAL CLASSIFICATION BROWN SILTY CLAY

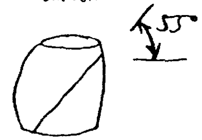
DATE 7/11/68

JOB SITE BEAVER VALLEY
INIT. DIA 1.4

TEST BY KLP

J.O. NO 11700
BORING 111
SAMPLE ST2A
DEPTH 15 FT.
TEST NO 111-2AR

SKETCH



WATER CONTENT

SPECIMEN LOCATION	MIDDLE	COMPLETE
CONTAINER NO	104	16
WT CONTAINER + WET SOIL (G)	36.70	165.50
WT CONTAINER + DRY SOIL (G)	32.00	138.70
WT WATER (G)	4.70	26.80
WT CONTAINER (G)	11.60	16.50
WT DRY SOIL (G)	20.40	122.20
WATER CONTENT PERCENT	23.04	21.93

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
4.00						
	0.0	0.0	0.01065	0.0	0.0	0.0
	0.020	0.0	0.01077	0.350	0.714	0.0
	0.040	1.250	0.01085	0.400	1.429	115.251
	0.060	5.234	0.01092	0.550	2.143	479.116
	0.080	9.218	0.01100	0.700	2.857	837.657
	0.100	13.202	0.01109	0.850	3.571	1190.875
	0.120	17.186	0.01117	1.000	4.286	1538.768
	0.140	21.170	0.01125	1.150	5.000	1881.336
	0.160	23.826	0.01134	1.250	5.714	2101.451
	0.180	27.810	0.01142	1.400	6.429	2434.257
	0.200	29.138	0.01151	1.450	7.143	2531.032
	0.220	30.466	0.01160	1.500	7.857	2626.030
	0.240	33.122	0.01169	1.600	8.571	2832.834
	0.260	34.450	0.01178	1.650	9.286	2923.395
	0.280	22.498	0.01188	1.200	10.000	1894.124
	0.300	38.434	0.01197	1.800	10.714	3210.113
	0.320	39.762	0.01207	1.850	11.429	3294.465
	0.340	41.091	0.01217	1.900	12.143	3377.040
	0.360	42.419	0.01227	1.950	12.857	3457.842
	0.380	43.747	0.01237	2.000	13.571	3536.868
	0.400	45.075	0.01247	2.050	14.286	3614.118
	0.420	46.403	0.01258	2.100	15.000	3689.595
	0.440	46.403	0.01268	2.100	15.714	3658.591
	0.460	49.059	0.01279	2.200	16.429	3835.226
	0.480	49.059	0.01290	2.200	17.143	3802.447
	0.500	50.387	0.01301	2.250	17.857	3871.712
	0.520	51.715	0.01313	2.300	18.571	3939.201
	0.540	51.715	0.01324	2.300	19.286	3904.646
	0.560	53.043	0.01336	2.350	20.000	3969.476
	0.580	54.371	0.01348	2.400	20.714	4032.530
	0.600	54.371	0.01361	2.400	21.429	3996.200
	0.620	54.371	0.01373	2.400	22.143	3959.872
	0.640	54.371	0.01386	2.400	22.857	3923.542
	0.660	54.371	0.01399	2.400	23.571	3887.213
	0.680	54.371	0.01412	2.400	24.286	3850.884
	0.700	54.371	0.01425	2.400	25.000	3814.555
	0.720	54.371	0.01439	2.400	25.714	3778.226
	0.740	54.371	0.01453	2.400	26.429	3741.897
	0.760	54.371	0.01467	2.400	27.143	3705.568
	0.780	55.699	0.01482	2.450	27.857	3758.862
	0.800	55.699	0.01497	2.450	28.571	3721.645
	0.820	55.699	0.01512	2.450	29.286	3684.429
	0.840	55.699	0.01527	2.450	30.000	3647.213
	0.860	55.699	0.01543	2.450	30.714	3609.995
	0.880	55.699	0.01559	2.450	31.429	3572.780
	0.900	55.699	0.01575	2.450	32.143	3535.563
	0.920	55.699	0.01592	2.450	32.857	3498.346
	0.940	55.699	0.01609	2.450	33.571	3461.130
	0.960	55.699	0.01627	2.450	34.286	3423.914

RATE OF STRAIN IS 8.571(PERCENT/MIN)

MAX COMP STRESS 4032.530

FIGURE 2F-46
UNCONFINED COMPRESSION TEST
BORING 111 - TEST NO. 111-2AR
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

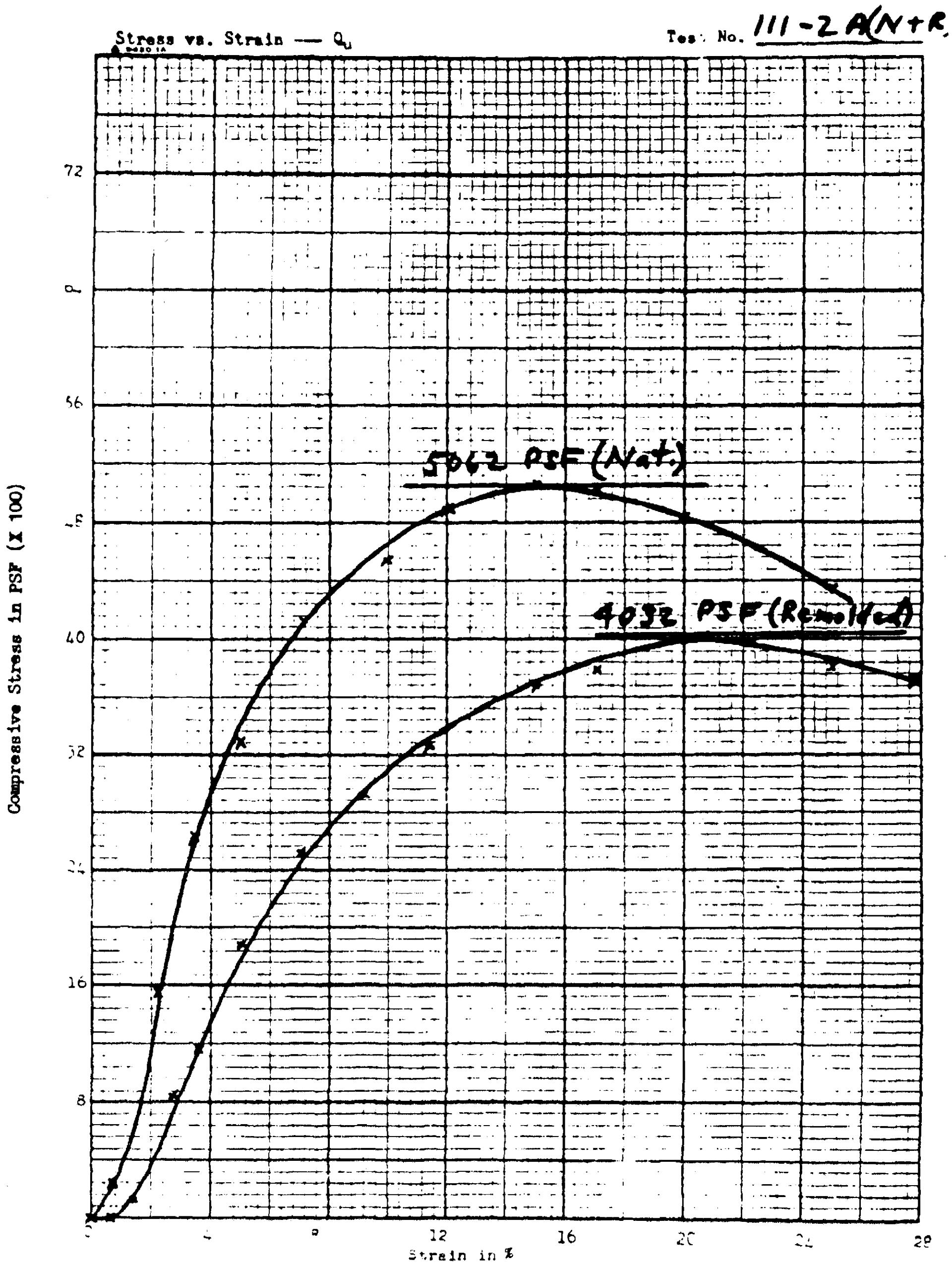


FIGURE 2F-47
COMPRESSIVE STRESS VS STRAIN
TEST NO. 111-2A (N&R)
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

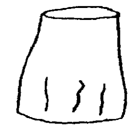
DATE 7/9/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 117
SAMPLE ST2
DEPTH 11.5 FT.
TEST NO 117-2N

SKETCH



WATER CONTENT

SPECIMEN LOCATION	TOP	MIDDLE	COMPLETE
CONTAINER NO	109	108	5
WT CONTAINER + WET SOIL (G)	63.50	23.80	1351.00
WT CONTAINER + DRY SOIL (G)	54.10	21.60	1139.00
WT WATER (G)	9.40	2.20	212.00
WT CONTAINER (G)	11.30	11.50	226.00
WT DRY SOIL (G)	42.80	10.10	913.00
WATER CONTENT PERCENT	21.96	21.	23.22

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
4.20						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	29.138	0.04291	1.450	0.357	678.998
	0.040	46.403	0.04307	2.100	0.714	1077.424
	0.060	63.667	0.04322	2.750	1.071	1472.966
	0.080	80.931	0.04338	3.400	1.429	1865.625
	0.100	92.883	0.04354	3.850	1.786	2133.389
	0.120	106.164	0.04370	4.350	2.143	2429.548
	0.140	119.444	0.04386	4.850	2.500	2723.489
	0.160	127.412	0.04402	5.150	2.857	2894.532
	0.180	136.708	0.04418	5.500	3.214	3094.303
	0.200	146.004	0.04434	5.850	3.571	3292.521
	0.220	155.300	0.04451	6.200	3.929	3489.187
	0.240	165.925	0.04468	6.600	4.286	3714.025
	0.260	172.565	0.04484	6.850	4.643	3848.243
	0.280	180.533	0.04501	7.150	5.000	4010.856
	0.300	187.173	0.04518	7.400	5.357	4142.742
	0.320	189.829	0.04535	7.500	5.714	4185.676
	0.340	196.469	0.04552	7.750	6.071	4315.680
	0.360	205.765	0.04570	8.100	6.429	4502.695
	0.380	207.093	0.04587	8.150	6.786	4514.457
	0.400	216.389	0.04605	8.500	7.143	4699.031
	0.420	221.701	0.04623	8.700	7.500	4795.871
	0.440	227.014	0.04641	8.900	7.857	4891.824
	0.460	229.670	0.04659	9.000	8.214	4929.875
	0.480	234.982	0.04677	9.200	8.571	5024.273
	0.500	240.294	0.04695	9.400	8.929	5117.785
	0.520	245.606	0.04714	9.600	9.286	5210.406
	0.540	246.934	0.04732	9.650	9.643	5217.957
	0.560	252.246	0.04751	9.850	10.000	5309.137
	0.580	256.230	0.04770	10.000	10.357	5371.590
	0.600	256.230	0.04789	10.000	10.714	5350.191
	0.620	258.886	0.04808	10.100	11.071	5384.027
	0.640	258.886	0.04828	10.100	11.429	5362.402
	0.660	261.542	0.04847	10.200	11.786	5395.574
	0.680	262.870	0.04867	10.250	12.143	5401.012
	0.700	264.198	0.04887	10.300	12.500	5406.234
	0.720	262.870	0.04907	10.250	12.857	5357.102
	0.740	264.198	0.04927	10.300	13.214	5362.102
	0.760	265.526	0.04947	10.350	13.571	5366.879
	0.780	265.526	0.04968	10.350	13.929	5344.703
	0.800	269.510	0.04989	10.500	14.286	5402.383
	0.820	268.182	0.05010	10.450	14.643	5353.367
	0.840	268.182	0.05031	10.450	15.000	5330.969
	0.860	268.182	0.05052	10.450	15.357	5308.570
	0.880	268.182	0.05073	10.450	15.714	5286.172

RATE OF STRAIN IS 3.741 (PERCENT/MIN)

MAX COMP STRESS 5406.234

FIGURE 2F-48
UNCONFINED COMPRESSION TEST
BORING 117 - TEST NO. 117-2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

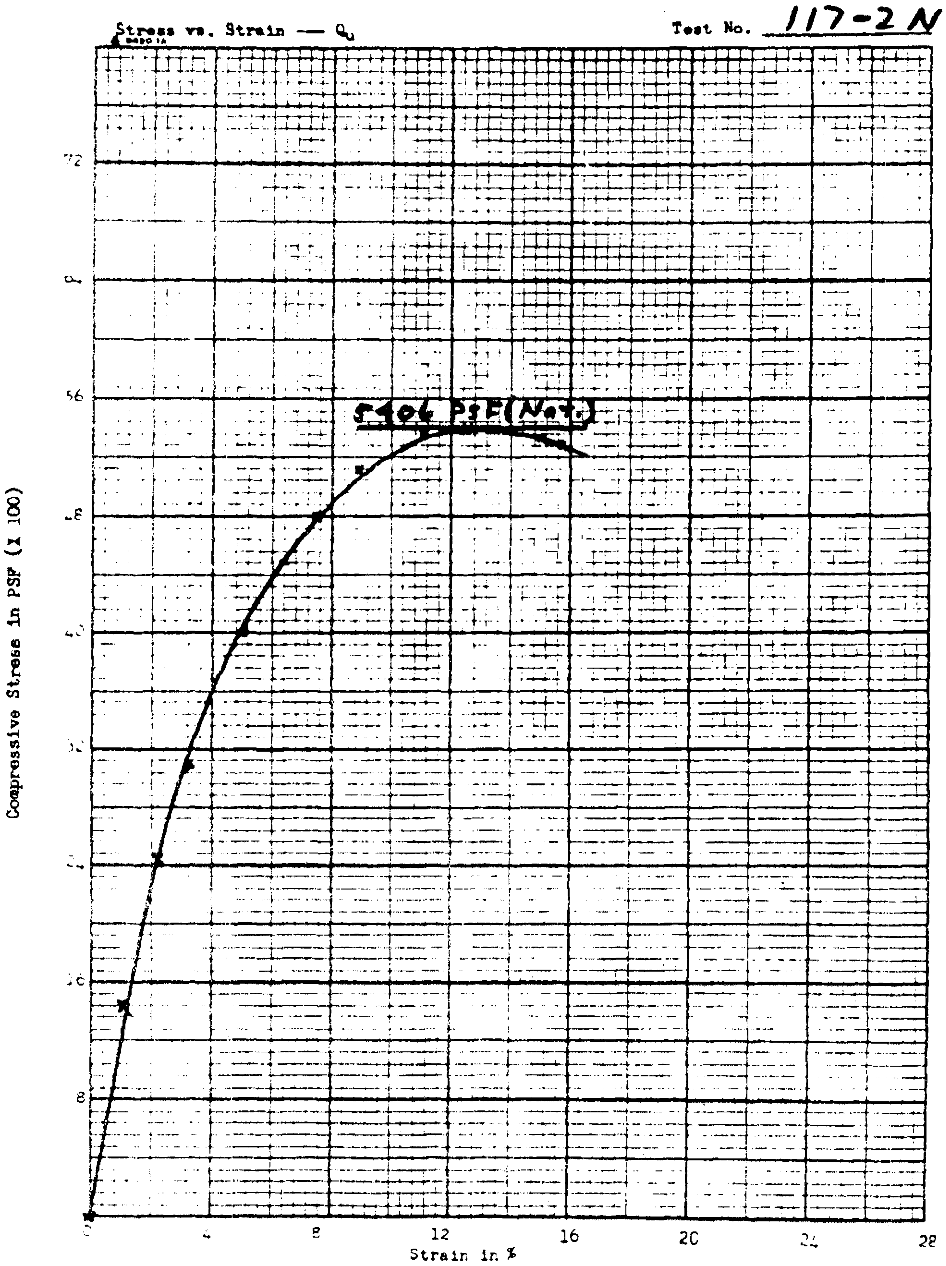


FIGURE 2F-49
COMPRESSIVE STRESS VS STRAIN
TEST NO. 117-2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY
DATE 7/9/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.8
TEST BY KLP

J.O. NO 11700
BORING 117
SAMPLE ST5
DEPTH 17.5 FT.
TEST NO 117-5N

SKETCH

WATER CONTENT

SPECIMEN LOCATION		TOP	BOTTOM	MIDDLE
CONTAINER NO		106	105	104
WT CONTAINER + WET SOIL	(G)	58.40	62.50	30.70
WT CONTAINER + DRY SOIL	(G)	48.80	52.30	26.60
WT WATER	(G)	9.60	10.20	4.10
WT CONTAINER	(G)	11.40	11.40	11.60
WT DRY SOIL	(G)	37.40	40.90	15.00
WATER CONTENT	PERCENT	25.67	24.94	27.33

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
1.50						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	6.562	0.04291	0.600	0.357	152.911
	0.040	18.514	0.04307	1.050	0.714	429.881
	0.060	33.122	0.04322	1.600	1.071	766.303
	0.080	49.059	0.04338	2.200	1.429	1130.900
	0.100	67.651	0.04354	2.900	1.786	1553.839
	0.120	80.931	0.04370	3.400	2.143	1852.106
	0.140	88.899	0.04386	3.700	2.500	2027.031
	0.160	96.867	0.04402	4.000	2.857	2200.625
	0.180	100.851	0.04418	4.150	3.214	2282.711
	0.200	100.851	0.04434	4.150	3.571	2274.288
	0.220	102.180	0.04451	4.200	3.929	2295.702
	0.240	104.836	0.04468	4.300	4.286	2346.620
	0.260	104.836	0.04484	4.300	4.643	2337.864
	0.280	106.164	0.04501	4.350	5.000	2358.612
	0.300	106.164	0.04518	4.350	5.357	2349.745
	0.320	106.164	0.04535	4.350	5.714	2340.878
	0.340	106.164	0.04552	4.350	6.071	2332.011

RATE OF STRAIN IS 4.048(PERCENT/MIN)

MAX COMP STRESS 2358.612

FIGURE 2F-50
UNCONFINED COMPRESSION TEST
BORING 117 - TEST NO. 117-5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

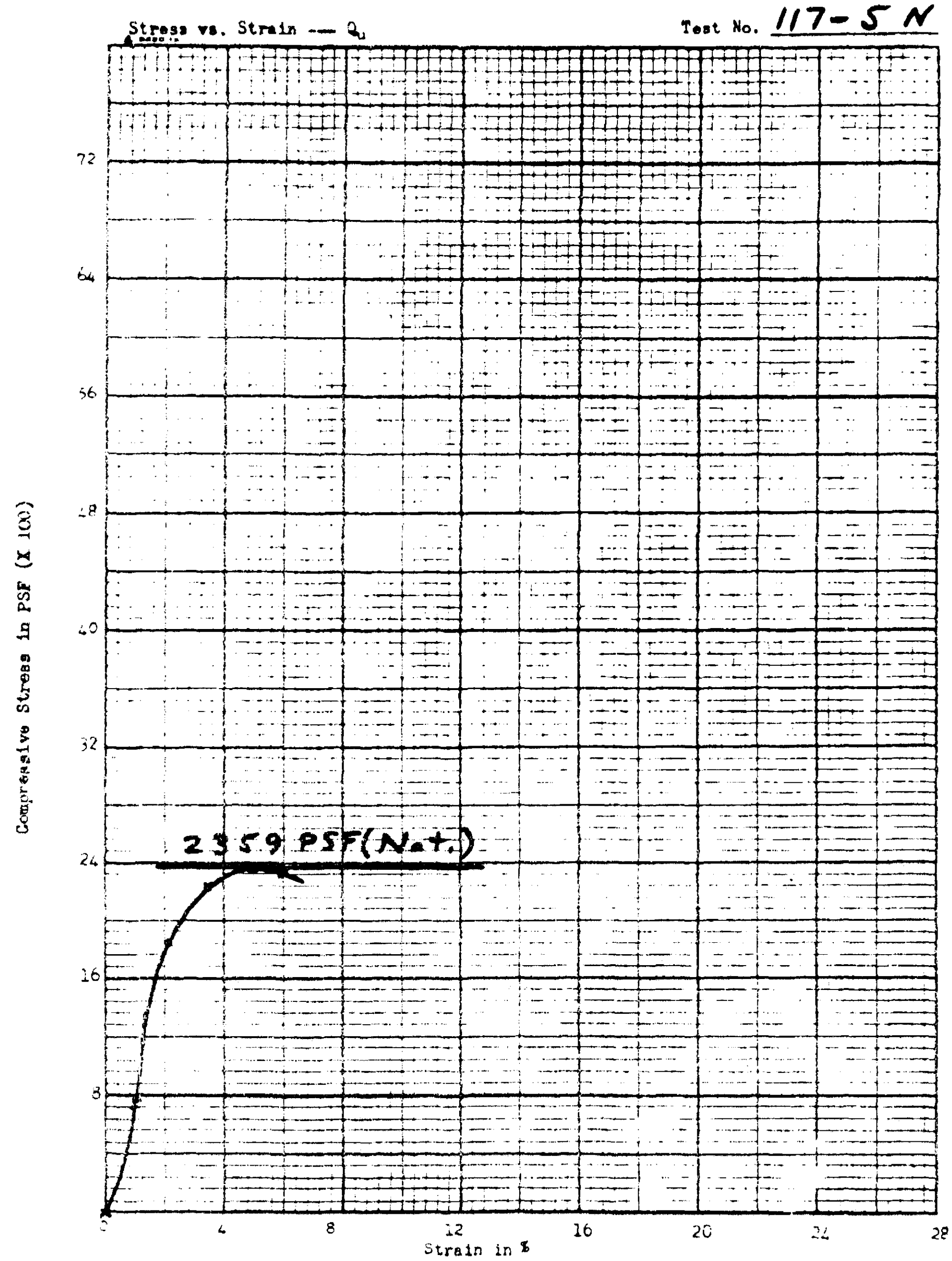


FIGURE NO. 2F-51
COMPRESSIVE STRESS VS STRAIN
TEST NO. 117-5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN CLAY, TRACE SILT

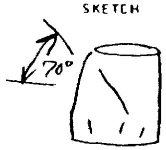
DATE 7/9/68

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 117
SAMPLE ST10
DEPTH 29 FT.
TEST NO 117-10N

SKETCH



WATER CONTENT

		TOP	BOTTOM	
SPECIMEN LOCATION		TOP	BOTTOM	COMPLETE
CONTAINER NO		102	101	NONE
WT CONTAINER + WET SOIL	(G)	56.60	81.70	
WT CONTAINER + DRY SOIL	(G)	44.90	64.00	
WT WATER	(G)	11.80	17.70	
WT CONTAINER	(G)	11.40	11.40	
WT DRY SOIL	(G)	33.50	52.60	
WATER CONTENT	PERCENT	33.4	33.65	34.0

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
5.50						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	6.562	0.04291	0.600	0.357	152.911
	0.040	17.186	0.04307	1.000	0.714	399.046
	0.060	27.810	0.04322	1.400	1.071	643.496
	0.080	38.434	0.04338	1.800	1.429	885.991
	0.100	49.059	0.04354	2.200	1.786	1126.802
	0.120	58.355	0.04370	2.550	2.143	1335.446
	0.140	66.323	0.04386	2.850	2.500	1512.257
	0.160	72.963	0.04402	3.100	2.857	1657.567
	0.180	78.275	0.04418	3.300	3.214	1771.709
	0.200	80.931	0.04434	3.400	3.571	1825.067
	0.220	86.243	0.04451	3.600	3.929	1937.656
	0.240	90.227	0.04468	3.750	4.286	2019.632
	0.260	94.211	0.04484	3.900	4.643	2100.942
	0.280	96.867	0.04501	4.000	5.000	2152.092
	0.300	99.523	0.04518	4.100	5.357	2202.778
	0.320	102.180	0.04535	4.200	5.714	2253.031
	0.340	104.836	0.04552	4.300	6.071	2302.839
	0.360	107.492	0.04570	4.400	6.429	2352.205
	0.380	112.272	0.04587	4.590	6.786	2447.447
	0.400	111.476	0.04605	4.550	7.143	2420.766
	0.420	112.804	0.04623	4.600	7.500	2440.183
	0.440	115.460	0.04641	4.700	7.857	2487.996
	0.460	115.460	0.04659	4.700	8.214	2478.353
	0.480	117.585	0.04677	4.780	8.571	2514.141
	0.500	119.444	0.04695	4.850	[illegible]	2543.918
	0.520	119.975	0.04714	4.870	9.286	2545.212
	0.540	121.569	0.04732	4.930	9.643	2568.865
	0.560	122.897	0.04751	4.980	10.000	2586.664
	0.580	122.897	0.04770	4.980	10.357	2576.399
	0.600	122.897	0.04789	4.980	10.714	2566.135
	0.620	126.084	0.04808	5.100	11.071	2622.155
	0.640	126.084	0.04828	5.100	11.429	2611.624
	0.660	126.084	0.04847	5.100	11.786	2601.094
	0.680	126.881	0.04867	5.130	12.143	2606.934
	0.700	126.881	0.04887	5.130	12.500	2596.337
	0.720	128.740	0.04907	5.200	12.857	2623.630
	0.740	128.740	0.04927	5.200	13.214	2612.877
	0.760	131.396	0.04947	5.300	13.571	2655.809
	0.780	131.396	0.04968	5.300	13.929	2644.835
	0.800	131.396	0.04989	5.300	14.286	2633.860
	0.820	133.255	0.05010	5.370	14.643	2659.999
	0.840	133.255	0.05031	5.370	15.000	2648.870
	0.860	133.255	0.05052	5.370	15.357	2637.740
	0.880	133.255	0.05073	5.370	15.714	2626.610
	0.900	134.052	0.05095	5.400	16.071	2631.120
	0.920	134.052	0.05117	5.400	16.429	2619.924
	0.940	135.380	0.05139	5.450	16.786	2634.572
	0.960	135.911	0.05161	5.470	17.143	2633.557

RATE OF STRAIN IS 3.117(PERCENT/MIN)

MAX COMP STRESS 2659.999

FIGURE 2F-52
UNCONFINED COMPRESSION TEST
BORING 117 - TEST NO. 117-10N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

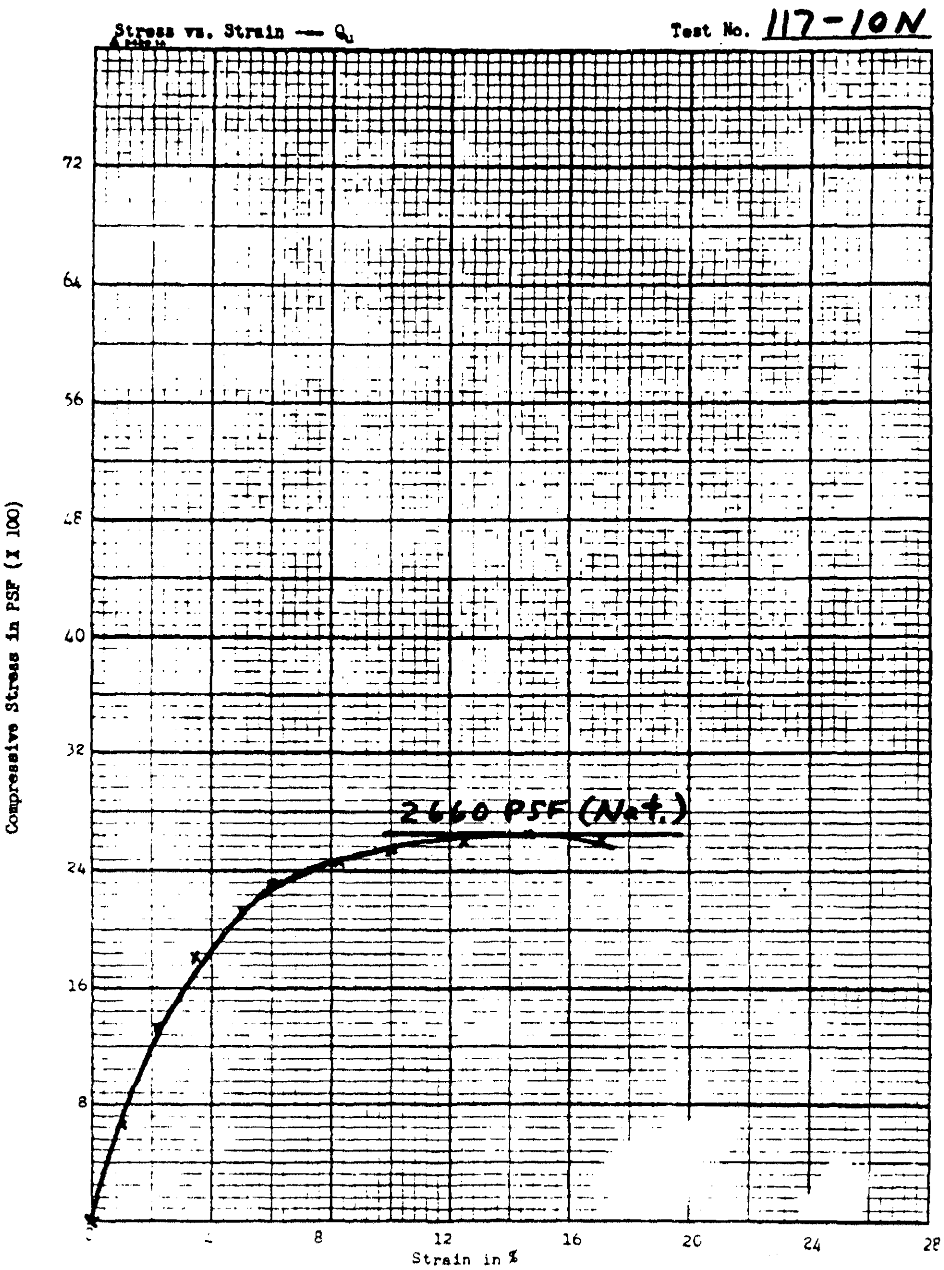
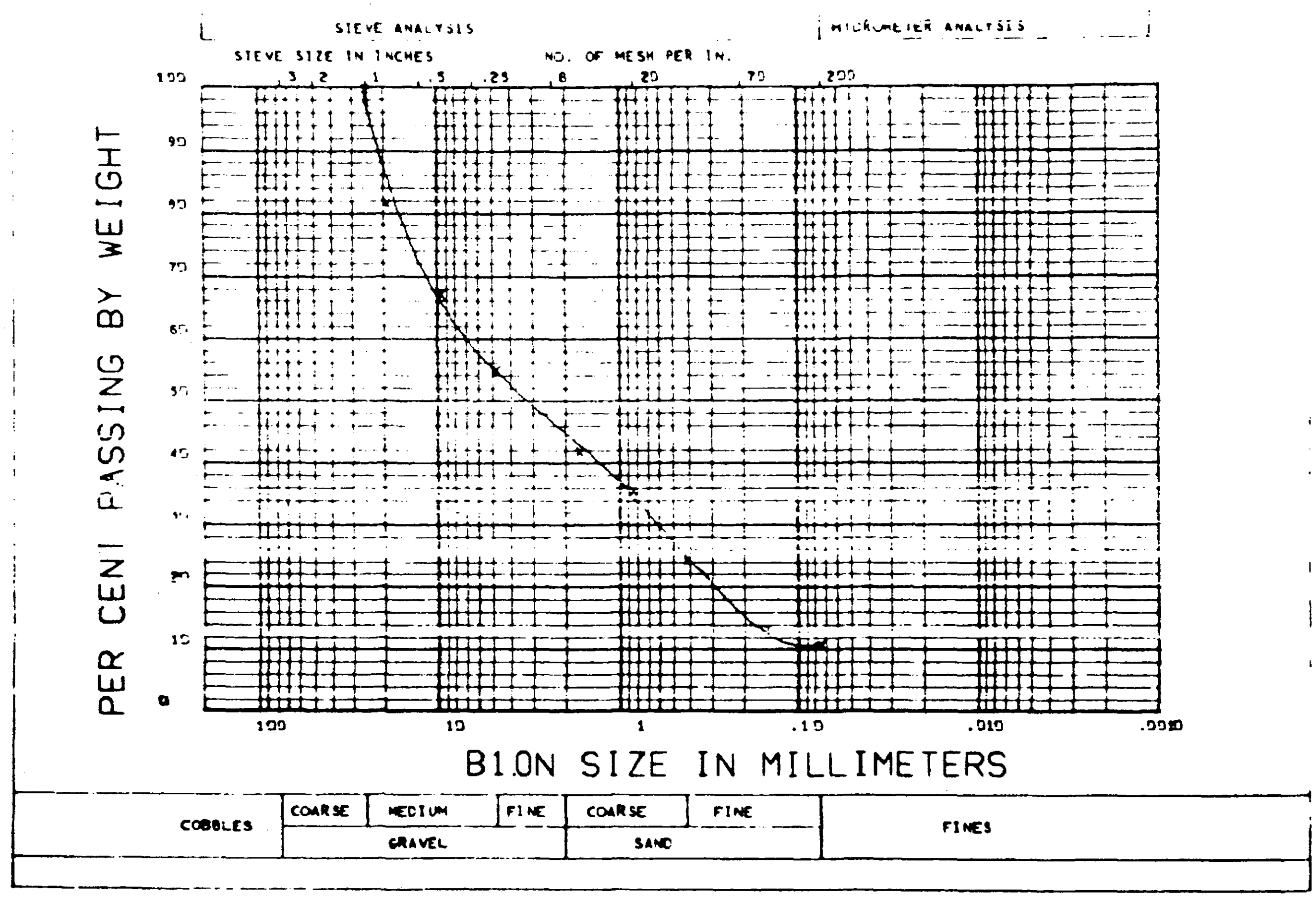


FIGURE 2F-53
COMPRESSIVE STRESS VS STRAIN
TEST NO. 117-10N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS2 DATE 8/6/86

LOCATION BEAVER VALLEY ELEV 727.00

TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

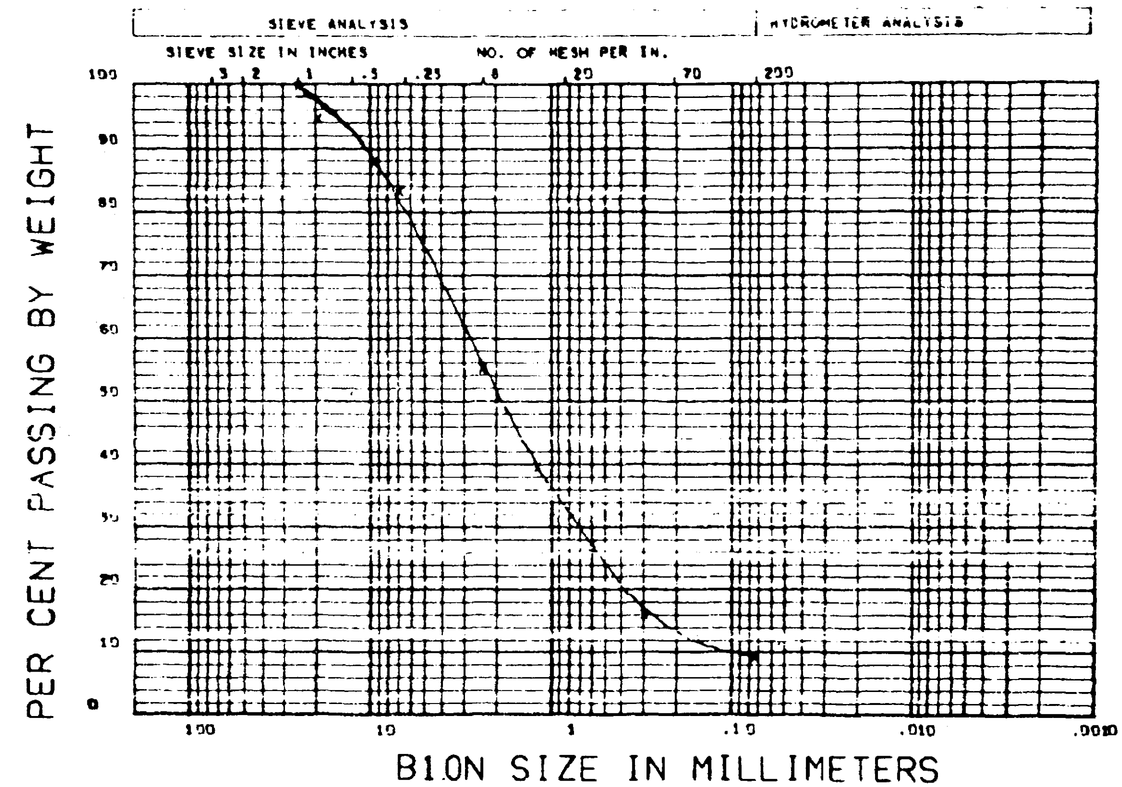
CLIENT DUQUESNE LIGHT CO JOB NO 11799

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-54
GRAIN SIZE
TEST NO. B101-SS2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	GRAVEL			SAND		FINES
	COARSE	MEDIUM	FINE	COARSE	FINE	

TEST NO. B101 SS4 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 717.00

TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

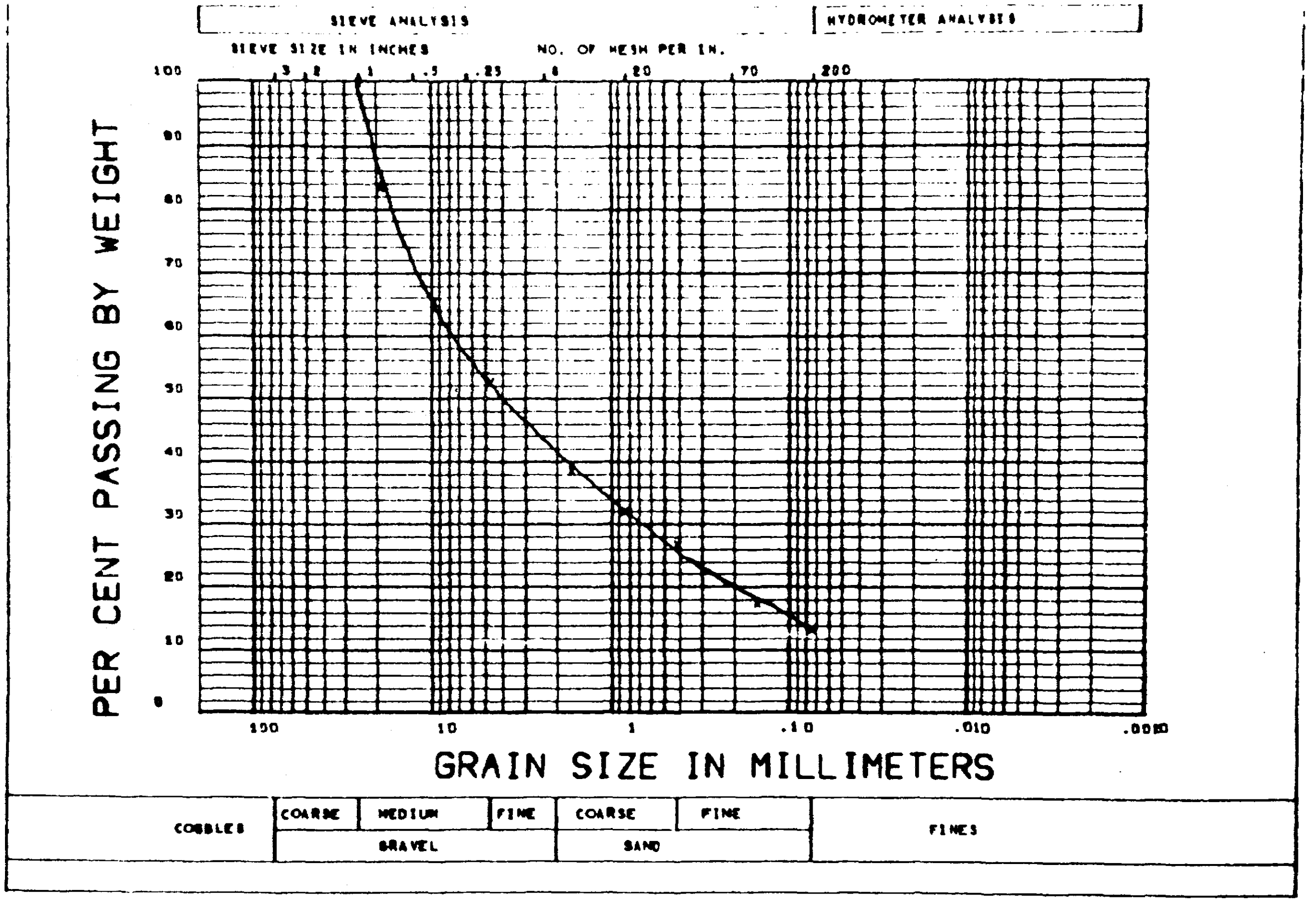
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-55
GRAIN SIZE
TEST NO. B101-SS4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS6 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 707.00

TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

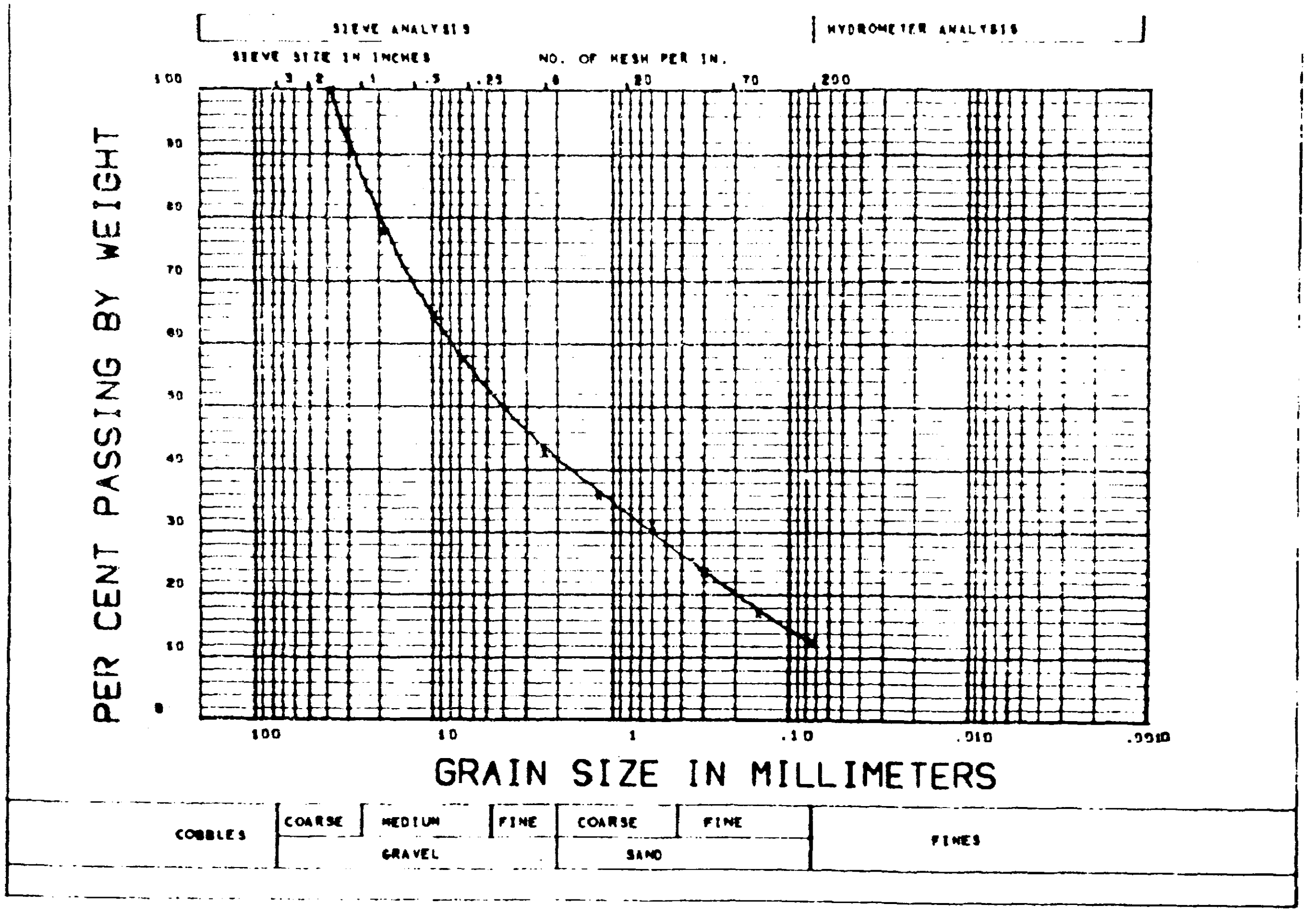
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-56
GRAIN SIZE
TEST NO. B101-SS6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS7 DATE 6/6/80

LOCATION BEAVER VALLEY ELEV 702.00

TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

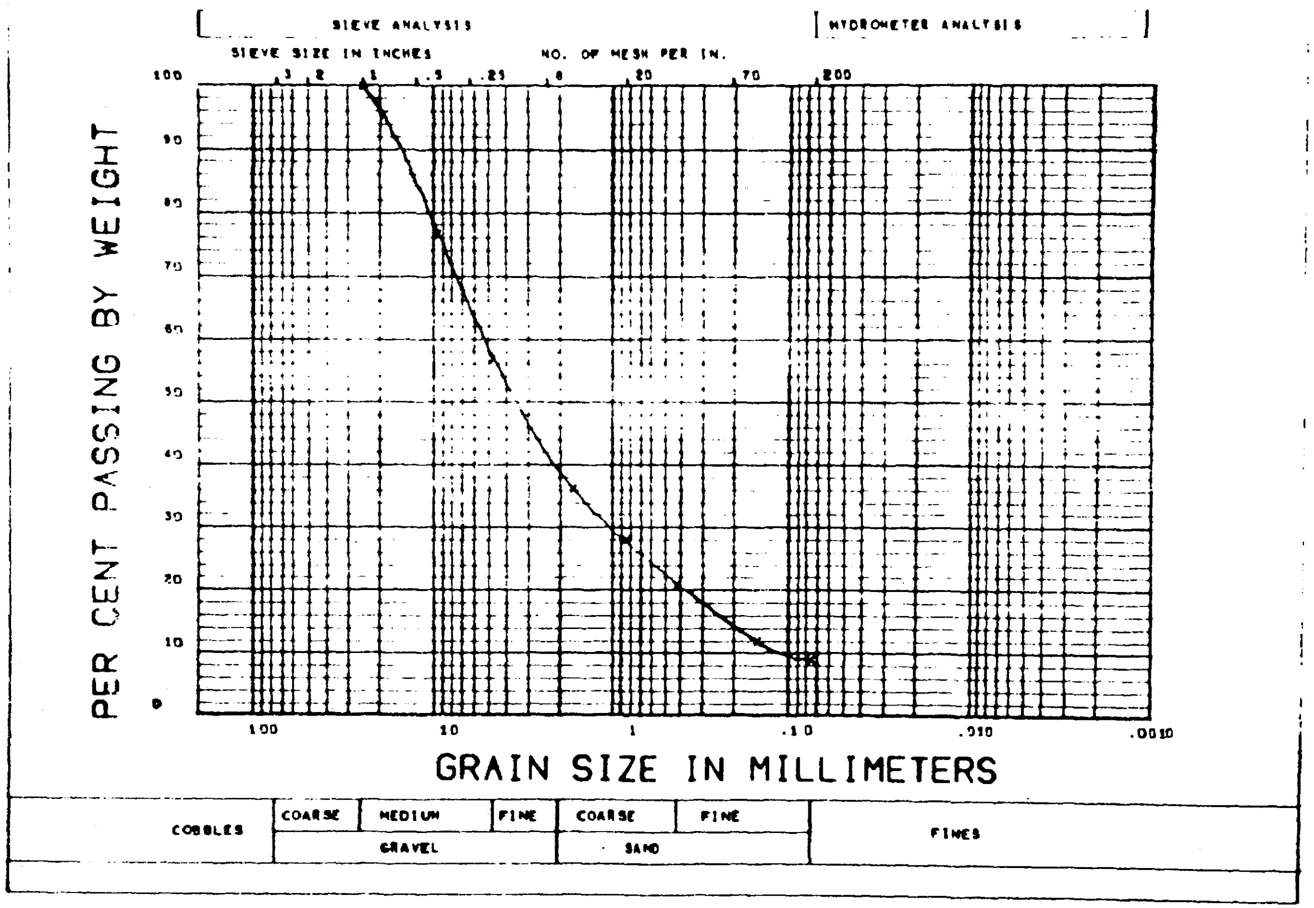
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-57
GRAIN SIZE
TEST NO. B101-SS7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS8 DATE [illegible]

LOCATION BEAVER VALLEY ELEV [illegible]

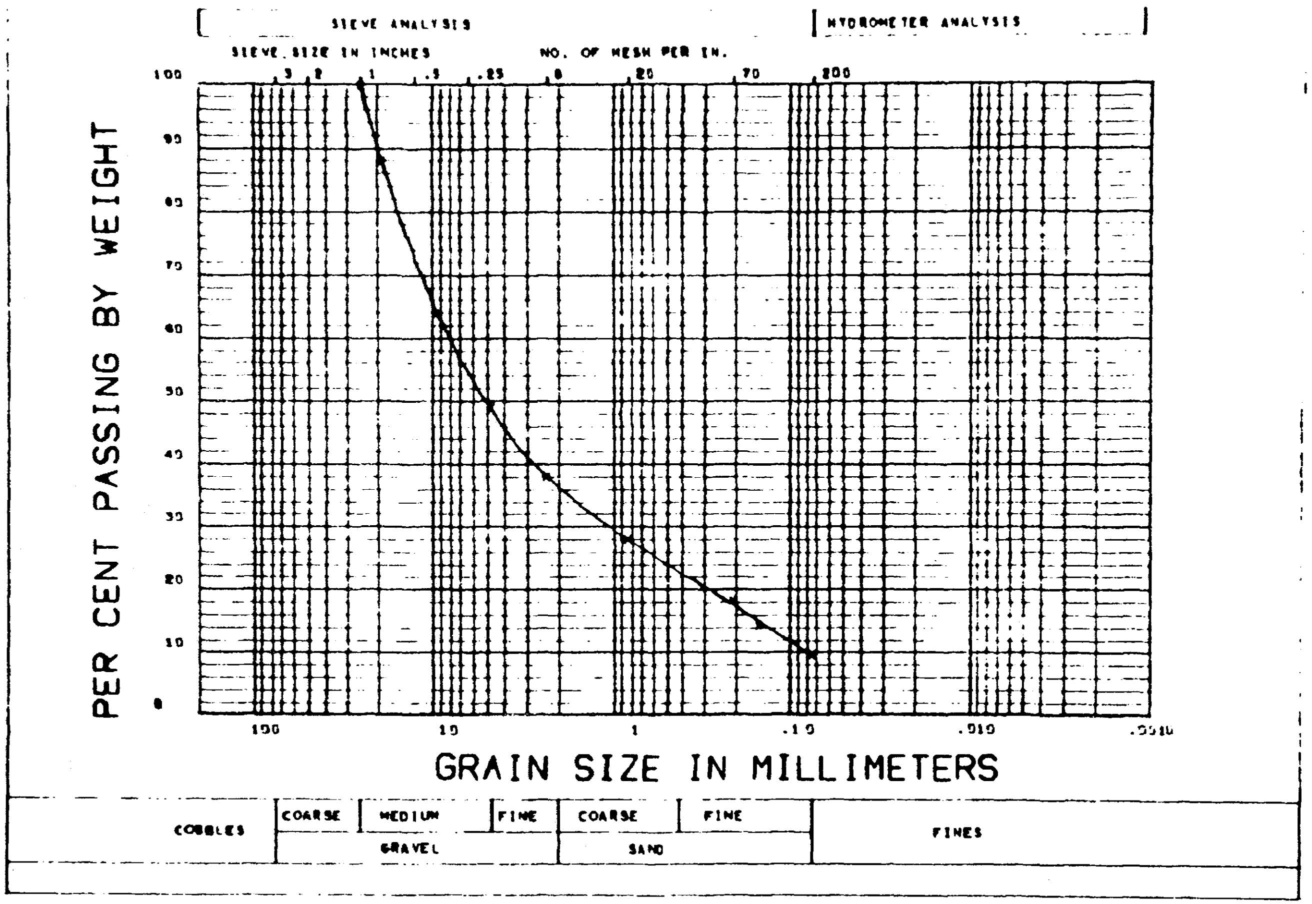
TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-58
GRAIN SIZE
TEST NO. B101 - SS8
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS10 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 690.90

TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

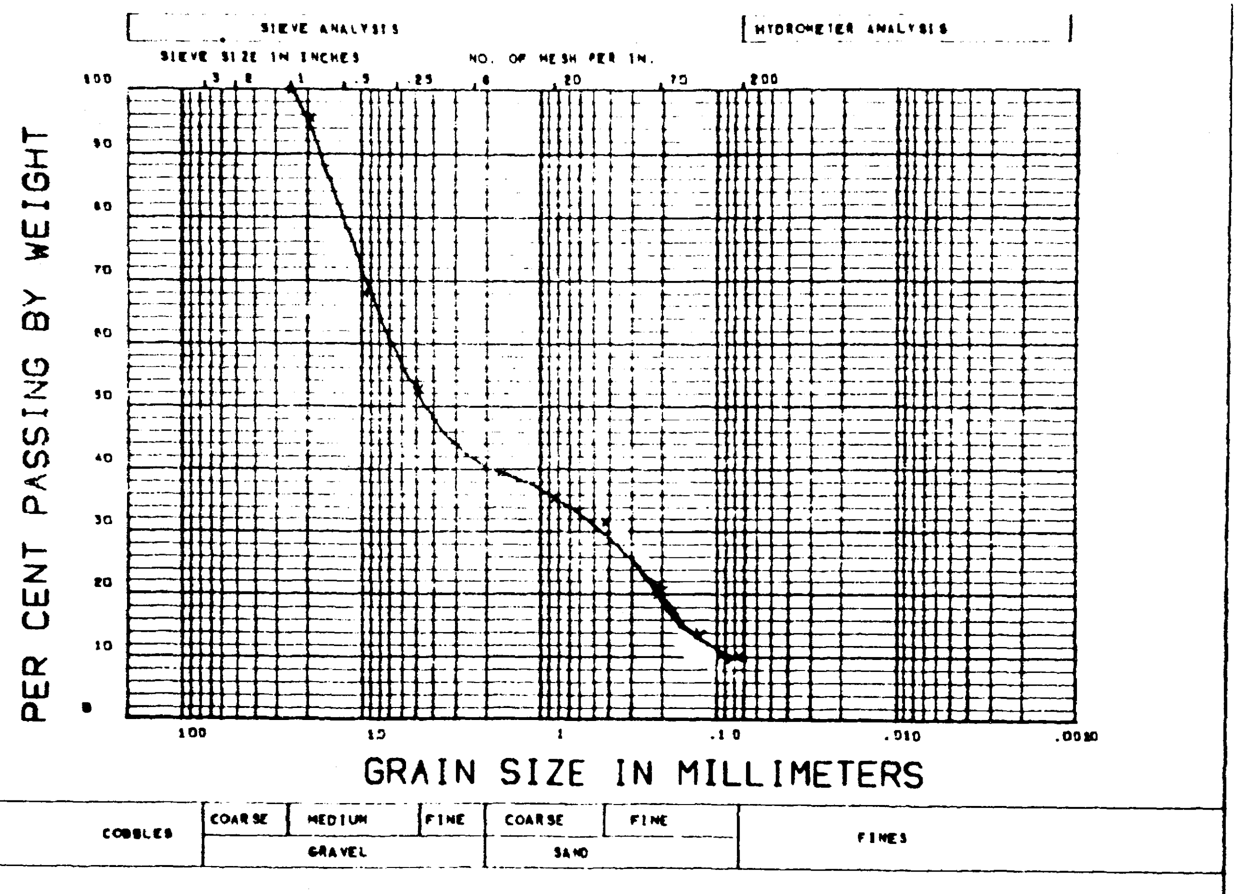
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-59
GRAIN SIZE
TEST NO. B101-SS10
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS12 DATE 8/6/80

LOCATION BEAVER VALLEY ELEV 680.00

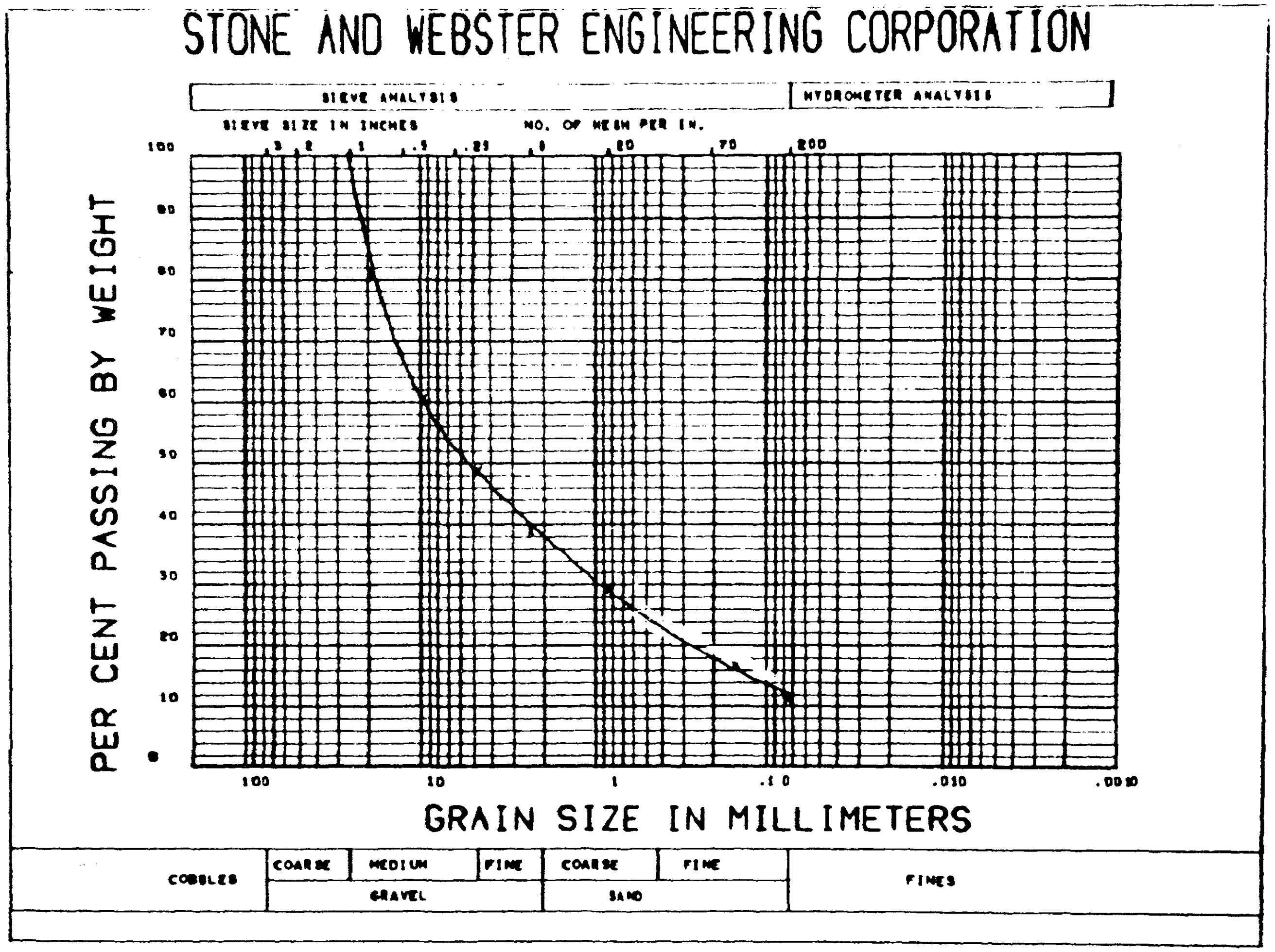
TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-60
GRAIN SIZE
TEST NO- B101-SS12
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



TEST NO. B101 SS13 DATE [illegible]

LOCATION BEAVER VALLEY ELEV 673.00

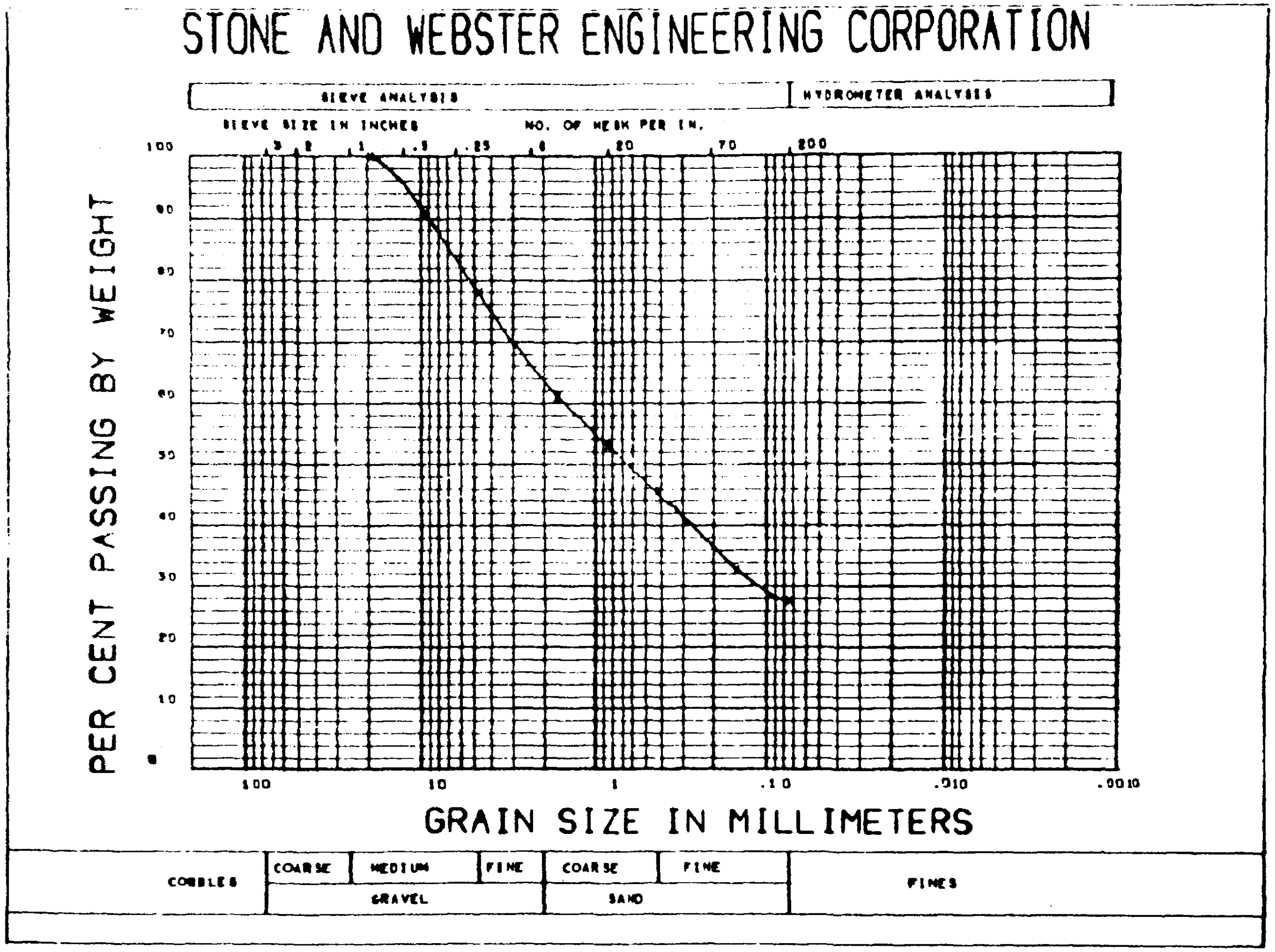
TYPE MATERIAL BROWN MEDIUM SAND AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-61
GRAIN SIZE
TEST NO. B101-SS13
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



TEST NO. B101 SS17 DATE 8/6/68

LOCATION BEAVER VALLEY ELEV 855.00

TYPE MATERIAL BROWN MEDIUM SAND, SOME SANDSTONE, SILT, CLAY

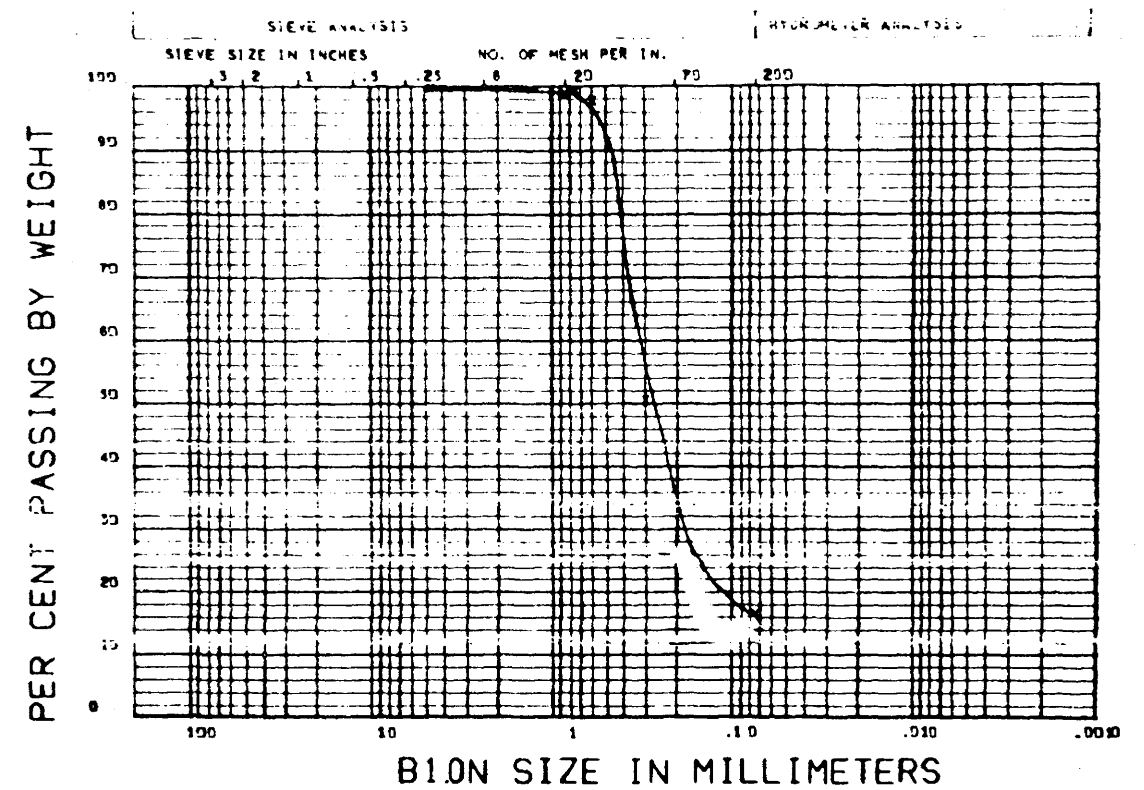
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-62
GRAIN SIZE
TEST NO. B101-SS17
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	COARSE	MEDIUM	FINE	COARSE	FINE	FINES
	GRAVEL			SAND		

TEST NO. B101 SS19 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 645.00

TYPE MATERIAL BROWN FINE TO MEDIUM SAND,SLIGHT SILT

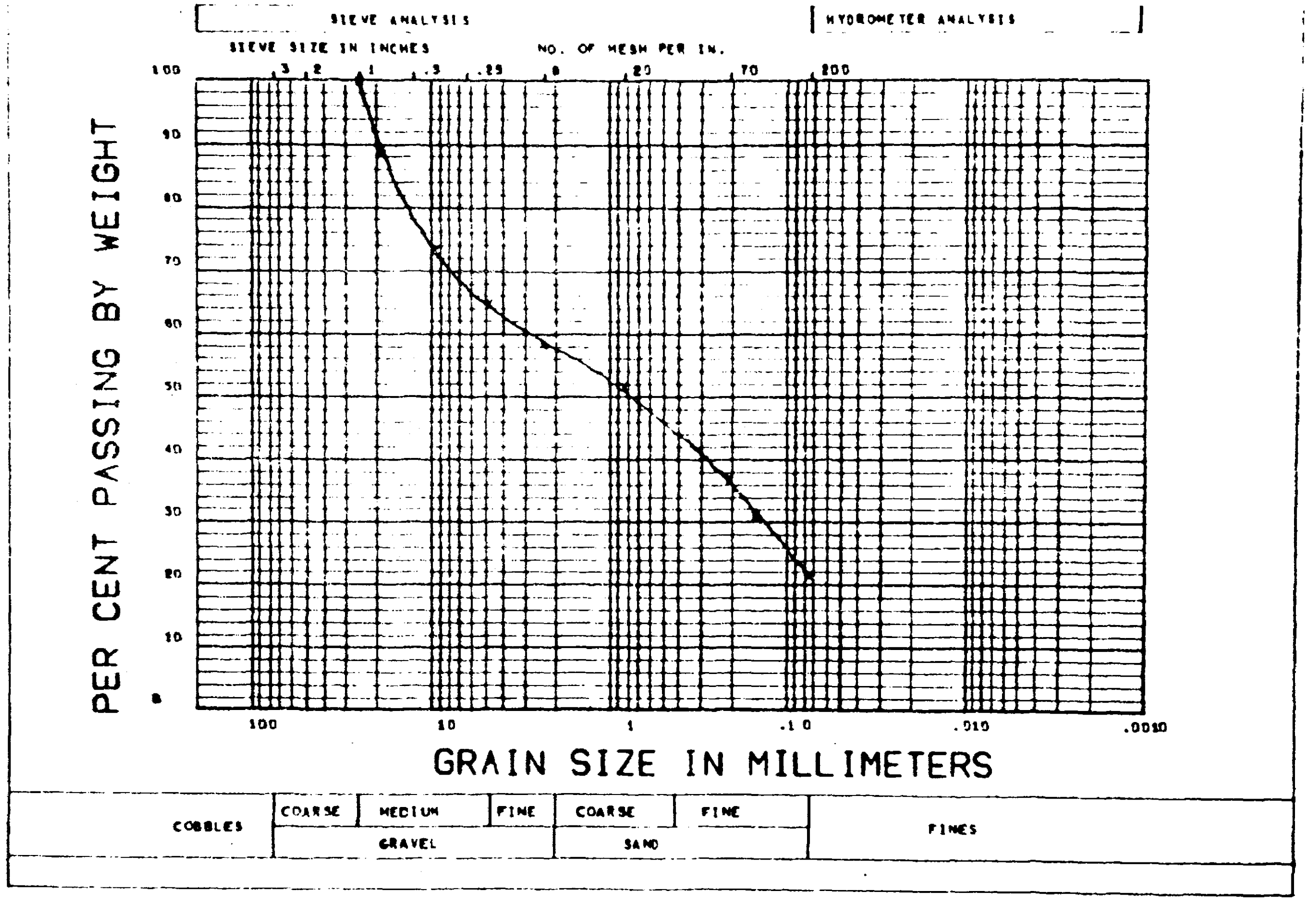
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-63
GRAIN SIZE
TEST NO. B101-SS19
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B101 SS22 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 830.00

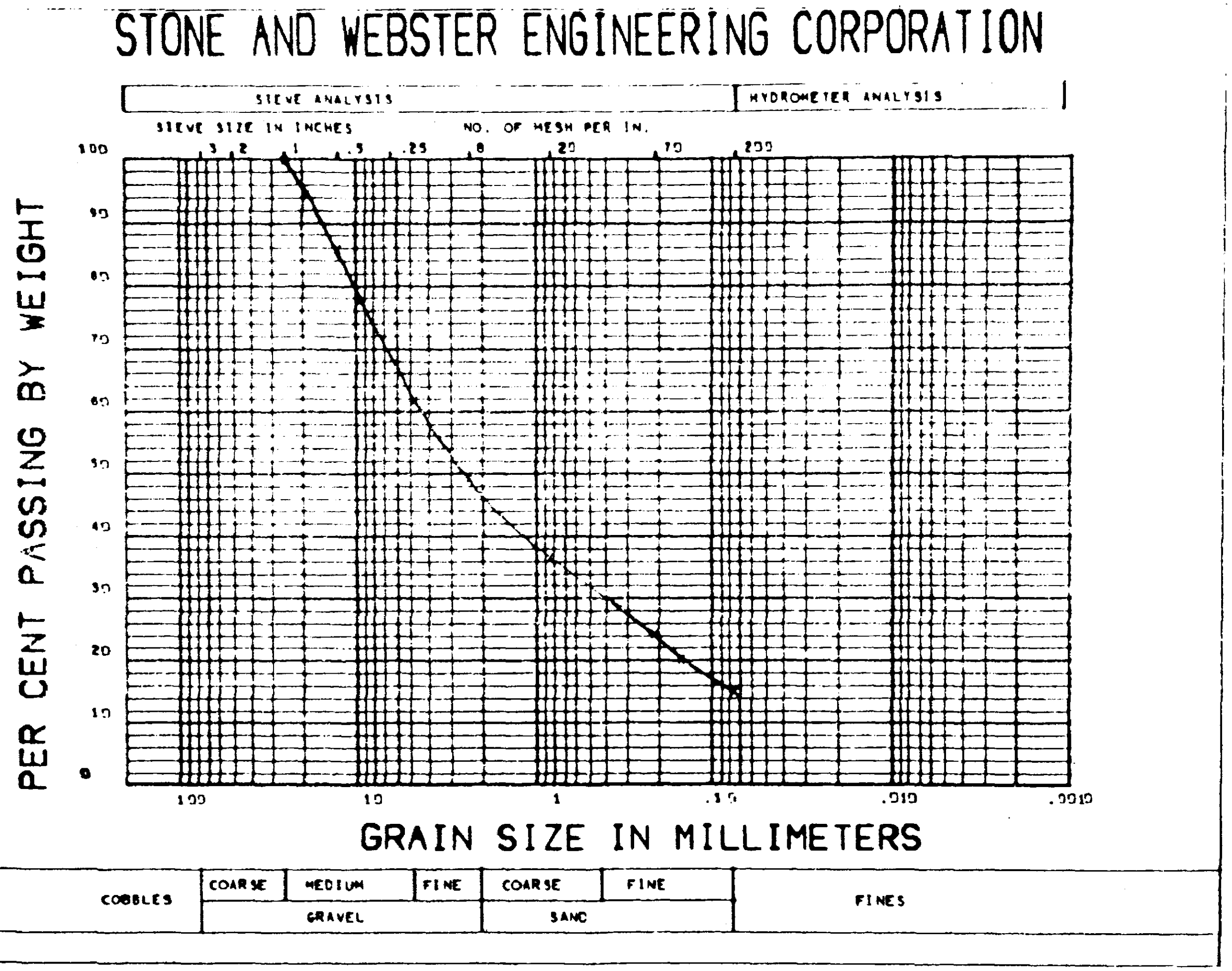
TYPE MATERIAL WEATHERED BLUE-GRAY SANDSTONE,WEAK FRAGMENTS

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-64
GRAIN SIZE
TEST NO. B101-SS22
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



TEST NO. B103 SS12 DATE 6/25/68

LOCATION BEAVER VALLEY ELEV 682.5

TYPE MATERIAL MEDIUM SAND AND GRAVEL, BROKEN BOULDER, BROWN

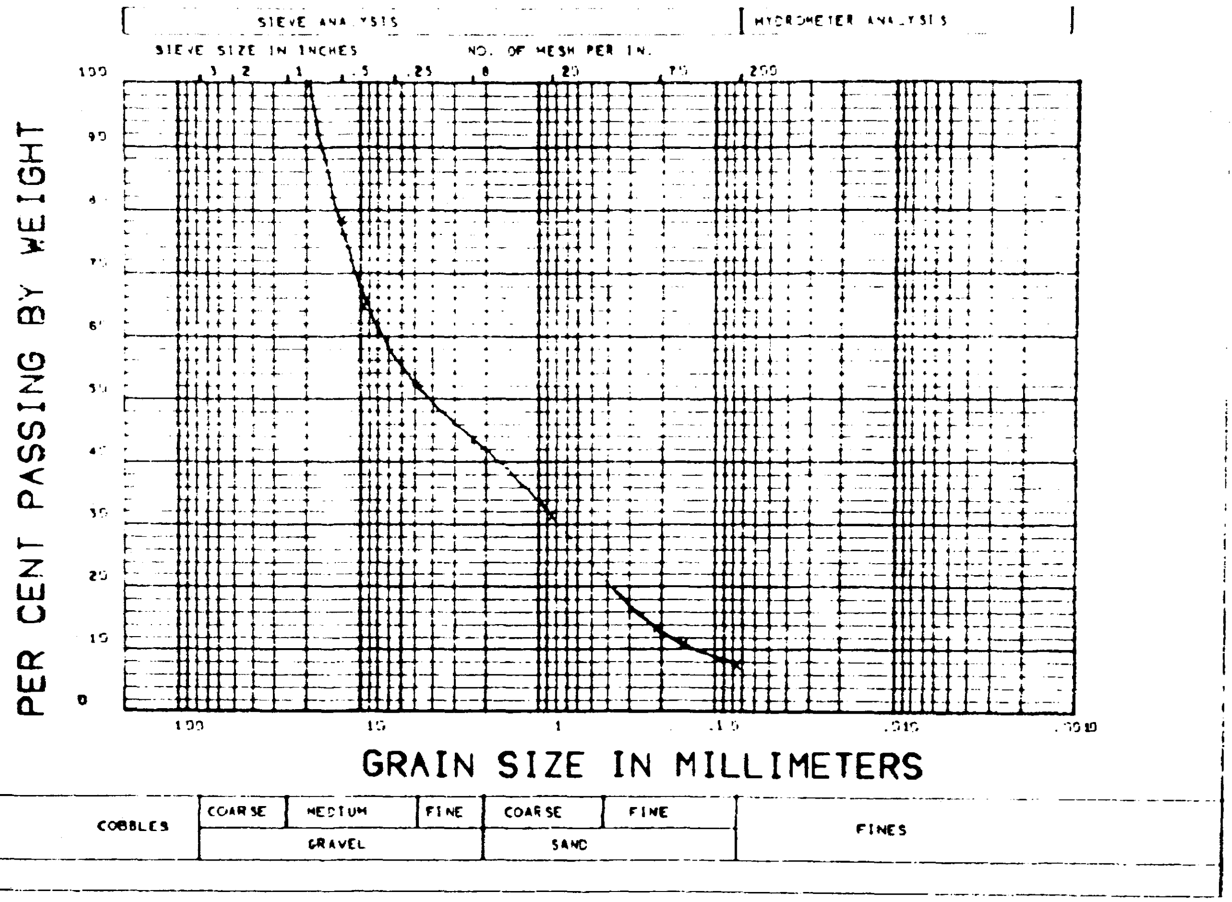
CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

TAKEN BY RAYMOND INT. TESTED BY KLP

FIGURE 2F-65
GRAIN SIZE
TEST NO. B103-SS12
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B103 SS14 DATE 8/25/66

LOCATION BEAVER VALLEY ELEV 672.5

TYPE MATERIAL MEDIUM SAND AND GRAVEL, BROKEN BOULDER, BROWN

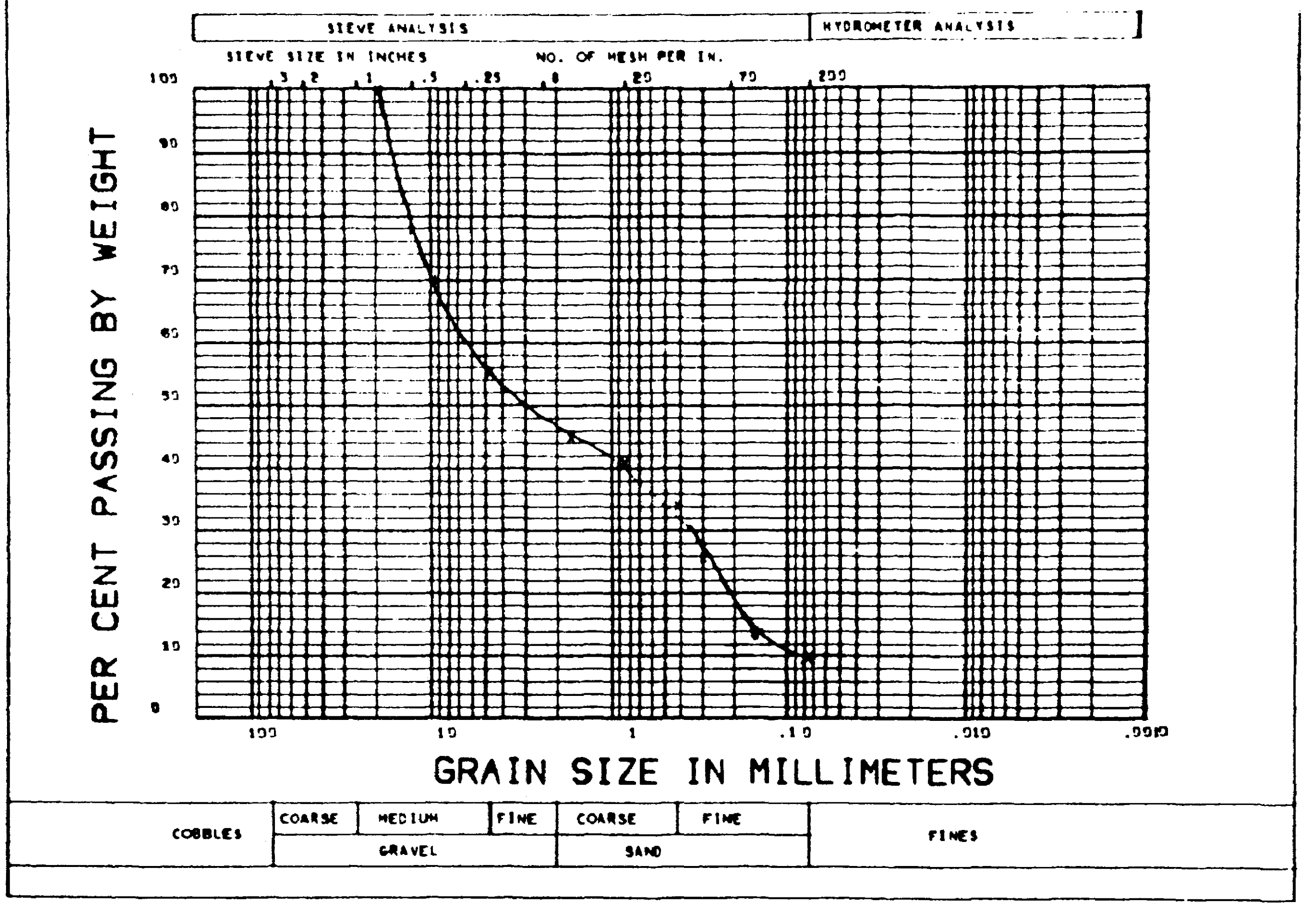
CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

TAKEN BY RAYMOND INT. TESTED BY KLP

FIGURE 2F-66
GRAIN SIZE
TEST NO. B103-SS14
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B103 SS17 DATE 6/25/68

LOCATION BEAVER VALLEY ELEV 667.5

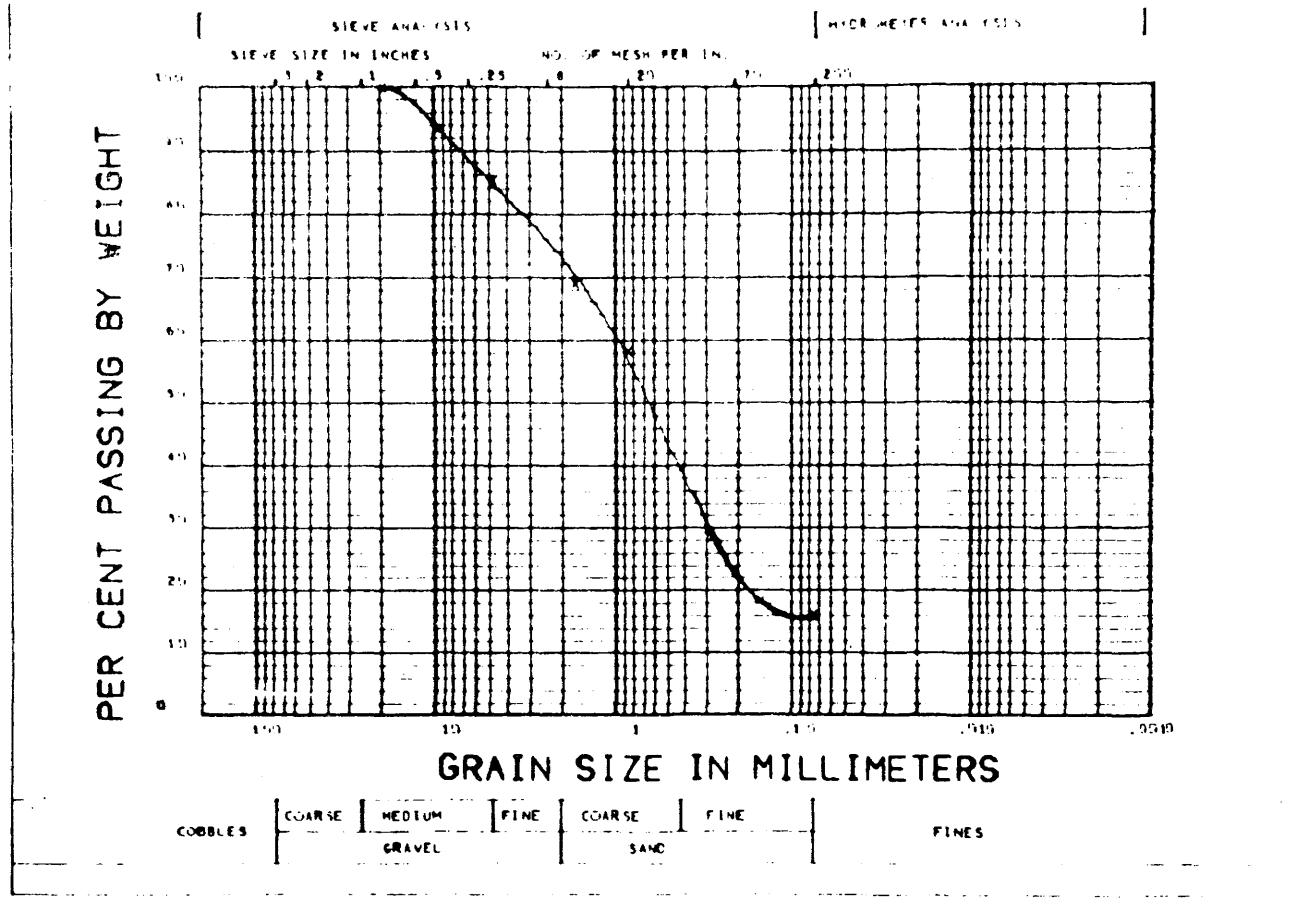
TYPE MATERIAL MEDIUM SAND AND GRAVEL, BROKEN BOULDER, BROWN

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

TAKEN BY RAYMOND INT. TESTED BY KLP

FIGURE 2F-67
GRAIN SIZE
TEST NO. B103-SS17
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B103 SS24 DATE 6/25/80

LOCATION BEAVER VALLEY ELEV 833.9

TYPE MATERIAL GRAY,MEDIUM TO COARSE SAND, TRACE GRAVEL

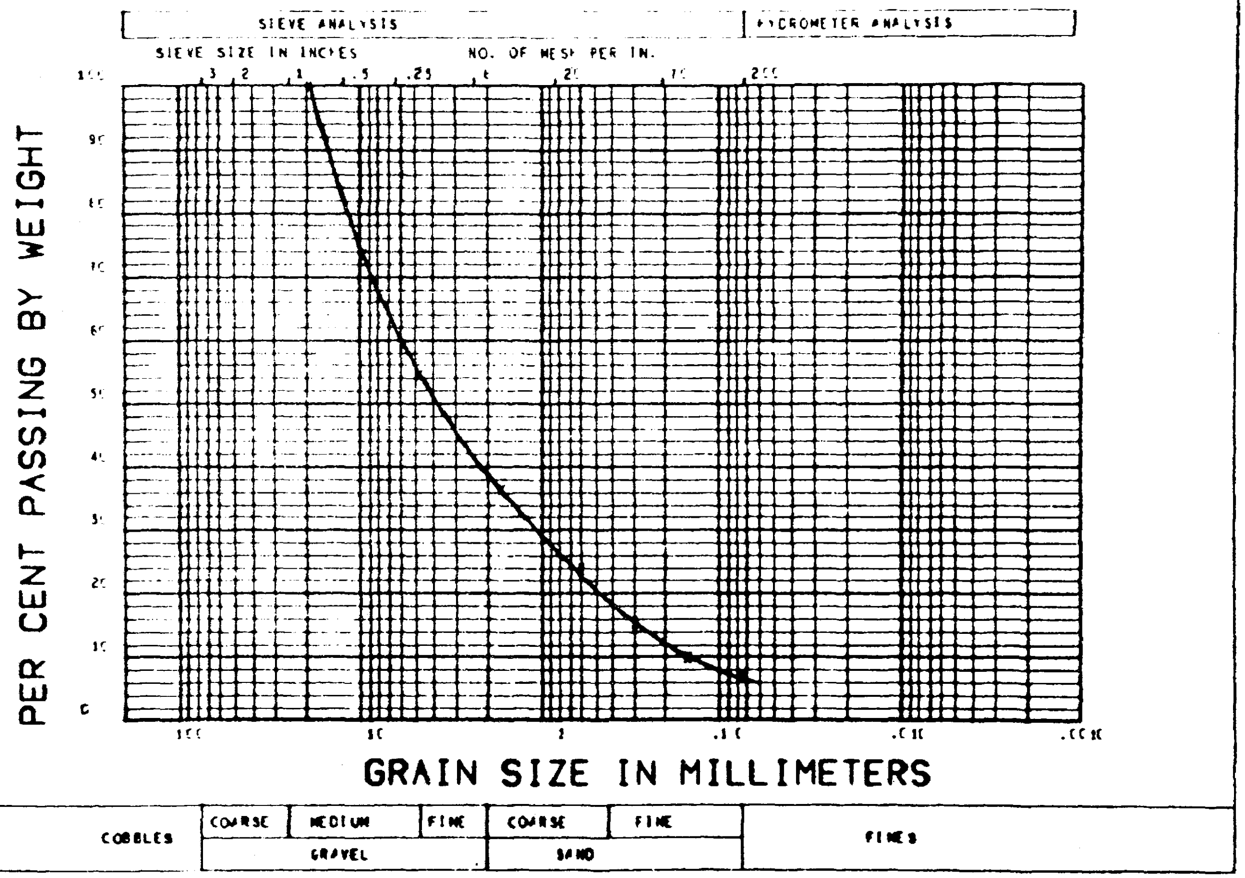
CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

TAKEN BY RAYMOND INT.TESTED BY KLP

FIGURE 2F-68
GRAIN SIZE
TEST NO- B103-SS24
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B104 SS4 DATE 5/5/[illegible]

LOCATION BEAVER VALLEY ELEV. 720 FT.

TYPE MATERIAL BROWN GRAVEL AND SAND

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10)= 35.5

PER CENT PASSING 200 SIEVE 7.1

WT. OF ORIG SAMPLE 242.5 WT. AFTER PREWASHING 225.5
WASHING LOSS 17.0

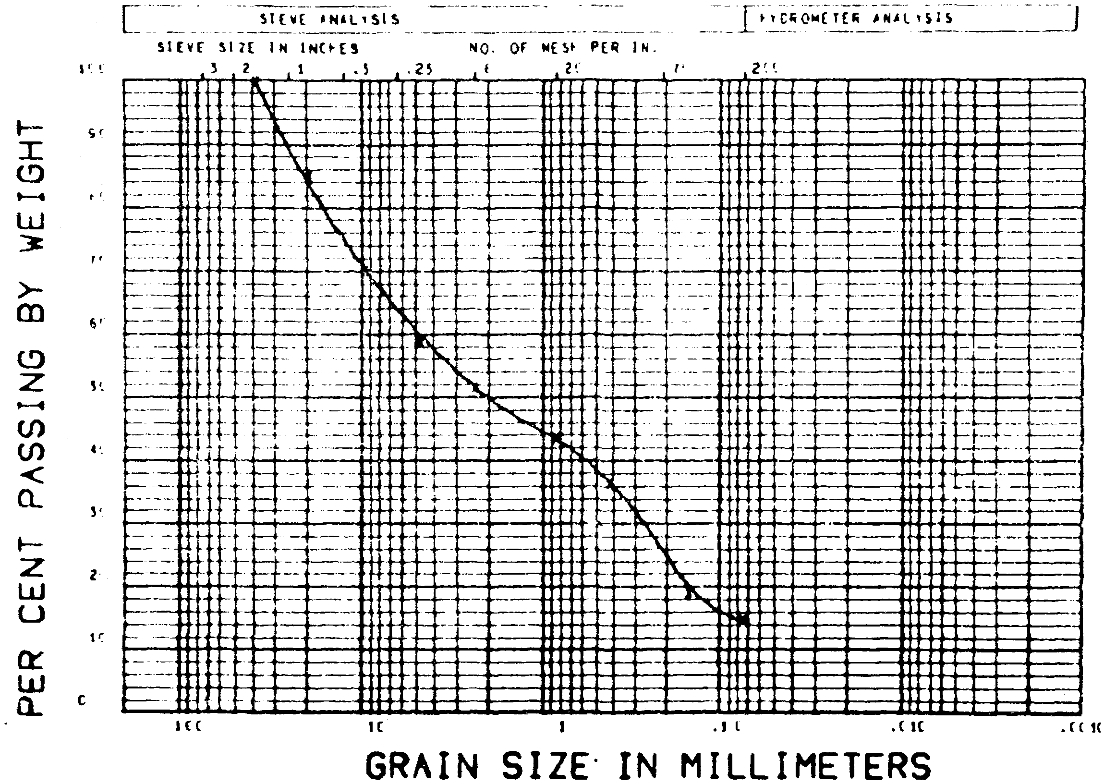
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.75	19.100	0.0	242.5	100.0
.375	9.520	63.6	178.9	73.7
4	4.699	46.5	132.4	54.5
12	1.651	44.3	88.1	36.3
30	0.595	30.5	57.6	23.7
50	0.295	20.4	37.2	15.3
100	0.147	13.0	24.2	10.0
200	0.074	7.0	17.2	7.1

WT. RETAINED ON PAN 0.2
WASHING LOSS 17.0
PAN TOTAL 17.2
TOTAL 242.5

FIGURE 2F-69
GRAIN SIZE
TEST NO. B104-SS4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	COARSE	MEDIUM	FINE	COARSE	FINE	FINES
	GRAVEL			SAND		

TEST NO. B104 SS6 DATE 5/5/80

LOCATION BEAVER VALLEY ELEV. 710 FT.

TYPE MATERIAL SAND AND GRAVEL

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 14.5

WT. OF ORIG SAMPLE 290.6 WT. AFTER PREWASHING 249.4
WASHING LOSS 41.2

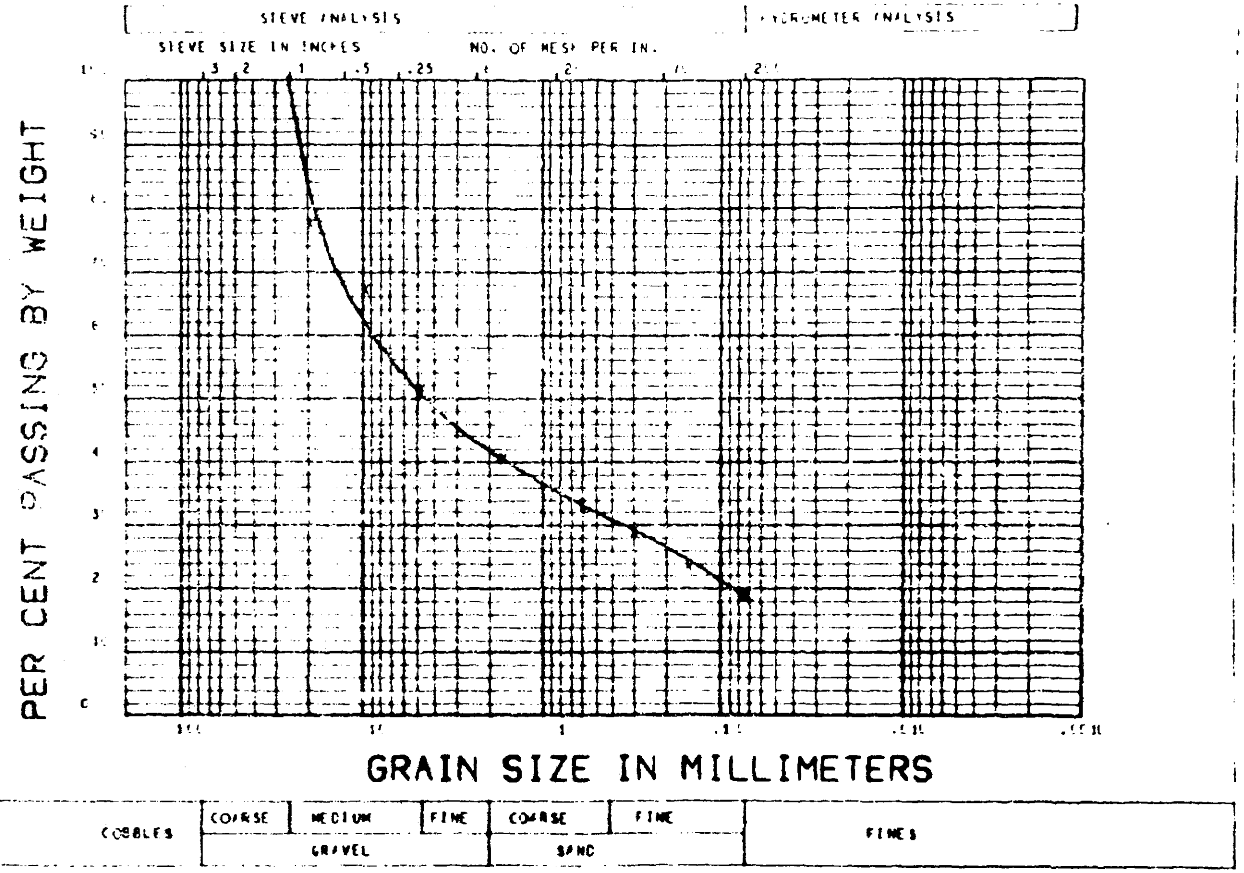
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	38.100	0.0	290.6	100.0
.75	19.100	43.4	247.2	85.1
.375	9.520	44.1	203.1	69.9
4	4.699	31.9	171.2	58.9
8	2.362	21.7	149.5	51.4
20	0.833	23.3	126.2	43.4
40	0.417	20.4	105.8	36.4
100	0.147	50.3	55.5	19.1
200	0.074	13.4	42.1	14.5

WT. RETAINED ON PAN 0.9
WASHING LOSS 41.2
PAN TOTAL 42.1
TOTAL 290.6

FIGURE 2F-70
GRAIN SIZE
TEST NO. B104-SS6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B104 SS7 DATE 5/5/80

LOCATION BEAVER VALLEY ELEV. 7?5 FT.

TYPE MATERIAL GRAVEL, SOME SAND

CLIENT DUQUESNE LIGHT COMPANY JOB NO [illegible]

DRILLER RAYMOND TESTED BY RLP

UNIFORMITY COEFFICIENT (D60/D10) =

PER CENT PASSING 200 SIEVE [illegible]

WT. OF ORIG SAMPLE 274.4 WT. AFTER PREWASHING 223.4

WASHING LOSS 51.0

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.	25.400	0.0	275.3	100.0
.75	19.100	61.3	214.0	77.7
.375	9.525	28.5	185.5	67.4
4	4.655	44.1	141.4	51.4
12	1.651	30.2	111.2	40.4
30	.5?5	19.3	91.6	33.4
50	.295	11.9	[illegible]	2[illegible]
100	.147	14.0	65.2	23.7
200	.074	13.3	51.9	18.[illegible]

WT. RETAINED ON PAN [illegible]

WASHING LOSS 51.[illegible]

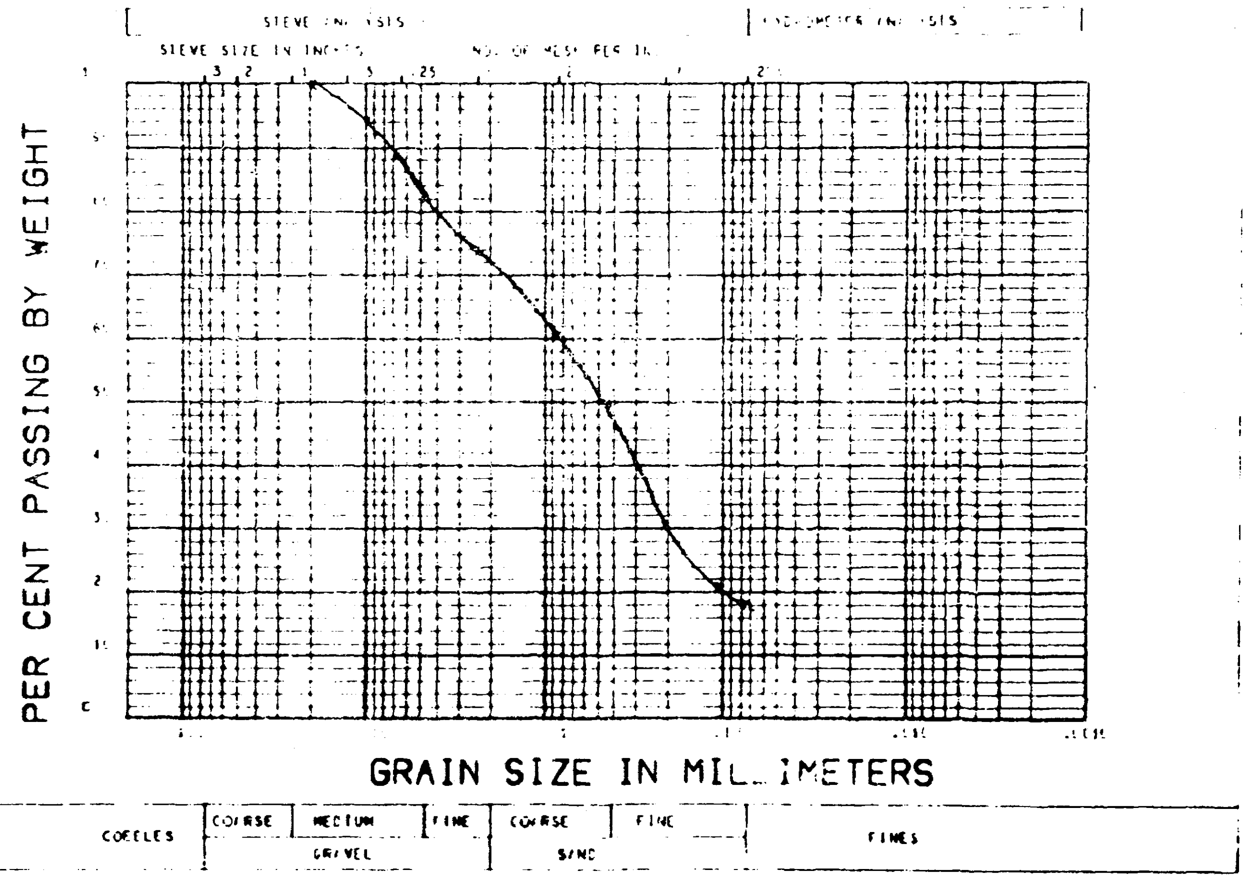
PAN TOTAL 51.[illegible]

TOTAL 275.3

FIGURE 2F-71
GRAIN SIZE
TEST NO. B104-SS7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B1[illegible]4 SS8 DATE 5/5/6[illegible]

LOCATION BEAVER VALLEY ELEV. 7[illegible] FT.

TYPE MATERIAL SAN, SOME GRAVEL

CLIENT DUQUESNE LIGHT COMPANY JOB NO 1[illegible]

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10) = ---

PER CENT PASSING 200 SIEVE 1[illegible].[illegible]

WT. OF ORIG SAMPLE 22[illegible].4 WT. AFTER PREWASHING 1[illegible].5
WASHING LOSS 41.[illegible]

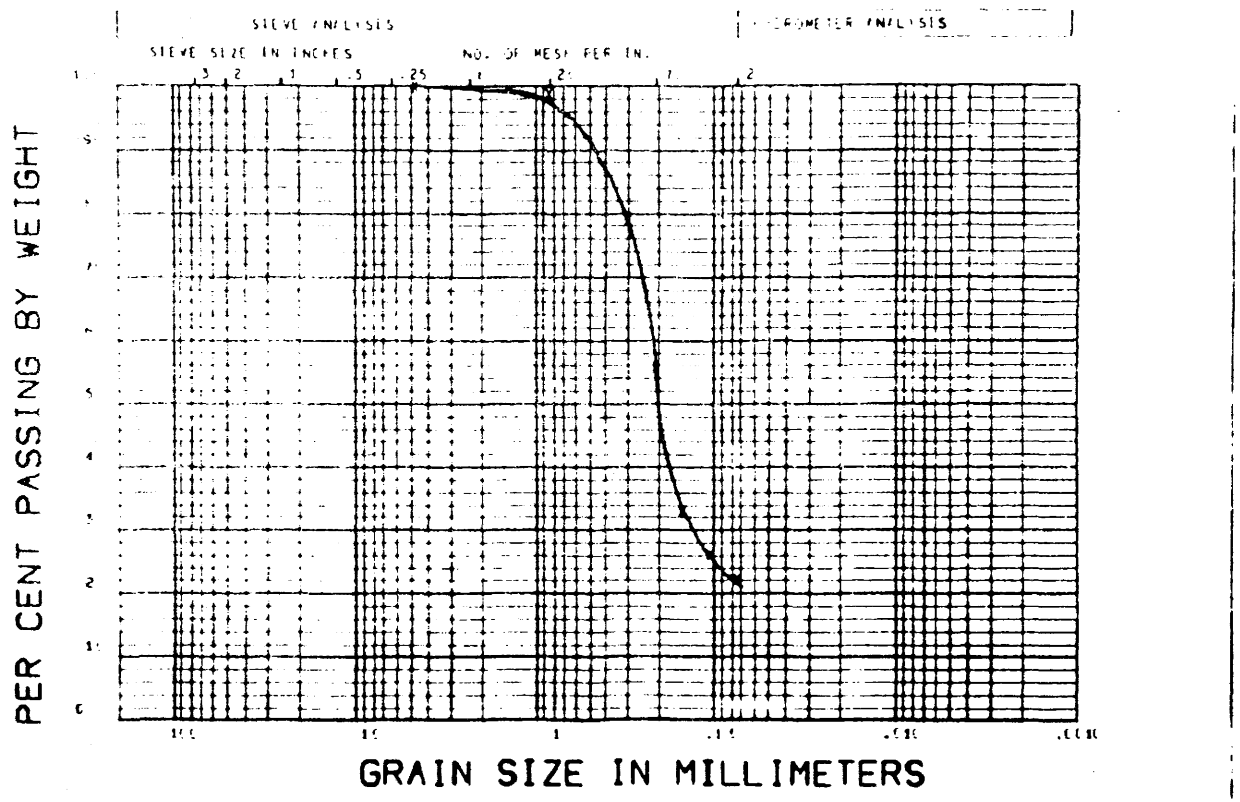
SIEVE OF SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.75	19.1[illegible]	0.0	22[illegible].[illegible]	100.0
.375	[illegible].520	12.5	216.2	[illegible].4
4	4.6[illegible]	2[illegible].[illegible]	1[illegible].3	[illegible]2.2
8	2.362	1[illegible].4	1[illegible].[illegible]	73.[illegible]
20	[illegible].[illegible]33	3[illegible].4	13[illegible].5	6[illegible].5
40	[illegible].417	25.0	113.5	4[illegible].5
70	0.2[illegible]	43.6	6[illegible].[illegible]	3[illegible].[illegible]
140	[illegible].1[illegible]	22.6	47.3	2[illegible].[illegible]
200	[illegible].174	[illegible].[illegible]	41.4	1[illegible].[illegible]

WT. RETAINED ON PAN [illegible].5
WASHING LOSS 4[illegible].[illegible]
PAN TOTAL 41.4
TOTAL 22[illegible].1

FIGURE 2F-72
GRAIN SIZE
TEST NO. B104-SS8
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	COARSE	MEDIUM	FINE	COARSE	FINE	FINES
	GRAVEL			SAND		

TEST NO. B104 SS11 DATE 5/5/6[illegible]

LOCATION BEAVER VALLEY ELEV. 6[illegible]5 FT.

TYPE MATERIAL SAND

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11[illegible]

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10) = ---

PER CENT PASSING 200 SIEVE 22.1

WT. OF ORIG SAMPLE 203.2 WT. AFTER PREWASHING 15[illegible].[illegible]
WASHING LOSS 44.4

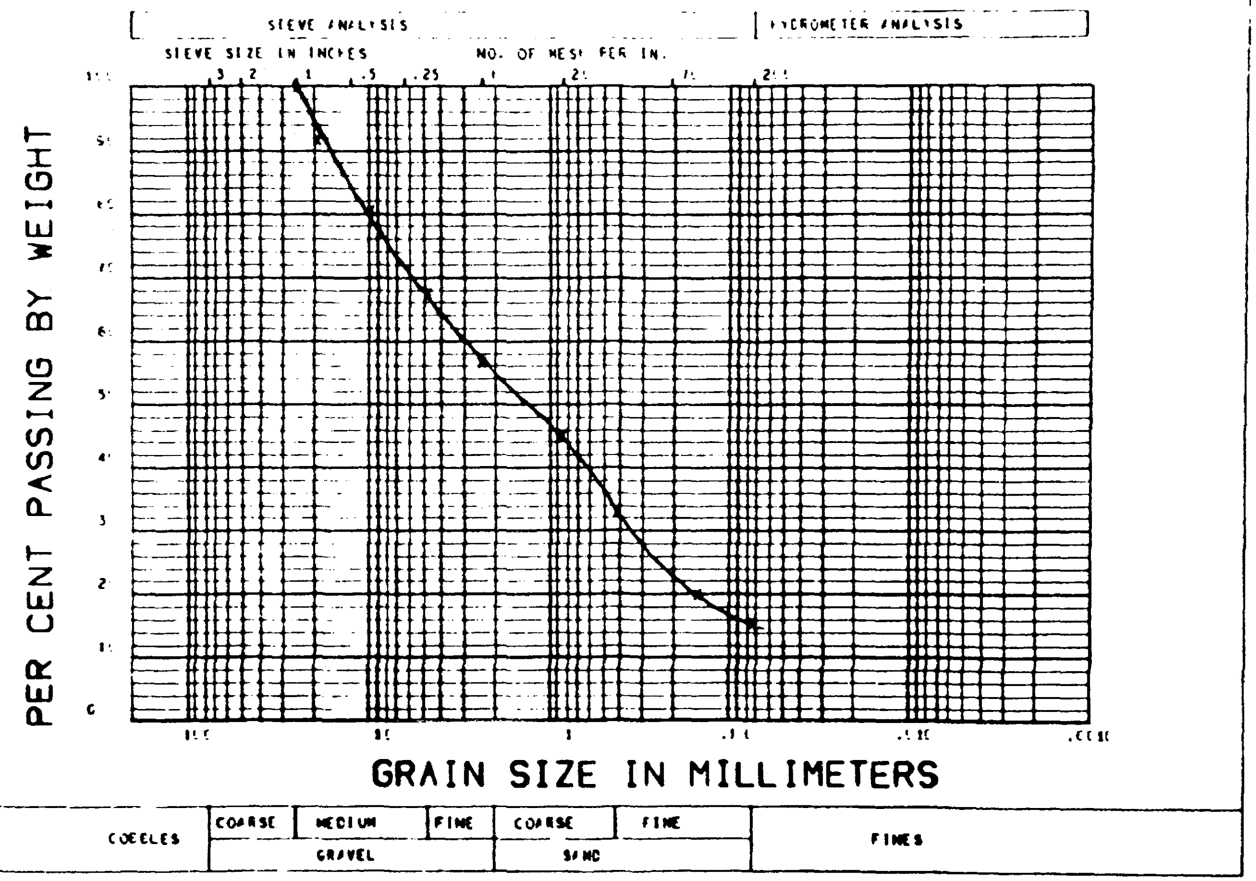
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
4	4.6[illegible]	0.0	203.5	100.0
20	0.833	2.1	201.[illegible]	99.[illegible]
50	0.295	40.3	161.3	79.2
70	0.210	48.0	113.5	55.7
100	0.147	46.5	67.0	32.9
140	0.104	14.2	52.[illegible]	25.[illegible]
200	0.074	7.7	45.1	22.1

WT. RETAINED ON PAN 0.7
WASHING LOSS 44.4
PAN TOTAL 45.1
TOTAL 203.5

FIGURE 2F-73
GRAIN SIZE
TEST NO. B104-SS11
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B104 SS12 DATE 5/5/66

LOCATION BEAVER VALLEY ELEV. 666 FT.

TYPE MATERIAL SAND AND GRAVEL

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11755

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 15.5

WT. OF ORIG SAMPLE 306.6 WT. AFTER PREWASHING 261.6
WASHING LOSS 46.6

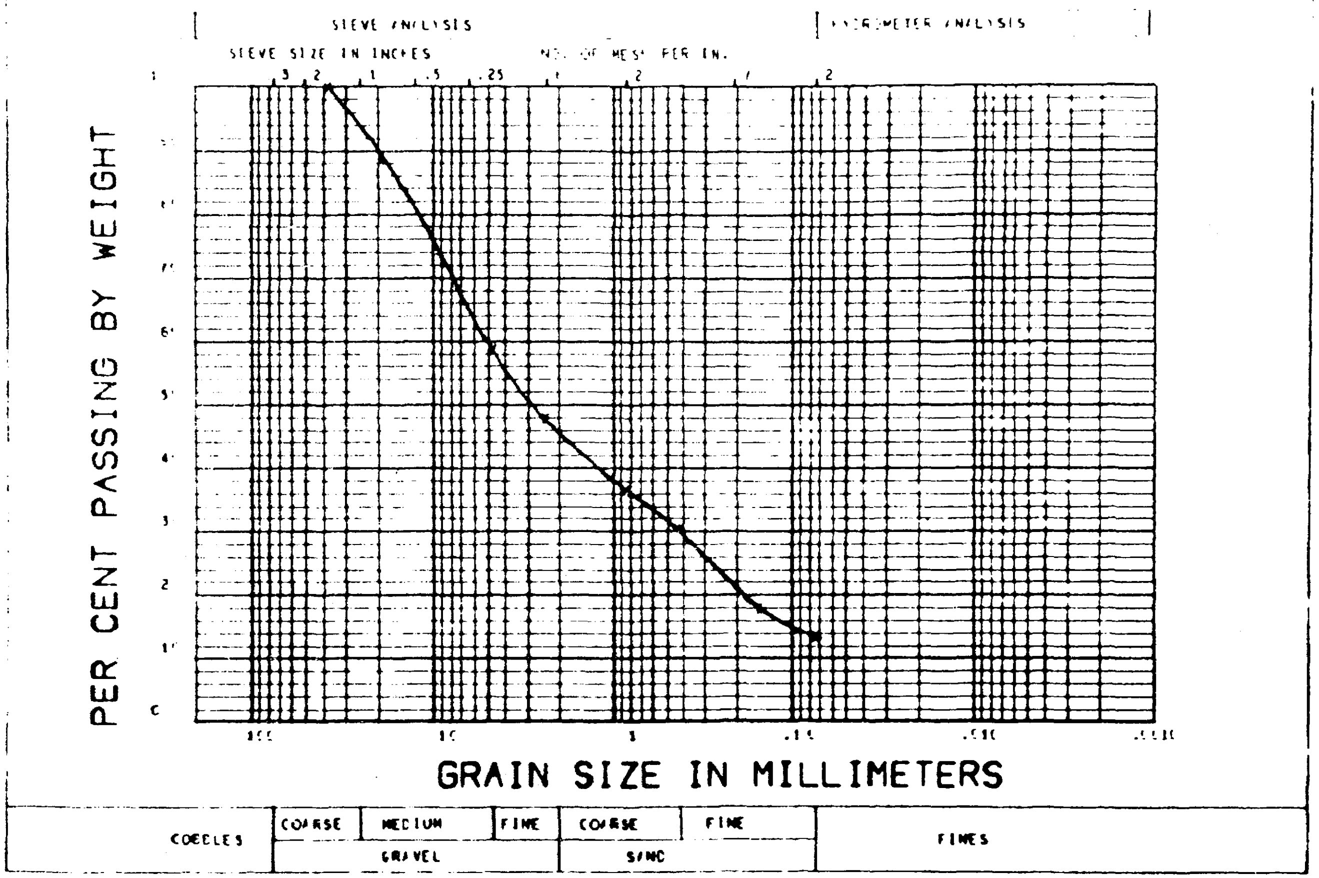
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.	25.400	0.0	305.1	100.0
.75	19.100	25.5	283.6	93.0
.375	9.520	34.6	245.0	80.6
4	4.699	40.6	204.4	67.4
8	2.362	34.0	174.4	56.4
20	0.833	35.7	134.7	44.5
40	0.417	37.2	101.5	32.6
100	0.147	40.1	61.4	19.5
200	0.074	13.6	47.0	15.5

WT. RETAINED ON PAN 1.0
WASHING LOSS 46.0
PAN TOTAL 47.0
TOTAL 305.1

FIGURE 2F-74
GRAIN SIZE
TEST NO. B104-SS12
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B104 SS13 DATE 5/5/66

LOCATION BEAVER VALLEY ELEV. 675 FT.

TYPE MATERIAL SAND AND GRAVEL

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

DRILLER RAYMOND TESTED BY RLP

UNIFORMITY COEFFICIENT (D60/D10): ---

PER CENT PASSING 200 SIEVE 13.4

WT. OF ORIG SAMPLE 340.0 WT. AFTER PREWASHING 256.5

WASHING LOSS 44.3

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	38.100	0.0	341.0	100.0
.75	19.100	38.7	303.1	88.7
.375	9.520	49.5	253.6	74.2
4	4.699	53.3	200.3	58.6
8	2.362	37.2	163.1	47.7
20	0.833	39.2	123.9	36.2
40	0.417	20.6	103.3	30.2
100	0.147	42.3	61.0	17.9
200	0.074	15.2	45.8	13.4

WT. RETAINED ON PAN 1.5

WASHING LOSS 44.3

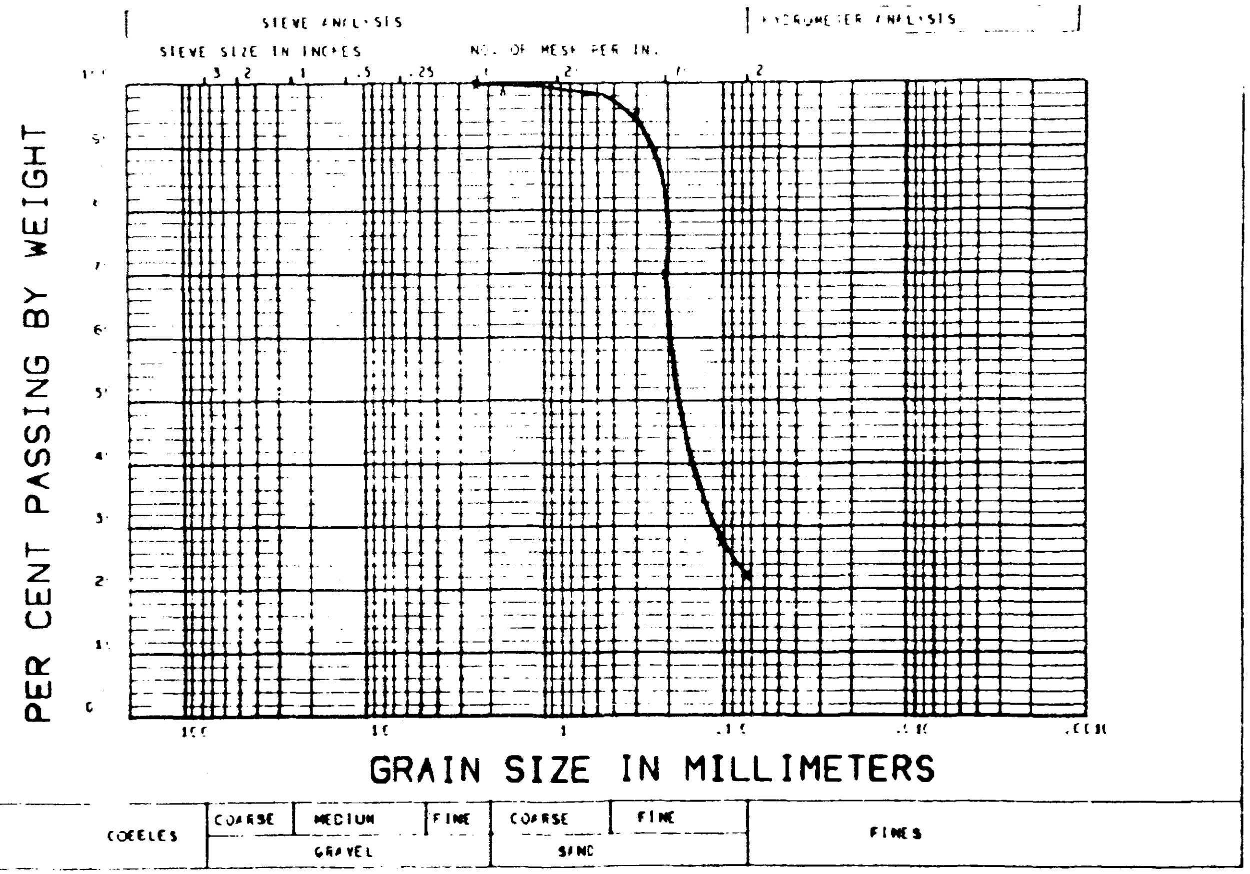
PAN TOTAL 45.8

TOTAL 341.0

FIGURE 2F-75
GRAIN SIZE
TEST NO. B104-SS13
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B104 SS18 DATE 5/6/81

LOCATION BEAVER VALLEY ELEV. 695 FT.

TYPE MATERIAL SAND

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 22.2

WT. OF ORIG SAMPLE 227.7 WT. AFTER PREWASHING 178.5
WASHING LOSS 48.8

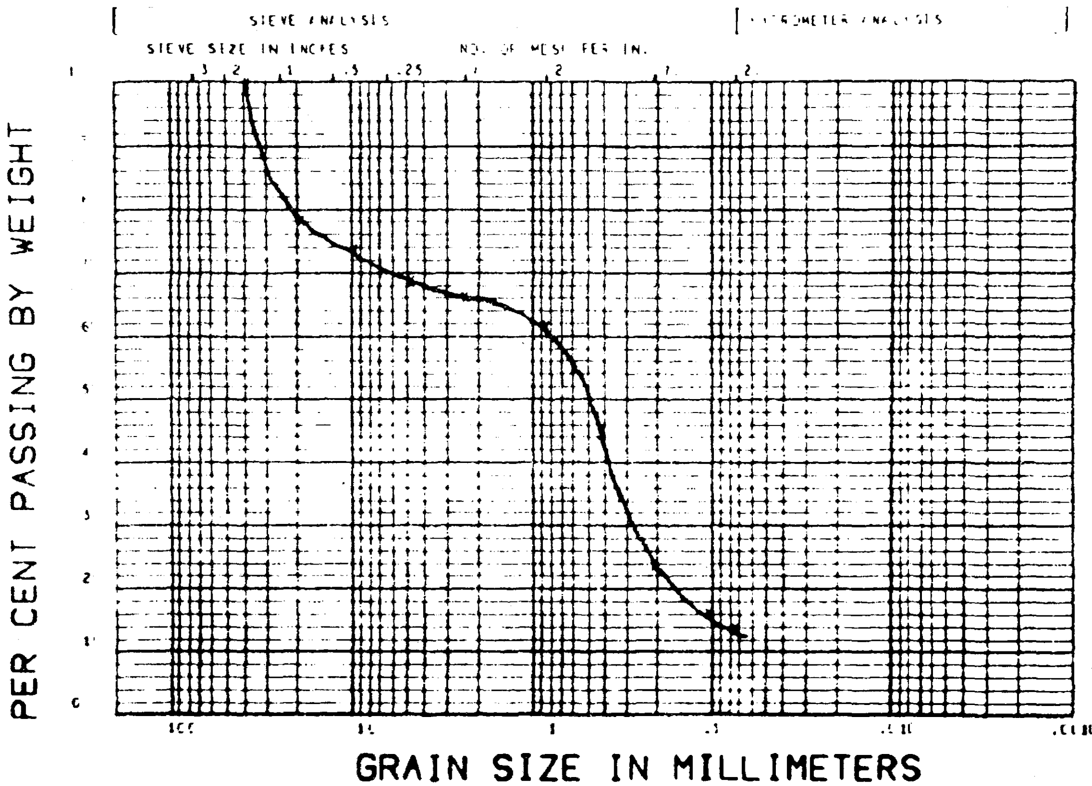
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	228.3	100.0
12	1.651	1.6	226.7	99.3
50	0.295	10.4	216.3	94.7
70	0.208	57.3	159.0	69.6
100	0.147	67.3	91.7	40.2
140	0.104	25.1	62.6	27.4
200	0.074	12.0	50.6	22.2

WT. RETAINED ON PAN 1.8
WASHING LOSS 48.8
PAN TOTAL 50.6
TOTAL 228.3

FIGURE 2F-76
GRAIN SIZE
TEST NO. B104-SS18
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	GRAVEL			SAND		FINES
	COARSE	MEDIUM	FINE	COARSE	FINE	

TEST NO. B104 SS20 DATE 5/5/68

LOCATION BEAVER VALLEY ELEV. [illegible] FT.

TYPE MATERIAL SAND AND GRAVEL

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11755

DRILLER RAYMOND TESTED BY RLP

UNIFORMITY COEFFICIENT (D60/D10) = ---

PER CENT PASSING 200 SIEVE 13.5

WT. OF ORIG SAMPLE 247.1 WT. AFTER PREWASHING 215.1

WASHING LOSS 32.8

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	[illegible]	0.0	247.1	100.0
.75	19.100	53.4	193.7	78.4
.375	9.520	12.0	181.7	73.5
4	4.655	12.6	169.1	68.4
8	2.362	6.0	163.1	66.0
20	0.833	11.0	152.1	61.6
40	0.417	42.5	109.6	44.4
70	0.210	51.4	58.2	23.6
140	0.104	18.7	39.5	16.0
200	0.074	6.1	33.4	13.5

WT. RETAINED ON PAN 0.6

WASHING LOSS 32.8

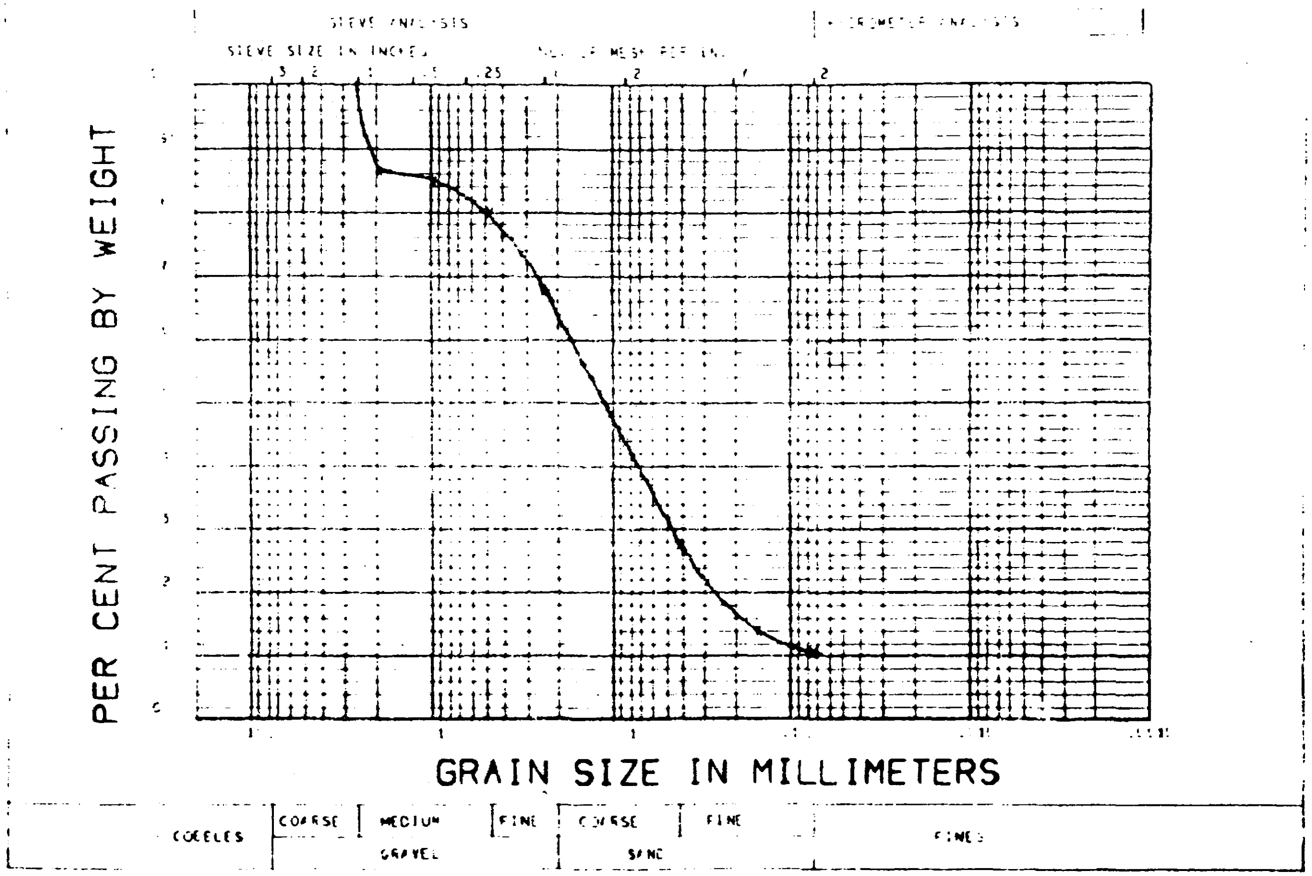
PAN TOTAL 33.4

TOTAL 247.1

FIGURE 2F-77
GRAIN SIZE
TEST NO. B104-SS20
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B104 SS21 DATE 5/5/81

LOCATION BEAVER VALLEY ELEV. 635 FT.

TYPE MATERIAL SAND, WITH GRAVEL

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

DRILLER RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10) = ---

PER CENT PASSING 200 SIEVE 10.4

WT. OF ORIG SAMPLE 181.4 WT. AFTER PREWASHING 162.6

WASHING LOSS 19.5

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.	25.400	0.0	181.7	100.0
.75	19.100	24.5	157.2	86.5
.375	9.525	3.0	154.2	84.9
4	4.699	9.1	145.1	79.9
8	2.362	22.2	122.6	67.8
25	0.833	43.7	79.2	43.6
45	0.417	29.6	49.6	27.3
100	0.147	24.4	25.2	13.9
200	0.074	6.3	18.9	10.4

WT. RETAINED ON PAN 0.4

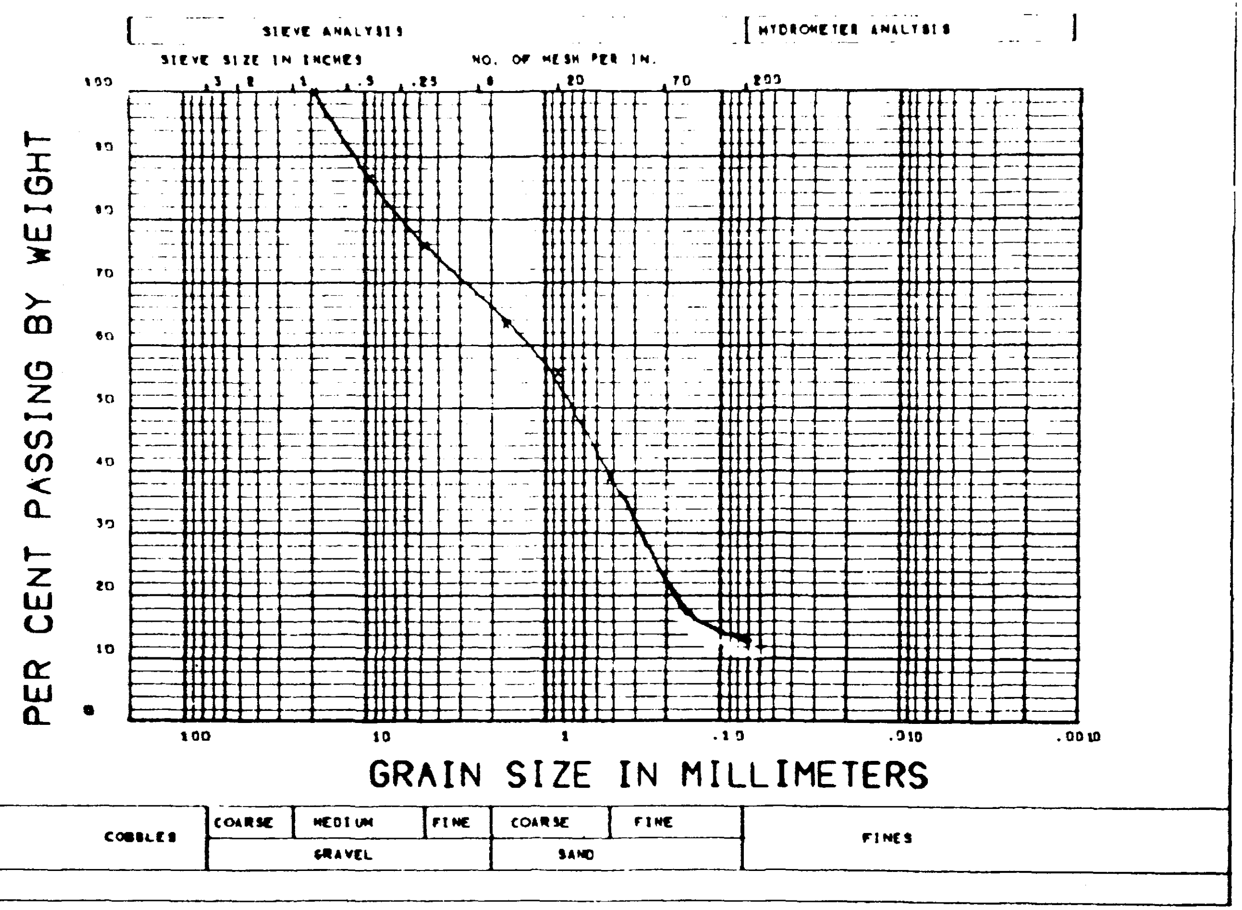
WASHING LOSS 18.5

PAN TOTAL 18.9

TOTAL 181.7

FIGURE 2F-78
GRAIN SIZE
TEST NO. B104-SS21
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS2 DATE 6/8/81

LOCATION BEAVER VALLEY ELEV 691.50

TYPE MATERIAL FINE TO COARSE BROWN SAND AND GRAVEL, SILTY

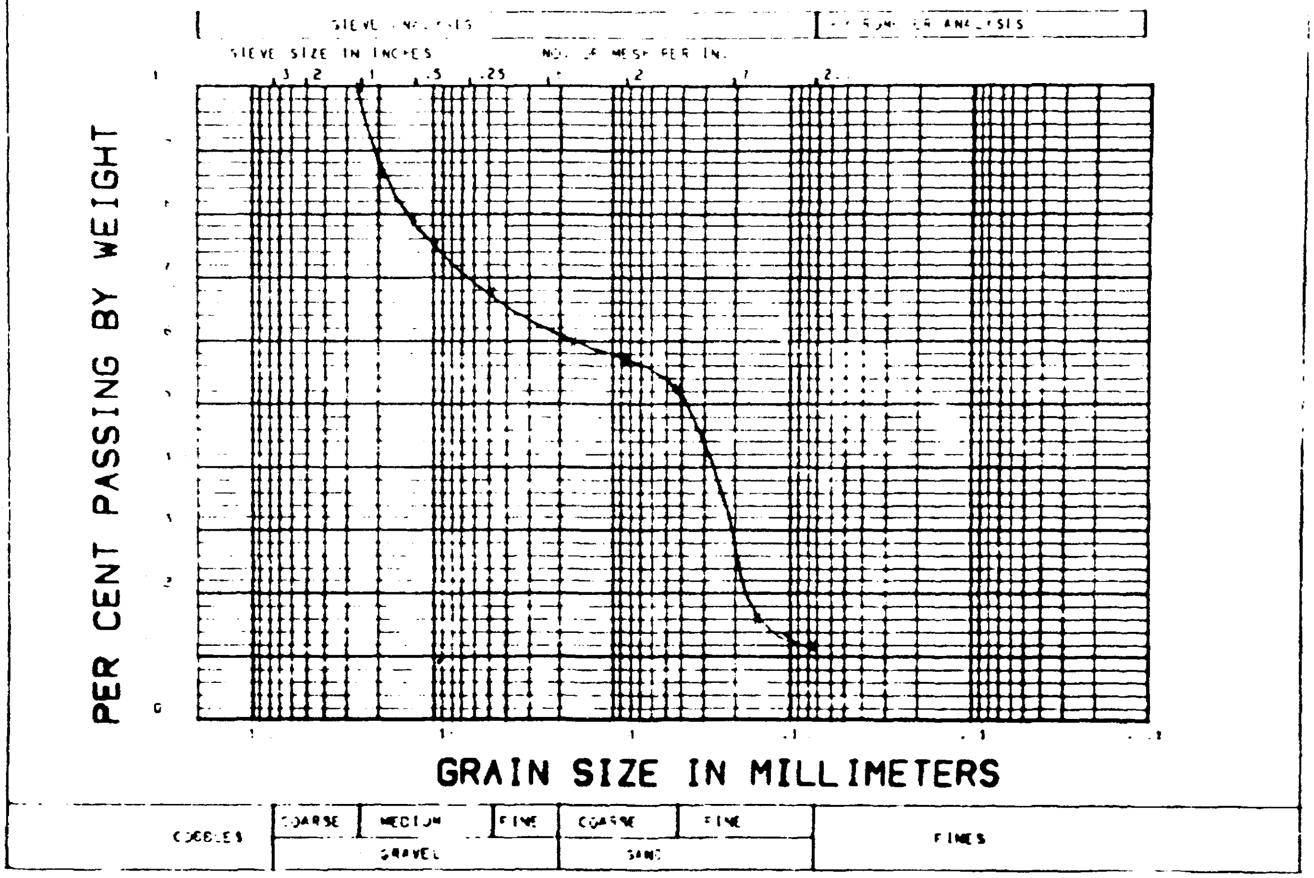
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-79
GRAIN SIZE
TEST NO. B108-SS2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS4 DATE 6/8/6-

LOCATION BEAVER VALLEY ELEV 6--

TYPE MATERIAL FINE TO COARSE BROWN SAND AND GRAVEL,SILTY

CLIENT DUQUESNE LIGHT CO JOB NO 1175-

TAKEN BY RAYMOND TESTED BY RLP

UNIFORMITY COEFFICIENT (D6./D1.) = ---

PER CENT PASSING 2.. SIEVE 11.7

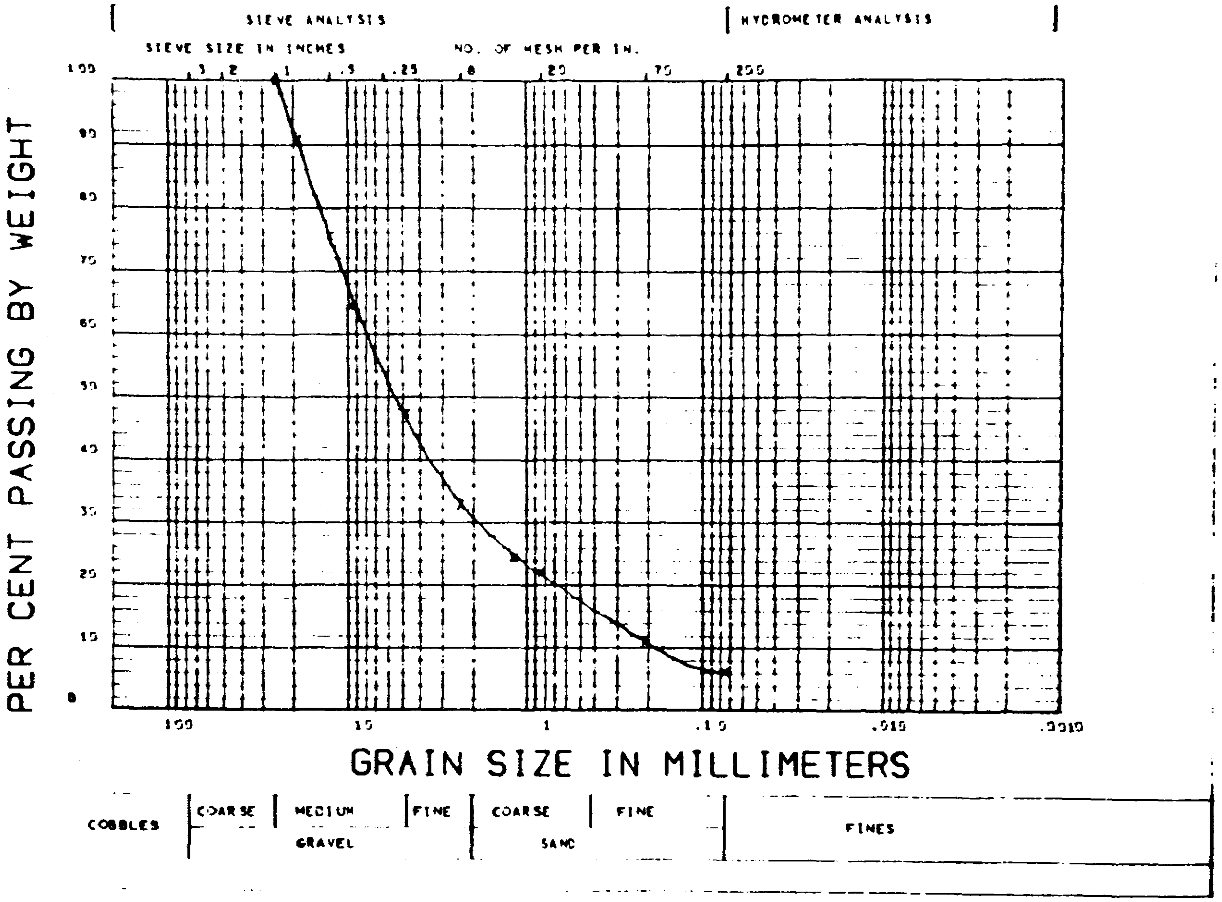
WT. OF ORIG SAMPLE 294.6 WT. AFTER PREWASHING 262.6
WASHING LOSS 32..

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.	25.4..	...	295..	1....
.75	19.1..	4..5	254.5	86.3
.5	12.7..	19.7	234.8	79.6
.375	9.52.	13.2	221.6	75.1
4	4.695	22.1	199.5	67.6
12	1.651	23.3	176.2	59.7
2	..833	8.6	167.6	56.8
4	..417	12.7	154.9	52.5
1	..147	1.7.7	47.2	16.
2.	...74	12.8	34.4	11.7

WT. RETAINED ON PAN 2.4
WASHING LOSS 32.
PAN TOTAL 34.4
TOTAL 295.

FIGURE 2F-80
GRAIN SIZE
TEST NO. B108-SS4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS5 DATE 6/8/66

LOCATION BEAVER VALLEY ELEV 675.00

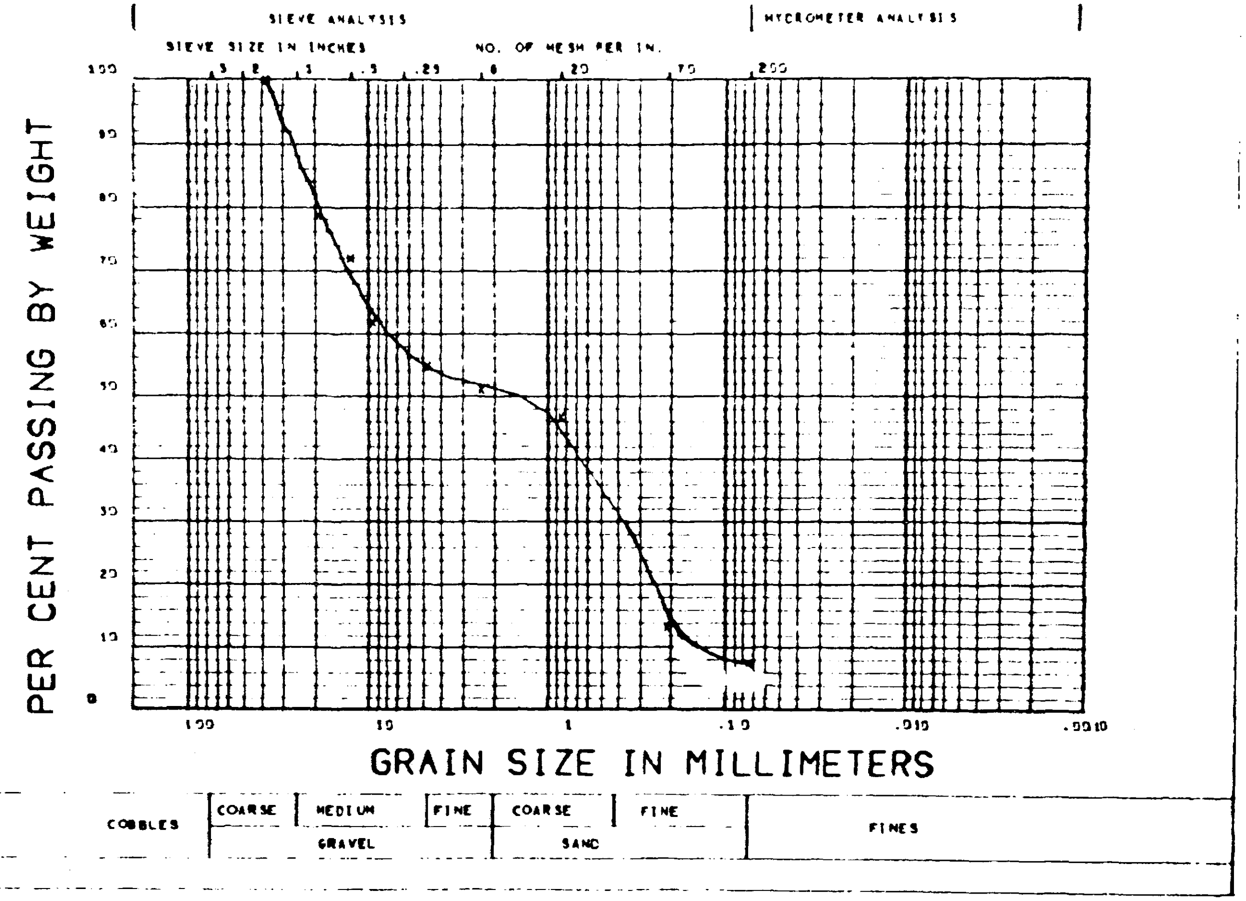
TYPE MATERIAL FINE TO COARSE BROWN SAND AND GRAVEL, SILTY

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-81
GRAIN SIZE
TEST NO- B108-SS5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS6 DATE 6/8/81

LOCATION BEAVER VALLEY ELEV 670.00

TYPE MATERIAL FINE TO COARSE BROWN SAND AND GRAVEL,SILTY

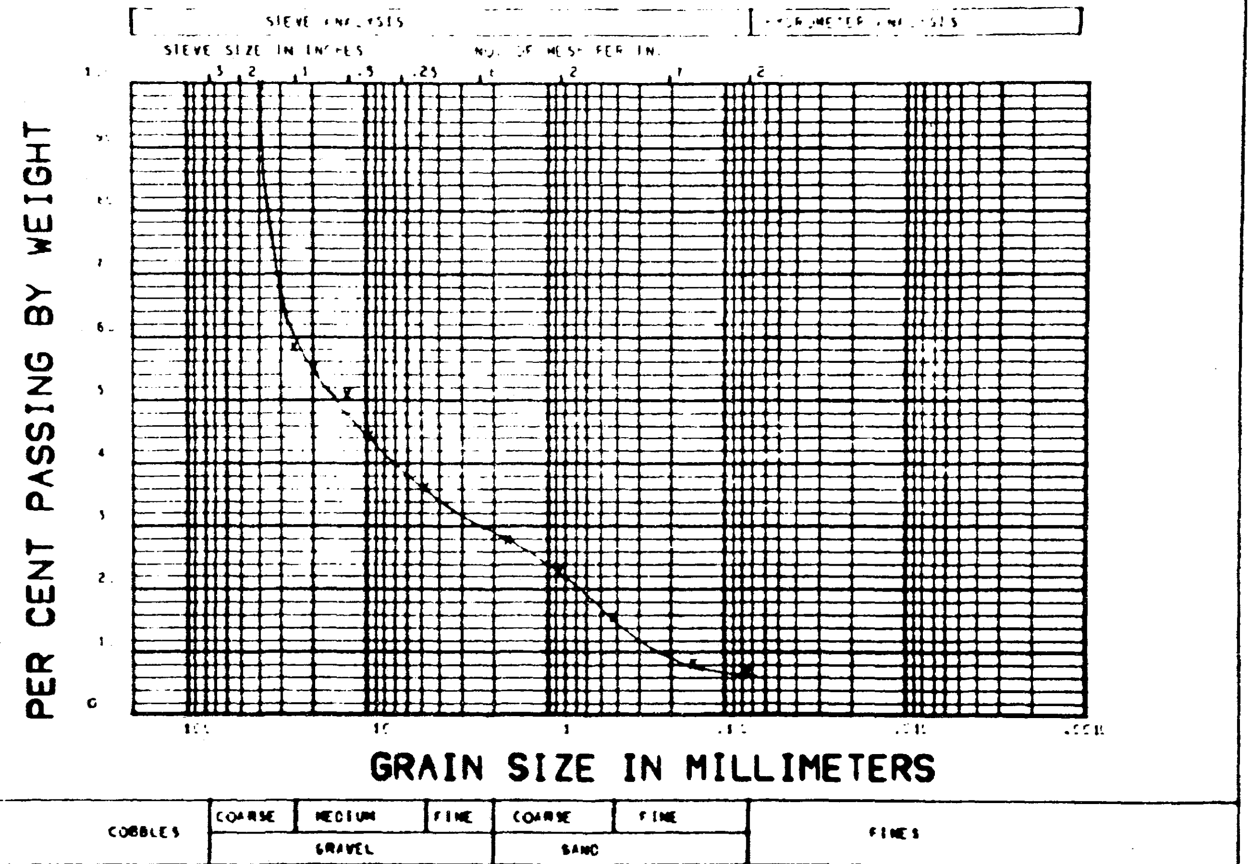
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-82
GRAIN SIZE
TEST NO. B108-SS6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION

REV. 0 (1/82)



TEST NO. B1.8 SS7 DATE 6/6/6?

LOCATION BEAVER VALLEY ELEV 665...

TYPE MATERIAL FINE TO COARSE BROWN SAND AND GRAVEL.SILTY

CLIENT DUQUESNE LIGHT CO JOB NO 117..

TAKEN BY RAYMOND TESTED BY RLP

UNIFORMITY COEFFICIENT (D60/D10)= 129.2

PER CENT PASSING 200 SIEVE 6.?

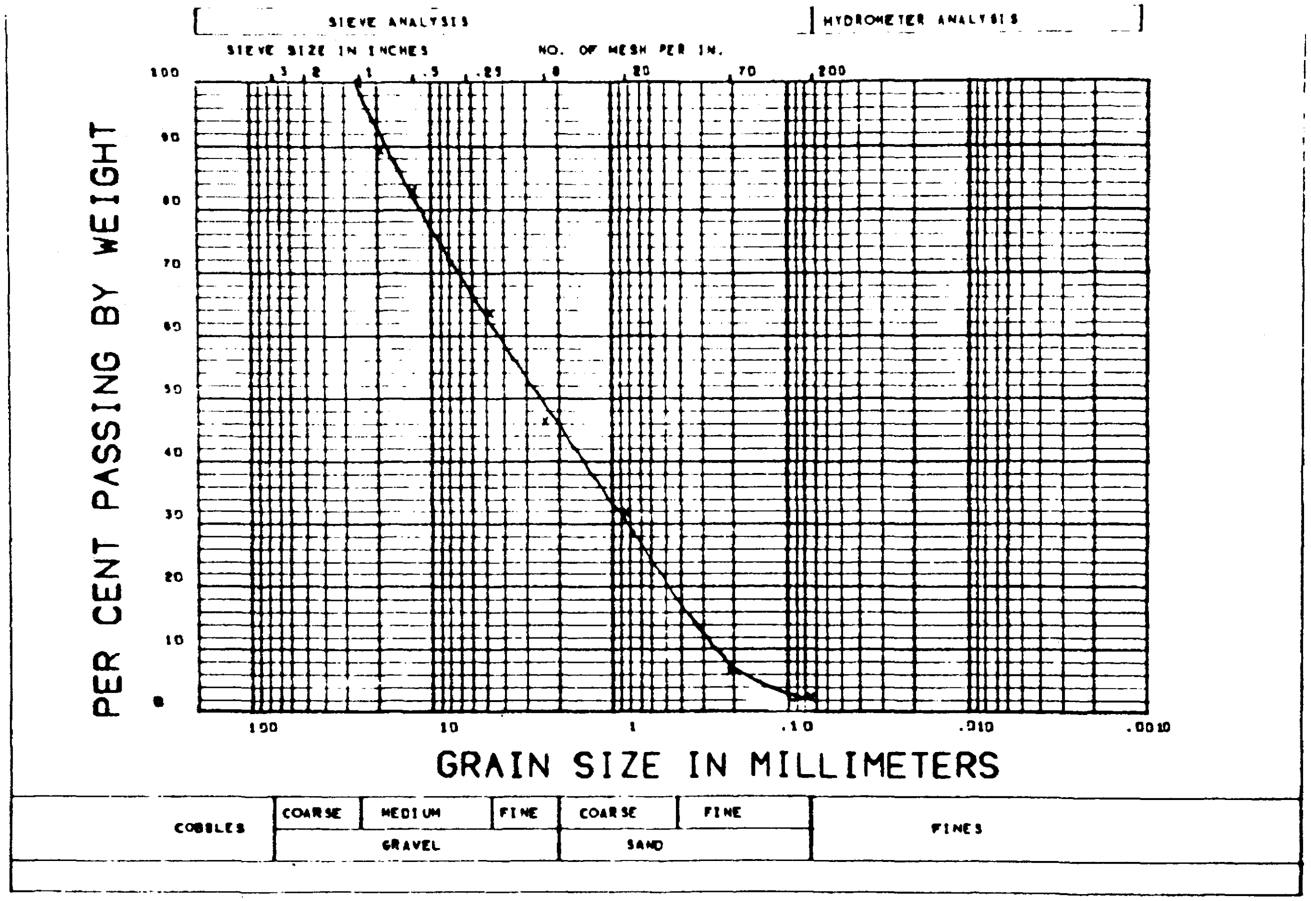
WT. OF ORIG SAMPLE 2?5.3 WT. AFTER PREWASHING 26?.?
WASHING LOSS 17.3

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	38.100	0.0	284.6	100.0
1.	25.400	116.6	168.0	59.5
.75	19.050	9.2	158.8	55.1
.5	12.700	12.1	144.7	50.8
.375	9.525	18.6	126.1	44.3
4	4.659	22.9	103.2	36.2
12	1.651	24.0	79.2	27.?
20	0.833	14.4	64.8	22.?
40	0.417	20.4	44.4	15.6
100	0.147	21.0	23.4	?.2
200	0.074	4.1	19.3	6.?

WT. RETAINED ON PAN 2..
WASHING LOSS 17.3
PAN TOTAL 19.3
TOTAL 284.?

FIGURE 2F-83
GRAIN SIZE
TEST NO. B108-SS7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS9 DATE 8/8/66

LOCATION BEAVER VALLEY ELEV 854.50

TYPE MATERIAL MEDIUM TO COARSE SAND, TRACE SILT AND GRAVEL

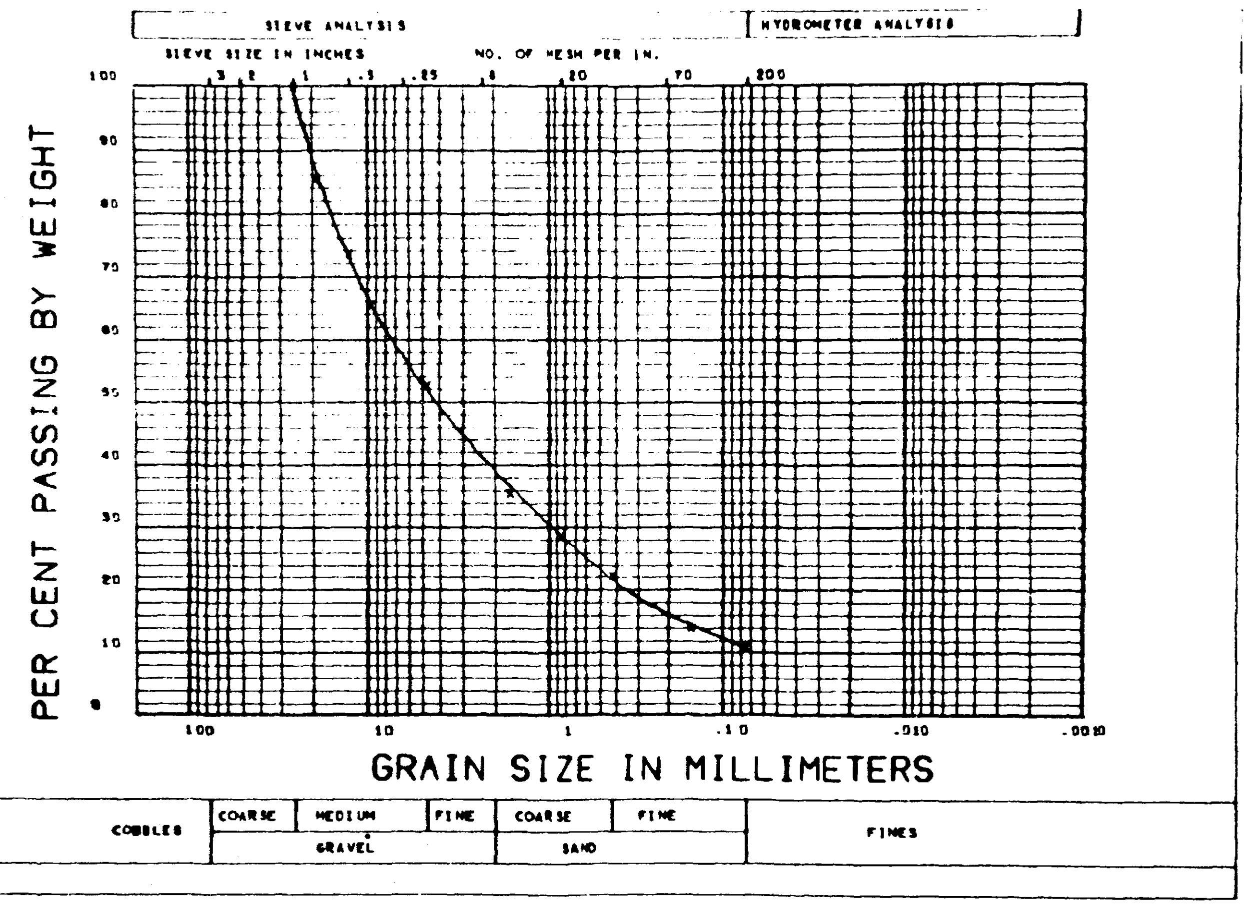
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-84
GRAIN SIZE
TEST NO. B108-SS9
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS10 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 649.50

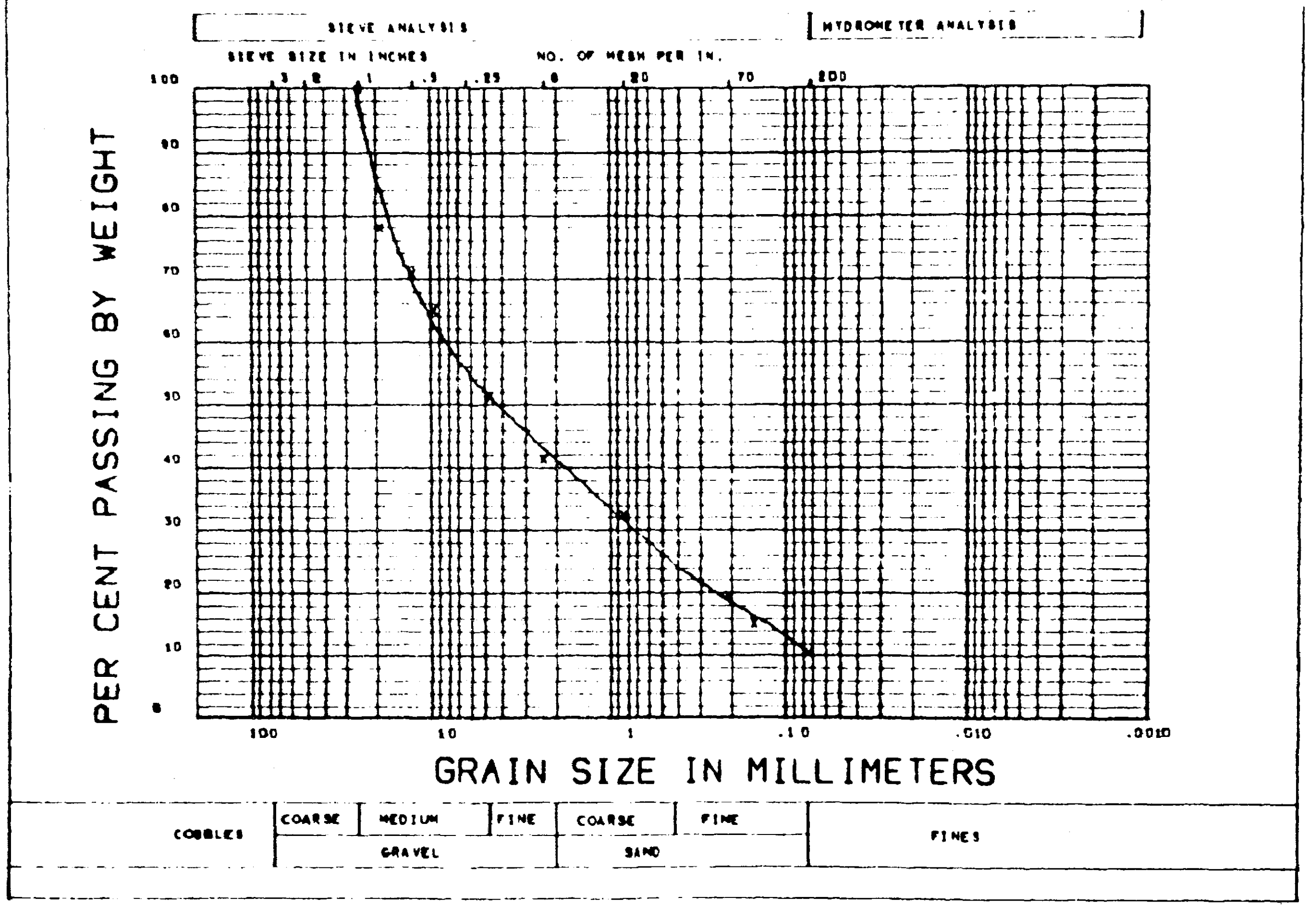
TYPE MATERIAL MEDIUM TO COARSE SAND, TRACE SILT AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-85
GRAIN SIZE
TEST NO. B108-SS10
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS12 DATE [illegible]

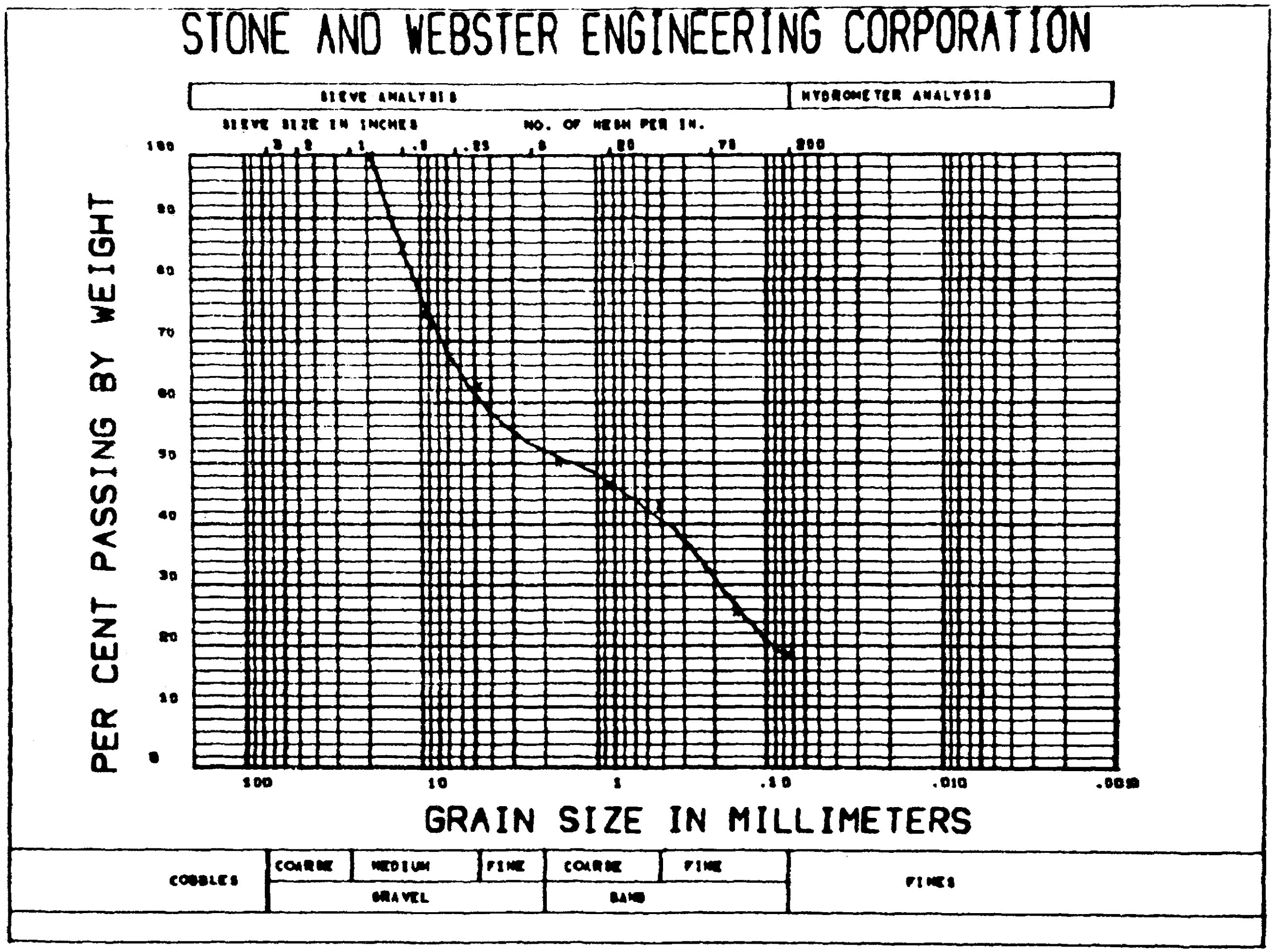
LOCATION BEAVER VALLEY ELEV [illegible].50

TYPE MATERIAL MEDIUM TO COARSE SAND, TRACE SILT AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-86
GRAIN SIZE
TEST NO. B108-SS12
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



TEST NO. B108 SS13 DATE [illegible]

LOCATION BEAVER VALLEY ELEV [illegible]

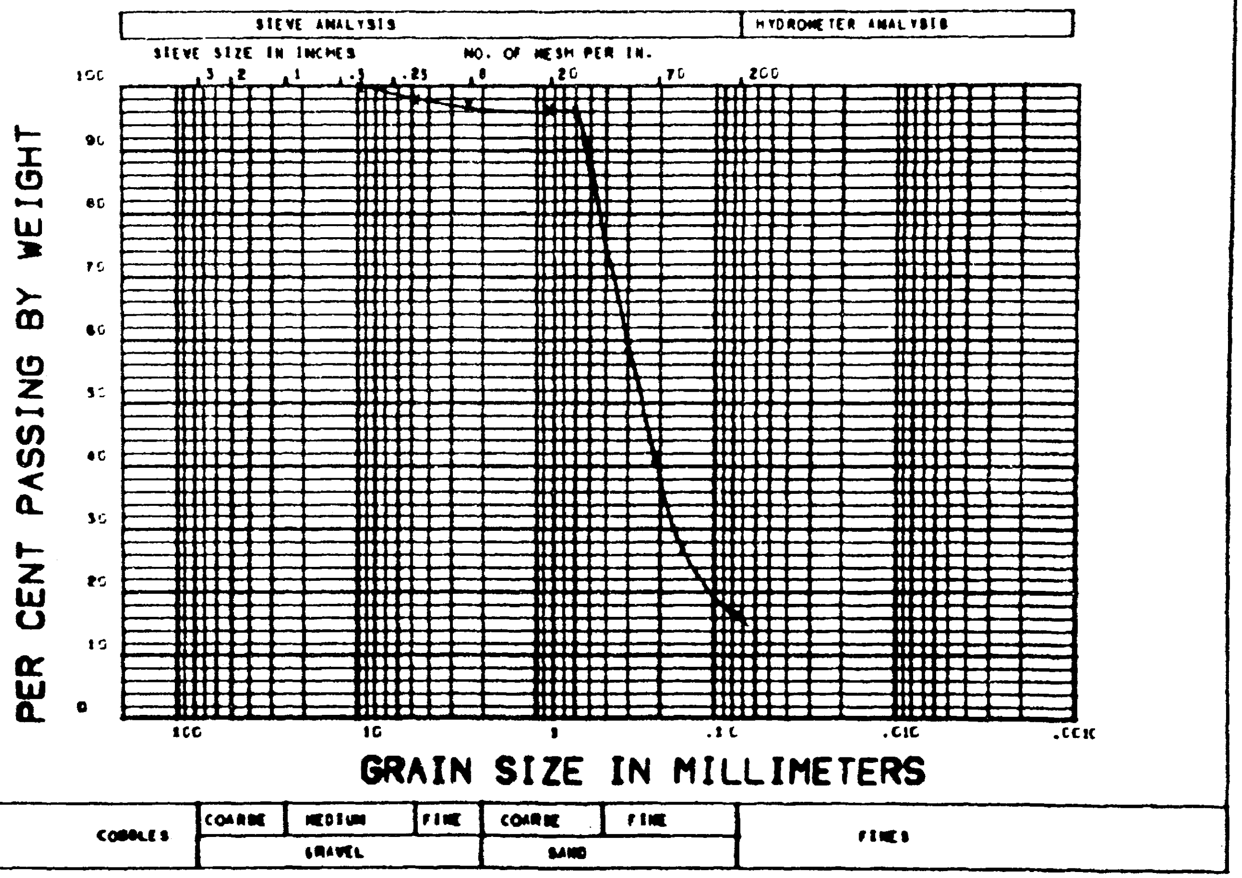
TYPE MATERIAL GRAY FINE SAND WITH SILT AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-87
GRAIN SIZE
TEST NO. B108-SS13
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 SS14 DATE 6/8/80

LOCATION BEAVER VALLEY ELEV 629.50

TYPE MATERIAL MEDIUM BROWN SAND TRACE SILT

CLIENT DUQUESNE LIGHT CO JOB NO 11750

TAKEN BY RAYMOND TESTED BY RLP

UNIFORMITY COEFFICIENT (D60/D10) = ---

PER CENT PASSING 200 SIEVE 16.4

WT. OF ORIG SAMPLE 224.2 WT. AFTER PREWASHING 188.3
WASHING LOSS 35.9

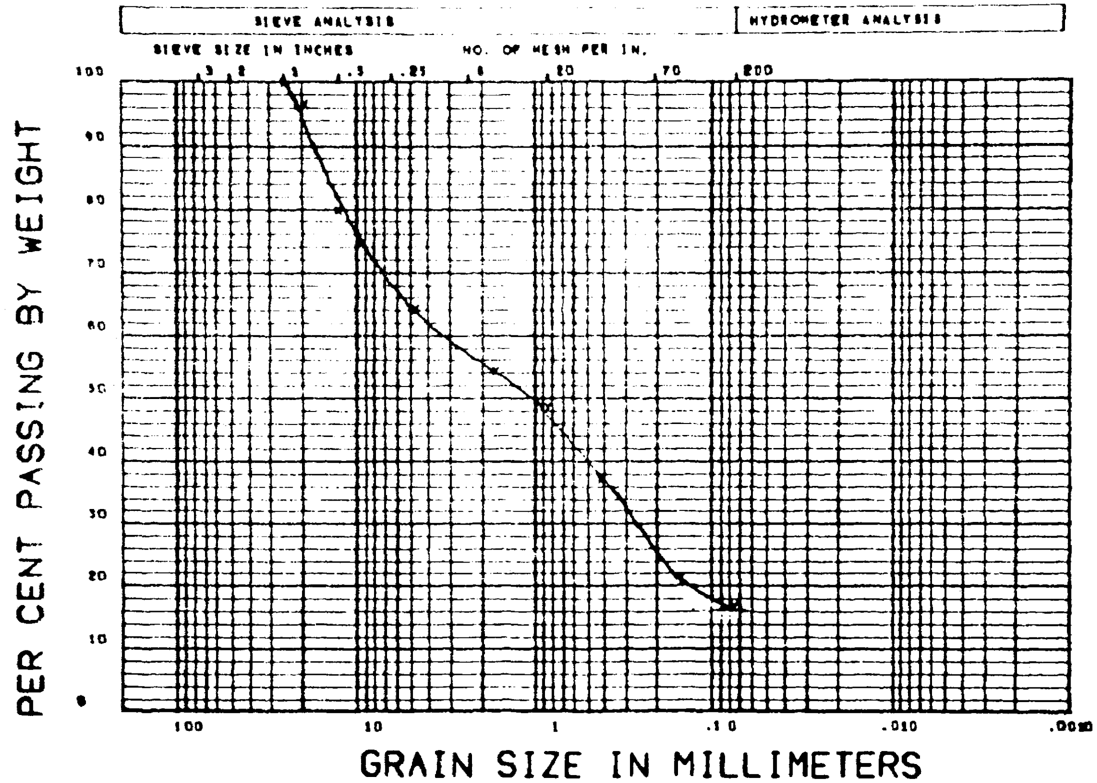
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.375	9.520	0.0	224.2	100.0
4	4.699	4.3	219.9	98.1
8	2.362	2.4	217.5	97.0
20	0.833	1.2	216.3	96.5
30	0.589	0.9	215.4	96.1
50	0.295	83.1	132.3	59.0
70	0.208	39.6	92.7	41.3
100	0.147	32.7	60.0	26.8
200	0.074	23.3	36.7	16.4

WT. RETAINED ON PAN 0.8
WASHING LOSS 35.9
PAN TOTAL 36.7
TOTAL 224.2

FIGURE 2F-88
GRAIN SIZE
TEST NO. B108-SS14
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	GRAVEL			SAND		FINES
	COARSE	MEDIUM	FINE	COARSE	FINE	

TEST NO. B108 SS15 DATE 6/6/86

LOCATION BEAVER VALLEY ELEV 684.50

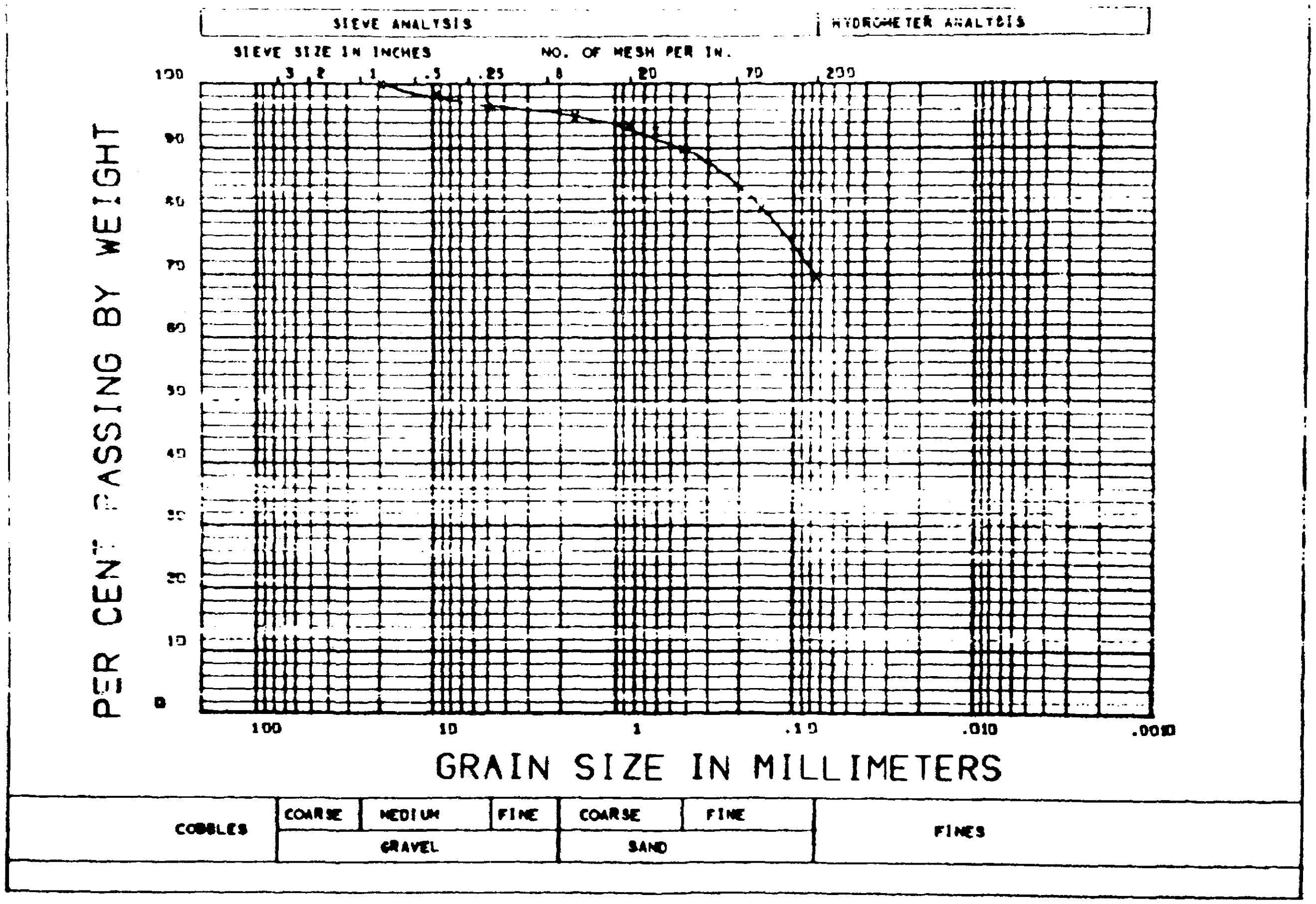
TYPE MATERIAL MEDIUM BROWN SAND, TRACE SILT AND GRAVEL

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLF

FIGURE 2F-89
GRAIN SIZE
TEST NO. B108-SS15
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B108 ST2 DATE 6/8/[illegible]

LOCATION BEAVER VALLEY ELEV 703.00

TYPE MATERIAL FINE,SOFT BROWN SILT

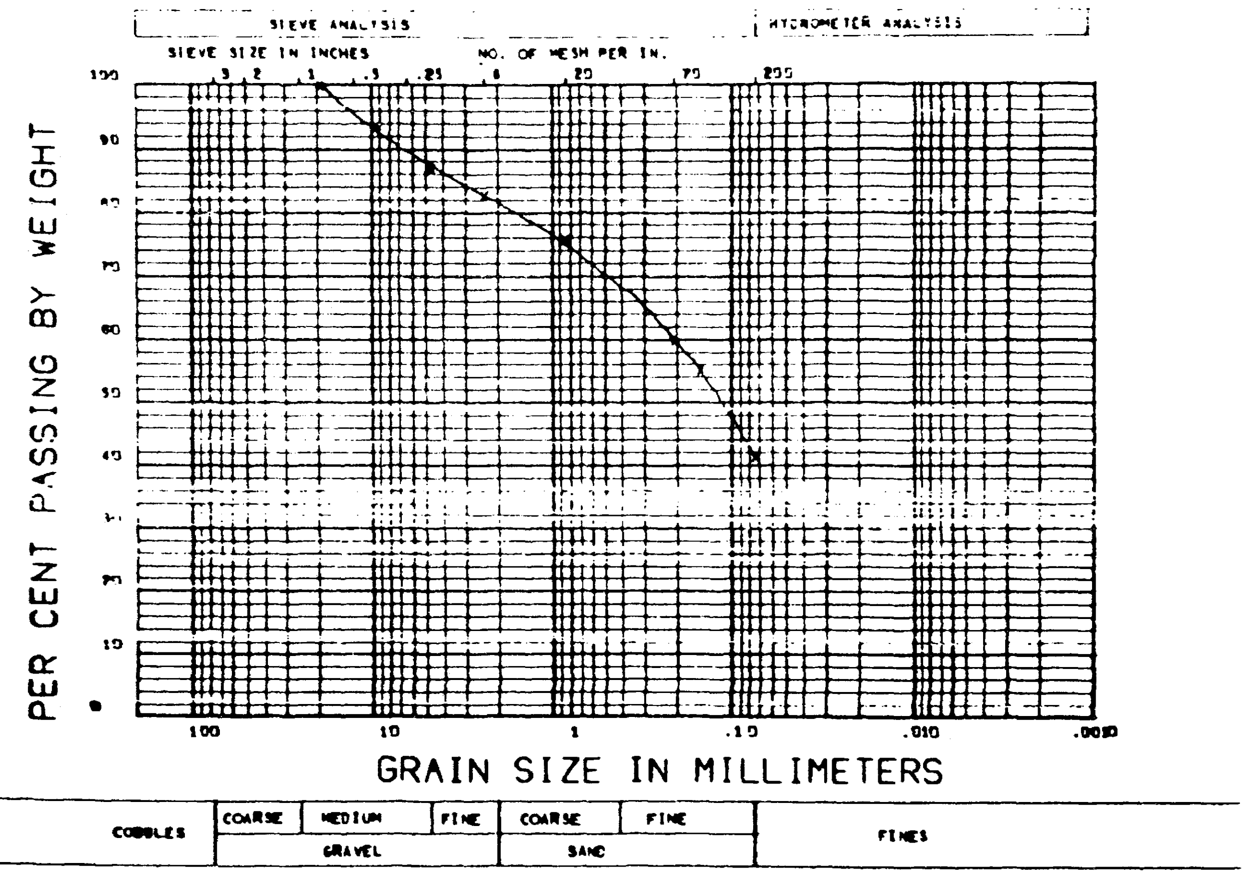
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-90
GRAIN SIZE
TEST NO. B108-ST2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. [illegible] ST4 DATE [illegible]

LOCATION BEAVER VALLEY ELEV [illegible]

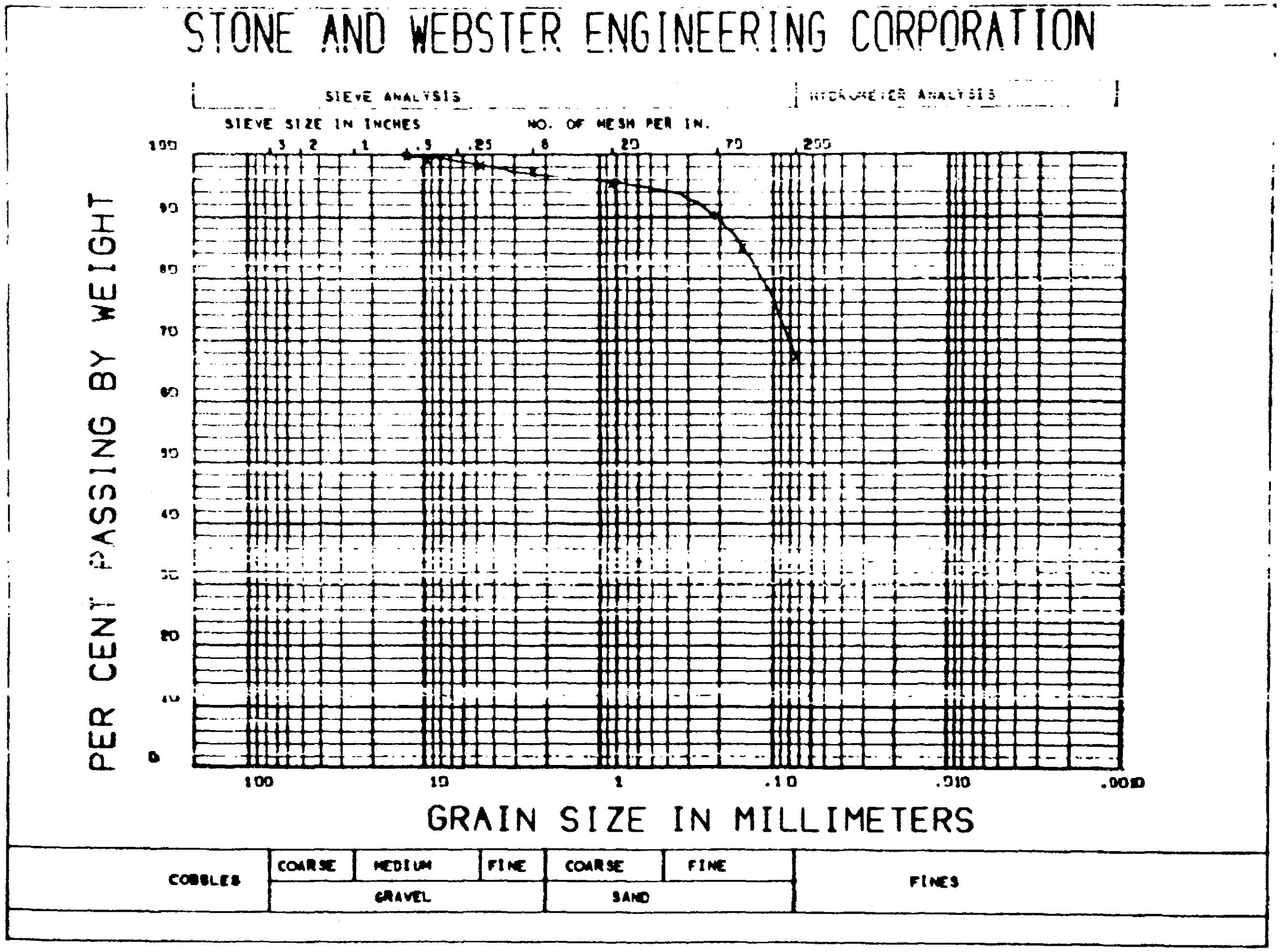
TYPE MATERIAL FINE,SOFT BROWN SILT

CLIENT DUQUESNE LIGHT CO JOB NO [illegible]

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-91
GRAIN SIZE
TEST NO. B108-ST4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



TEST NO. B108 ST6 DATE [illegible]

LOCATION BEAVER VALLEY ELEV [illegible]

TYPE MATERIAL FINE,SOFT BROWN SILT

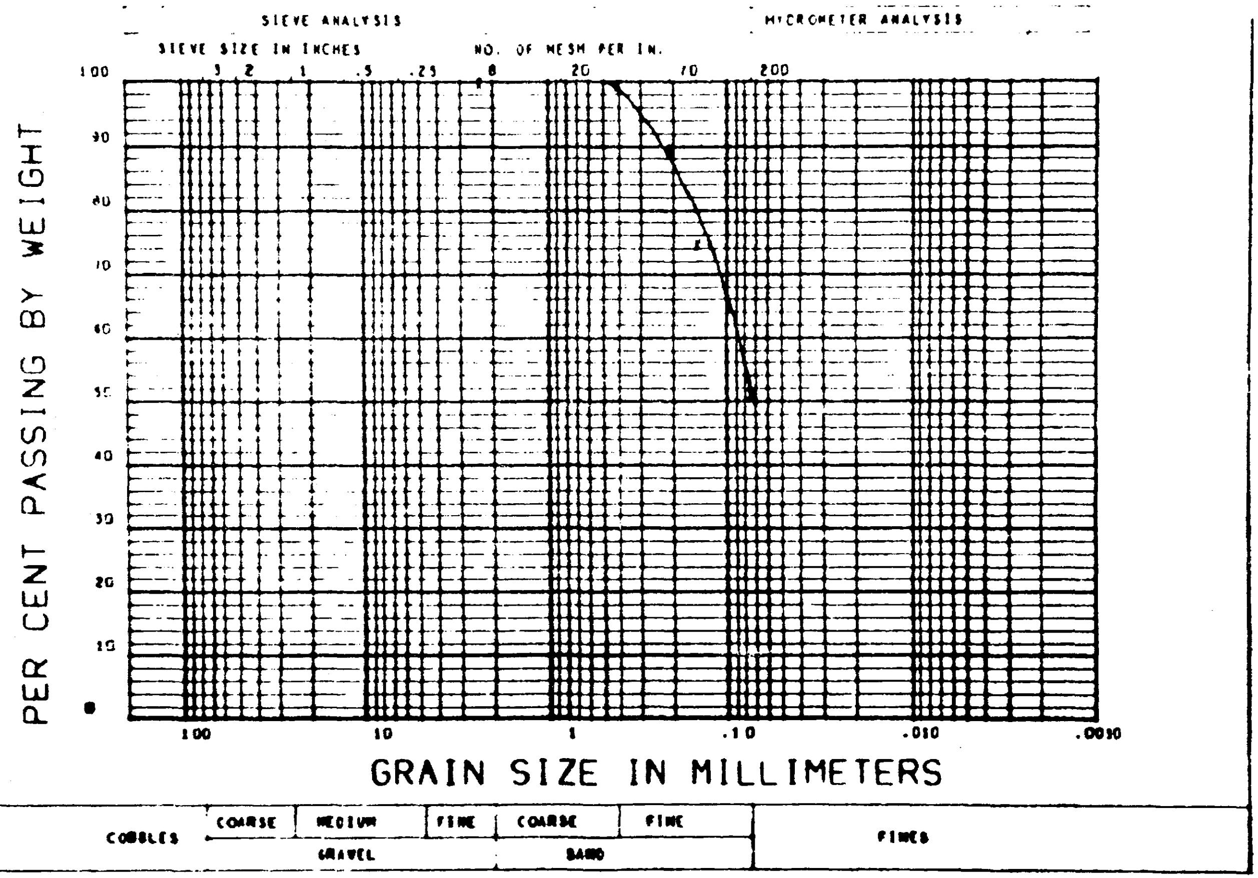
CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-92
GRAIN SIZE
TEST NO. B108-ST6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 109-9 DATE 8/1/69

LOCATION BEAVER VALLEY DEPTH 22-24 FT.

TYPE MATERIAL BROWN SILTY SAND, TRACE OF CLAY

CLIENT DUQUESNE JOB NO 11700

DRILLER. RAYMOND TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10): ---

PER CENT PASSING 200 SIEVE 51.1

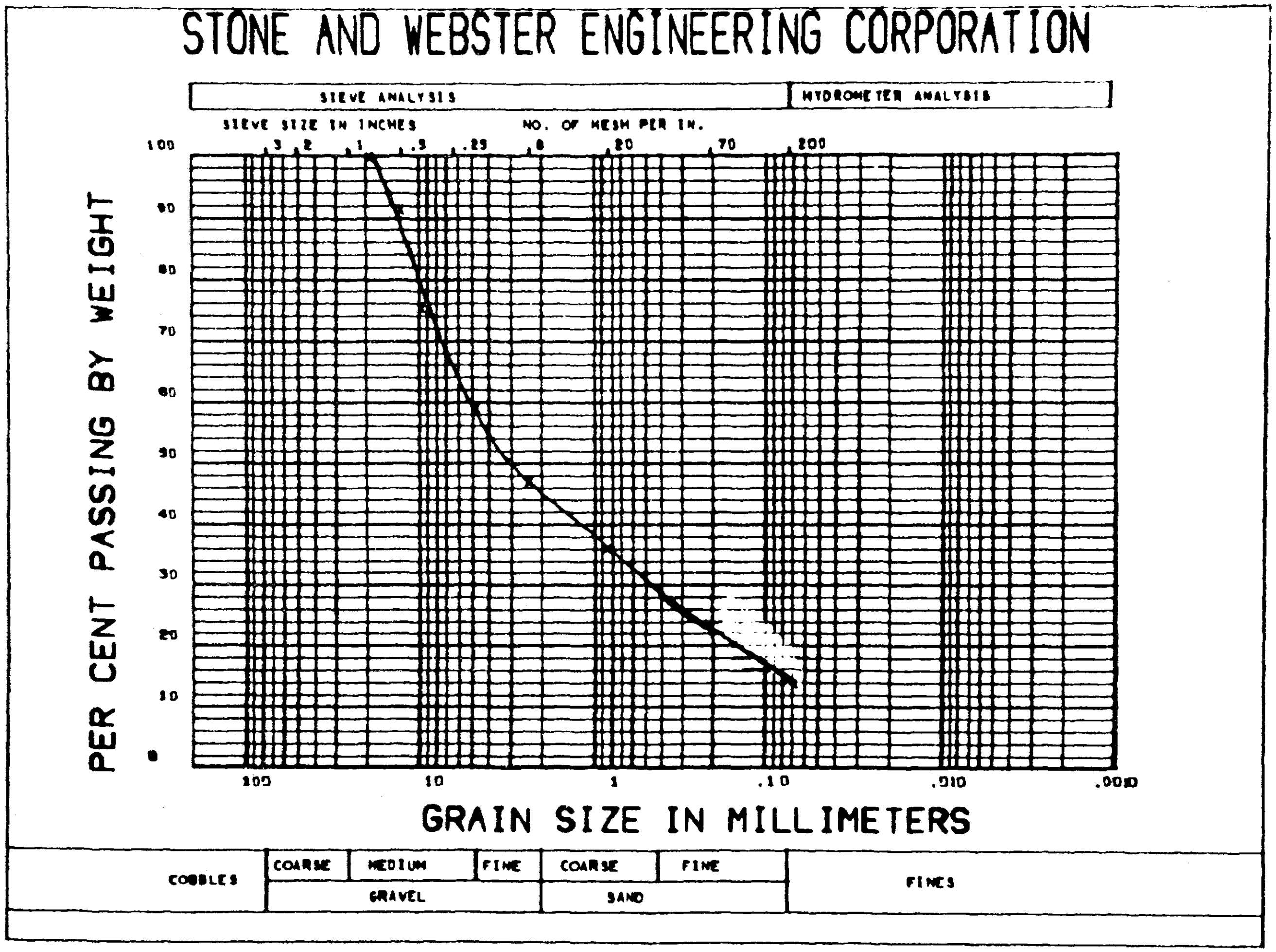
WT. OF ORIG SAMPLE 567.5 WT. AFTER PREWASHING 286.6
WASHING LOSS 280.4

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	567.5	100.0
40	0.417	2.4	565.1	99.6
70	0.200	58.3	506.8	89.7
100	0.147	84.9	423.9	74.7
200	0.074	134.0	289.9	51.1

WT. RETAINED ON PAN 0.5
WASHING LOSS 280.4
PAN TOTAL 280.9
TOTAL 567.5

FIGURE 2F-93
GRAIN SIZE
TEST NO. 109-9
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



TEST NO. B115 SS22 DATE 6/25/68

LOCATION BEAVER VALLEY ELEV 683.0

TYPE MATERIAL MED. BROWN SAND, TRACE SILT + BOULDER FRAGS.

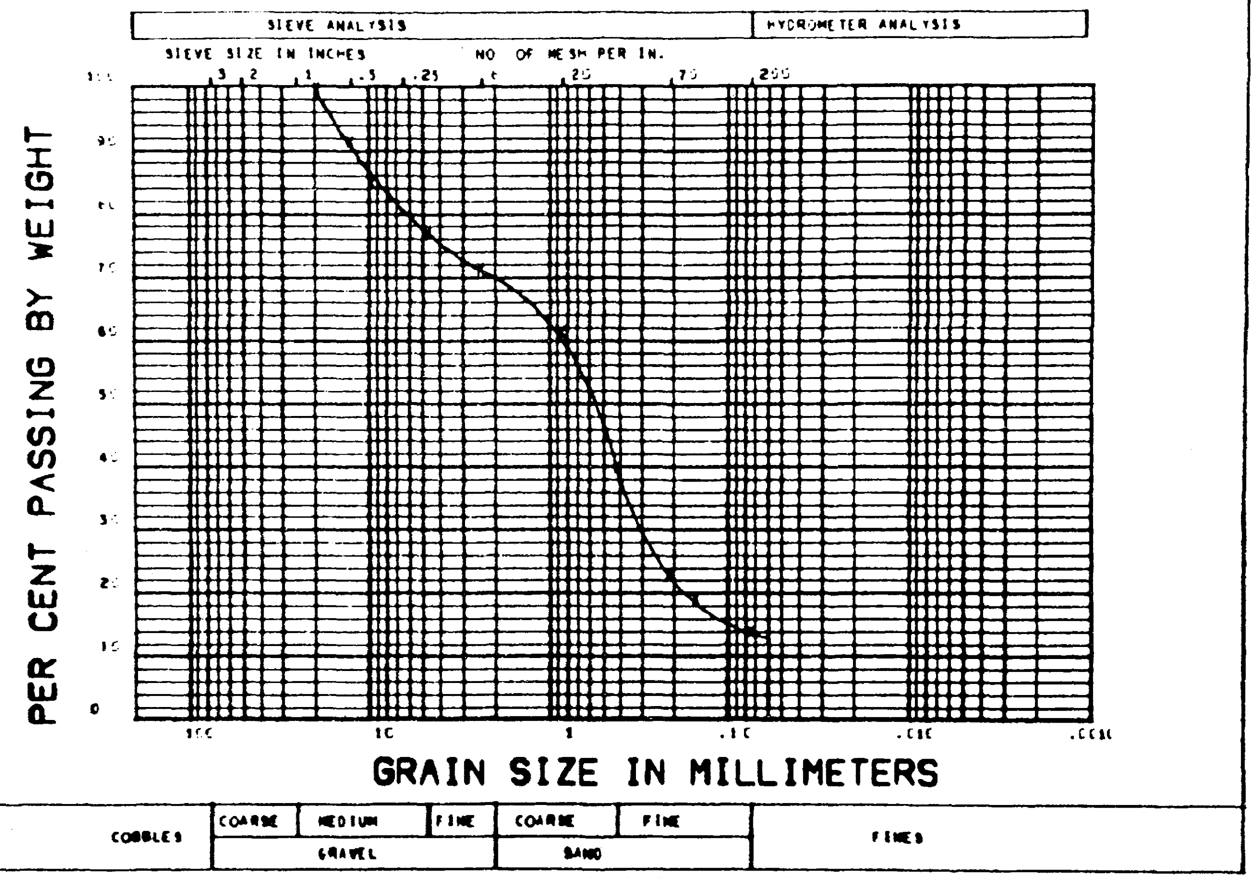
CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

TAKEN BY RAYMOND INT. TESTED BY KLP

FIGURE 2F-94
GRAIN SIZE
TEST NO. B115-SS22
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B115 SS32 DATE 6/25/80

LOCATION BEAVER VALLEY ELEV 638.0

TYPE MATERIAL GRAY MED. SILTY SAND, SMALL GRAVEL, SHALE

CLIENT DUQUESNE LIGHT COMPANY JOB NO 11700

TAKEN BY RAYMOND INT. TESTED BY KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 14.5

WT. OF ORIG SAMPLE 362.9 WT. AFTER PREWASHING 312.8

WASHING LOSS 49.8

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.75	19.100	0.0	362.9	100.0
.5	12.700	30.5	332.4	91.6
.375	9.520	24.2	308.2	84.9
4	4.699	29.5	278.7	76.8
8	2.362	19.5	259.2	71.4
20	0.833	36.6	222.6	61.4
40	0.417	78.4	144.4	39.4
70	0.208	61.8	82.6	22.8
100	0.147	13.0	69.6	19.2
200	0.074	17.9	50.5	14.5

WT. RETAINED ON PAN 1.1

WASHING LOSS 49.8

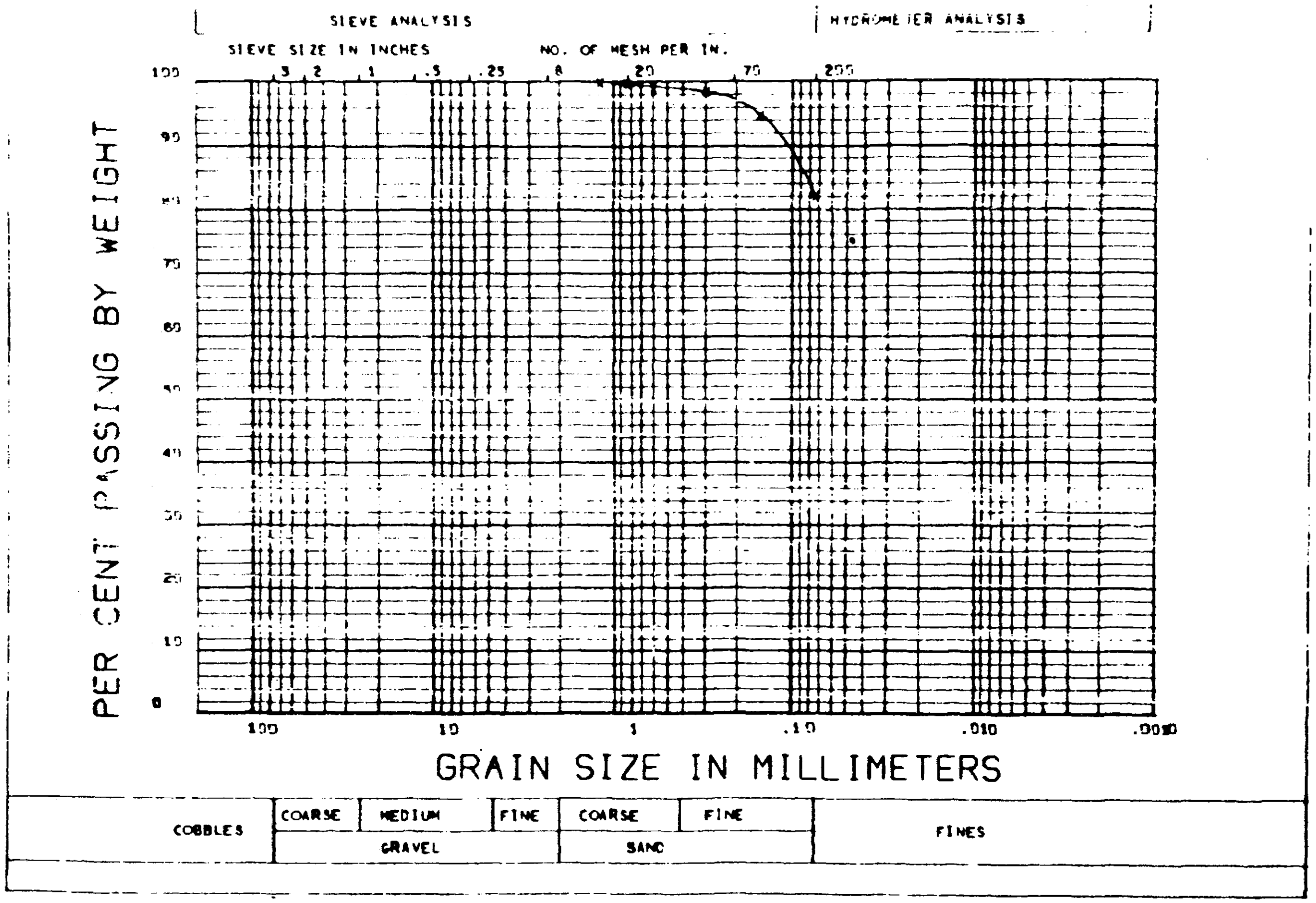
PAN TOTAL 50.9

TOTAL 362.9

FIGURE 2F-95
GRAIN SIZE
TEST NO. B115-SS32
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. B117 ST15 DATE 6/6/68

LOCATION BEAVER VALLEY ELEV 632.50

TYPE MATERIAL SOFT, GRAY SILTY CLAY, TRACE ORGANIC

CLIENT DUQUESNE LIGHT CO JOB NO 11700

TAKEN BY RAYMOND TESTED BY KLP

FIGURE 2F-96
GRAIN SIZE
TEST NO. B117-ST15
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2G

SEISMIC VELOCITY MEASUREMENTS

for the

BEAVER VALLEY POWER STATION

of the

DUQUESNE LIGHT COMPANY

SHIPPINGPORT, PENNSYLVANIA

Prepared for

STONE & WEBSTER ENGINEERING CORPORATION

Prepared by

WESTON GEOPHYSICAL ENGINEERS, INC.

WESTON, MASSACHUSETTS

The Weston Geophysical Engineers Inc. report was retyped/reformatted as part of the Update of the FSAR.

WESTON GEOPHYSICAL ENGINEERS, INC.

POST OFFICE BOX 306
WESTON, Massachusetts 02193
AREA CODE 617 899-0060

May 27, 1968

Stone & Webster Engineering Corporation
225 Franklin Street
Boston, Massachusetts

Attention: Mr. William F. Swiger, Consulting Engineer

Gentlemen:

Seismic velocity measurements at the Beaver Valley Power Station of the Duquesne Light Company were made under the terms of your Purchase Order Number BV-5, Job Number 11700.

The scope of this study was outlined during conferences with your Mr. W. F. Swiger, Consulting Engineer and Mr. P. A. Wild, Senior Soils Engineer.

This report is a complete presentation of our findings.

Very truly yours,

WESTON GEOPHYSICAL ENGINEERS, INC.

(Originally signed by)

Vincent J. Murphy
Vice President - Geophysicist

VJM:jh

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

A seismic field investigation program took place at the Beaver Valley Power Station during the period April 17 through 27, 1968.

This investigation consisted of the measurements of velocity values for "P" (longitudinal, compressional) waves and “S” (shear, transverse) waves in a series of boreholes and on the ground surface. These data would be used by the engineers for the foundation evaluations of subsurface materials and for soil dynamics considerations.

METHOD OF MEASUREMENT

Velocity values were measured in various direction by up-hole, down-hole, and cross-hole procedures. Vertically and horizontally oriented seismic wave detectors were used for all "S" wave measurements. A limited amount of seismic refraction survey investigation took place to verify the elevation of bedrock and to also determine velocity layering.

All data were photographically recorded with twelve-channel instrumentation and processed immediately for preliminary evaluation.

The pattern of holes for these measurements was established to provide different length of wave paths and different azimuths for measurements.

The positions of these holes are shown on the Plan Map which accompanies this report (the Plant Map was prepared from Stone & Webster Engineering Corporation drawing No. SK-11700-S-50). Lines of investigation for seismic refraction measurements and for surface shear wave measurements were oriented in a number of random directions in the vicinity of the boreholes; these lines are not shown on the Plan Map.

RESULTS

On Figure 2G-1b of the drawings which accompany this report, we have noted “P” wave and “S” wave velocity values for the overburden materials and for bedrock.

The best quality filed recordings of "S" waves were recorded from cross-hole measurements. The velocity values are shown on Figure 2G-1b at elevations corresponding to the positions of cross-hole measurements.

No anomalous conditions, such as low velocity zones or layers, were disclosed during these measurements.

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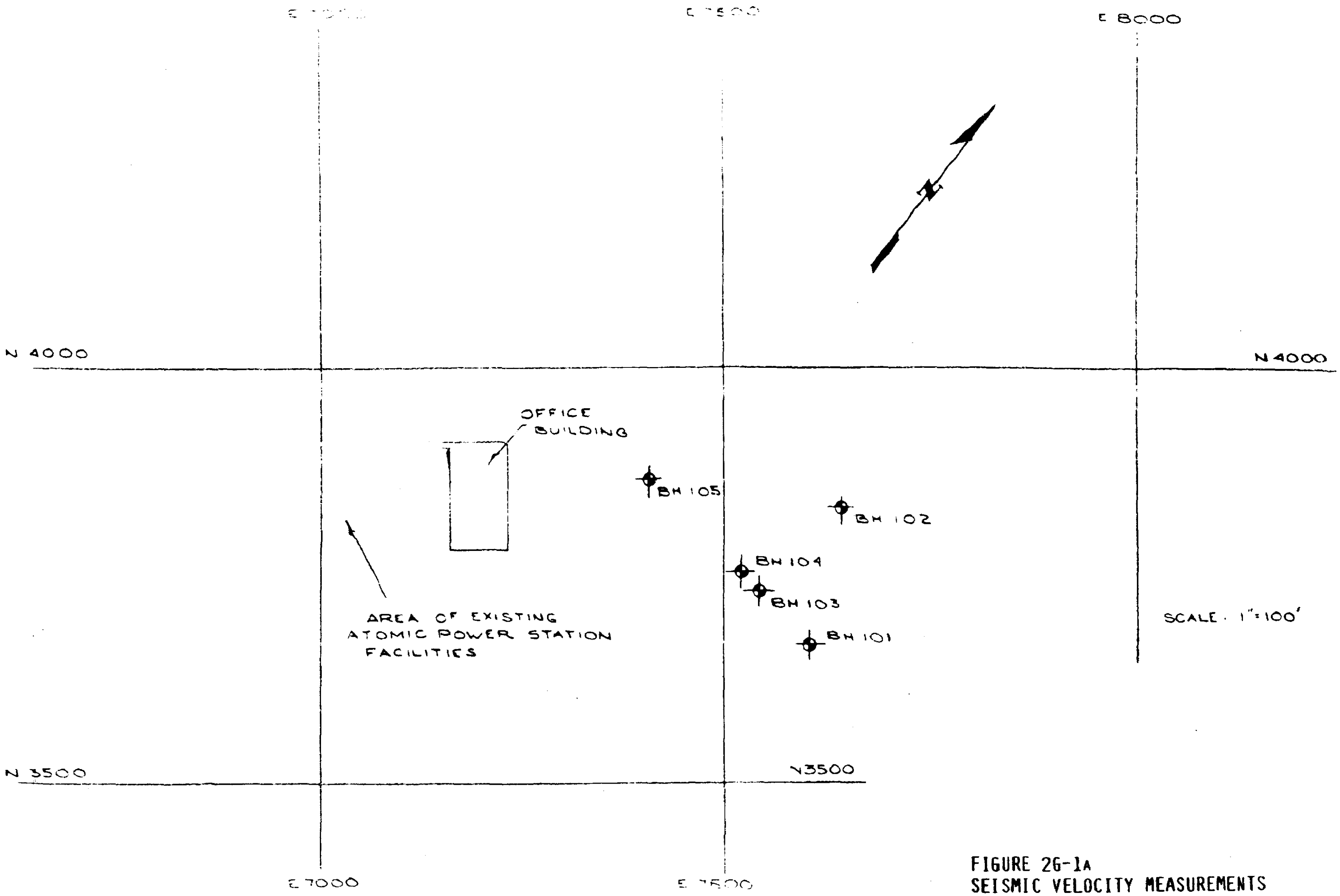

FIGURE 2G-1A
SEISMIC VELOCITY MEASUREMENTS
SHEET 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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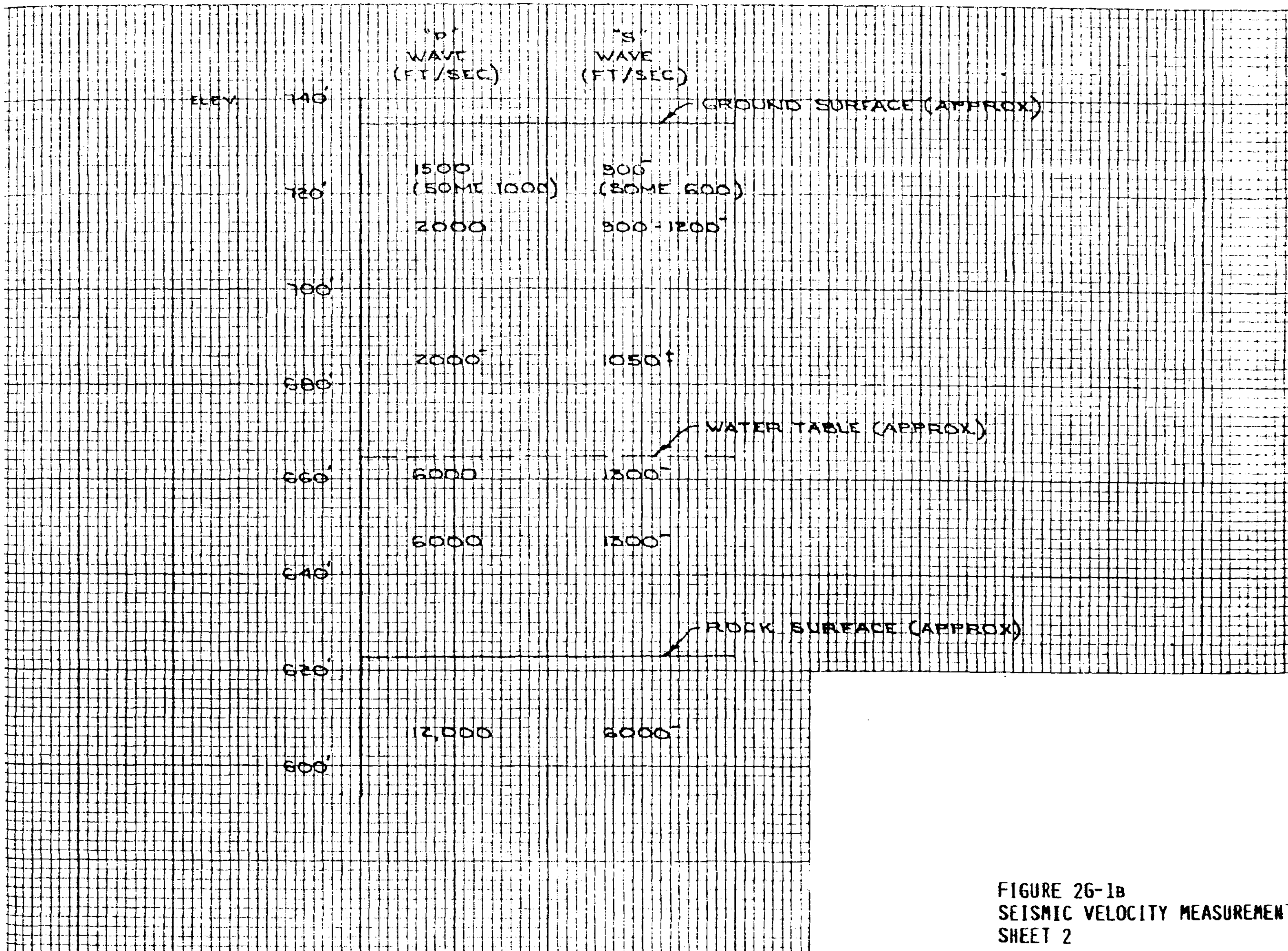

FIGURE 2G-1B
SEISMIC VELOCITY MEASUREMENTS
SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

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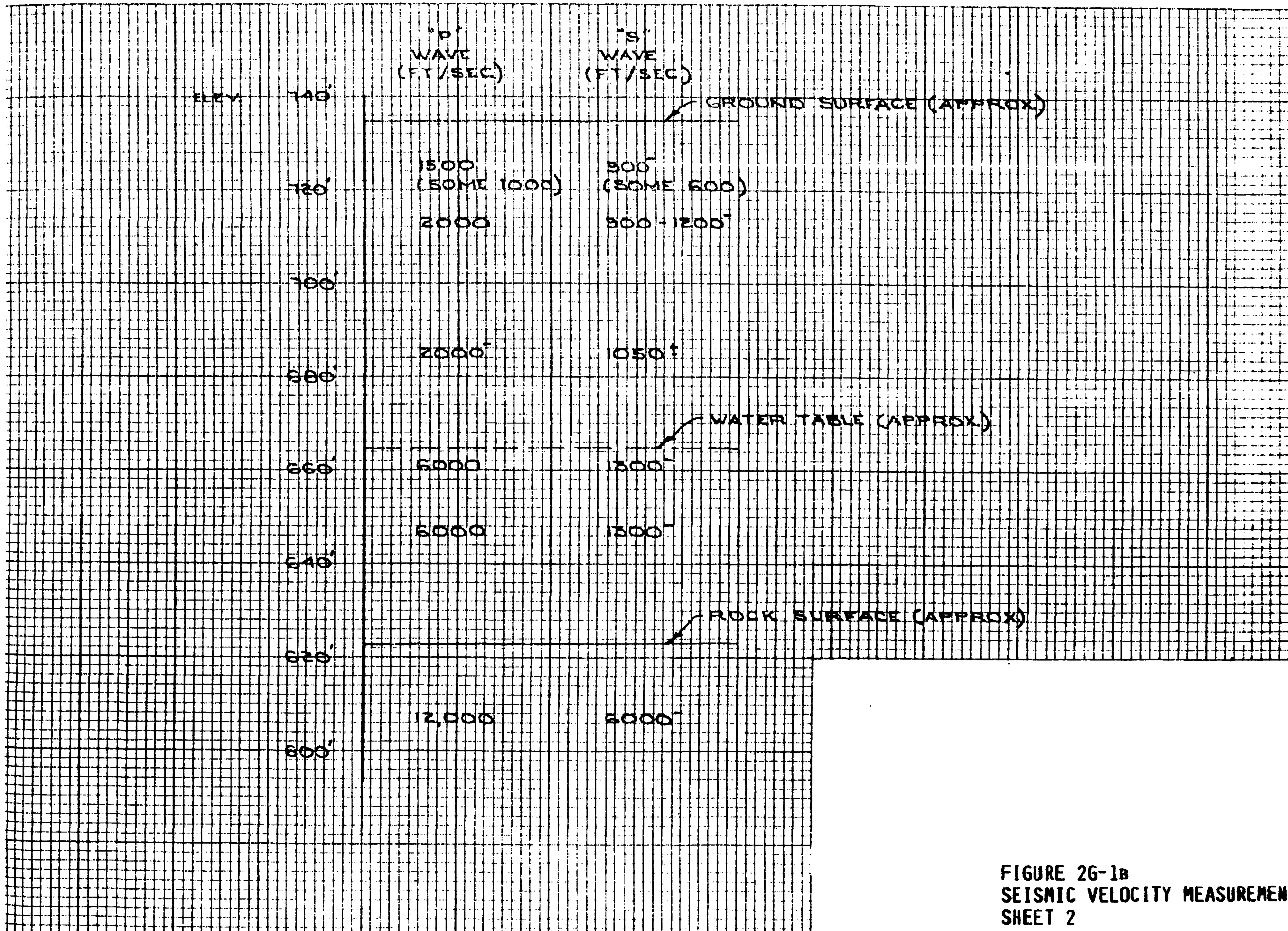

FIGURE 2G-1B
SEISMIC VELOCITY MEASUREMENTS
SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

APPENDIX 2H

ADDITIONAL BORING

AND SOIL TEST DATA

Prepared for

DUQUESNE LIGHT COMPANY

Prepared by

STONE & WEBSTER ENGINEERING CORPORATION

BOSTON, MASSACHUSETTS

The Stone & Webster Engineering Corporation report was retyped/ reformatted as part of the Update of the FSAR.

APPENDIX 2H

ADDITIONAL BORING AND SOIL TEST DATA

2H.1 GENERAL

This appendix furnishes additional information regarding foundations and soil conditions at the Beaver Valley Power Station.

The following material is included in this appendix:

Results of insitu density tests of sands and gravels as found during excavation for the auxiliary building and reactor containment structure.

Details of computations of liquefaction potential under the various structures and facilities.

Boring logs and soil tests as listed later.

Cross hole seismic test results.

Drawings showing location and critical slip circles for the stability analyses reported in Section 2.6.

Supplementary Shippingport site boring data and accompanying letter (borings were made to extend initial investigations for the Shippingport Power Station).

2H.2 INSITU DENSITY TESTS

Seven insitu density tests were made during excavation for the containment structure and auxiliary building. These are shown in Table 2H-1. They indicate insitu relative densities of about 80 to 90 percent.

2H.3 LIQUEFACTION ANALYSIS

Initial studies of liquefaction were made only for the high level terrace, El. 735. These studies were based on shear stresses in the soil mass developed from a modal dynamic analysis made to determine shear motion amplification in the soil column. The results are given in Figure 2.6-7. The indicated factors of safety were large, and no detailed analysis was made of the several structures since these weighed as much or more than the soil displaced and factors of safety against liquefaction under them would have been equal to or slightly higher than for the soil column.

Additional studies were then made using shear stresses computed from the acceleration for the DBE for the soil column. For this purpose the shear stress of any depth Z is computed from the relation:

$$t = ALPHA * M * a$$

where:

M = total mass above point considered, including any superimposed structures

a = maximum ground acceleration, single pulse peak, expressed as a fraction of acceleration due to gravity

ALPHA = ratio which gives average acceleration of mass above elevation considered for the number of cycles of vibration used and the reduction of acceleration with depth below surface. Since at the soil rock interface the soil acceleration must be equal to the rock acceleration, values of ALPHA for the strong motion portion of recorded earthquake (5 to 8 cycles) generally have values of about 0.7 near the surface and reduce with depth below the surface.

Computations of factor of safety against liquefaction have been made for values of ALPEA of 0.72, 0.90, and 1.00.

Figure 2.6-4 shows a plot of penetration resistance against elevation for borings on the high level terrace at or above El. 735, from investigations for Beaver Valley and from earlier investigations for Shippingport. These data have been plotted in Figure 2H-1 for the high level terrace in the form of penetration resistance against effective vertical stress at the location of each sample when taken. Similar plots are shown in Figure 2H-2 for the borings on the intermediate terrace and in Figure 2H-3 for the borings along the low level terrace of El. 670680. These several plots indicate median densities for the lower sands and gravels of about 60 percent relative density.

Relatively low blow counts were recorded in some locations and accordingly a study was made to determine whether these indicated merely random and erratic variations, in which case the median values of density could be properly used for evaluation of liquefaction potential, or whether they represented continuous strata of loose materials which must be considered separately.

The penetration values indicate relative densities in the upper soils of the high level terrace (above El. 675) of about DR = 80. Seven insitu samples were taken of these soils for field density measurement during excavation for the reactor and auxiliary building. Results are shown in Table 2H-1. They indicate insitu densities of 80 to 90 percent, which compare favorably with the penetration test results.

Comparison of N values in adjoining borings indicated no continuous loose stratum of significant extent. Thus boring 110 shows relatively low N values at about E1. 655 and 640. Boring 20 shows low values at El. 645 and 632. Boring 310 which is located between them shows no low values. Again, borings 112 and 111 show low values at about El. 655 but boring 8, between them, shows appreciably higher N values at the same elevations. Accordingly, it was concluded that relative density would be defined by average values of penetration resistance.

During site excavation three small elongated lenses of fine sand were noted in the sands and gravels of the terrace. These were small, 5 ft to 8 ft wide and 2 ft to 3 ft thick. They appeared to be small stream cut channels which had filled with fine sand and a fine silt top. Because of their very limited extent they are considered to not be significant as regards liquefaction hazard.

To investigate density further, selected groups of borings were considered. Thus, for the area occupied by the turbine building and adjoining transformer terrace, borings, 8, 25, 108, 109, 111, and 112 were studied as shown in Figure 2H-4. For this purpose the samples were considered in two groups: those lying between El. 665 and 645 and from El. 645 to 630. There were some samples near and below El. 630 which showed very high densities. Ignoring these very high blow counts, the plots indicated median relative densities in this area as follows:

El. 665645 DR = 55 percent
El. 645630 DR = 55 percent

For the low level terrace, a study was made of borings 20, 21, 109, 110, 111 and 310. The results are plotted in Figure 2H-5. Median values of DR from this plot are about:

El. 665645 DR = 65 percent
El. 645630 DR = 55 percent+

Accordingly, it was decided to use relative densities of 55 percent for analysis of the turbine building area, intermediate terrace, level and low level terrace at the foot of the slope from the intermediate terrace.

This review indicated that the values of relative density in the high level terrace used in earlier studies of this area were conservative. Accordingly, the same values have been used again including an assumed DR = 55 percent for soils above the GWL which is extremely conservative, since insitu tests show values of DR = 80 percent plus.

Results of this analysis are given in Table 2H-2 for the several structures for eight cycles of motion, for the several values of an ALPHA previously indicated and for a ground acceleration of 0.125 g. Analyses have been made for the normal flood, El. 675, which has a recurrence frequency of about 2 yr and for the Corps of Engineers of Pittsburgh District "Standard Project Flood," El. 705.0, which is estimated to have a recurrence frequency in excess of 1,000 yr. Minimum factors of safety, assuming ALPHA equals 1.0, found are as follows:

	GWL @ EL. 675 F.S.	GWL @ El. 705.0 F.S.
Containment Structure	2.1	1.7
Auxiliary Building	2.1	1.5
Fuel Building	2.1	1.8
Turbine Room	1.7	1.25
Transformer Area (Intermediate Terrace)	1.7	1.25

Initially, once through condenser cooling was planned with circulating water supplied from an intake on the shore of the river near the upstream edge of the site. To minimize thermal discharge to the river, subsequently the decision was reached to install complete off-river cooling using a large cooling tower. Whereas with the original concept, the river water lines paralleled the circulating water pipes for a portion of their course and a joint intake structure was planned, with the new concept the river water lines cross the circulating water system at only one location and extend then straight to the river. The intake structure for the river water lines is supported on bedrock. The sands and gravels of the lower terrace over which the river intake lines pass have been recompacted to median relative densities exceeding 75 percent along the route of these pipe lines. Liquefaction of the sands and gravels along the route of these lines therefore is not a hazard.

The indicated factors of safety are considered to be adequate to ensure a satisfactory level of safety for the following reasons:

1. It is assumed that the peak of the design flood and DBE occurs simultaneously. The design flood has a recurrence frequency of about 1,000 to 2,000 years and a very sharp peak of short duration. The recurrence frequency for the DBE is estimated to be longer than 10,000 years. The probability of simultaneous occurrences is less than 1×10^{-9}.

2. The shearing stresses in this analysis have been computed from the expression

   tz = ALPHA * M * Ap

   where:

   ALPHA = a factor which establishes approximate equivalence between transient shaking involving peaks of varying amplitude and a steady shaking in which all peaks have the same amplitude (ALPHA varies with number of peaks considered and with depth below surface.)

   tz = shearing stress at depth z

   M = total mass above depth z

   Ap = peak acceleration at ground surface, expressed as a fraction of acceleration due to gravity

   The minimum safety factor of 1.25 obtains for ALPHA equal to 1.0, which implies that all soil and structures above each elevation considered simultaneously experience the peak acceleration in the same direction and all eight cycles of motion are equal and equal the peak acceleration. As indicated in Figure 2H-6, ALPHA decreases rapidly with depth below surface and for the turbine building area for the critical depth, which is in the region of El. 630 to El. 650, the ratio of the peak acceleration at the centroid of the mass to the peak acceleration at ground surface is of the order of 0.6. Observed ratios of eight major peaks to maximum single peaks in available records indicate values of ALPHA recorded that are approximately equal to 0.75. These data indicate that actually ALPHA equals 0.5% for the critical depth.

3. Eight major cycles of shaking have been used in the analysis. This corresponds to a duration of intense motion of about 20 seconds. The DBE for this site has been established by Weston Geophysical Research, Inc.,(See Appendix 2C) as MM VI to VII, which is about two orders larger than the largest earthquake of record in the site area. Twenty seconds of intense motion with an average acceleration at the ground surface of 0.125g would correspond to a much larger and more intense earthquake than the postulated DBE.

   It is concluded therefore that the computed factor of safety is adequate because:

   a) It assumes simultaneous occurrence of two improbable events.

   b) The earthquake motions assumed are very conservative.

   c) The method of calculation and the value of ALPHA used are extremely conservative. The probable value of ALPHA for the critical depth is of the order of 0.5, indicating a factor of safety against initial liquefaction (pore pressures first equal minor principal stress) of about 2.5.

The probability of simultaneous occurrence of the maximum DBE probable maximum flood to El. 730.0 does not justify evaluation of the liquefaction potential under the aforementioned combination of conditions. Therefore, liquefaction under the DBE is not a hazard to any of the seismic Class I structures of the project discussed above.

2H.4 MEASUREMENT OF SHEAR WAVE VELOCITY IN SOIL

Time distance plots of crosshole seismic tests made to determine shear wave velocities for these soils are shown in Figures 2H-7, 2H-8, and 2H-9.

2H.5 DETAILS OF THE SLOPE STABILITY ANALYSES

A plan showing the location of the sections analyzed for stability of banks is shown in Figure 2H-10. Profiles and typical stability analysis results and slip circles are shown in Figures 2H-11, 2H-12 and 2H-13.

2H.6 SUPPLEMENTARY SOIL TEST DATA

Additional boring logs and soil test data not included in Appendix 2E are included as follows:

Logs of Borings 301 through 310	Figures 2H-15, 2H-16, 2H-17, 2H-18, and 2H-19
Logs of Borings 401 through 404	Figures 2H-20 and 2H-21
Triaxial Test Data	Figures 2H-22, 2H-23, 2H-24, 2H-25, 2H-26, 2H-27, 2H-28, 2H-29, 2H-30, 2H-31, 2H-32, 2H-33, 2H-34, 2H-35, and 2H-36
Summary of Laboratory Test Data	Figures 2H-37 and 2H-38
Laboratory Test Procedures	Figure 2H-39

Unconfined Compression Test Data	Figures 2H-40, 2H-41, 2H-42, 2H-43, 2H-44, 2H-45, 2H-46, 2H-47, 2H-48, 2H-49, 2H-50, 2H-51, 2H-52, 2H-53, 2H-54, 2H-55, 2H-56, 2H-57, 2H-58, 2H-59, 2H-60, and 2H-61
Grain Size Tests	Figures 2H-62, 2H-63, 2H-64, 2H-65, 2H-66, 2H-67, 2H-68, 2H-69, 2H-70, 2H-71, 2H-72, 2H-73, 2H-74, 2H-75, 2H-76, 2H-77, 2H-78, 2H-79, 2H-80, and 2H-81

2H.7 SUPPLEMENTARY SHIPPINGPORT SITE BORINGS DATA

A letter, dated April 22, 1955, with Shippingport Atomic Power Station site boring data is included in the immediately following pages.

STONE & WEBSTER ENGINEERING CORPORATION

49 FEDERAL STREET, BOSTON 7, MASSACHUSETTS

NEW YORK
BOSTON
CHICAGO
HOUSTON
PITTSBURGH
LOS ANGELES
SAN FRANCISCO

April 22, 1955

Mr. R. B. Horner,
Chief Design Engineer,
Duquesne Light Company,
Sixth Avenue,
Pittsburgh 19, Pennsylvania

EXECUTIVE
J.O.No.9147 435

Dear Sir:

ADDITIONAL BORINGS
SHIPPINGPORT NUCLEAR POWER STATION

In accordance with your authorization of February 14, 1955, we have examined the samples taken in 18 additional borings made at the site of the proposed Shippingport Nuclear Power Station. Attached are prints of our drawings SK-42155-C1, SK-42155-C2, SK-42155-C3, SK-42155-C4 and SK-42155-C5, inclusive, showing the logs of these borings as prepared by the driller and the classification of the soil samples received in our Soils Laboratory. Also attached is a print of drawing SK-42155-C6 showing the location of the above borings.

The borings made adjacent to the proposed plant and along the intake and discharge tunnels agree both in character of soils found and, with one exception, in elevations at which changes of strata occur with the soil profiles prepared from the borings made in the initial investigation during the spring and summer of 1954. These additional borings allow more accurate determination of the elevation of the bearing stratum of sand and gravel and will be of use during the construction program. The exception was Boring F which showed the recent clay and silt deposits extending to a greater depth than had been anticipated from other borings. At this boring, the bearing stratum is about 8 ft lower than the original boring program had indicated. Since Boring G and H indicate that the top of the bearing stratum rises, it appears that this is a localized condition which probably originated from vagaries of the old river channel. In view of the excellent agreement between the soils found in these additional borings and those found in the preliminary investigation, there is no reason to modify or change our recommendations in our previous Report on Subsurface Conditions Shippingport Site dated August 9, 1954, concerning the foundations for the power station or its major auxiliaries in the area lying north of the railroad tracks.

R.B.H. 2. April 22, 1955

On April 18, 1955, Mr. Conwell outlined by telephone the general features of the circulating water intake and discharge, and requested that we comment on the soil conditions along the route of these facilities. We understand that the intake probably will be a castinplace concrete tunnel having inside dimensions of approximately 8 ft by 8 ft, or equivalent precast concrete pipe, and that the general route of the intake and discharge lines will follow that shown on your drawing 4939-B39 dated January 27, 1955, and marked "Preliminary".

This tunnel will start from the intake structure which will be founded on sand and gravel and, consequently, will provide a relatively rigid support, cross the low lying soft compressible soils of Area C described in our report of August 9, 1954, and then cross the more stable soils of Area B to the power station. In Area C, the center line of the tunnel will be approximately El. 674 which is about the level of present ground surface, and the tunnel will be covered by fill and riprap for erosion protection. In Area B, the area above the tunnel will not be filled, initially, except in the immediate vicinity of the power station. As the tunnel crosses Area B, the following conditions may be expected:

Section 1. Tunnel buried in and underlain by clay silt soils of Area B without additional fill over it. Tunnel in operation weighs approximately the same as soil it displaces.

Section 2. Tunnel buried in and underlain by clay silt soils of Area B. Area above tunnel filled to about Gr. 706.

Section 3. Tunnel supported on and underlain by sand and gravel or by well compacted granular fill placed for the support of the turbine room. Area above tunnel filled to about Gr. 706.

Within Area B where no additional fill is placed above the tunnel, there should be practically no settlement since the tunnel will weigh essentially the same as the soil it displaces. Through Area C, however, the fill to be placed will cause considerable compression of the underlying soils. Accordingly, if the tunnel were founded directly on these soils, it would settle appreciably, while at the ends there would be substantially no settlement since one end terminates in a rigidly supported intake structure and the other enters the relatively stable soils of Area B. Therefore, founding directly upon the soil of Area C would result in severe and probably damaging differential settlements. Even if precast concrete pipe were used, which can accommodate some settlement by joint rotation, it appears probable that distortion near the ends of Area C would be more than the joints could accommodate and remain tight.

It is therefore recommended that, in Area C, the intake tunnel be supported upon a rigid foundation deriving its support from the underlying sands and gravels. Piles are suggested, and if used, should be conservatively loaded since compression of the soil under the weight of the fill would cause some additional load on them by dragdown. In computing the load on the piles, the weight of the soil over the tunnel within a trapezoid having a base equal to the width of the tunnel and sloping outward on both sides at two vertical to one horizontal should be used.

Through Area B, the intake will pass from a section of substantially no settlement, Section 1, through a section of appreciable settlement due to the weight of deep fill, Section 2, to a section of negligible settlement, Section 3. In Section 3, although considerable fill will be placed above it, the intake will be founded either directly on the sand and gravel stratum or on the northerly part of the dense, compact fill placed to sup- port the turbine room. Differential settlement between Section 2 and the adjoining sections would, therefore, occur if the tunnel were founded in the existing soils without special precautions. While only moderate settlements are anticipated, the differential settlements would probably be sufficient to crack a rigid tunnel founded directly in the soil. Because of the large amount of fill to be placed over the tunnels near the station, the use of piles for the support of the tunnels through this section to avoid differential settlement appears costly. It might be possible to excavate to stable sand and gravel through this section and backfill with well compacted fill. If this were done, the tunnel and its support would be appreciably more rigid than the surrounding soil. As shown on attached SK-42155-C7, because of soil arching, this would result in an extremely heavy load being placed on the tunnel. For design purposes, the tunnel should be considered as supporting the soil within a trapezoid having a base equal to the width of the tunnel and sides sloping out at two vertical to one horizontal. This requirement might result in an expensive section if a rigid tunnel were used.

A reinforced precast concrete pipe, such as Lock Joint Pipe, founded directly in these soils without piles or other special precaution, might accommodate by joint rotation such differential settlements as may reasonably be anticipated along this portion of the intake. Careful study would be required to determine whether joint rotation would result in leakage.

A properly stiffened circular steel pipe might have sufficient elasticity to adjust itself without damage to the differential settlements to be anticipated.

We have attempted to describe the several different loading and founding conditions along the route of the intake. We believe that further study and comparative estimates of alternative designs to meet these conditions will be required to determine a sound economic solution.

We shall be glad to assist you in such studies in any way you may request. Our present information is this matter is somewhat general and further data as to your requirements might modify the problem. To illustrate, we list the following:

Dimensions of the heavy fill to be placed north of the turbine room.

What consideration should be given to possible future extension northward of this fill beyond the limits planned initially?

Dimensions of the berm of compacted fill to be placed under the north side of the turbine room to replace compressible materials between the bottom of the foundation and the sand and gravel stratum.

Relation of contemplated future intake lines to the initial intake.

The same general soil conditions described for the intake apply to the discharge tunnel as it leaves the turbine room.

It is our understanding that consideration is being given to the use of an open flume for a portion of the discharge. The change from tunnel to open ditch or flume will be made at a drop structure. We anticipate this structure will be of concrete and that it will be relatively heavy and massive. We assume it will be founded upon the underlying sand and gravel, either directly, if the grades are suitable, or by using piles or excavating the compressible clay silts and replacing them with compacted, granular fill. In studying comparative economics of these various methods, it should be noted that the top of the bearing stratum is well below ground water level.

This open flume or canal would extend from approximately the location of Boring F through Borings G and H to the river. We estimate that, near Boring F, this canal will be approximately 30 ft deep in order to provide a water depth of 6 to 8 ft at normal pool level in the river. The lower members of the soil through which this canal will be excavated are relatively weak and, accordingly, the stability of the canal banks was investigated. Preliminary computations based on an assumed slope of sides of two horizontal to one vertical

indicated the banks should be stable under normal conditions. However, some difficulty may be expected with sloughing following periods of high water in the river, especially if the river level drops rapidly. Also, the soils are fine grained and weak and will be readily eroded, either by relatively high velocities in the discharge canal or, possibly, by erosion during flood stages of the Ohio River. Considering the relative grades of the discharge tunnel and the normal pool level of the Ohio River, we do not believe such sloughing as may occur would interfere with the operation of the plant. However, it would be well in laying out miscellaneous structures, roads and other facilities to keep these at a reasonable distance from the canal banks. We suggest a minimum distance of 100 ft.

As shown by Borings J and K, soil conditions at the site of the transmission substation are different from those at the power station site. This area is blanketed by a considerable depth of fine grained soils which probably originated as outwash deposits from the weathering of the hills just to the south. These consist of interbedded sandy silts and very fine silty sands, the upper few feet being predominantly clay of a medium-to-stiff consistency. While inorganic, these soils are loose and structures founded above them will be subject to slight-to-moderate settlements, depending upon the weight of the structure and the size of the area loaded. We consider them, however, satisfactory for the support of transmission towers, bus structures and transformers such as are usually placed in a transmission substation.

There is a 15 ft difference in ground elevation between Borings J and K, approximately 175 ft apart. At Boring K there is 8 ft of medium-to-stiff clay on the surface underlain by 9 ft of loose silts and sands. At Boring J the thickness of surface clay is 4 ft and the thickness of loose silts and sands has increased to 19 ft. We would prefer to have the foundations supported on the surface clay or in a moderate amount of well compacted fill above the clay. To accomplish this, we suggest that consideration be given to orienting the substation parallel to the ground contours to reduce the maximum difference in ground elevation as much as possible. We also suggest benching the area, using a minimum of excavation at the south side of each bench and building up the north side with compacted fill. This grading work should be done well in advance of the construction of foundations to permit time for the area to consolidate and come to equilibrium under the changed loading conditions.

We suggest that foundations be loaded to not exceeding 2,000 psf dead loads, and to not exceeding 2,500 psf dead plus live plus wind loads. Foundations of the substation and equip-ment may be placed in filled areas, assuming the fill is properly compacted to secure good density and that all rubbish, debris,

brush and organic matter are stripped from the surface before placing the fill. We suggest using the same bearing for footings founded in this fill as are to be used in the natural soil.

Boring L, which is located approximately at the site of the 60,000 gal water tank, shows recent outwash deposits to a depth of about 4 ft, below which, 5 ft of coal blossom was found. This in turn was underlain by a very hard gray clay which the driller termed "fire clay". While the coal blossom was marked compact on the boring, we suggest that, if the tank is a tower supported structure, the tower legs be carried through it to the underlying compact clay. This material is hard and dry and it may be loaded 4 tons per sq ft. If a ground supported tank is contemplated, some other procedure may be desirable.

We are sending you eight copies of this letter with all attachments in order that you will have the necessary copies for distribution.

If you have further questions or if you wish additional copies of this letter or prints of these boring logs, please advise us.

Yours very truly,

(Originally signed by)

F. W. Argue,
Engineering Manager

Enclosures

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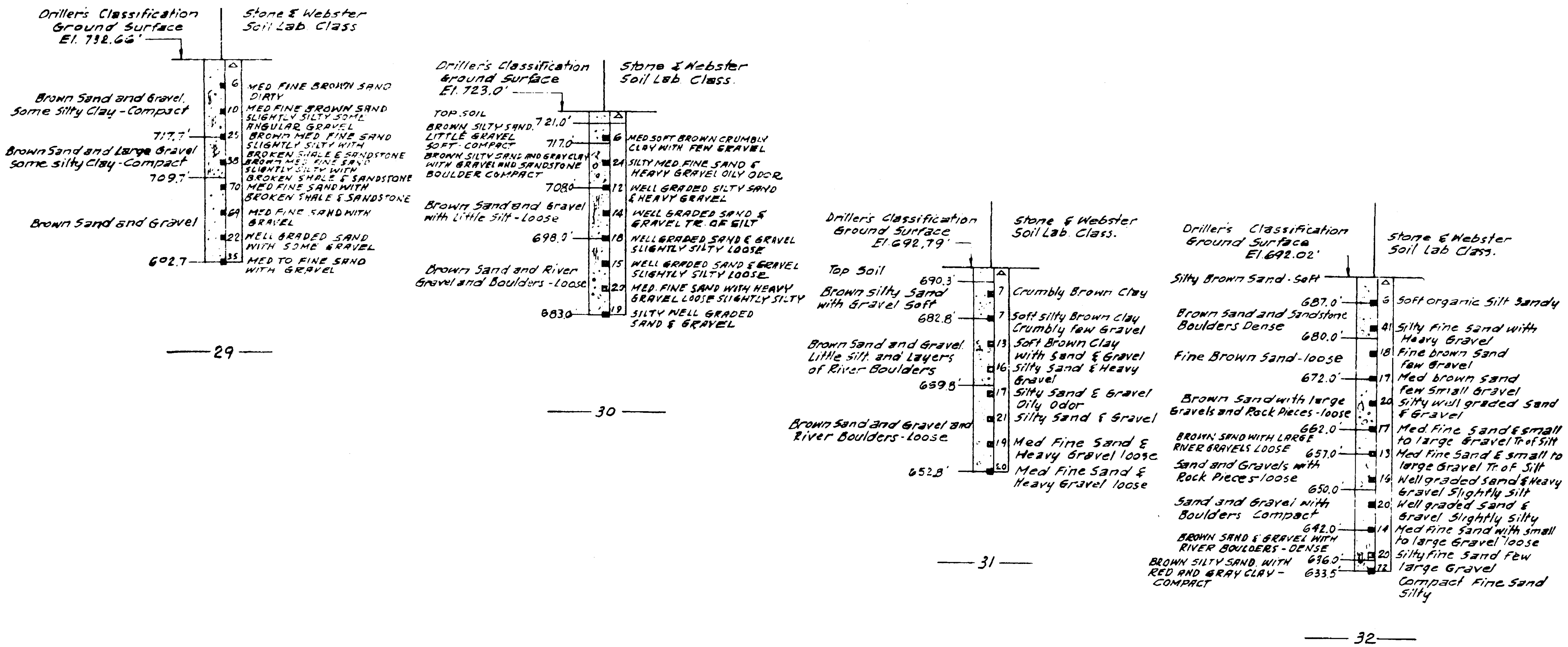


△ Numbers of Blows of 140# Weight Falling 30" Required to Drive 2" O.D. Spoon 12 Inches

* Casing Sample

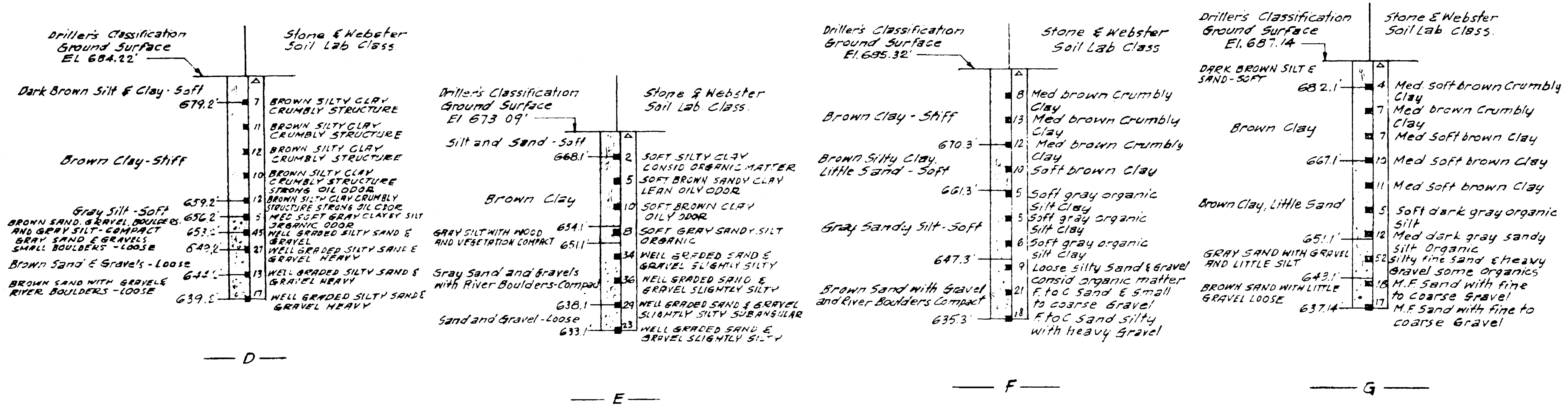
BORING LOGS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
APRIL 1955

SK-42155-C1

BEAVER VALLEY POWER STATION UNIT NO. 1

UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

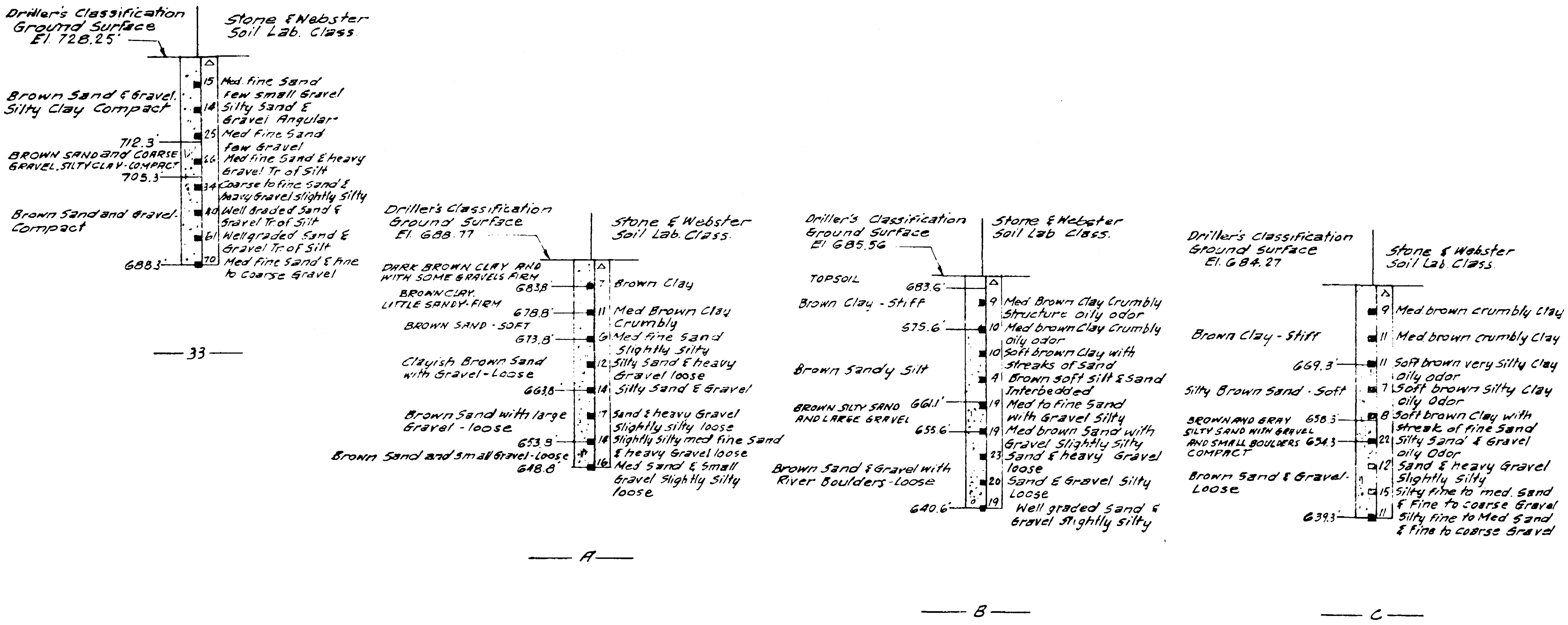


△ Number of Blows of 140# Weight Falling 30" Required to Drive 2" O.D. Spoon 12 Inches
* Casing Sample

BORING LOGS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
APRIL 1955

SK-42155-C2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



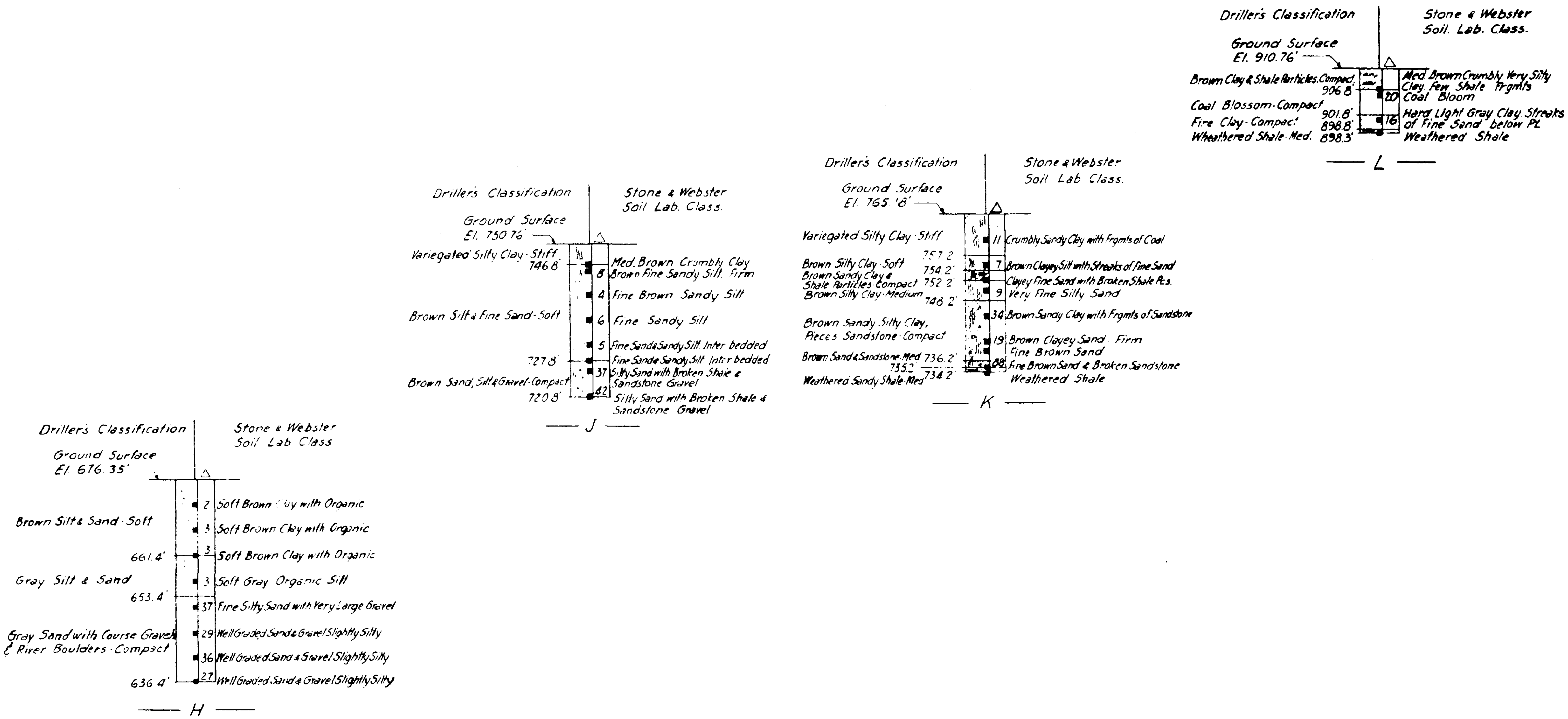
△ Number of Blows of 140# weight falling 30" Required to Drive 2" O.D Spoon 12 Inches

✱ Casing sample

BORING LOGS
SHIPPINGPORT SITE
DOQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
APRIL 1955

SK-42155-C3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

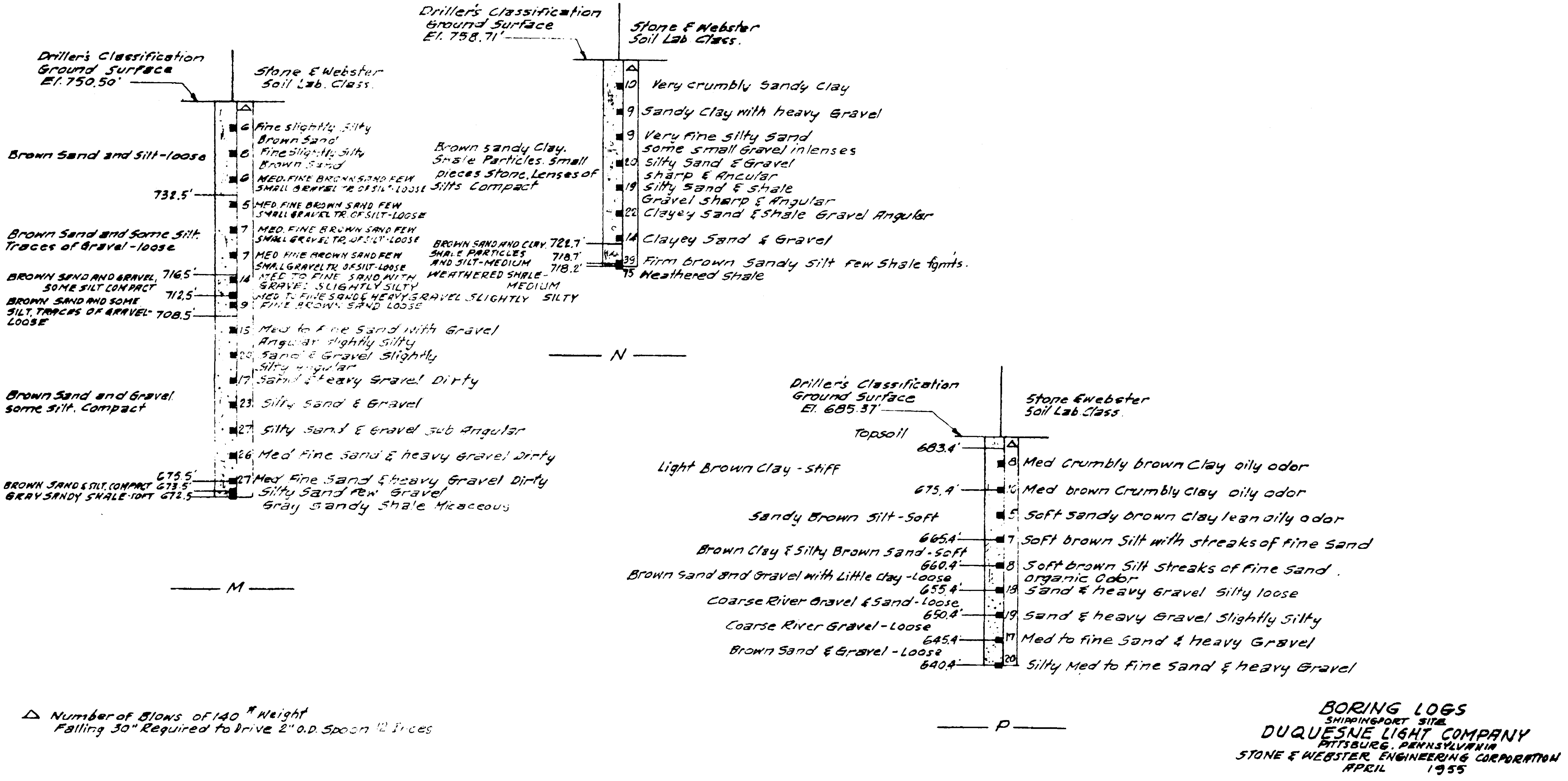


△ Number of Blows of 140# Weight Falling 30" Required to Drive 2" O.D. Spoon 12 Inches

BORING LOGS
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
APRIL, 1955

SK-42155-C4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

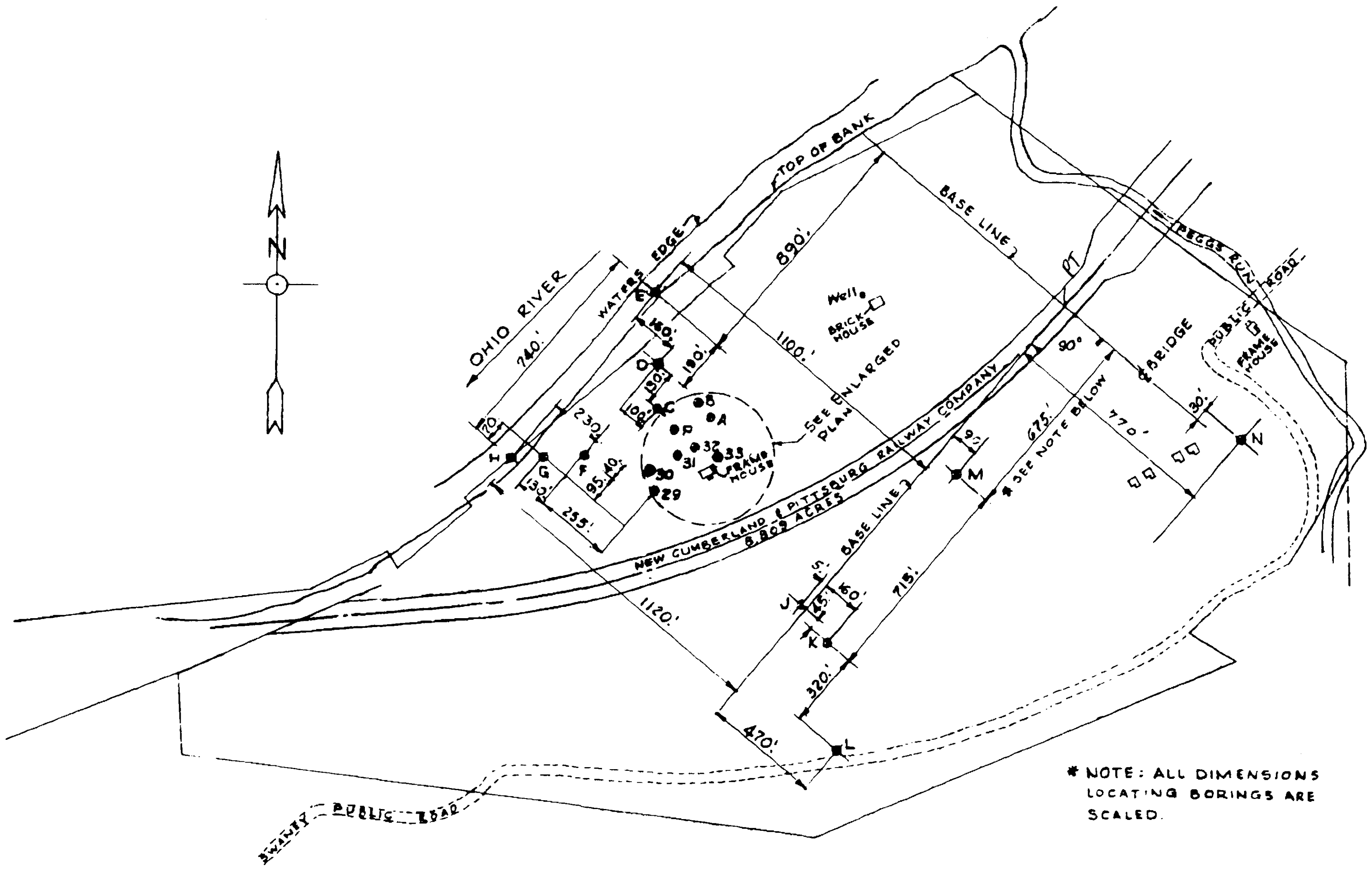


SK-42155-C5

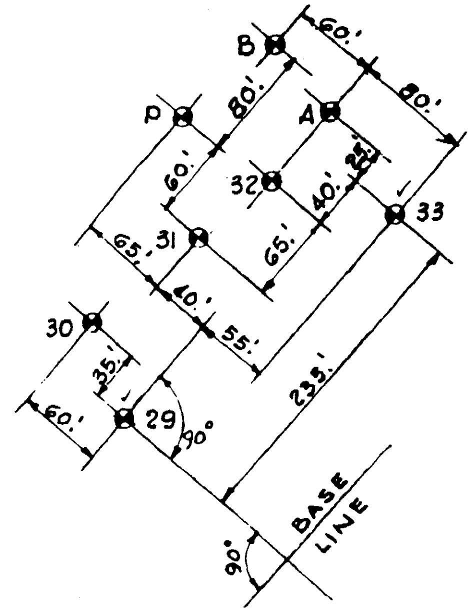
BEAVER VALLEY POWER STATION UNIT NO. 1

UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



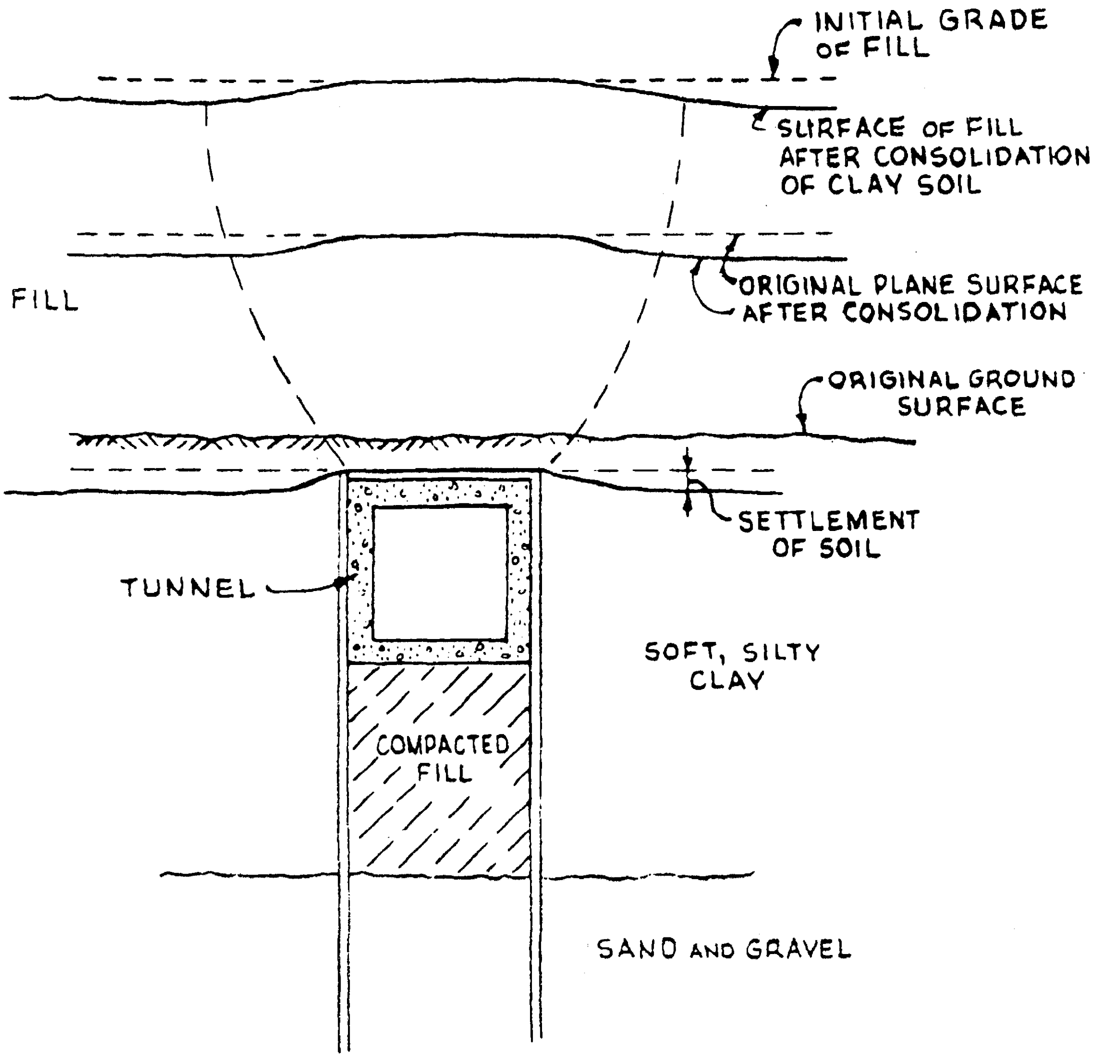
* NOTE: ALL DIMENSIONS LOCATING BORINGS ARE SCALED.



ENLARGED PLAN
SCALE: 1" = 100'

BORING LOCATION PLAN
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
PITTSBURGH, PENNSYLVANIA
STONE & WEBSTER ENGINEERING CORPORATION
APRIL, 1955
SCALE: 1" = 400'

SK-42155-C6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



ARCHING OF SOIL
INTAKE TUNNEL
SHIPPINGPORT SITE
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
APRIL 1955

SK-42155-C7

TABLES FOR APPENDIX 2H

Table 2H-1

RELATIVE DENSITIES AND RELATED SOIL PROPERTIES FOR SOILS UNDERLYING BEAVER VALLEY POWER STATION SITE VIBRATORY COMPACTION TESTS AT 1 PSI FOR 8 MIN

Test No.	Depth, Ft	Elevation, Ft	Description of Soils	Grain Size Analysis, % Passing		Natural Wet Density (PCF) (In-Place)	Minimum Density, PCF	Maximum Density, PCF		Natural Dry Density, PCF (In-Place)	Relative Density,☆ %	Location	
				No. 200 Mesh	D60/D10			VIB	Field*			North Coordinates	East Coordinates
1	25.0	710.0	Medium brown coarse sand slightly silty, some gravel	1	50.0	129.0	112.0	136.8	139.3	120.6	87	3710	7500
2	35.0	700.0	Fine to medium brown sand, some coarse sand and gravel, trace of clay and silt	1	42.5	139.8	117.4	134.3	141.4	131.3	92	3799	7550
3	40.0	695.0	Same as Test 2 with large pieces of broken gravel	2	44.0	141.3	115.0	134.9	141.4	132.9	94	3751	7600
4**	45.0	690.0	Same as Test 1	2	89.0	131.7	120.0	128.4	141.4	123.7	87.5	3730	7575
5	47.5	687.5	Same as Test 2	1	47.5	138.5	115.4	134.5	141.4	129.6	91	3730	7588
6	49.8	685.2	Same as Test	1	50.0	136.6	116.8	133.9	143.7	130.0	92	3691	7550
7	52.5	682.5	Fine to medium gravel and sand slightly silty, some large gravel	1	29.0	143.9	116.4	134.7	143.7	136.5	95	3782	7550

Maximum densities were obtained both by laboratory (ASTM D2049-64T), and field compaction using a vibratory compactor.

* Field in-place density tests were performed in area soils during the reactor containment excavation.

** Test No. 4 was performed using the Bureau of Reclamation Procedure for determining minimum and maximum densities.

☆ Relative density was calculated using measured natural (in-place) and field compacted densities.

TABLE 2H-2

ANALYSIS OF LIQUEFACTION POTENTIAL

				ALPHA = 0.72 at Surface					ALPHA = 0.90				ALPHA = 1.0			
Elev.	Total Mass, psf	$\bar{\sigma}_V$	DR %	ALPHA	Shear Stress, t psf	$t/\bar{\sigma}_V$	$t/\bar{\sigma}_{III}$	F.S.	ALPHA	t psf	$t/\bar{\sigma}_V$	F.S.	ALPHA	t psf	$t/\bar{\sigma}_V$	F.S.
REACTOR - 150 fT ø Mat at El. 681 Ft-11 In. - Avg Load 7.5 ksf																
GWL = El. 675																
675	8,320	8,320	55	0.72	750	0.090	0.29	3.2	0.90	940	0.113	2.6	1.0	1,040	0.124	2.3
665	9,520	8,920	55	0.72	860	0.096	0.29	3.0	0.90	1,080	0.121	2.4	1.0	1,200	0.134	2.2
655	10,720	9,520	60	0.72	980	0.103	0.32	3.2	0.90	1,220	0.128	2.5	1.0	1,360	0.143	2.2
645	11,920	10,120	60	0.72	1,070	0.106	0.32	3.0	0.90	1,340	0.132	2.4	1.0	1,480	0.146	2.2
635	13,120	10,720	60	0.72	1,180	0.110	0.32	2.9	0.90	1,480	0.138	2.3	1.0	1,640	0.153	2.1
GWL = 707 (Corresponds to River Design Flood - Recurrence Frequency <1:1000 Yr)																
675	8,320	6,360	55*	0.72	750	0.118	0.29	2.5	0.90	940	0.148	2.0	1.0	1,040	0.164	1.8
665	9,520	6,960	55	0.72	860	0.124	0.29	2.3	0.90	1,080	0.153	1.9	1.0	1,200	0.172	1.7
655	10,720	7,560	60	0.72	980	0.130	0.32	2.4	0.90	1,220	0.162	2.0	1.0	1,360	0.180	1.8
645	11,920	8,160	60	0.72	1,070	0.131	0.32	2.4	0.90	1,340	0.164	2.0	1.0	1,480	0.182	1.8
635	13,120	8,760	60	0.72	1,180	0.134	0.32	2.4	0.90	1,480	0.168	1.9	1.0	1,640	0.186	1.7
AUXILIARY BUILDING - Avg Load 2.4 ksf at Elev. 720																
For GWL = El. 675																
695	5,400	5,400	55*	0.72	485	0.09	0.29	3.2	0.90	610	0.112	2.6	1.0	670	0.125	2.3
685	6,600	6,600	55*	0.72	590	0.09	0.29	3.2	0.90	740	0.112	2.6	1.0	820	0.125	2.3
675	7,800	7,800	55*	0.72	700	0.09	0.29	3.2	0.90	870	0.112	2.6	1.0	970	0.125	2.3
665	9,000	8,400	55*	0.72	810	0.096	0.29	3.0	0.90	1,015	0.120	2.4	1.0	1,120	0.134	2.2
655	10,200	9,000	60	0.72	920	0.102	0.32	3.1	0.90	1,150	0.127	2.5	1.0	1,280	0.142	2.2
645	11,400	9,600	60	0.72	1,030	0.107	0.32	3.0	0.90	1,290	0.134	2.4	1.0	1,430	0.148	2.2
635	12,600	10,200	60	0.72	1,140	0.111	0.32	2.9	0.90	1,420	0.138	2.3	1.0	1,580	0.154	2.1
For GWL = El. 707																
695	5,400	4,680	55	0.72	485	0.104	0.29	2.78	0.90	610	0.130	2.2	1.0	670	0.143	2.0
685	6,600	5,280	55	0.72	590	0.112	0.29	2.58	0.90	740	0.140	2.1	1.0	820	0.155	1.9
675	7,800	5,880	55	0.72	700	0.119	0.29	2.44	0.90	870	0.147	1.96	1.0	970	0.165	1.7
665	9,000	6,480	55	0.72	810	0.125	0.29	2.32	0.90	1,015	0.157	1.85	1.0	1,120	0.173	1.7
655	10,200	7,080	55	0.72	920	0.130	0.29	2.2	0.90	1,150	0.164	1.77	1.0	1,280	0.181	1.6
645	11,400	7,680	55	0.72	1,030	0.134	0.29	2.16	0.90	1,290	0.167	1.73	1.0	1,430	0.186	1.6
635	12,600	8,280	55	0.72	1,140	0.138	0.29	2.1	0.90	1,420	0.172	1.68	1.0	1,580	0.191	1.5

*DR = Relative Density - Assumed as 55% above El. 665 - Conservative since in situ tests Elev. 680 to 715 Avg 80% - 90%

ALPHA = Ratio of average acceleration for 8 cycles at point considered to peak acceleration (single pulse) at surface

$\bar{\sigma}_V$ = Effective vertical stress at point considered

$t/\bar{\sigma}_{III}$ = Shear stress to cause INITIAL LIQUEFACTION in 8 cycles after SEED from tests on Sacramento River Sand No. 3

TABLE 2H-2 (CONT'D)

ANALYSIS OF LIQUEFACTION POTENTIAL

				ALPHA = 0.72 at Surface					ALPHA = 0.90				ALPHA = 1.0			
Elev.	Total Mass, psf	$\bar{\sigma}_V$	DR %	ALPHA	Shear Stress, t psf	$t / \bar{\sigma}_V$	$t / \bar{\sigma}_{III}$	F.S.	ALPHA	t psf	$t / \bar{\sigma}_V$	F.S.	ALPHA	t psf	$t / \bar{\sigma}_V$	F.S.
TURBINE BUILDING - Avg Load 3.6 ksf at El. 683.5 ft - Select Compacted to 680 - 675 ± For Normal Flood GWL = River = El. 675.0 Ft																
675	4,620	4,620	55	0.72	415	0.09	0.29	3.0	0.90	520	0.113	2.56	1.0	580	0.126	2.3
665	5,820	5,220	55	0.72	525	0.10	0.29	2.9	0.90	655	0.125	2.3	1.0	730	0.139	2.1
655	7,020	5,820	55	0.72	635	0.109	0.29	2.66	0.90	790	0.136	2.1	1.0	880	0.150	1.9
645	8,220	6,420	55	0.72	740	0.115	0.29	2.52	0.90	925	0.144	2.0	1.0	1,030	0.160	1.8
635	9,420	7,020	55	0.72	850	0.121	0.29	2.40	0.90	1,060	0.150	1.9	1.0	1,180	0.168	1.7
For Project Design Flood - Elev. 707.0																
675	4,620	2,640	55	0.72	415	0.157	0.29	1.84	0.90	525	0.199	1.46	1.0	580	0.220	1.32
665	5,820	3,240	55	0.72	525	0.163	0.29	1.78	0.90	660	0.205	1.42	1.0	730	0.225	1.28
655	7,020	3,840	55	0.72	635	0.163	0.29	1.78	0.90	790	0.205	1.42	1.0	880	0.230	1.26
645	8,220	4,440	55	0.72	740	0.167	0.29	1.73	0.90	925	0.210	1.38	1.0	1,030	0.232	1.25
635	9,420	5,040	55	0.72	850	0.167	0.29	1.73	0.90	1,060	0.208	1.39	1.0	1,180	0.233	1.24
Transformer Yard Area Ground Surface = Elev. 706.0 Bottom of Clay = El. 655± Normal Flood = GWL = El. 675.0																
655	6,300	5,100	55	0.72	570	0.112	0.29	2.6	0.90	710	0.139	2.1	1.0	790	0.153	1.90
645	7,500	5,700	55	0.72	675	0.118	0.29	2.45	0.90	845	0.148	1.96	1.0	940	0.166	1.74
635	8,700	6,300	55	0.72	780	0.124	0.29	2.35	0.90	980	0.155	1.88	1.0	1,090	0.173	1.67
For Design Flood to Elev. 707																
655	6,300	3,450	55	0.72	570	0.165	0.29	1.75	0.90	710	0.205	1.4	1.0	790	0.230	1.26
645	7,500	4,050	55	0.72	675	0.168	0.29	1.73	0.90	845	0.210	1.38	1.0	940	0.232	1.25
635	8,700	6,300	55	0.72	780	0.168	0.29	1.73	0.90	980	0.211	1.37	1.0	1,090	0.235	1.23
Fuel Building Avg Load 4.75 ksf at Elev. 715.0 (For Normal Flood Elev. 675-0)																
685	8,350	8,350	55	0.72	750	0.09	0.29	3.0	0.90	940	0.112	2.6	1.0	1,040	0.125	2.3
675	9,550	9,550	55	0.72	860	0.09	0.29	3.0	0.90	1,075	0.112	2.6	1.0	1,190	0.125	2.3
665	10,750	10,150	55	0.72	965	0.095	0.29	2.9	0.90	1,210	0.119	2.4	1.0	1,340	0.132	2.2
655	11,950	10,750	55	0.72	1,075	0.10	0.29	2.9	0.90	1,345	0.125	2.3	1.0	1,490	0.138	2.1
645	13,150	11,350	55	0.72	1,180	0.104	0.29	2.9	0.90	1,475	0.130	2.2	1.0	1,640	0.144	2.0
635	14,350	11,950	55	0.72	1,290	0.108	0.29	2.8	0.90	1,610	0.135	2.1	1.0	1,790	0.150	1.9
For Project Design Flood Elev. 707.2																
685	8,350	8,340	55	0.72	750	0.09	0.29	3.0	0.90	940	0.114	2.5	1.0	1,040	0.125	2.3
675	9,550	8,940	55	0.72	860	0.097	0.29	3.0	0.90	1,075	0.120	2.4	1.0	1,190	0.134	2.1
665	10,750	9,540	55	0.72	965	0.101	0.29	2.9	0.90	1,210	0.127	2.3	1.0	1,340	0.141	2.0
655	11,950	10,140	55	0.72	1,075	0.106	0.29	2.8	0.90	1,345	0.134	2.2	1.0	1,490	0.147	1.9
645	13,150	10,740	55	0.72	1,180	0.11	0.29	2.6	0.90	1,475	0.137	2.1	1.0	1,640	0.152	1.9
635	14,350	11,340	55	0.72	1,290	0.114	0.29	2.5	0.90	1,610	0.142	2.0	1.0	1,790	0.157	1.9

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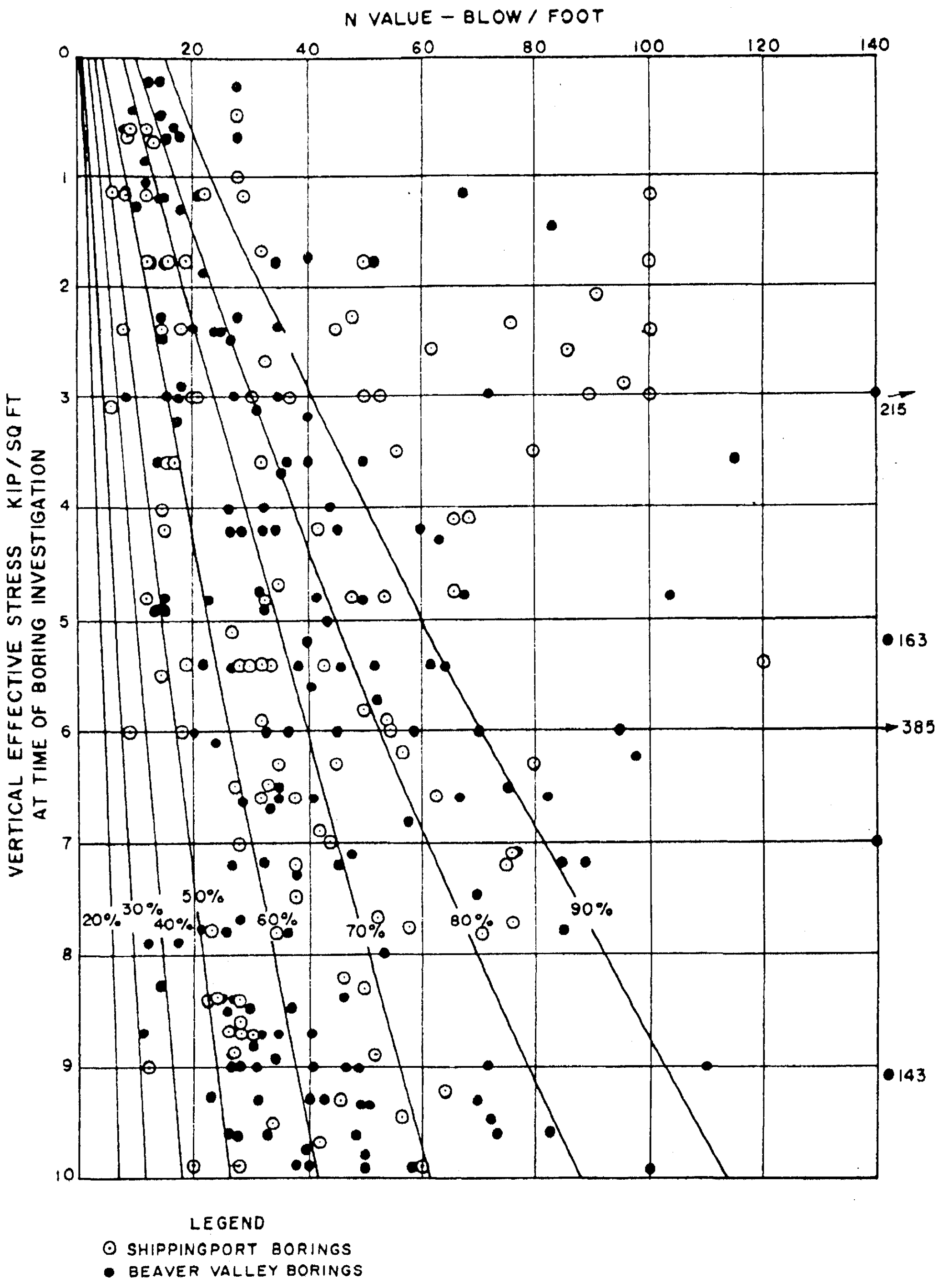


FIGURE 2H-1
CORRELATION OF BLOW COUNT AND RELATIVE DENSITY FOR SAND AND GRAVEL
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

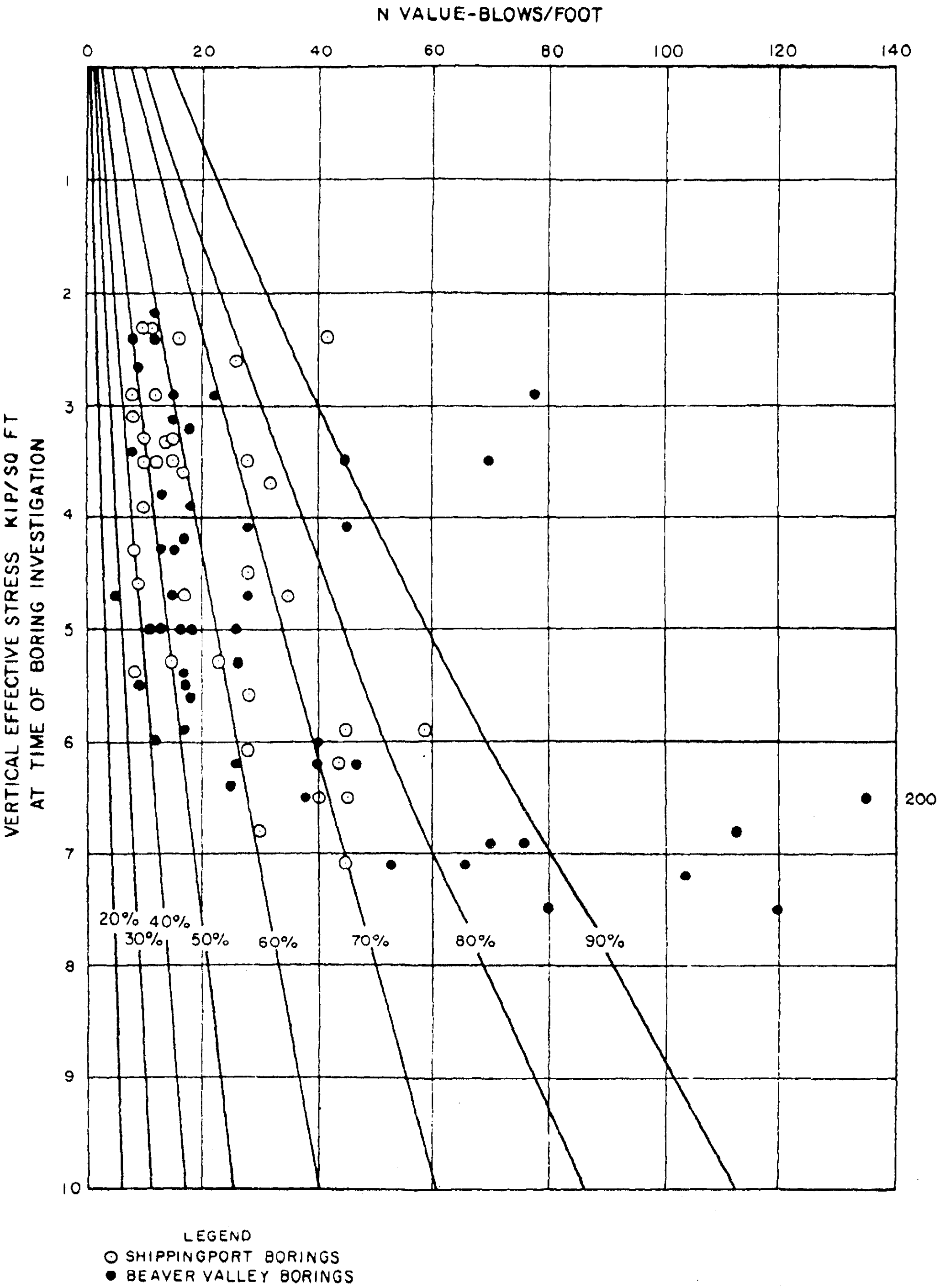


FIGURE 2H-2
CORRELATION OF BLOW COUNT AND RELATIVE DENSITY FOR INTERMEDIATE BENCH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

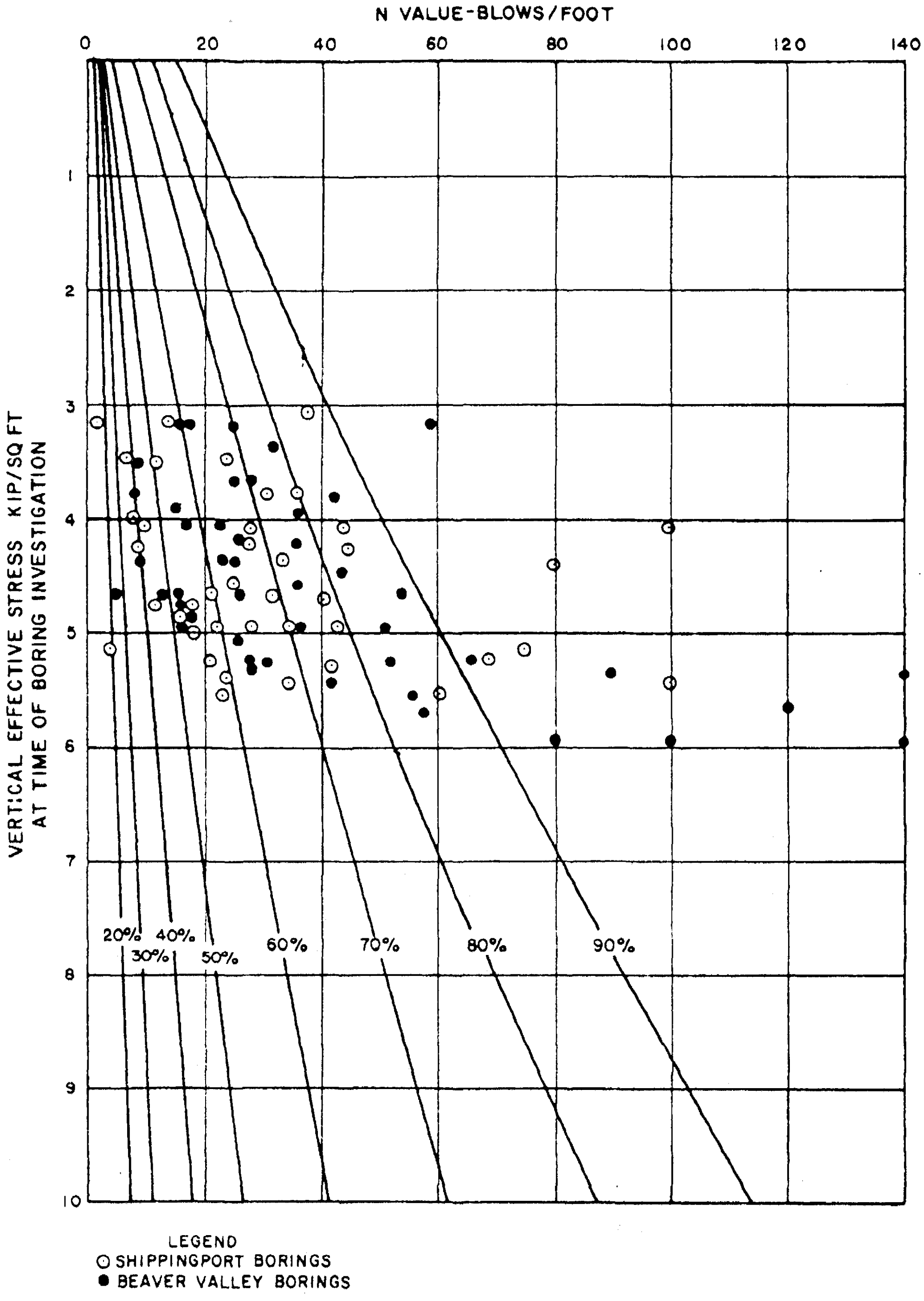


FIGURE 2H-3
CORRELATION OF BLOW COUNT AND RELATIVE DENSITY FOR LOW LEVEL BENCH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

BORING NO.	8	25	112	108	109	111
SURF. EL	688.0'	694.0'	710.0'	715.0'	690.0'	690.0'
BLOW COUNTS						
EL. 665 TO 645	39,21 18,28	10,9	15,11,16 17,9,26 12,20,15	17,5 13,16, 9	17,23,17	13,9,15
EL. 645 TO 630	34,18,22		20,22 26,29 200,76	12,23 135,118	9,13 18,66	23,19,26

IGNORE VERY HIGH BLOW COUNTS AT ABOUT EL. 630' AND BELOW

EL. 665-645 ZONE

EL. 710 BORINGS:

665-645 $\overline{\sigma}_v$ = 6.0 ksf — MEDIAN N=15 DR=50%

EL. 690 BORINGS:

665-645 $\overline{\sigma}_v$ = 3.6 ksf — MEDIAN N=17 DR=60%

AVG.=55% DR

EL. 645-630 ZONE

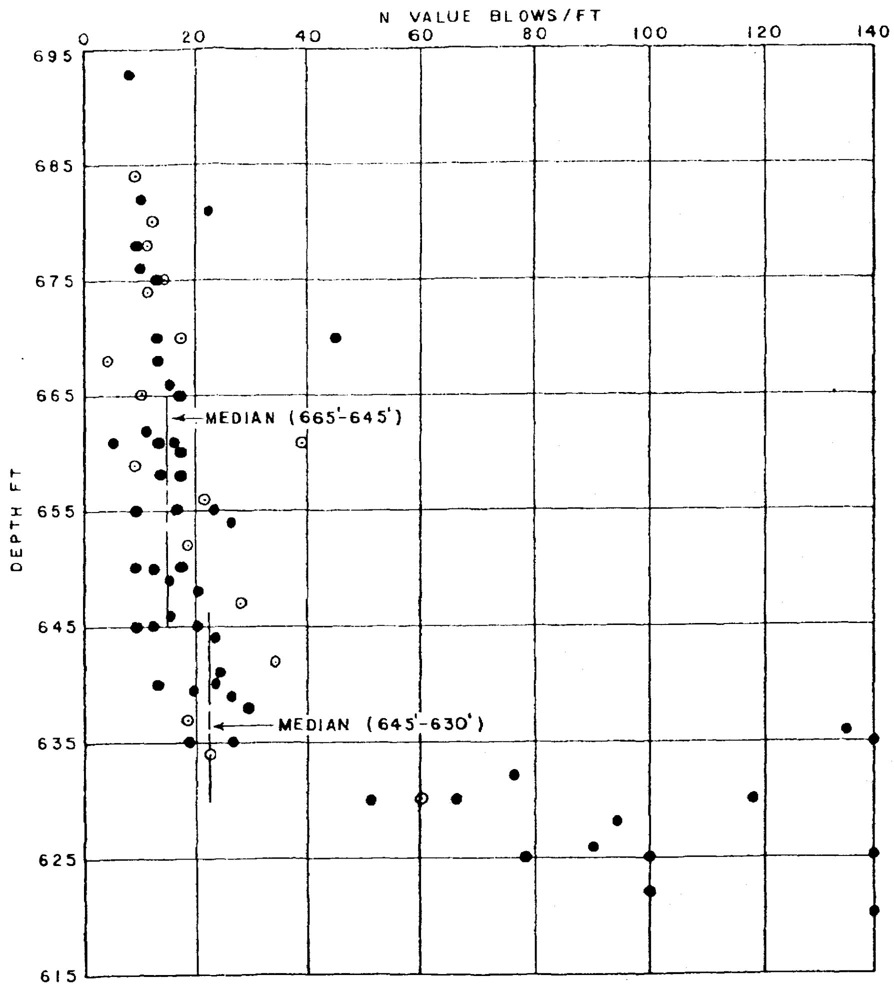
EL. 710' BORINGS:

$\overline{\sigma}_v$ = 7.1 ksf — MEDIAN N=22 DR=53%

EL. 680± BORINGS:

$\overline{\sigma}_v$ = 4.7 ksf — MEDIAN N=18 DR=57%

AVG.=55% DR



LEGEND

⊙ SHIPPINGPORT BORINGS NOS. 8, 25

● BEAVER VALLEY BORINGS NOS. 108, 109, 111, 112

FIGURE 2H-4
BLOW COUNT VS. DEPTH
BORINGS 8, 25, 108, 109, 111, 112
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

BORING NO.	21	20	111	109	110	310
SURF. EL.	684.0'	677.0'	690.0'	690.6'	689.6'	679.5'
BLOW COUNTS						
EL. 665 TO 645	10,26	10	13,9,15	23,17	59,8, 16	19,20, 23,28, 22
EL. 645 TO 630+	11,26 31,18	9,12 5,7	23,19,26	9,13,18	25,5, 41,31	24,23

EL. 665-645 ZONE
EL. 690 BORINGS: MEDIAN N=15 DR=55%
EL. 680± BORINGS: MEDIAN N=23 DR=75%
AVG.=63% DR

EL. 645-630 ZONE
EL. 690± BORINGS: MEDIAN N=20 DR=60%
EL. 680± BORINGS: MEDIAN N=13 DR=55%
AVG.=57% DR

LEGEND

○ SHIPPINGPORT BORINGS NOS. 20, 21
● BEAVER VALLEY BORINGS NOS. 109, 110, 111, 310

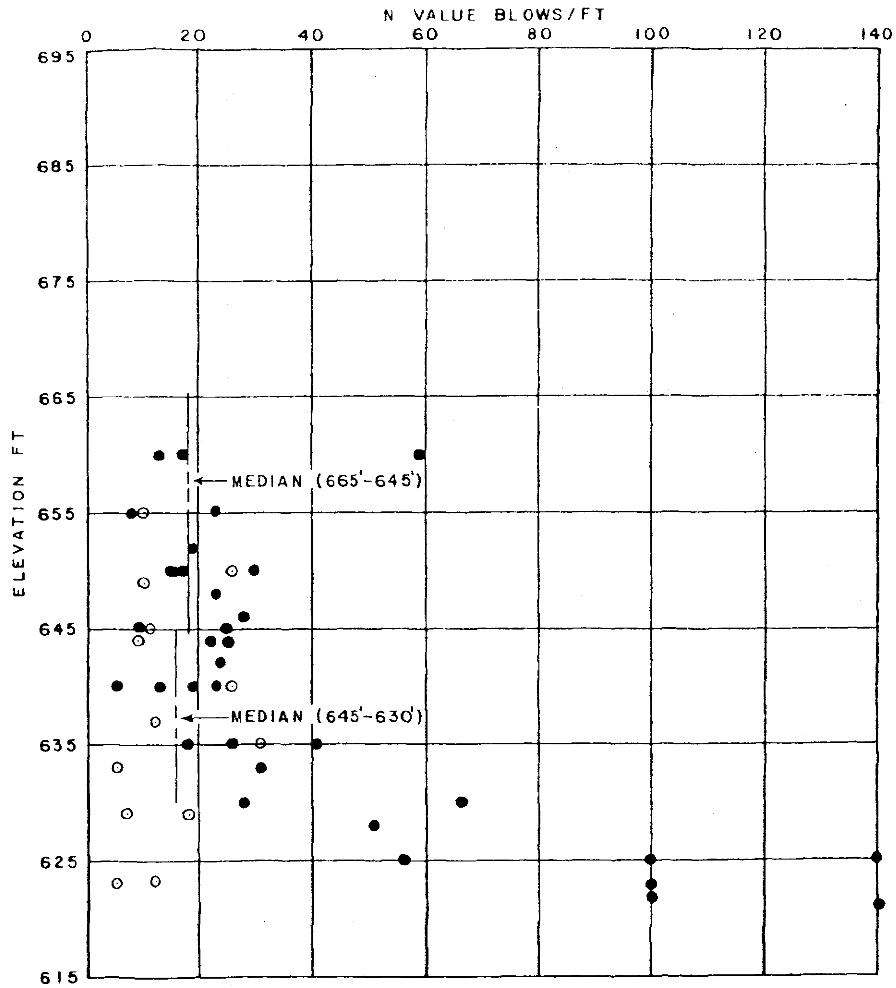


FIGURE 2H-5
BLOW COUNT VS. DEPTH
BORINGS 20, 21, 109, 110, 111, 310
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

COMPUTED SINGLE PEAK VALUES OF ALPHA

Z DEPTH	$\frac{Z'-Z}{Z'}$	SINGLE PEAK DYALS	SHEAR STRESS FOR I=a x m	ALPHA SINGLE PEAK
20	.81	200	300	0.667
40	.62	370	600	0.62
60	.41	520	900	0.58
80	.23	660	1,200	0.55
100	.05	730	1,500	0.49

Z'=105' (735 to 630 AT REACTOR) = DEPTH OF OVERBURDEN
a= MAX SURF. ACCELERATION-SINGLE PEAK= 0.125g

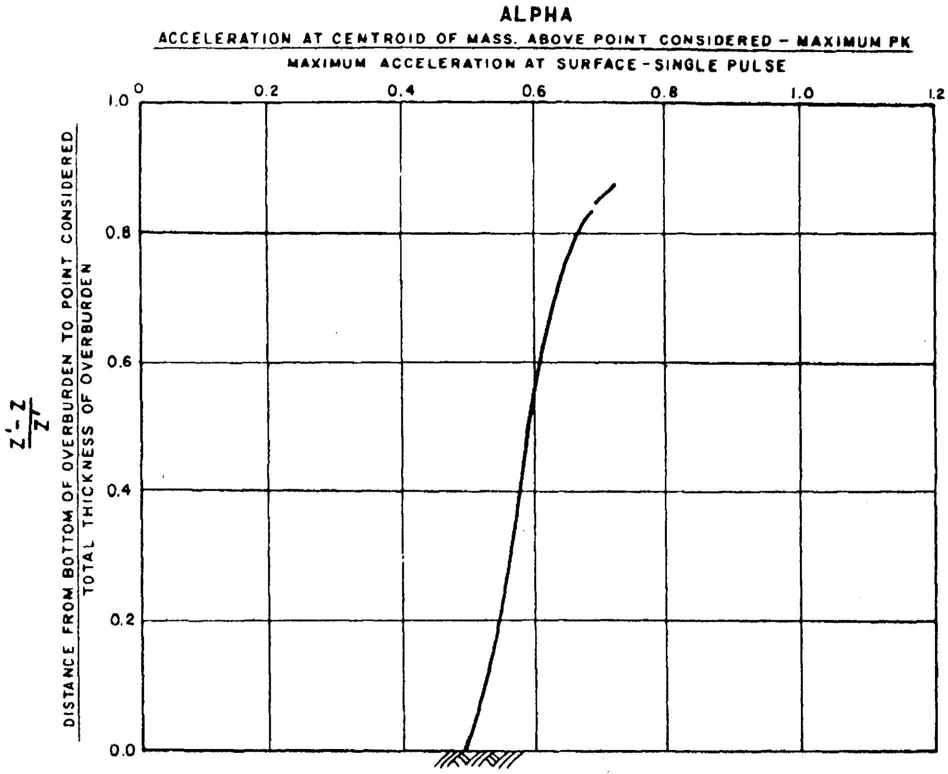
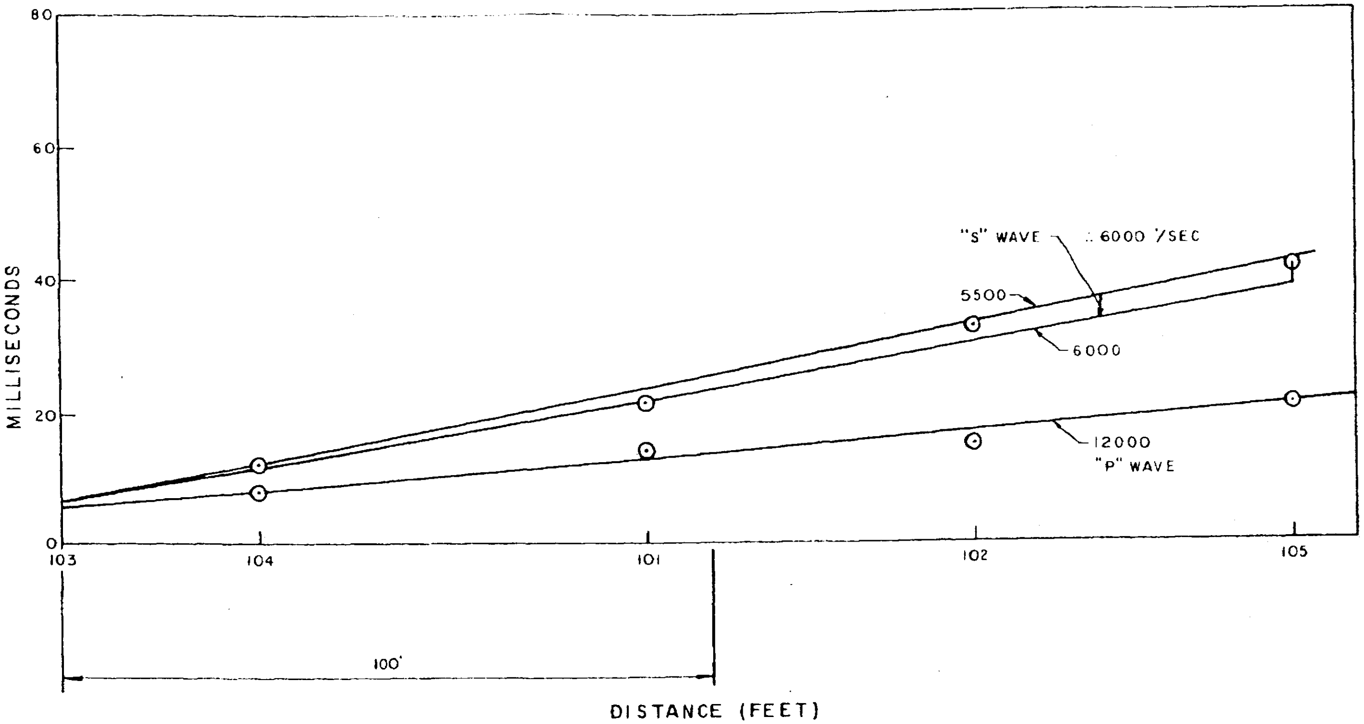


FIGURE 2H-6
VARIATION OF ALPHA WITH DEPTH
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



NOTE:
SHOT AND RECORED AT DEPTH 130 FEET IN ROCK

FIGURE 2H-7
MILLISECONDS VS. DISTANCE
P & S WAVE DETERMINATIONS
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

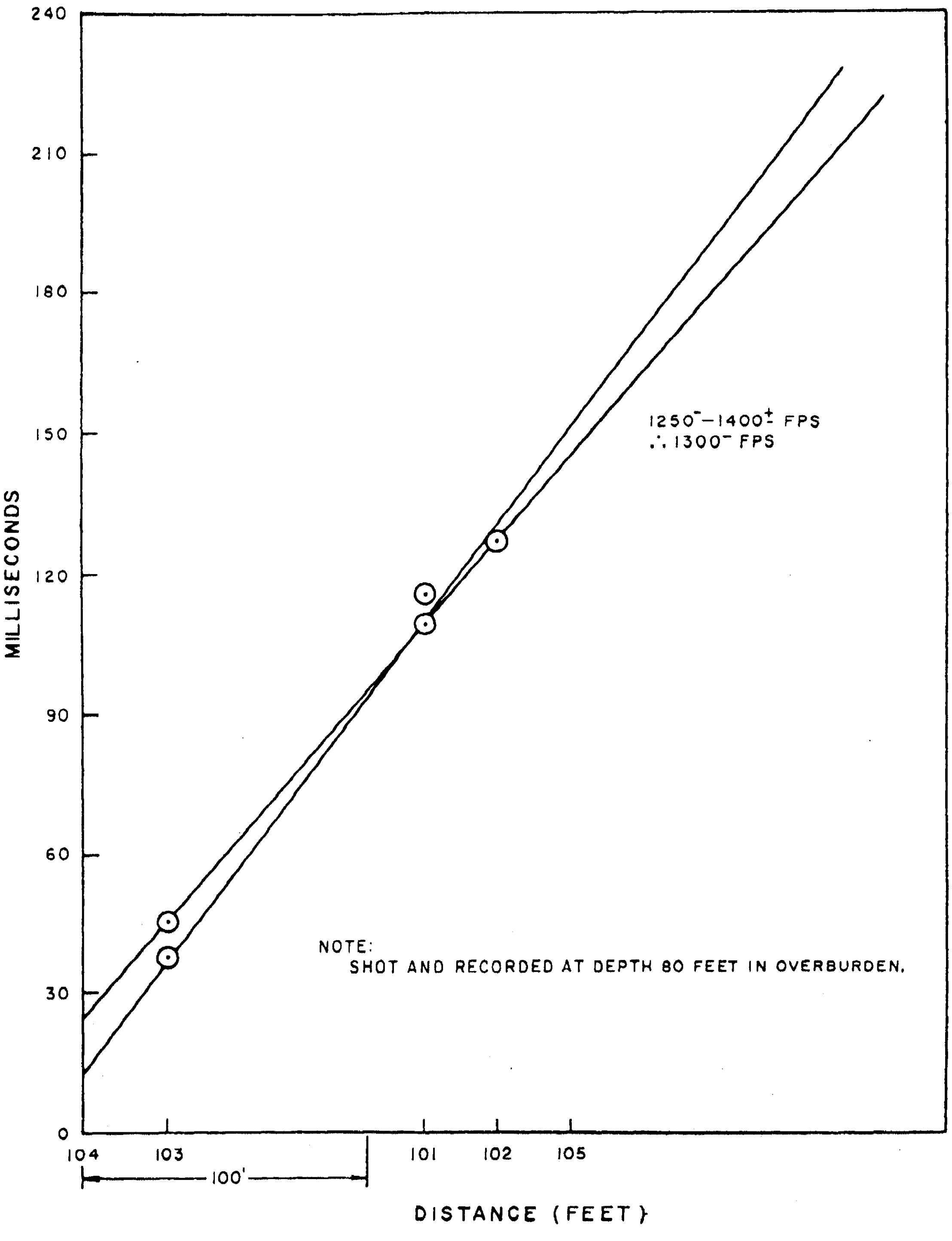


FIGURE 2H-8
MILLISECONDS VS. DISTANCE
S WAVE VELOCITY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

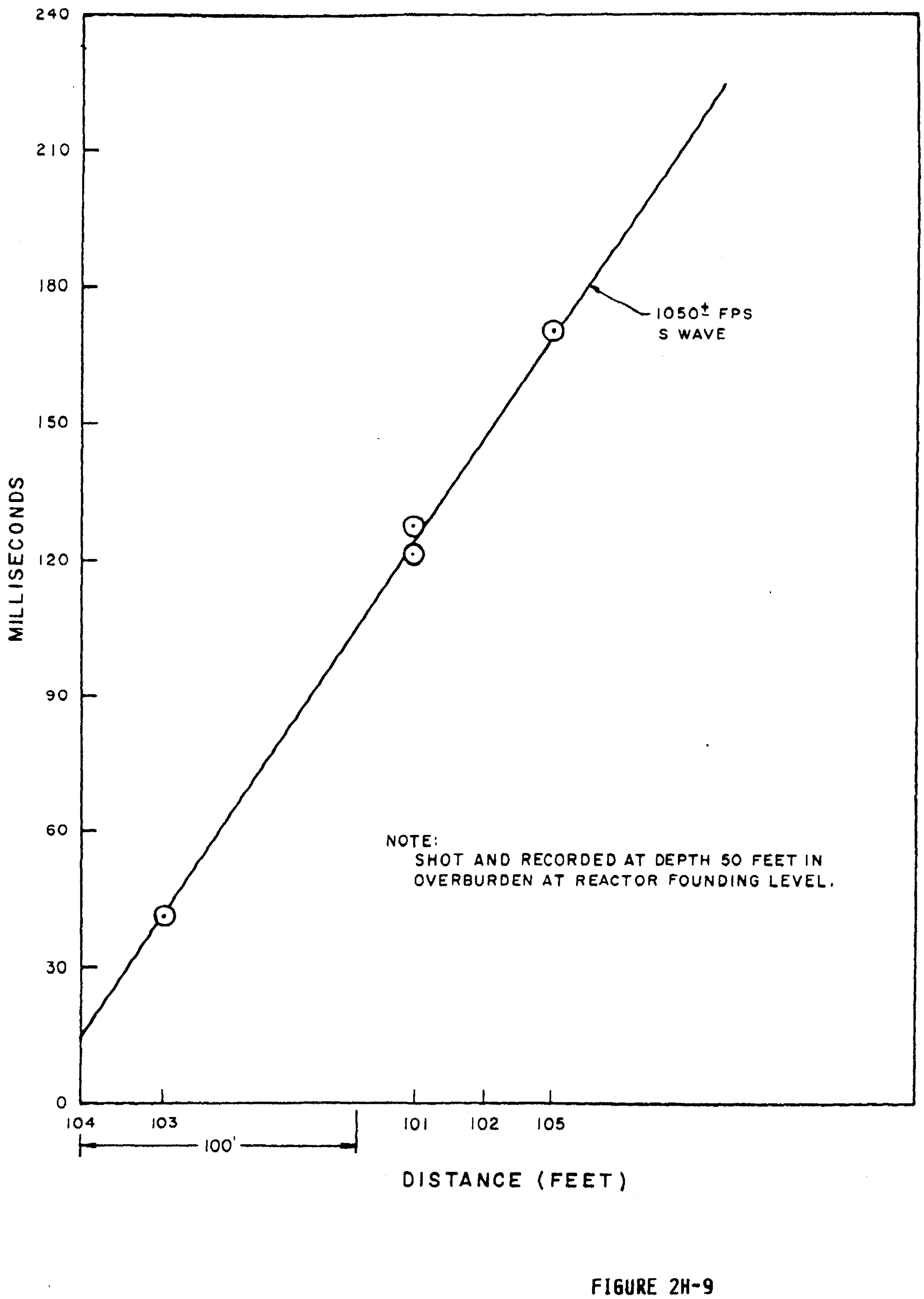


FIGURE 2H-9
MILLISECONDS VS. DISTANCE
S WAVE VELOCITY
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

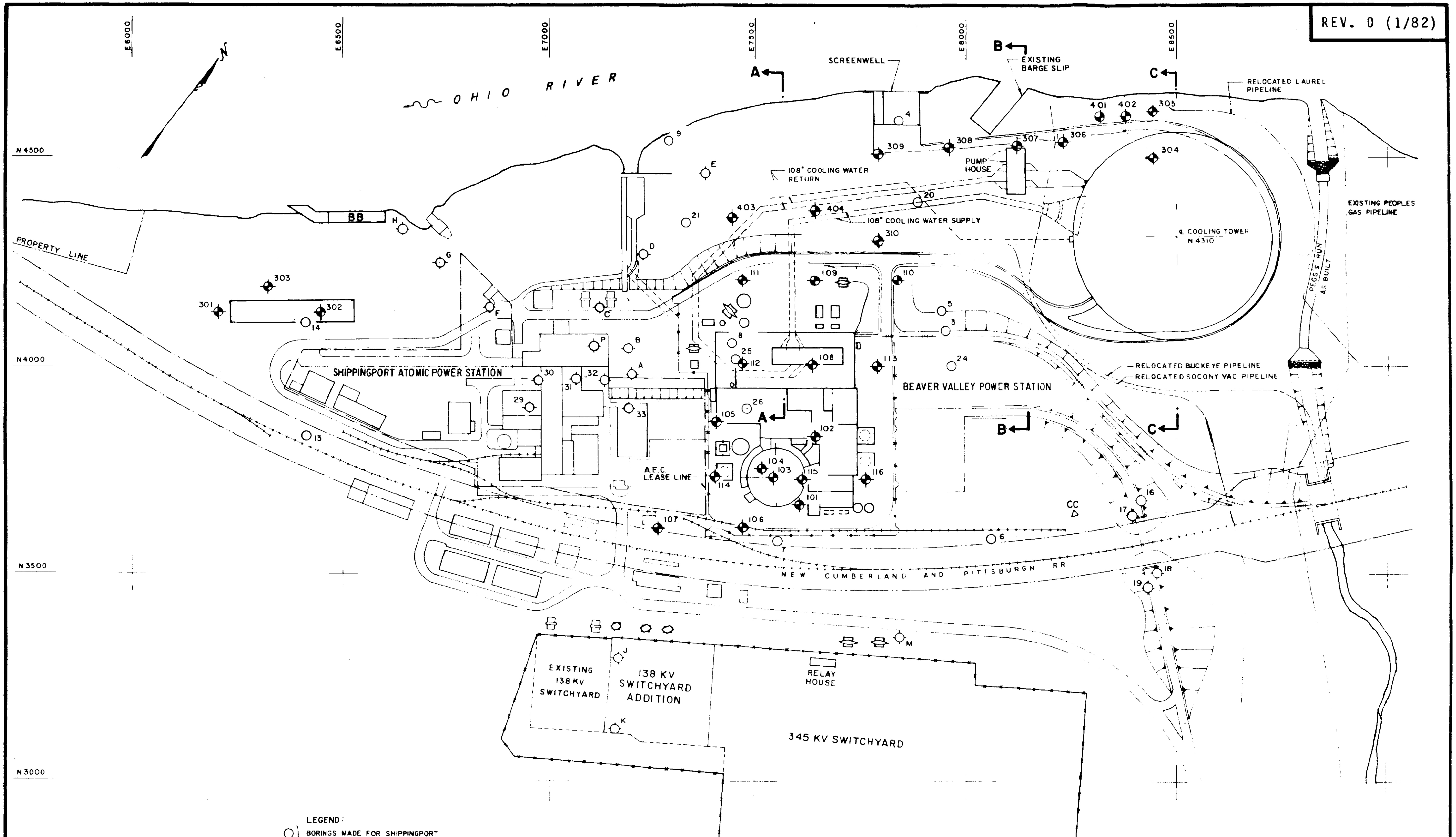
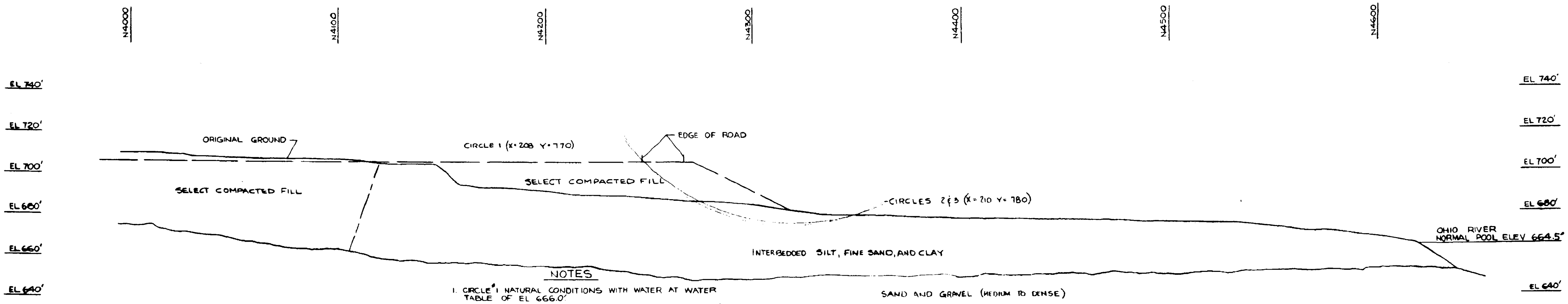


FIGURE 2H-10
LOCATION OF STABILITY ANALYSIS - SECTIONS

BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

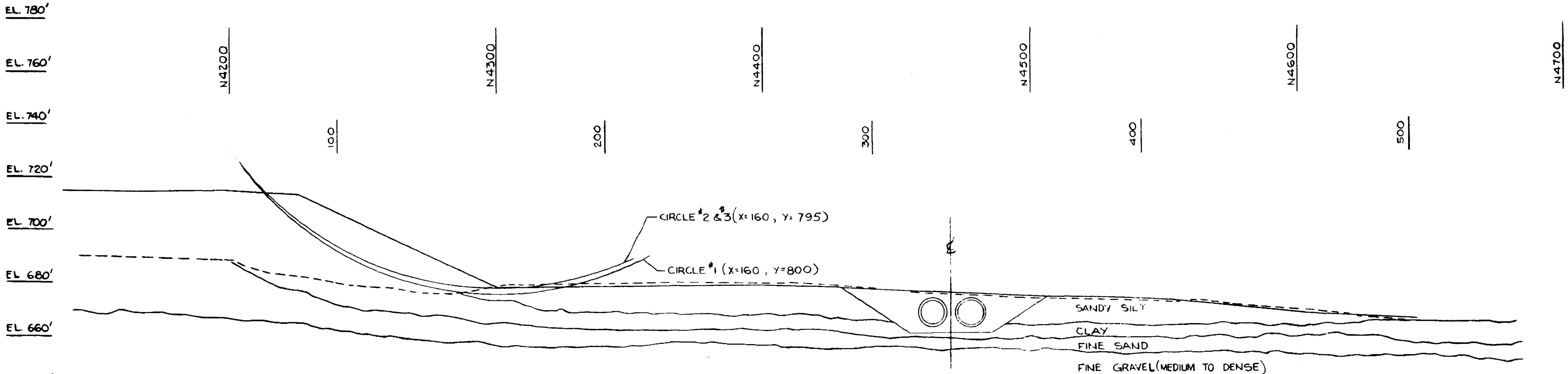


NOTES

1. CIRCLE #1 NATURAL CONDITIONS WITH WATER AT WATER TABLE OF EL 666.0'
2. CIRCLE #2 FLOOD CONDITIONS WITH WATER AT EL 707.0'
3. CIRCLE #3 FLOOD CONDITIONS WITH WATER INITIALLY AT EL 707.0' AND RAPID DRAWDOWN AND DESIGN BASIS EARTHQUAKE OCCURRING SIMULTANEOUSLY.
4. SOIL PARAMETERS SEE FIG. 2H-14

FIGURE 2H-11
STABILITY ANALYSIS
FOR E7550 SECTION AA
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



NOTES

1. CIRCLE #1 NATURAL CONDITIONS WITH WATER AT WATER TABLE OF EL. 666.0'.
2. CIRCLE #2 FLOOD CONDITIONS WITH WATER AT EL. 707.0'.
3. CIRCLE #3 FLOOD CONDITIONS WITH WATER INITIALLY AT EL. 707.0 AND RAPID DRAWDOWN AND DESIGN BASIS EARTHQUAKE OCCURRING SIMULTANEOUSLY.
4. SOIL PARAMETERS SEE FIG. 2H-14

FIGURE 2H-12
STABILITY ANALYSIS
FOR E8150 SECTION BB
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

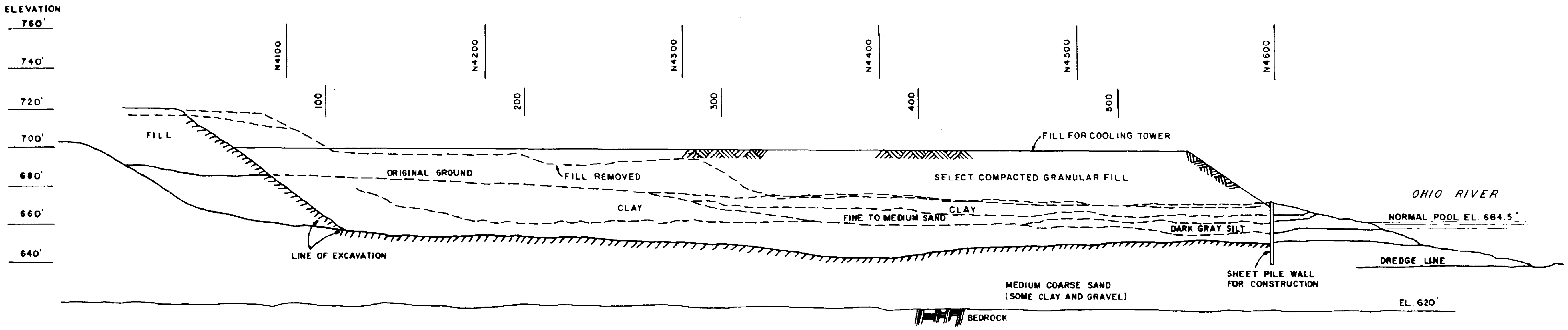


FIGURE 2H-13
STABILITY ANALYSIS
FOR E8500 SECTION CC
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

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FIGURE 2H-14
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY SH. 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 301
TYPE OF BORING DRIVE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 700.6'
DATE DRILLED JULY, 1969 DRILLED BY PENN. DRILLING LOGGED BY B.G., K.L.P.
NOTES

GROUND EL. 700.6' BORING NO. 301

Strata Description	Sample Type and No.	Blows or Recovery	Piezo. Test	Laboratory or Geologist's Description
DARK BROWN SANDY CLAY WITH SOME GRAVEL, COMPACT, MOIST	ST1	78		SILT - SANDY, FIRM, BROWN
	SS1	25		SAME AS ST1
	SS2	23		SAME AS ST1
	SS3	18		CLAY - FIRM, LEAN, SILTY, TRACE OF SANDSTONE FRAGMENTS, BROWN
	SS4	17		SAME AS SS3
	SS5	11		SAME AS SS3
DARK BROWN SANDY CLAY, STIFF	ST2	100		SAME AS SS3
	ST3	83		SAME AS SS3
DARK GRAY CLAY, TRACE OF WOOD, DAMP TO WET	ST4	100		CLAY - FIRM, LEAN, ORGANIC, SILTY, UNIFORM, GRAY
DARK GRAY CLAY WITH LOOSE GRAVEL, WET	ST5	75		SAME AS ST4
DARK GRAY SANDY CLAY WITH LOOSE GRAVEL, WET	SS6	23	▽ 1	SAND - MEDIUM, WITH ORGANIC SILT AND GRAVEL, POORLY GRADED, SUBROUNDED, GRAY-BROWN
	SS7	25		SAME AS SS6
DARK BROWN SAND AND COARSE GRAVEL SOME SILT, WET	SS8	36		GRAVEL - FINE AND MEDIUM, WITH SAND, TRACE OF SILT, FAIRLY WELL GRADED, ROUNDED TO SUBROUNDED, BLACK
	SS9	36		SAME AS SS8
DARK BROWN COARSE SAND, SOME MEDIUM GRAVEL AND SILT, WET	SS10	44		SIMILAR TO SS8, BUR MORE SAND
	SS11	25		SAND - MEDIUM AND COARSE, SILTY, SOME GRAVEL, UNIFORM, ROUNDED, DARK GRAY
	SS12	43		SAME AS SS11
	SS13	56		SAME AS SS11

Elevation scale: 690, 680, 670

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX.
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE.

BORING LOG 301
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-19

DUQUESNE LIGHT COMPANY SH. 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 302
TYPE OF BORING DRIVE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 703.2'
DATE DRILLED JULY, 1969 DRILLED BY PENN. DRILLING LOGGED BY B.G., M. B.
NOTES

GROUND EL. 703.2' BORING NO. 302

Strata Description	Sample Type and No.	Blows or Recovery	Piezo. Test	Laboratory or Geologist's Description
DARK BROWN SANDY CLAY WITH ROCK FRAGMENTS, COMPACT, DAMP	ST1	100		SILT - SANDY, SOME FINE TO MEDIUM GRAVEL, TRACE OF CLAY, MEDIUM STIFF, BROWN
	SS1	20		SAME AS ST1
	SS2	19		SILT - SOME CLAY, SOME MEDIUM GRAVEL AND FINE SAND, BROWN
	SS3	16		SAME AS ST1
DARK BROWN SANDY CLAY WITH GRAY SLAG, COMPACT, DAMP	SS4	26		SILT - SOME CLAY, ORGANIC, SOME FINE GRAVEL, MEDIUM STIFF, BROWN AND BLACK
	SS5	21		SAND - FINE, SILTY, SOME FINE GRAVEL, POORLY GRADED, ROUNDED, BROWN
	SS6	17		SAME AS SS4
DARK BROWN SANDY CLAY WITH SOME GRAVEL, SOFT, WET	SS7	11		GRAVEL - FINE, SANDY, SILTY, TRACE OF CLAY, FAIRLY WELL GRADED, ROUNDED, BROWN
	ST2	100		SAME AS SS7
	ST3	79	▽ 1	GRAVEL - MEDIUM, SANDY, SILTY, POORLY GRADED, SUBROUNDED, BROWN
	ST4	100		SAME AS ST3
	ST5	100		SAME AS ST3
DARK BROWN COARSE SAND AND GRAVEL, LITTLE SILT, LOOSE, WET	ST6	100		SAME AS ST3
	SS8	23		GRAVEL - MEDIUM, SANDY, SILTY, ORGANIC, TRACE OF CLAY, POORLY GRADED, SUBROUNDED, BROWN
	SS9	24		GRAVEL - MEDIUM, SANDY, FAIRLY WELL GRADED, SUBROUNDED, BLACK
	SS10	36		SAME AS SS9
	SS11	42		SAME AS SS9
	SS12	25		SAME AS SS9
	SS13	34		SAME AS SS9

Elevation scale: 700, 690, 680, 670

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL.
5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX.
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE.

BORING LOG 302
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-20

FIGURE 2H-15
BORING LOGS 301 AND 302
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY

SH. 1 OF 1

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 303
TYPE OF BORING: DRIVE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 696.0'
DATE DRILLED: JULY, 1969 DRILLED BY: PENN DRILLING LOGGED BY: B.G., K.L.F.
NOTES:

GROUND EL. 696.0' BORING NO. 303

ELEV FEET	DEPTH FEET	STRATA DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NO	SAMPLE BLOWS OR RECOV	R.Q.D.	DIP OF BEDS	PRESS TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SANDY CLAY WITH SOME SMALL GRAVEL, DAMP		ST1	71				SILT - TRACE OF GRAVEL, SLIGHTLY ORGANIC, MEDIUM FIRM, BROWN
				ST2	54				SIMILAR TO ST1, BUT TRACE OF CLAY
				ST3	100				SAME AS ST2
690		DARK BROWN SANDY CLAY SLAG, SOME WOOD, DAMP, FILL		ST4	38				SILT - ORGANIC, WITH GRAVEL, SOFT, BLACK
		DARK BROWN SANDY CLAY WITH SMALL GRAVEL THROUGHOUT, DAMP		ST5	100				CLAY - SOFT, LEAN, SILTY, SANDY, TRACE OF GRAVEL, BROWN
				ST6	100				SIMILAR TO ST5, BUT ALSO TRACE OF ORGANIC
				ST7	100			▽ 1	SAME AS ST6
				ST8	100				SAME AS ST6
680				ST9	100				SAME AS ST6
		DARK GRAY SANDY CLAY, SOME SMALL GRAVEL		ST10	100				SAME AS ST6
				ST11	100				SAME AS ST6
		DARK BROWN SANDY CLAY, VERY STIFF, DAMP		ST12	100				CLAY - SOFT, LEAN, SILTY, UNIFORM, BROWN
		DARK BROWN COARSE SAND AND GRAVEL, LITTLE SILT, LOOSE, WET		SS1	25				GRAVEL - FINE AND MEDIUM, AND SAND, TRACE OF SILT, FAIRLY WELL GRADED, SUBROUNDED, BLACK
670				SS2	32				SAME AS SS1
				SS3	28				SAME AS SS1
				SS4	33				SAME AS SS1
				SS5	26				SAME AS SS1
				SS6	26				SAME AS SS1
				SS7	26				SAME AS SS1
660									

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽[1] INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
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6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

4
3
2
1

BORING LOG 303

BEAVER VALLEY POWER STATION - UNIT NO. 1

SHIPPINGPORT, PENNSYLVANIA

DUQUESNE LIGHT COMPANY

STONE & WEBSTER ENGINEERING CORPORATION

11700-SSK-21

DUQUESNE LIGHT COMPANY

SH. 1 OF 1

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 304
TYPE OF BORING: DRIVE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 675.3'
DATE DRILLED: JULY, 1969 DRILLED BY: PENN DRILLING LOGGED BY: B.G., K.L.F.
NOTES:

GROUND EL. 675.3' BORING NO. 304

ELEV FEET	DEPTH FEET	STRATA DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NO	SAMPLE BLOWS OR RECOV	R.Q.D.	DIP OF BEDS	PRESS TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SANDY SILT, DAMP		ST1	100				SAND - MEDIUM, SILTY, SOME ROOTS, UNIFORM, ROUNDED, BROWN
				ST2	100				SILT - SANDY, SOME DECAYED VEGETATION, FIRM, BROWN
670		DARK BROWN SANDY CLAY, SOME WOOD, DAMP		ST3	100				SIMILAR TO ST2, BUT TRACE OF CLAY
				ST4	100				SAME AS ST3
		DARK BROWN AND GRAY SANDY CLAY, WET		ST5	50				SIMILAR TO ST2, BUT SOFTER
		DARK GRAY, SOME BROWN SAND AND CLAY, WET		ST6	100				SILT - ORGANIC, SANDY, WITH DECAYED VEGETATION, SOFT, GRAY
				ST7	100			▽ 1	SAME AS ST6
660				ST8	100				SAND - MEDIUM, SILTY, WITH GRAVEL, SOME ORGANIC, POORLY GRADED, SUBROUNDED, GRAY-BROWN
				ST9	100				GRAVEL - FINE AND MEDIUM, SANDY, SILTY, WELL GRADED, SUBROUNDED, BROWN
		DARK BROWN COARSE SAND AND GRAVEL, SOME CLAY, WET		SS1	17				SAME AS ST9
				SS2	20				SAME AS ST9
				SS3	22				SIMILAR TO ST9, BUT SOME ORGANIC, LESS GRADING
				SS4	28				SAME AS ST9
650				SS5	28				SAME AS ST9
				SS6	18				SAME AS ST9
		DARK BROWN COARSE SAND, FEW GRAVEL, SOME CLAY, WET		SS7	16				SAND - MEDIUM, SILTY, WITH MEDIUM GRAVEL, POORLY GRADED, ROUNDED, BROWN
				SS8	13				SAND - MEDIUM, SOME SILT, TRACE OF FINE GRAVEL, UNIFORM, ROUNDED, BROWN
640									

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽[1] INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING
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5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

4
3
2
1

BORING LOG 304

BEAVER VALLEY POWER STATION - UNIT NO. 1

SHIPPINGPORT, PENNSYLVANIA

DUQUESNE LIGHT COMPANY

STONE & WEBSTER ENGINEERING CORPORATION

11700-SSK-22

FIGURE 2H-16
BORING LOGS 303 AND 304
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY — SH. 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 305
TYPE OF BORING DRIVE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 671.2'
DATE DRILLED JULY, 1969 DRILLED BY PENN DRILLING LOGGED BY B.G., K.L.P.
NOTES

GROUND EL. 671.2' BORING NO. 305

ELEV FEET	DEPTH FEET	STRATA DESCRIPTION	SAMPLE TYPE AND NO	BLOWS OR RECOV.	R.Q.D.	DIP OF BEDS	PRESS. TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
670		DARK BROWN FINE SAND, DAMP	ST1	100				SAND - FINE TO MEDIUM, SOME SILT, UNIFORM, SUBROUNDED, BROWN
		DARK BROWN WOOD SOME CLAY, DAMP	ST2	100				PEAT - SOFT, SANDY, BROWN
		DARK BROWN SANDY CLAY, SOME WOOD, WET	ST3	100				SILT - SANDY, ORGANIC, SOFT, GRAY-BROWN
		DARK BROWN AND GRAY FINE SAND, WET	ST4	25				SILT - SANDY, SOFT, BROWN
		DARK GRAY SILT, SOME CLAY AND SAND, VERY SOFT, WET	ST5	100			∇ 1	SILT - ORGANIC, WITH ROOTS, SANDY, SOFT, GRAY-BROWN
660			ST6	100				SAME AS ST5
			ST7	100				SAND - FINE TO COARSE, ORGANIC, SILTY, WITH GRAVEL, FAIRLY WELL GRADED, SUBROUNDED, BROWN AND BLACK
		DARK GRAY SAND, FEW GRAVEL, SOME CLAY, WET	SS1	16				SIMILAR TO ST7, BUT LESS ORGANIC, LESS GRADING
			SS2	14				GRAVEL - FINE TO COARSE, SILTY, SANDY, WELL GRADED, SUBROUNDED, BROWN
			SS3	14				SIMILAR TO SS2, BUT ALSO TRACE OF ORGANIC
		DARK BROWN MEDIUM SAND AND GRAVEL, SOME CLAY, WET	SS4	18				SAND - MEDIUM, TRACE OF SILT, WITH SANDSTONE FRAGMENTS, PARTIALLY GRADED, SUBROUNDED, BROWN
650			SS5	28				SAME AS SS4
			SS6	22				SIMILAR TO SS4, BUT MORE SILT AND GRAVEL
			SS7	36				SAME AS SS6

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2 " OD SAMPLE SPOON 12 " OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT.
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ∇¹ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
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5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

4	
3	
2	
1	LLH

BORING LOG 305

BEAVER VALLEY POWER STATION - UNIT NO. 1

SHIPPINGPORT, PENNSYLVANIA

DUQUESNE LIGHT COMPANY

STONE & WEBSTER ENGINEERING CORPORATION

11700-SSK-23

DUQUESNE LIGHT COMPANY — SH. 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 306
TYPE OF BORING DRIVE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 674.8'
DATE DRILLED JULY, 1969 DRILLED BY PENN DRILLING LOGGED BY B.G., M.B., K.L.P.
NOTES

GROUND EL. 674.8' BORING NO. 306

ELEV FEET	DEPTH FEET	STRATA DESCRIPTION	SAMPLE TYPE AND NO	BLOWS OR RECOV.	R.Q.D.	DIP OF BEDS	PRESS. TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SILTY SAND, DAMP	ST1	100				SILT - CLAYEY, TRACE OF ROOTS, SOFT, BROWN
			ST2	100				SAND - FINE, SILTY, ORGANIC, UNIFORM, ROUNDED, BROWN
670			ST3	100				SAME AS ST1
		DARK GRAY AND BROWN FINE SAND LITTLE CLAY, DAMP	ST4	100				SAME AS ST1
		DARK BROWN SANDY CLAY, SOFT, WET	ST5	100				SIMILAR TO ST1, BUT ALSO SANDY
			ST6	100			∇ 1	SILT - ORGANIC, SANDY, SOFT, BLACK
		DARK BROWN AND GRAY SANDY CLAY, WET	ST7	100				SAND - FINE, ORGANIC, SILTY, UNIFORM, ROUNDED, BLACK
660		DARK GRAY SILTY SAND, WET	ST8	100				GRAVEL - MEDIUM, SILTY, CONSIDERABLE MEDIUM SAND, TRACE OF CLAY, POORLY GRADED, SUBANGULAR, BROWN
		DARK BROWN SAND FEW GRAVELS, WET	SS1	17				SAME AS ST8
		DARK BROWN SAND AND GRAVEL SOME CLAY, WET	SS2	21				SAME AS ST8, WITH SOME COARSE GRAVEL
			SS3	17				GRAVEL - MEDIUM TO COARSE, CLAYEY, CONSIDERABLE MEDIUM SAND, POORLY GRADED, SUBANGULAR, BROWN
			SS4	20				SAME AS SS3
			SS5	25				SAME AS SS3
650			SS6	33				SAME AS SS3
			SS7	26				GRAVEL - FINE TO MEDIUM, SANDY, SOME SILT, FAIRLY WELL GRADED, ROUNDED, BROWN
			SS8	24				SAME AS SS7

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30 " REQUIRED TO DRIVE A 2 " OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
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5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX.
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

4	
3	
2	
1	LLH

BORING LOG 306

BEAVER VALLEY POWER STATION - UNIT NO. 1

SHIPPINGPORT, PENNSYLVANIA

DUQUESNE LIGHT COMPANY

STONE & WEBSTER ENGINEERING CORPORATION

11700-SSK-24

FIGURE 2H-17
BORING LOGS 305 AND 306
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

DUQUESNE LIGHT COMPANY

SH. 1 OF 1

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 | J.O. No. 11700 | BORING No. 307
TYPE OF BORING: DRIVE | LOCATION: SHIPPINGPORT, PENNSYLVANIA | GROUND ELEV. 675.0'
DATE DRILLED: JULY, 1969 | DRILLED BY: PENN DRILLING | LOGGED BY: B.G., M.B., K.L.P.
NOTES:

GROUND EL. 675.0' BORING NO. 307

ELEV. FEET	DEPTH FEET	STRATA DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NO	BLOWS OR RECOV.	R.Q.D.	DIP OF BEDS	PRESS TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SANDY SILT, DAMP		ST1	100				SILT - SOME DECAYED VEGETATION AND CLAY, SOFT, BROWN
				ST2	100				SAME AS ST1
670				ST3	100				SIMILAR TO ST1, BUT MORE CLAYEY
				ST4	100				SAME AS ST3
				ST5	71			1	SAME AS ST3
		* SEE BELOW		ST6	100			▽	SILT - ORGANIC, SANDY, SOFT, DARK GRAY
		DARK GRAY CLAY, WET, SOME SAND		ST7	100				SAME AS ST6
660		DARK GRAY SANDY CLAY, FEW GRAVELS WET		SS1	24				GRAVEL - FINE TO MEDIUM, CLAYEY, MEDIUM SAND, POORLY GRADED, SUBROUNDED, BROWN
		DARK BROWN MEDIUM SAND AND GRAVEL, SOME CLAY, COMPACT, DAMP		SS2	32				GRAVEL - FINE TO MEDIUM, SILTY, MEDIUM SAND, TRACE OF CLAY, FAIRLY WELL GRADED, SUBANGULAR, BROWN
				SS3	38				SAME AS SS2
				SS4	34				SAME AS SS2
		DARK BROWN AND GRAY SAND AND GRAVEL, SOME CLAY COMPACT		SS5	42				GRAVEL - FINE TO MEDIUM, SANDY, SILT, FAIRLY WELL GRADED, SUBANGULAR, BROWN
				SS6	53				SAME AS SS5
650		DARK BROWN FINE SAND, FEW GRAVELS, LITTLE CLAY, LOOSE WET		SS7	23				GRAVEL - FINE TO MEDIUM, ORGANIC, SANDY, TRACE OF CLAY, SILT, POORLY GRADED, SUBANGULAR, BLACK

*DARK BROWN SILTY CLAY, SOFT, LITTLE SAND, DAMP

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ▮ INDICATES LOCATION OF SAMPLES
3. ▽[1] INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL
5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX.
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

4	
3	
2	
1	9-20-68 LKH

BORING LOG 307
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-25

DUQUESNE LIGHT COMPANY

SH. 1 OF 1

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 | J.O. No. 11700 | BORING No. 308
TYPE OF BORING: DRIVE | LOCATION: SHIPPINGPORT, PENNSYLVANIA | GROUND ELEV. 674.9'
DATE DRILLED: JULY, 1969 | DRILLED BY: PENN DRILLING | LOGGED BY: B.G., M.B., K.L.P.
NOTES:

GROUND EL. 674.9' BORING NO. 308

ELEV. FEET	DEPTH FEET	STRATA DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NO	BLOWS OR RECOV.	R.Q.D.	DIP OF BEDS	PRESS TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SANDY SILT		ST1	100				SILT - CLAYEY, SOME ROOTS, FIRM, BROWN
				ST2	100				SILT - SOME CLAY AND FINE SAND, FIRM, BROWN
670				ST3	67				SAME AS ST2
		DARK BROWN SANDY CLAY, STIFF, DAMP		ST4	100				SAME AS ST2
				ST5	100			1	SAME AS ST2
		DARK GRAY MEDIUM SAND, SOME CLAY		ST6	71			▽	SAND - MEDIUM, SILTY, ORGANIC, UNIFORM, ROUNDED, BLACK
		DARK GRAY SAND AND GRAVEL, SOME CLAY, WET		SS1	28				GRAVEL - FINE TO MEDIUM, ORGANIC, SANDY, POORLY GRADED, SUBROUNDED, BLACK
660				SS2	23				GRAVEL - FINE TO MEDIUM, ORGANIC, SANDY, TRACE OF CLAY, POORLY GRADED, SUBANGULAR, BLACK
				SS3	27				GRAVEL - FINE TO MEDIUM, SANDY, POORLY GRADED, SUBROUNDED, BROWN
				SS4	41				SAME AS SS3
		DARK BROWN MEDIUM SAND AND GRAVEL, SOME CLAY, COMPACT		SS5	43				GRAVEL - FINE TO MEDIUM, SILT, MEDIUM SAND, TRACE OF CLAY, POORLY GRADED, SUBROUNDED, BROWN
				SS6	52				SAME AS SS5
650									

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ▮ INDICATES LOCATION OF SAMPLES
3. ▽[1] INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL
5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

4	
3	
2	
1	LKH

BORING LOG 308
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-26

FIGURE 2H-18
BORING LOGS 307 AND 308
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY

SH. 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 309
TYPE OF BORING DRIVE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 675.2'
DATE DRILLED JULY, 1969 DRILLED BY PENN DRILLING LOGGED BY B.G., M.B.
NOTES

GROUND EL. 675.2' BORING NO. 309

ELEV. FEET	DEPTH FEET	STRATA DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NO.	SAMPLE BLOWS OR RECOV.	R.Q.D.	DIP OF BEDS	PRESS. TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SILTY CLAY, DAMP		ST1	100				CLAY - SOFT, LEAN, SILTY, UNIFORM, BROWN
				ST2	100				SAME AS ST1
670				ST3	71				SAME AS ST1
				ST4	100				CLAY - SOFT, LEAN, SILTY, SOME FINE SAND, UNIFORM, BROWN
				ST5	71				SAND - FINE, SILTY, UNIFORM, ROUNDED, BROWN
		DARK BROWN SANDY CLAY, WET		ST6	100			1 ▽	CLAY - SOFT, LEAN, ORGANIC, SILTY, SOME FINE SAND, UNIFORM, BROWN
				ST7	100				SILT - ORGANIC, SANDY, SOFT, BLACK
660		DARK GRAY FINE SAND, LITTLE SILT, WET		ST8	100				SAND - FINE, ORGANIC, SILTY, UNIFORM, ROUNDED, BROWN
				ST9	100				SAND - MEDIUM, ORGANIC, SILTY, UNIFORM, ROUNDED, BROWN
				ST10	100				SAND - MEDIUM, ORGANIC, SILTY, SOME FINE GRAVEL, POORLY GRADED, ROUNDED, BROWN
		DARK GRAY SAND AND GRAVEL, COMPACT, WET		SS1	34				SAND - MEDIUM, ORGANIC, SILTY, SOME FINE GRAVEL, POORLY GRADED, ROUNDED, BROWN
				SS2	25				GRAVEL - MEDIUM, ORGANIC, SILTY, CONSIDERABLE MEDIUM SAND, FAIRLY WELL GRADED, ROUNDED, BROWN
				SS3	32				SAND - MEDIUM, ORGANIC, SILTY, SOME MEDIUM GRAVEL, FAIRLY WELL GRADED, ROUNDED, BROWN
650				SS4	40				GRAVEL - MEDIUM, ORGANIC, SILTY, CONSIDERABLE MEDIUM SAND, FAIRLY WELL GRADED, ROUNDED, BLACK
				SS5	36				SAME AS SS4
				SS6	36				SAME AS SS4
				SS7	45				SAME AS SS4
640									

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽[1] INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL
5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX.
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

BORING LOG 309
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-27

DUQUESNE LIGHT COMPANY

SH. 1 OF 1

SITE BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 310
TYPE OF BORING DRIVE LOCATION SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 679.5'
DATE DRILLED JULY, 1969 DRILLED BY PENN DRILLING LOGGED BY B.G., M.B.
NOTES

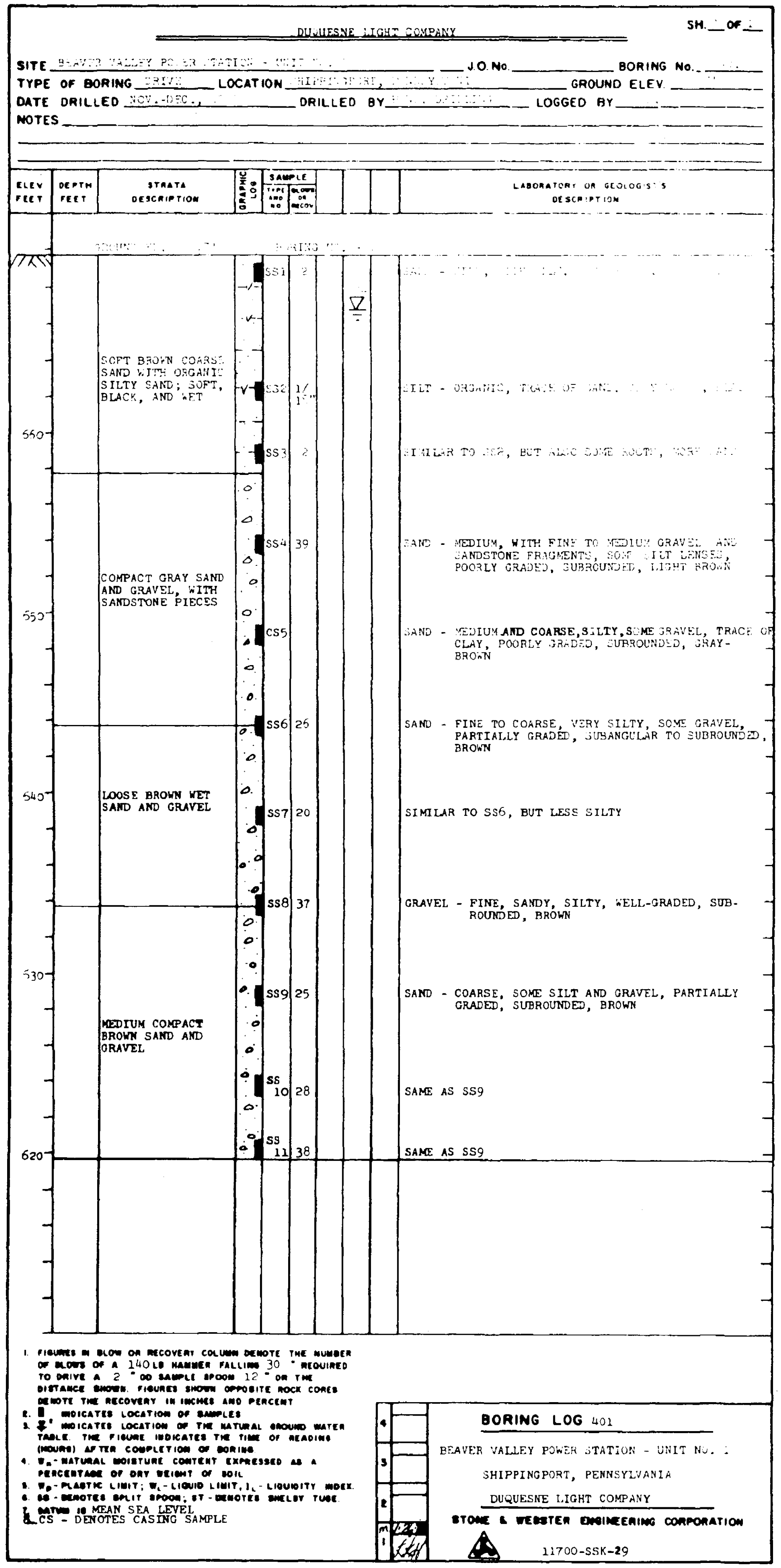
GROUND EL. 679.5' BORING NO. 310

ELEV. FEET	DEPTH FEET	STRATA DESCRIPTION	GRAPHIC LOG	SAMPLE TYPE AND NO.	SAMPLE BLOWS OR RECOV.	R.Q.D.	DIP OF BEDS	PRESS. TEST (GPM)	LABORATORY OR GEOLOGIST'S DESCRIPTION
		DARK BROWN SANDY CLAY, FEW SMALL GRAVEL, SOME WOOD, DAMP		ST1	100				SILT - SANDY, CLAYEY, SLIGHT MEDIUM GRAVEL, MEDIUM STIFF, BROWN
				ST2	100				CLAY - MEDIUM STIFF, MEDIUM FAT, SILTY, FINE SAND WITH MEDIUM GRAVEL, UNFIORM, BROWN
		DARK BROWN SANDY CLAY, WOOD BRICK, FILL, HARD		ST3	100				SILT - SANDY, CLAYEY, CONSIDERABLE MEDIUM GRAVEL, MEDIUM STIFF, BROWN
		DARK BROWN SANDY CLAY, DAMP		ST4	100				CLAY - MEDIUM STIFF, MEDIUM FAT, SILTY, UNIFORM, BROWN
670				ST5	100				SAME AS ST4
				ST6	100				CLAY - MEDIUM STIFF, MEDIUM FAT, SILTY, FINE SAND, UNIFORM, BROWN
				ST7	100				CLAY - MEDIUM STIFF, FAT, SILT, UNIFORM, BROWN
				ST8	67				CLAY - SOFT, LEAN, CONSIDERABLE FINE SAND, SILTY, UNIFORM, BROWN
		DARK BROWN SAND SOME CLAY, WET		ST9	100				SAME AS ST7
660				ST10	100			0 ▽	SILT - CLAYEY, CONSIDERABLE FINE SAND, MEDIUM STIFF, BROWN
		DARK BROWN SANDY SILT, WET		ST11	100				SAME AS ST10
				ST12	100				SAME AS ST10
				ST13	100				GRAVEL - MEDIUM TO COARSE, SILTY, CONSIDERABLE MEDIUM SAND, POORLY GRADED, SUBROUNDED, BROWN
		DARK BROWN SAND AND COARSE GRAVEL, SOME CLAY, LOOSE, WET		SS1	19				SAME ST ST13
650				SS2	30				SAME AS ST13
				SS3	23				GRAVEL - FINE TO MEDIUM, SILTY, CONSIDERABLE MEDIUM SAND, TRACE OF CLAY, FAIRLY WELL GRADED, SUBROUNDED, BROWN
				SS4	28				SAME AS ST13
				SS5	22				GRAVEL - FINE TO MEDIUM, SILTY, MEDIUM SAND, FAIRLY WELL GRADED, ANGULAR, BROWN
				SS6	24				SAME AS ST13
				SS7	23				GRAVEL - FINE TO MEDIUM, SILTY, MEDIUM SAND, FAIRLY WELL GRADED, SUBANGULAR, BROWN
640									

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ▮ INDICATES LOCATION OF SAMPLES.
3. ▽[1] INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING.
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL
5. W_p - PLASTIC LIMIT; W_L - LIQUID LIMIT; I_L - LIQUIDITY INDEX.
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE.
7. DATUM IS MEAN SEA LEVEL
8. R.Q.D. - DENOTES ROCK QUALITY DESIGNATION - % OF RECOVERY 4" OR OVER, DUE TO ROCK STRUCTURE

BORING LOG 310
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION
11700-SSK-28

FIGURE 2H-19
BORING LOGS 309 AND 310
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT



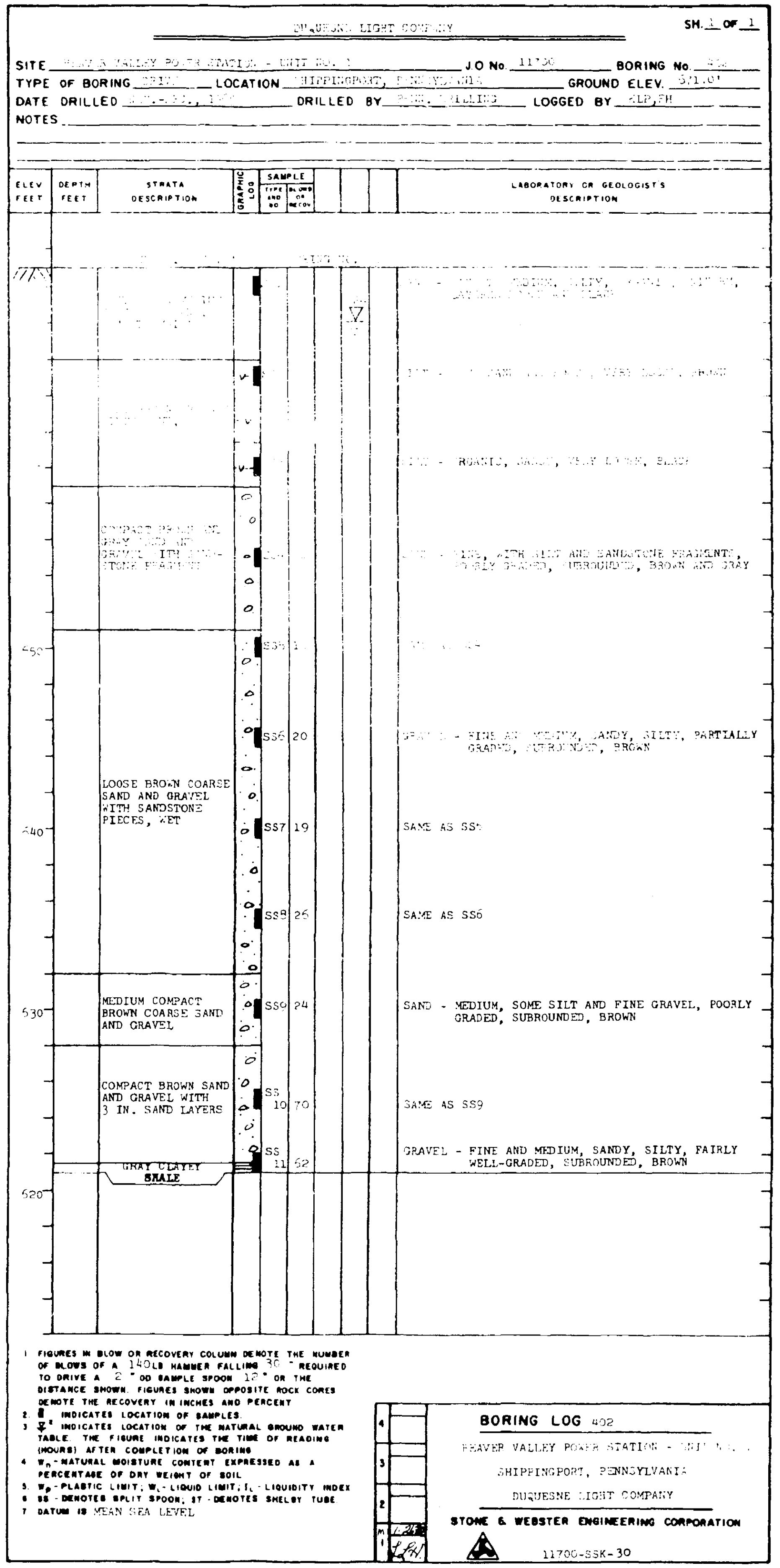


FIGURE 2H-20
BORING LOGS 401 AND 402
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

DUQUESNE LIGHT COMPANY — SH. 1 OF 1

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 403
TYPE OF BORING: DRIVE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 685.0'
DATE DRILLED: NOV.-DEC., 1969 DRILLED BY: PENN. DRILLING LOGGED BY: KLP, BG
NOTES:

GROUND EL. 685.0' BORING NO. 403

ELEV FEET	STRATA DESCRIPTION	SAMPLE TYPE AND NO	BLOWS OR RECOV	LABORATORY OR GEOLOGIST'S DESCRIPTION
	DARK BROWN SILT, TRACE OF SMALL GRAVEL, SOFT, WET	SS1	2	SILT - SANDY, SOME ROOTS AND CLAY LENSES, VERY LOOSE, BROWN
680	DARK BROWN SANDY CLAY, SOME SILT, SOFT, WET	SS2	13	SILT - SOME CLAY, FINE SAND, AND ROOTS, COMPACT, BROWN
		SS3	21	CLAY - HARD, LEAN, VERY SILTY, UNIFORM, BROWN, LOW SENSITIVITY w_n=22.4%
670		SS4	14	SIMILAR TO SS3, BUT STIFF w_n=22.9%
		SS5	15	SAME AS SS4 w_n=19.5%
660	DARK BROWN SAND AND GRAVEL, SOME CLAY, LOOSE, WET	SS6	16	SAND - FINE, WITH SILT AND GRAVEL, POORLY GRADED, SUBROUNDED, GRAY
	DARK BROWN VERY COARSE SAND AND GRAVEL, SOME CLAY, COMPACT, WET	SS7	37	SAND - MEDIUM, WITH GRAVEL, SILTY, POORLY GRADED, SUBROUNDED, BROWN
650	DARK GRAY SAND AND GRAVEL, LITTLE CLAY, LITTLE SILT, WET	SS8	14	GRAVEL - FINE AND MEDIUM, SANDY SILTY, POORLY GRADED, SUBROUNDED, DARK GRAY
	DARK BROWN COARSE SAND, LOOSE, SOME SMALL GRAVEL, WET	SS9	9	SAND - MEDIUM, TRACE OF SILT AND FINE GRAVEL, UNIFORM, SUBROUNDED, BROWN
640		SS 10	10	SAME AS SS9
	DARK BROWN AND GRAY COARSE SAND AND MEDIUM GRAVEL, LOOSE, WET	SS 11	14	GRAVEL - FINE AND MEDIUM, SANDY, SILTY, SOME SANDSTONE FRAGMENTS, FAIRLY WELL-GRADED, SUBROUNDED, BROWN
630				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ■ INDICATES LOCATION OF SAMPLES
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING
4. W_n - NATURAL MOISTURE CONTENT EXPRESSED AS A PERCENTAGE OF DRY WEIGHT OF SOIL
5. W_p - PLASTIC LIMIT, W_L - LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS MEAN SEA LEVEL

BORING LOG
BEAVER VALLEY POWER STATION - UNIT NO. 1
SHIPPINGPORT, PENNSYLVANIA
DUQUESNE LIGHT COMPANY
STONE & WEBSTER ENGINEERING CORPORATION

DUQUESNE LIGHT COMPANY — SH. 1 OF 1

SITE: BEAVER VALLEY POWER STATION - UNIT NO. 1 J.O. No. 11700 BORING No. 404
TYPE OF BORING: DRIVE LOCATION: SHIPPINGPORT, PENNSYLVANIA GROUND ELEV. 685.4'
DATE DRILLED: NOV.-DEC., 1969 DRILLED BY: PENN. DRILLING LOGGED BY: KLP, FE
NOTES:

GROUND EL. BORING NO. 404

ELEV FEET	STRATA DESCRIPTION	SAMPLE TYPE AND NO	BLOWS OR RECOV	LABORATORY OR GEOLOGIST'S DESCRIPTION
	SOFT BROWN SAND WITH SOME FINE GRAVEL, MOIST	SS1	11	SAND - FINE, SILTY, WITH GRAVEL, ORGANIC, POORLY GRADED, ROUNDED, BROWN
680	SOFT BROWN SILTY SAND, MOIST	SS2	17	SAND - FINE, AND SILT, TRACE OF CLAY, SLIGHTLY ORGANIC, UNIFORM, GRAY AND BROWN
	DARK GRAY ORGANIC SILTY SAND, WITH PIECES OF WOOD, WET			
	STIFF REDDISH-BROWN SILTY SAND WITH TRACES OF CLAY AND ORGANIC MATERIAL, WET	SS3	10	SILT - SOME CLAY, COMPACT, BROWN w_n=52.[illegible]
670		SS4	10	SAME AS SS3 w_n=[illegible]
	SOFT BROWN SILTY FINE SAND, WET	SS5	[illegible]	SILT - AND FINE SAND, TRACE OF CLAY AND ROOTS, LOOSE, BROWN
660		SS6	[illegible]	SILT - AND FINE SAND, LOOSE, BROWN
	COMPACT BROWN SAND AND GRAVEL	SS7	22	SAND - FINE, AND SILT, WITH MEDIUM GRAVEL AND CLAY LENSES, POORLY GRADED, SUBROUNDED, BROWN
650		SS8	34	SAND - MEDIUM, SILTY, WITH GRAVEL, POORLY GRADED, SUBROUNDED, BROWN
		SS9	33	SIMILAR TO SS8, BUT LESS SILT AND GRAVEL
640	BROWN MEDIUM TO COARSE SAND WITH SOME GRAVEL	SS 10	40	SAND - MEDIUM AND COARSE, AND GRAVEL, [illegible] SILT AND SANDSTONE FRAGMENTS, PARTIALLY GRADED, SUBROUNDED, BROWN
	MEDIUM COMPACT BROWN SAND AND GRAVEL WITH SANDSTONE PIECES	SS 11	29	SIMILAR TO SS10, BUT MORE SILTY
630				

1. FIGURES IN BLOW OR RECOVERY COLUMN DENOTE THE NUMBER OF BLOWS OF A 140 LB HAMMER FALLING 30" REQUIRED TO DRIVE A 2" OD SAMPLE SPOON 12" OR THE DISTANCE SHOWN. FIGURES SHOWN OPPOSITE ROCK CORES DENOTE THE RECOVERY IN INCHES AND PERCENT
2. ■ INDICATES LOCATION OF SAMPLES
3. ∇ INDICATES LOCATION OF THE NATURAL GROUND WATER TABLE. THE FIGURE INDICATES THE TIME OF READING (HOURS) AFTER COMPLETION OF BORING
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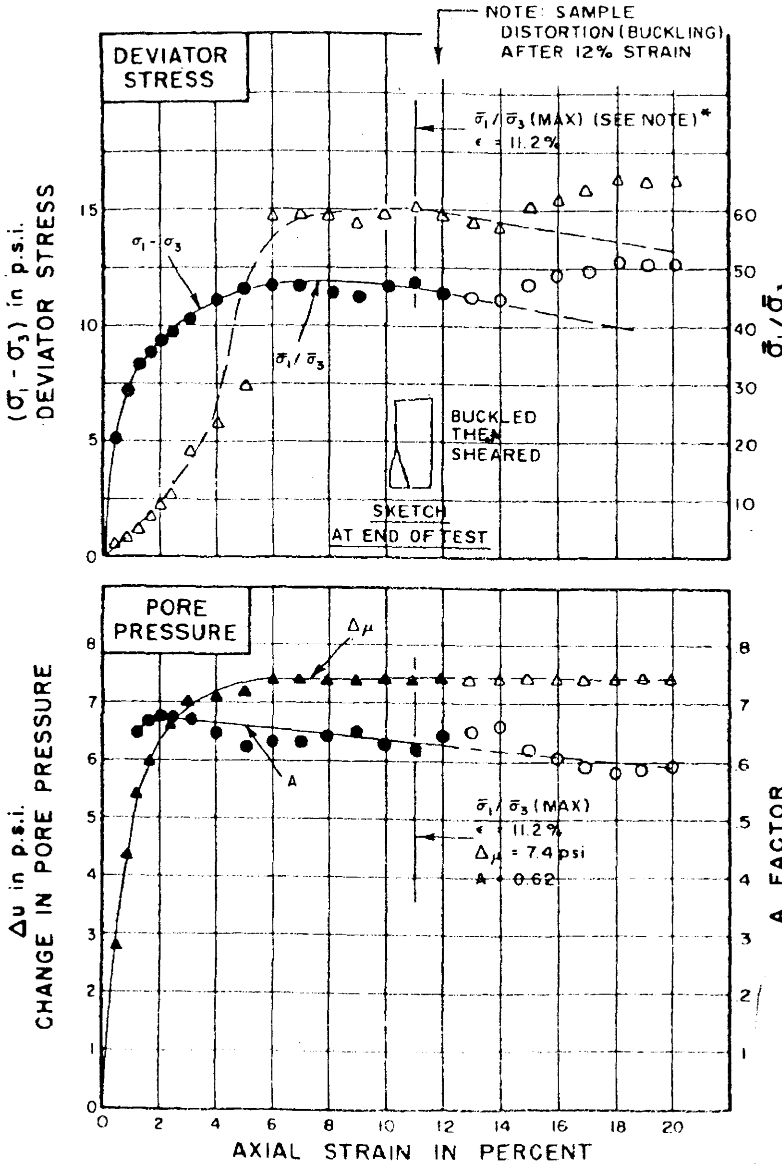
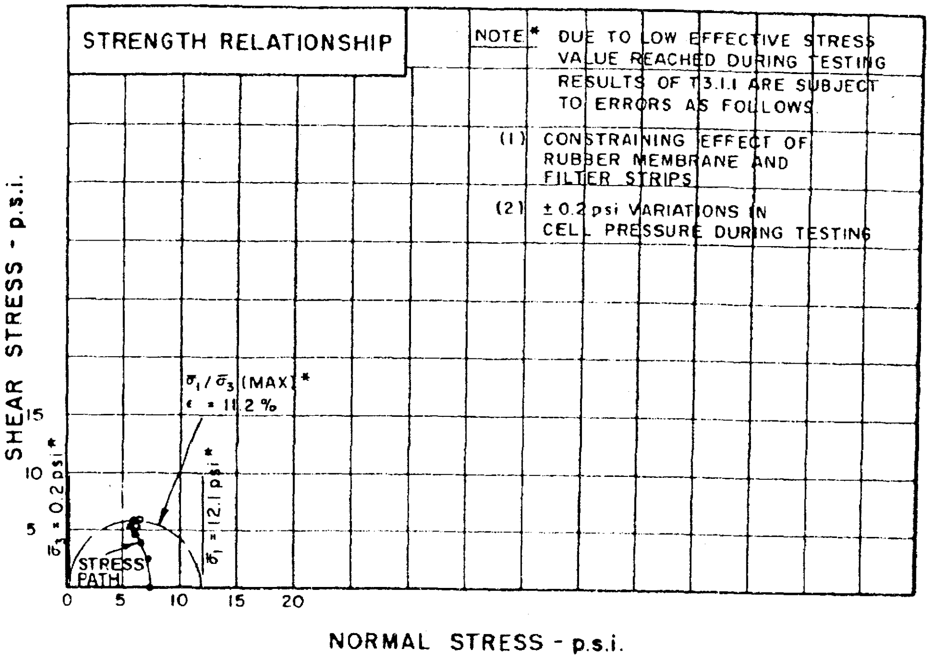
5. W_p - PLASTIC LIMIT, W_L - LIQUID LIMIT, I_L - LIQUIDITY INDEX
6. SS - DENOTES SPLIT SPOON; ST - DENOTES SHELBY TUBE
7. DATUM IS

BORING LOG
STONE & WEBSTER ENGINEERING CORPORATION

FIGURE 2H-21
BORING LOGS 403 AND 404
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T3.1.1		BORING 305	7.6	W_i = 71.4% γ = 83 pcf
		SAMPLE 3		μ_b = 77.4 psi TYPE TEST CU
		DEPTH 4.0' - 4.5'		STRAIN RATE = 0.17%/min.
				PORE PRESSURE RESPONSE = 99%
		GRAY TO BLACK		REMARK: NON-HOMOGENEOUS
		ORGANIC SILTY		SAMPLE
		SANDS		

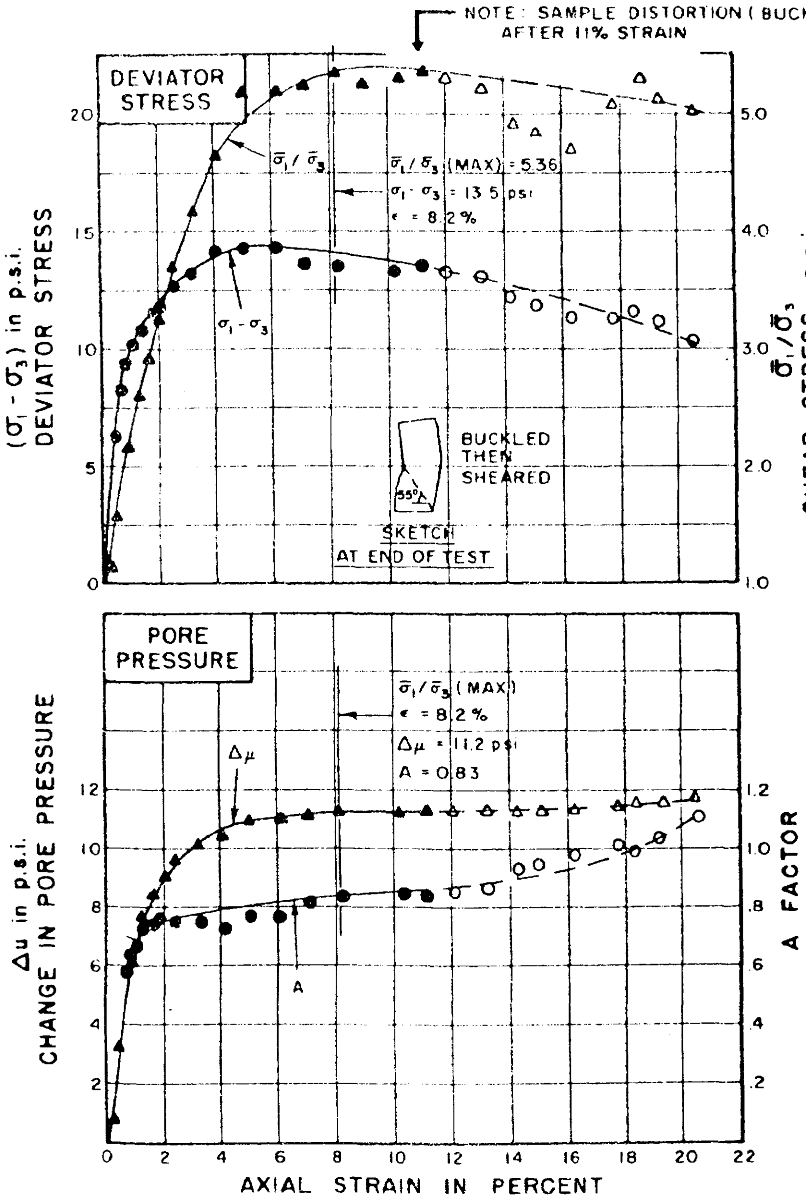
BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

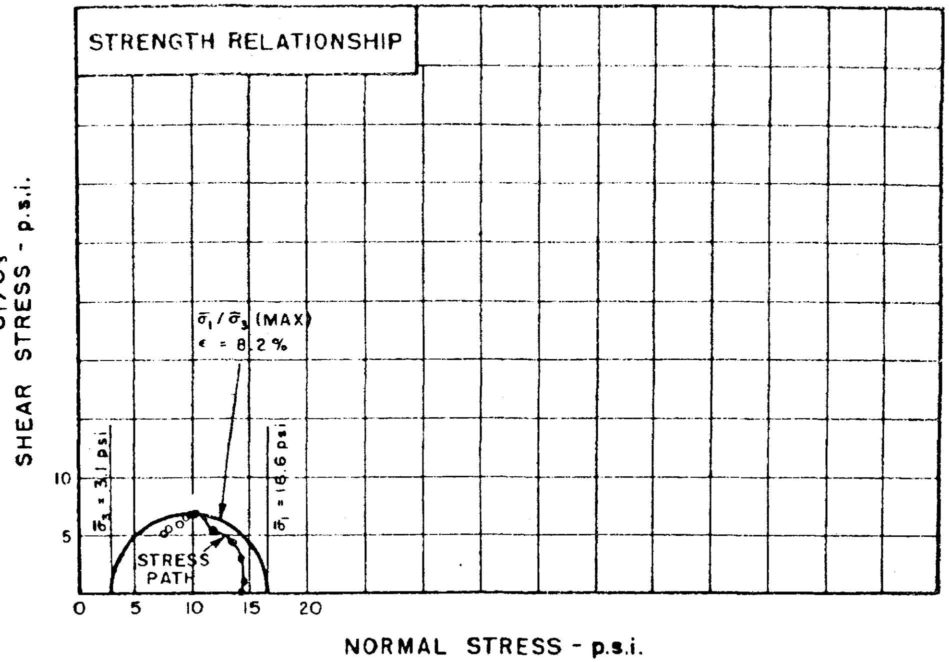
TRIAXIAL TESTS
(CONSOLIDATED UNDRAINED)

FILE NO. 511 DATE SEPT/69

FIGURE 2H-22
TRIAXIAL TESTS
BORING 305 - SHEET 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T31.2		BORING 305	14.3	Wi = 47.4% γ = 94 pcf
		SAMPLE 3		μ_b = 92.6 psi TYPE TEST CU
		DEPTH 5.2' - 5.5'		STRAIN RATE = 0.18%/min.
				PORE PRESSURE RESPONSE = 98%
		GRAY SILTY		REMARK: NON-HOMOGENEOUS
		SAND AND CLAYEY		SAMPLE
		SILT; ORGANIC		

BEAVER VALLEY POWER STATION
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TRIAXIAL TESTS
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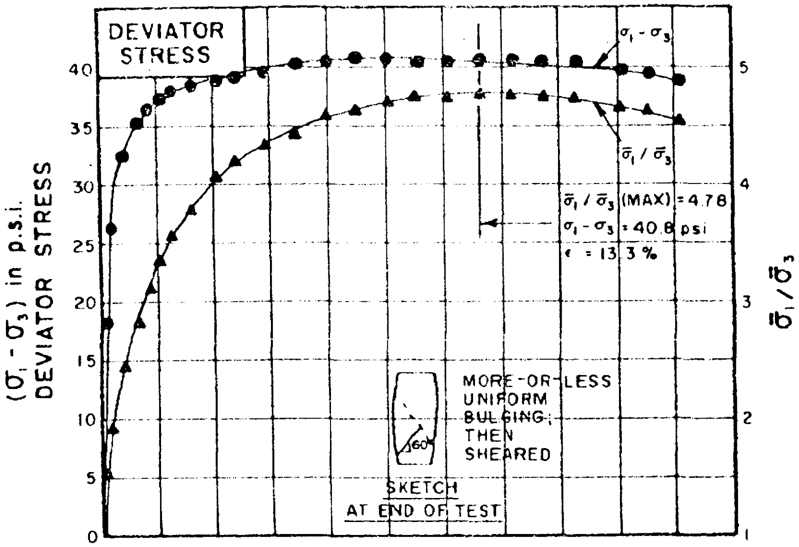
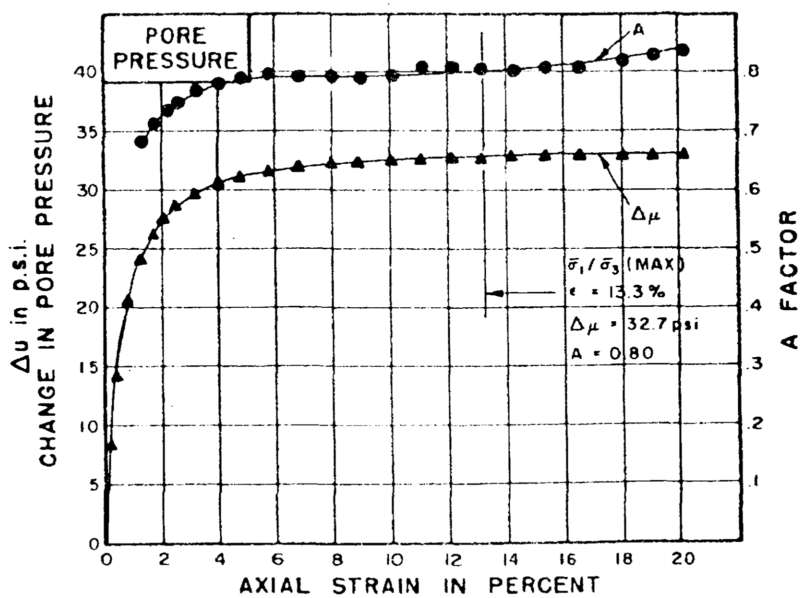
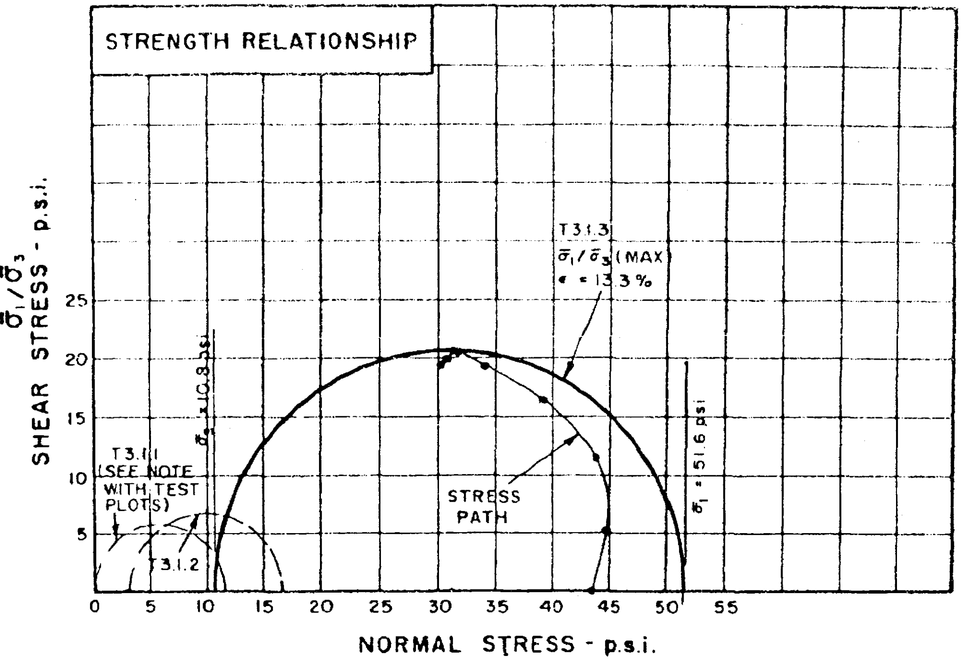
FIGURE 2H-23
TRIAXIAL TESTS
BORING 305 - SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)







TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T3.1.3		BORING 305	43.5	W_i = 49.8 % γ = 99 pcf
		SAMPLE 3		μ_b = 82.4 psi TYPE TEST CU
		DEPTH 5.5' - 5.9'		STRAIN RATE = 0.18 %/min.
				PORE PRESSURE RESPONSE = 100%
		GRAY SANDY		
		CLAYEY SILT		
		ORGANIC		

BEAVER VALLEY POWER PROJECT
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TRIAXIAL TESTS
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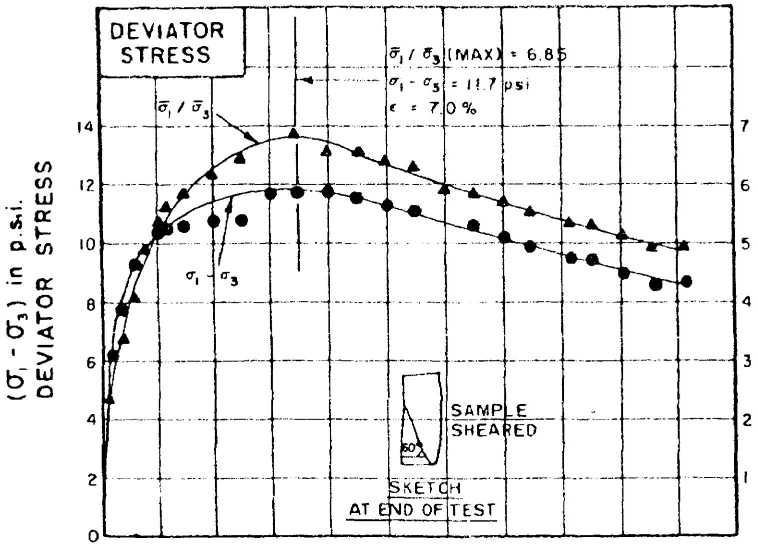
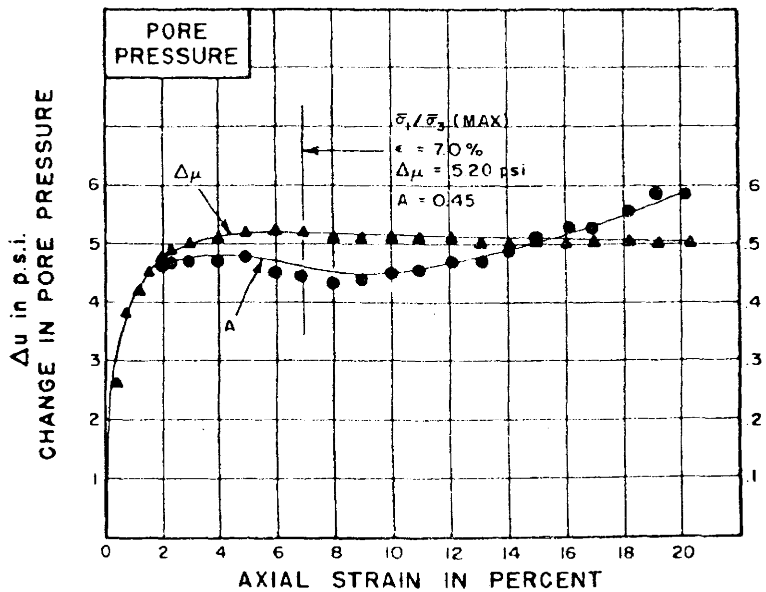
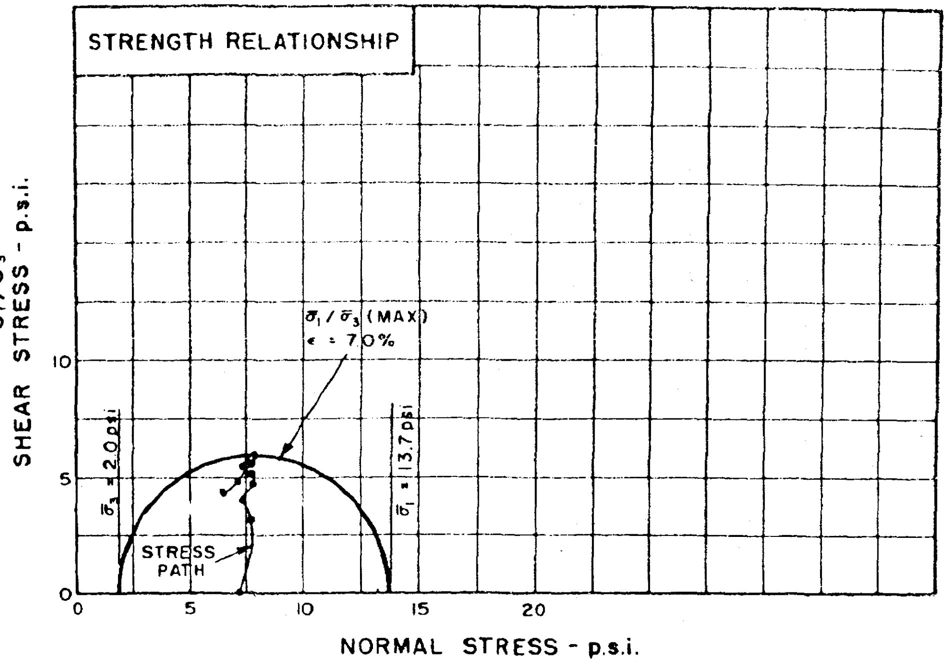
FIGURE 2H-24
TRIAXIAL TESTS
BORING 305 - SHEET 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)







TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T4.1.1		BORING 306	7.2	W_i = 67.0% γ = 88 pcf
		SAMPLE 5		μ_D = 66.5 psi TYPE TEST CU
		DEPTH 8.0' - 8.4'		STRAIN RATE = 0.17%/min
				PORE PRESSURE RESPONSE = 100%
		MOTTLED BROWN		
		SILTY CLAY		

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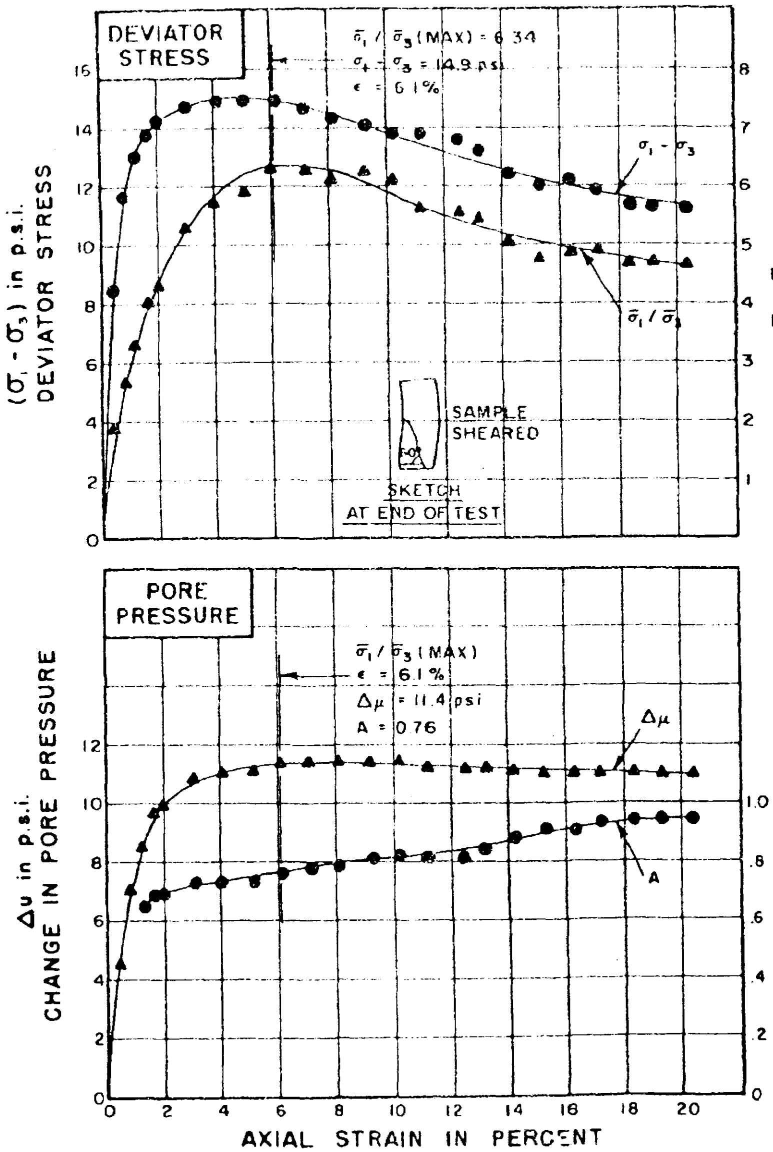
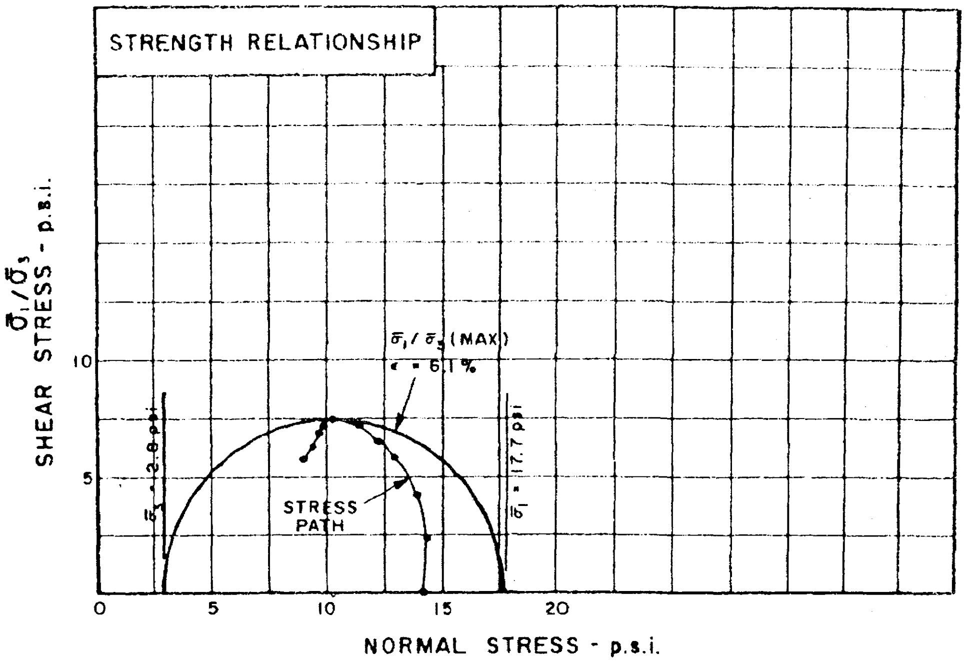
FIGURE 2H-25
TRIAXIAL TESTS
BORING 306 - SHEET 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T4.1.2		BORING 306	14.2	W_i = 76.6% γ = 88 pcf
		SAMPLE 5		μ_b = 72.8 psi TYPE TEST CU
		DEPTH 8.4' - 8.7'		STRAIN RATE = 0.17%/min.
				PORE PRESSURE RESPONSE = 98%
		MOTTLED BROWN		
		SILTY CLAY		

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(CONSOLIDATED UNDRAINED)
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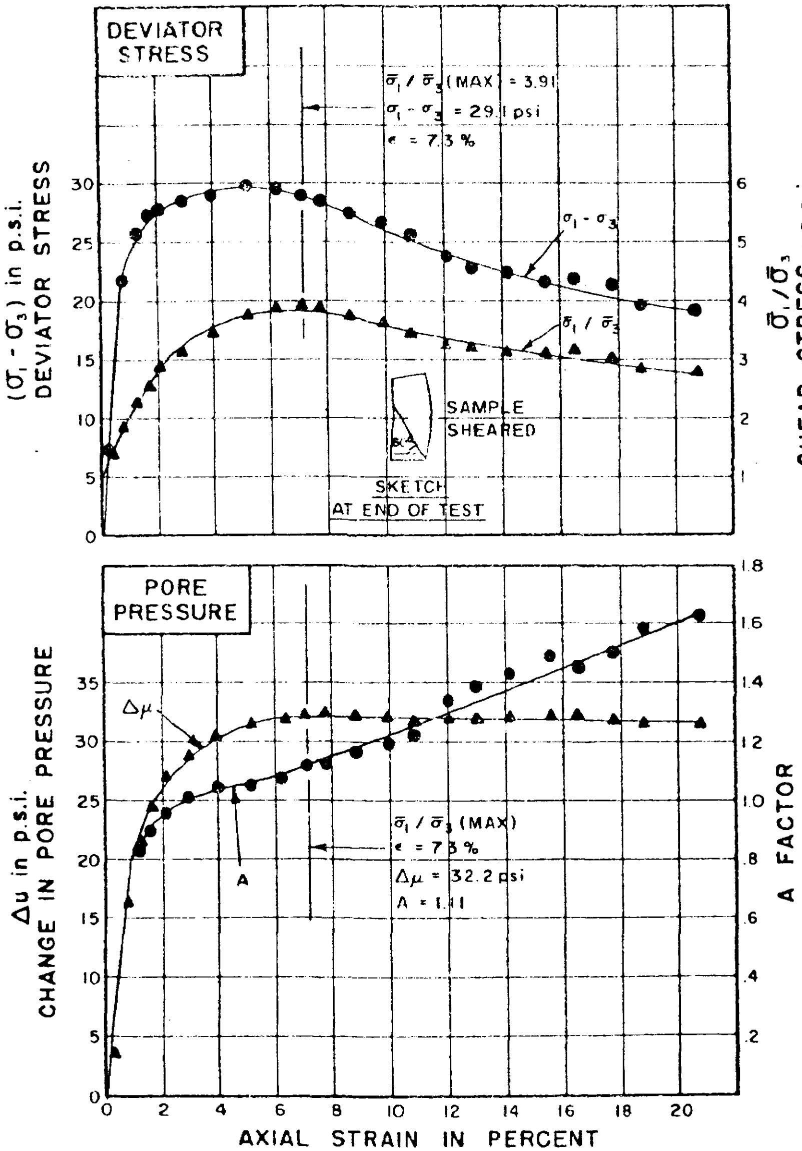
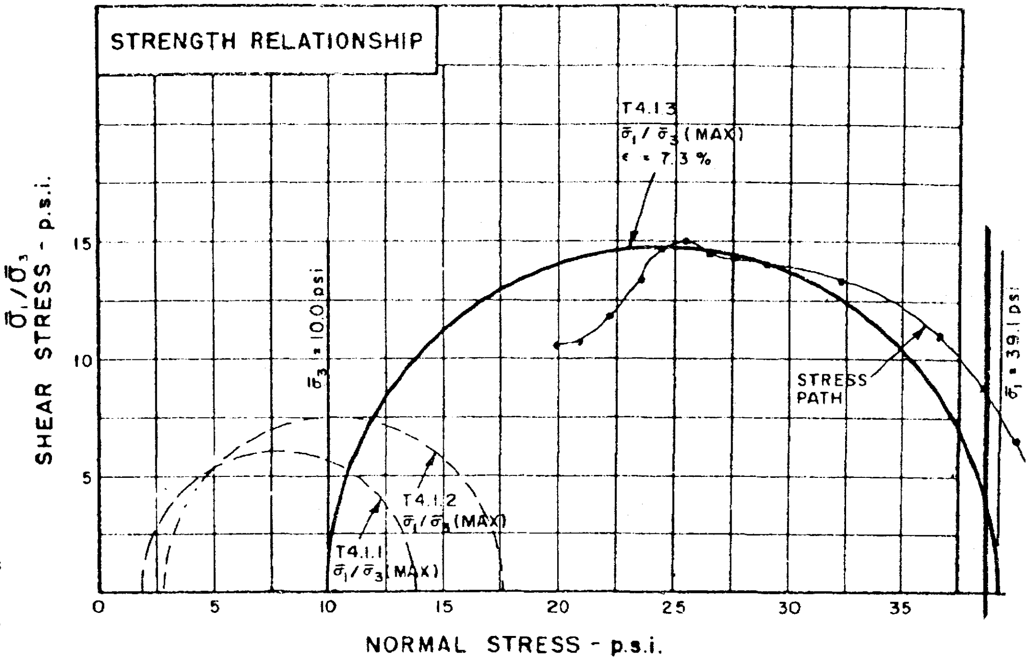
FIGURE 2H-26
TRIAXIAL TESTS
BORING 306 - SHEET 2

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T4.1.3		BORING 306	42.2	W_i = 69.2 % γ = 94 pcf
		SAMPLE 5		μ_b = 63.3 psi TYPE TEST CU
		DEPTH 9.0' - 9.4'		STRAIN RATE = 0.18 %/min.
				PORE PRESSURE RESPONSE = 100 %
		MOTTLED BROWN		NOTE: SAMPLE INCLUDES
		SILTY CLAY		WOOD FRAGMENTS

BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

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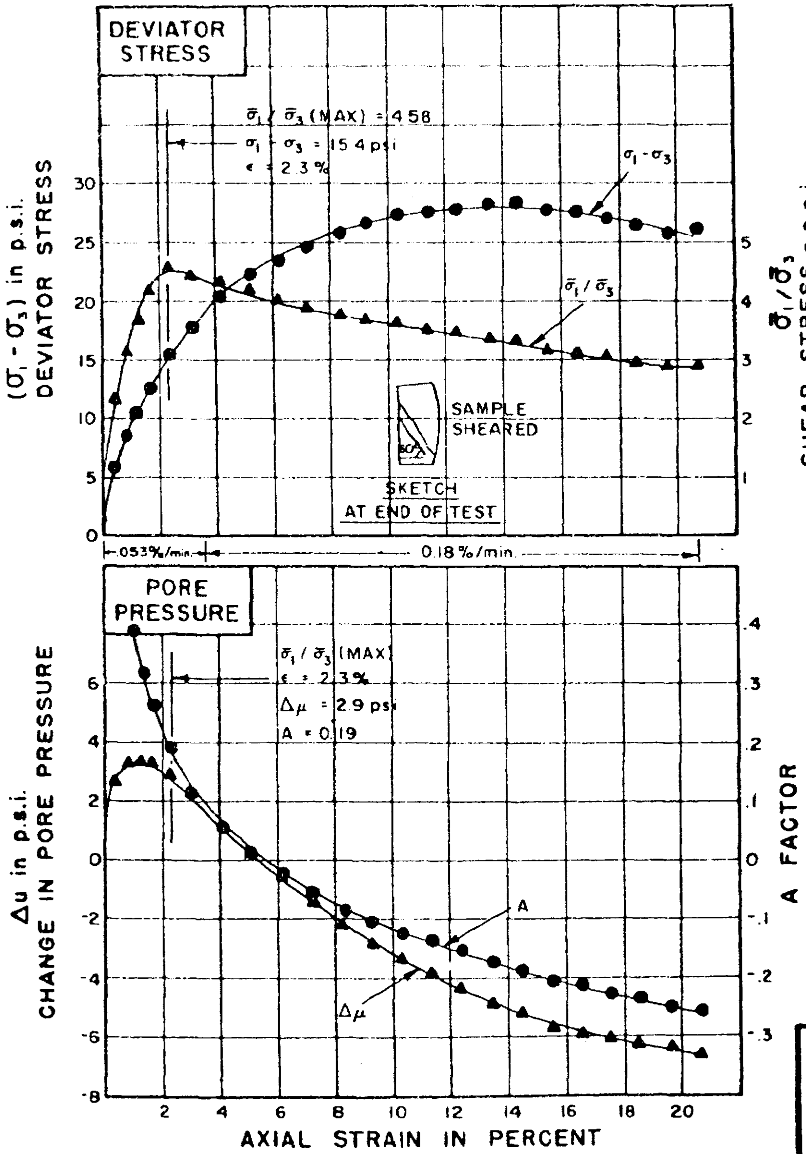
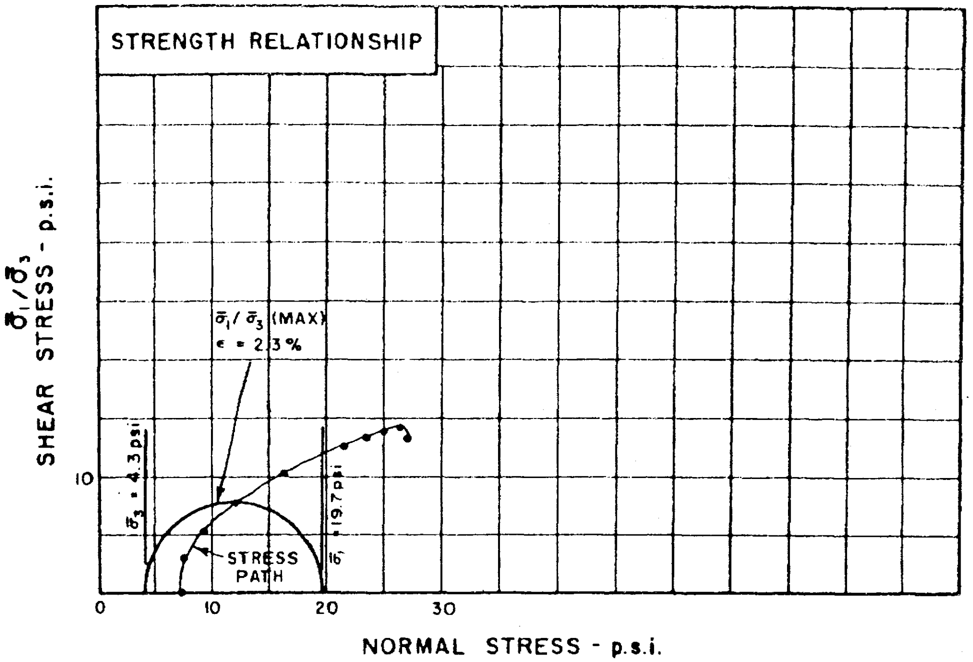
FIGURE 2H-27
TRIAXIAL TESTS
BORING 306 - SHEET 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





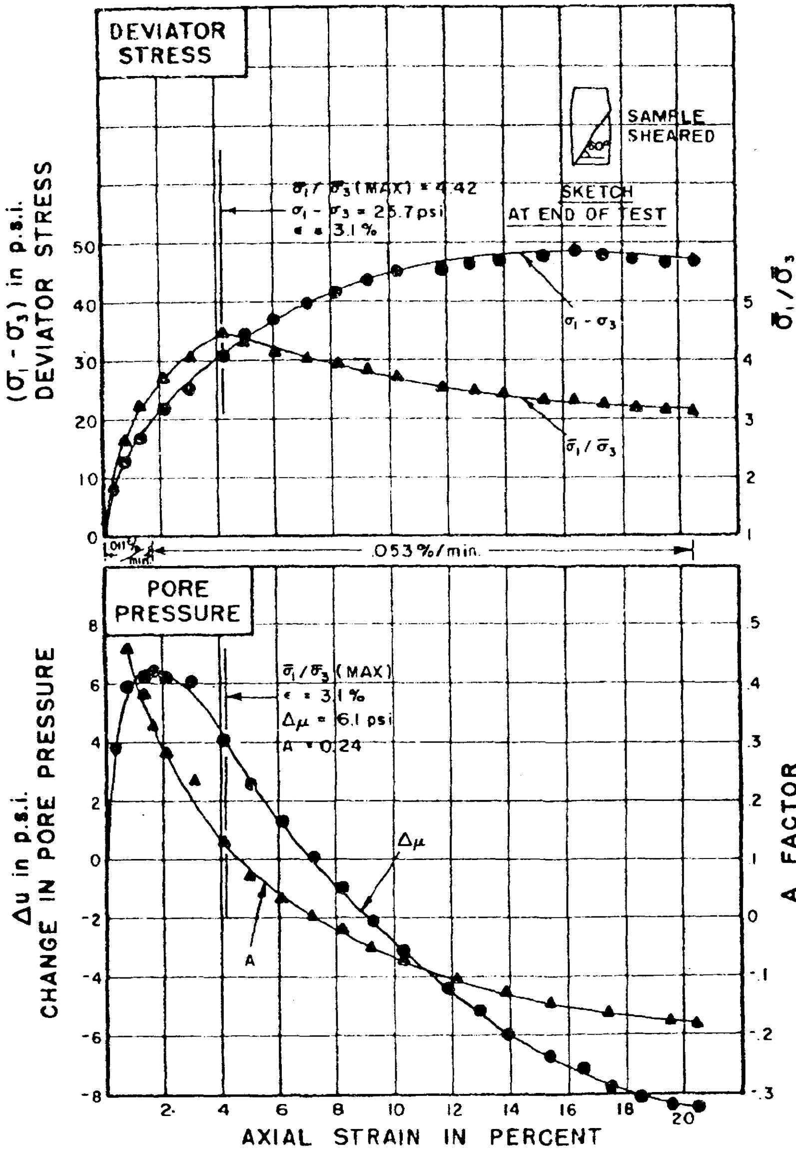
TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T6.1.1		BORING 301	7.2	Wi = 23.5 % γ = 126 pcf
		SAMPLE 3		μ_b = 61.7 psi TYPE TEST CU
		DEPTH 11.8'-12.1'		STRAIN RATE = SEE PLOT
				PORE PRESSURE RESPONSE = 100%
		MOTTLED BROWN		
		SANDY, CLAYEY SILT		

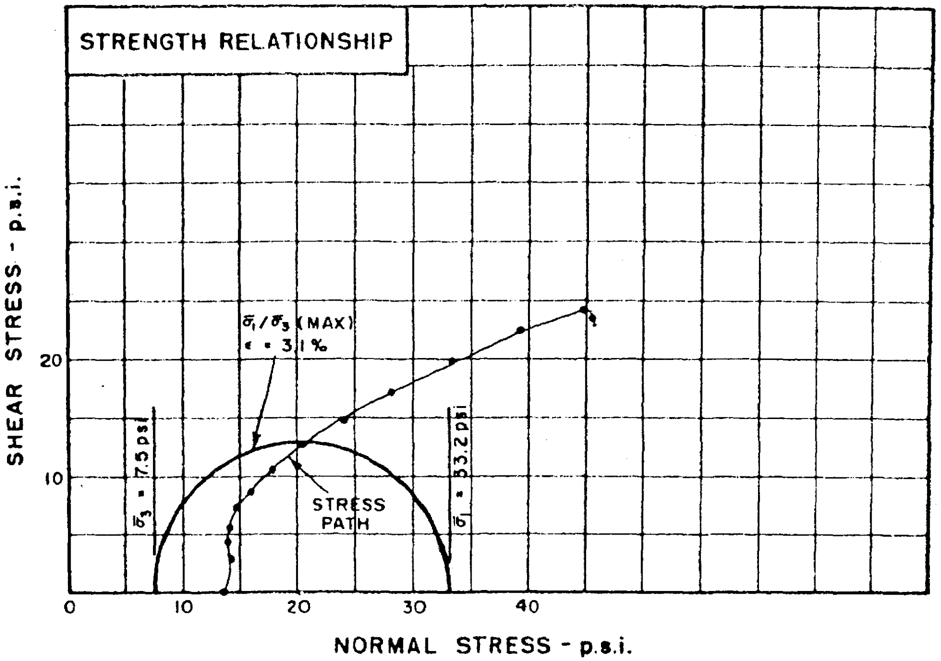
BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

TRIAXIAL TESTS
(CONSOLIDATED UNDRAINED)
FILE NO. 511 DATE SEPT./69

FIGURE 2H-28
TRIAXIAL TESTS
BORING 301 - SHEET 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T6.1.2		BORING 301	13.6	Wi = 23.6% γ = 126 pcf
		SAMPLE 3		μb = 73.2 psi TYPE TEST CU
		DEPTH 11.8' - 12.1'		STRAIN RATE = SEE PLOT
				PORE PRESSURE RESPONSE = 98%
		MOTTLED BROWN		
		SANDY CLAYEY SILT		

BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

TRIAXIAL TESTS
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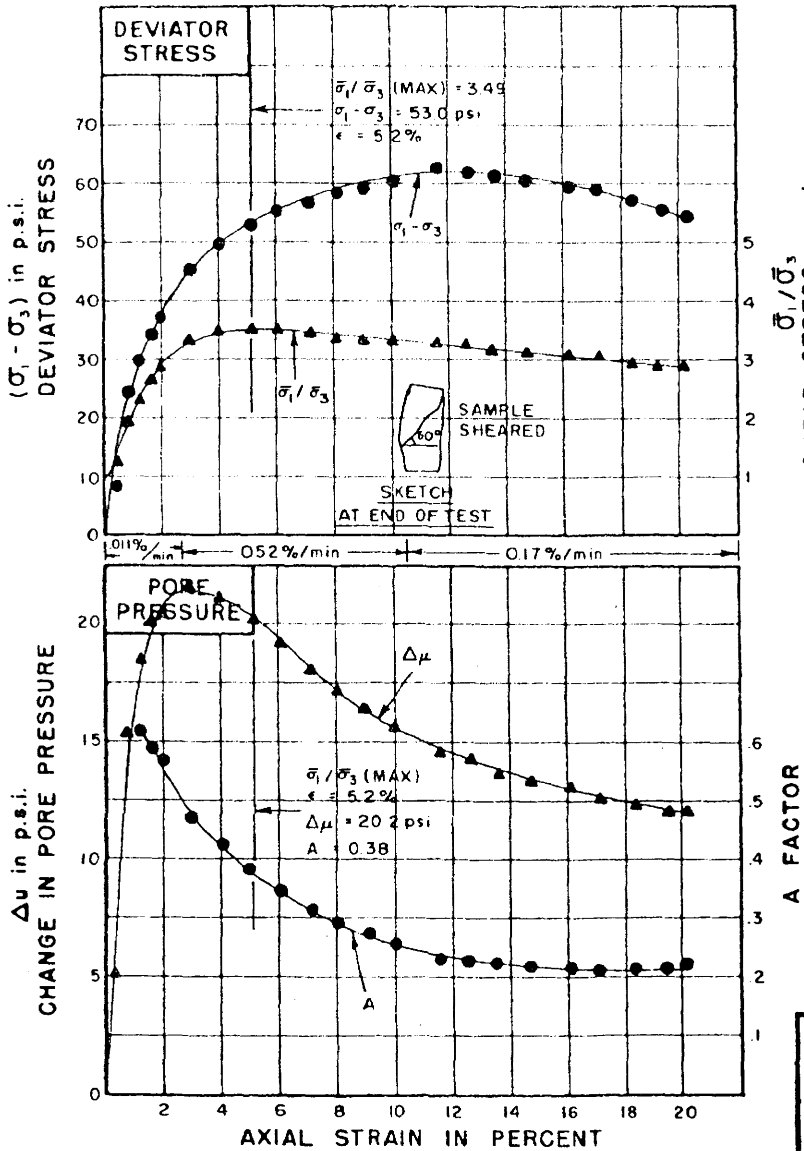
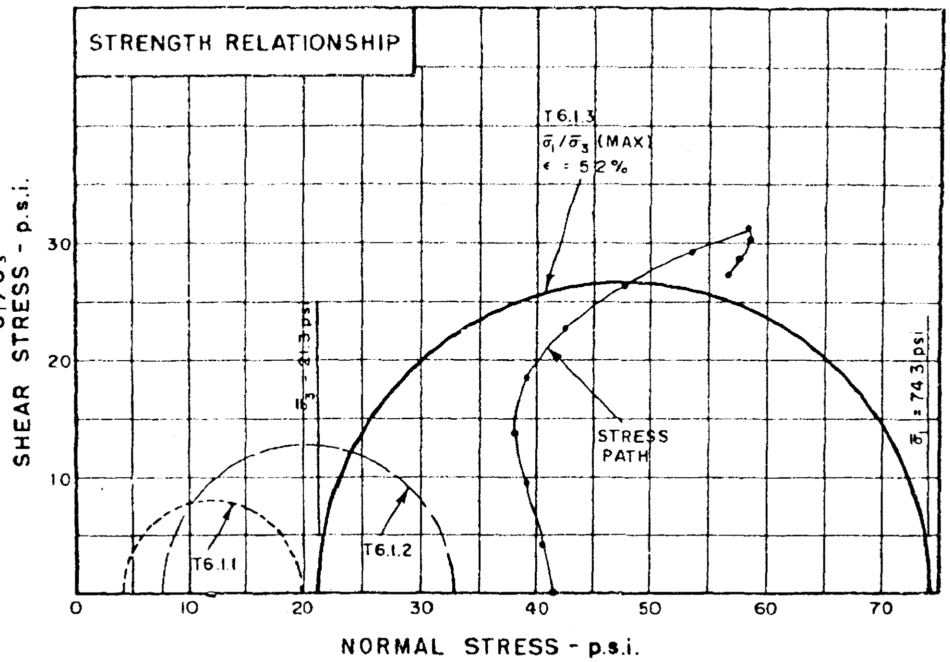
FIGURE 2H-29
TRIAXIAL TESTS
BORING 301 - SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T6.1.3		BORING 301	41.5	W_i = 22.3% γ = 128 pcf
		SAMPLE 3		μ_b = 62.6 psi TYPE TEST CU
		DEPTH 12.1'-12.5'		STRAIN RATE = SEE PLOT
				PORE PRESSURE RESPONSE = 96%
		MOTTLED BROWN		
		SANDY CLAYEY		
		SILT		

BEAVER VALLEY POWER STATION
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TRIAXIAL TESTS
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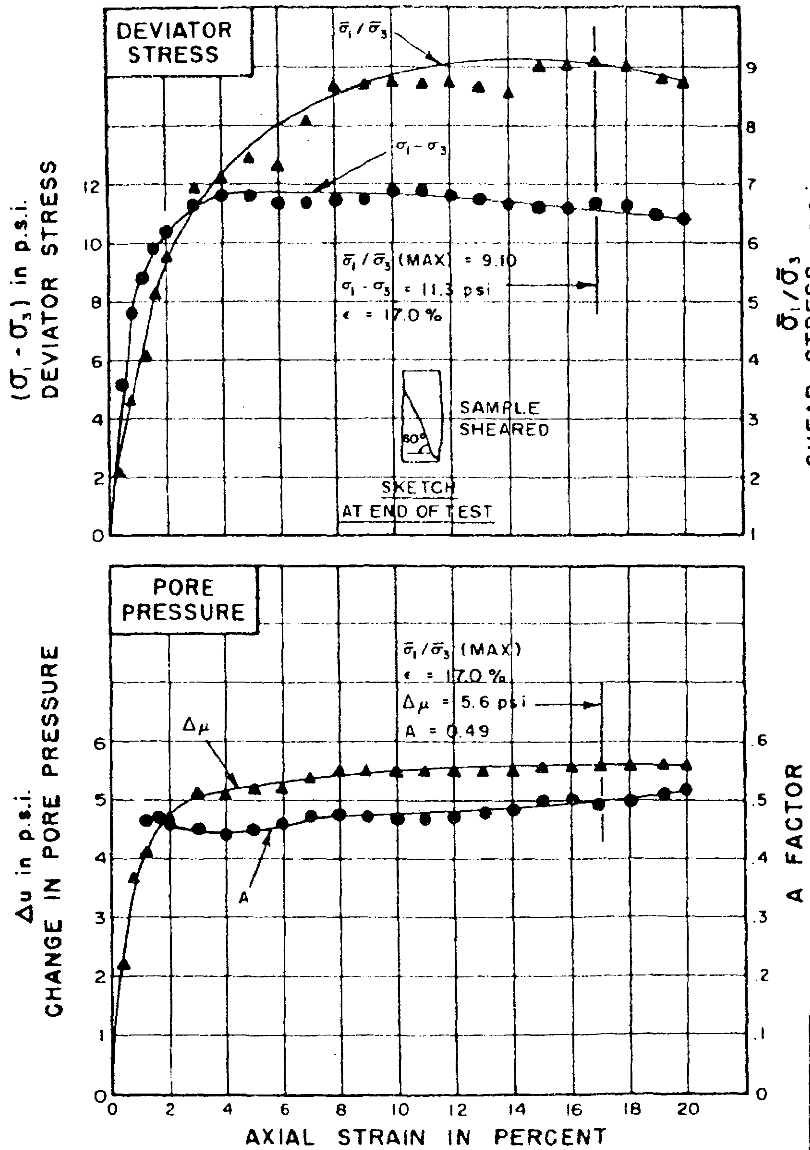
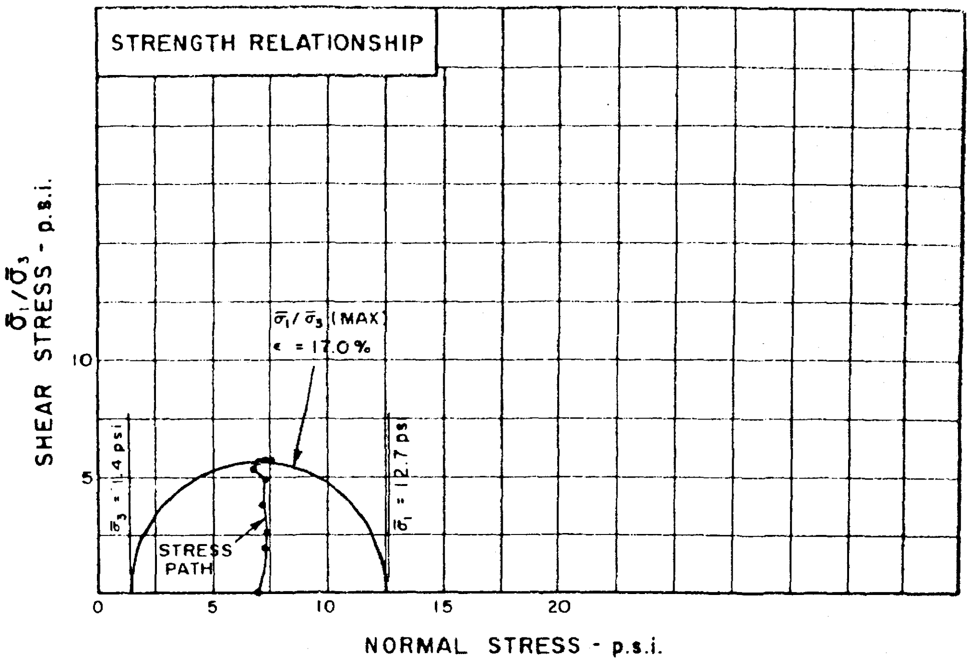
FIGURE 2H-30
TRIAXIAL TESTS
BORING 301 - SHEET 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T71.1		BORING 308	7.0	W_i = 74.5% γ = 89 pcf
		SAMPLE 4		μ_b = 64.7 psi TYPE TEST CU
		DEPTH 6.8' - 7.2'		STRAIN RATE = 0.17%/min.
				PORE PRESSURE RESPONSE = 100%
		MOTTLED BROWN		
		SILTY CLAY		

BEAVER VALLEY POWER STATION
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TRIAXIAL TESTS
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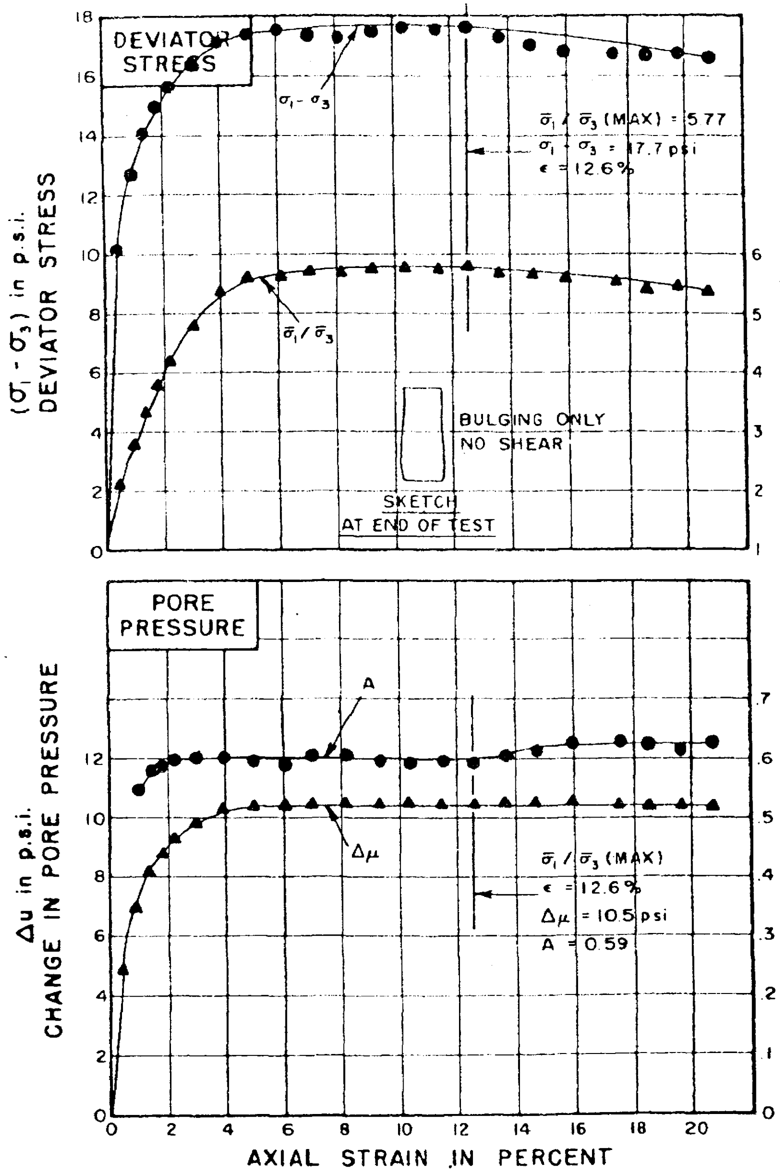
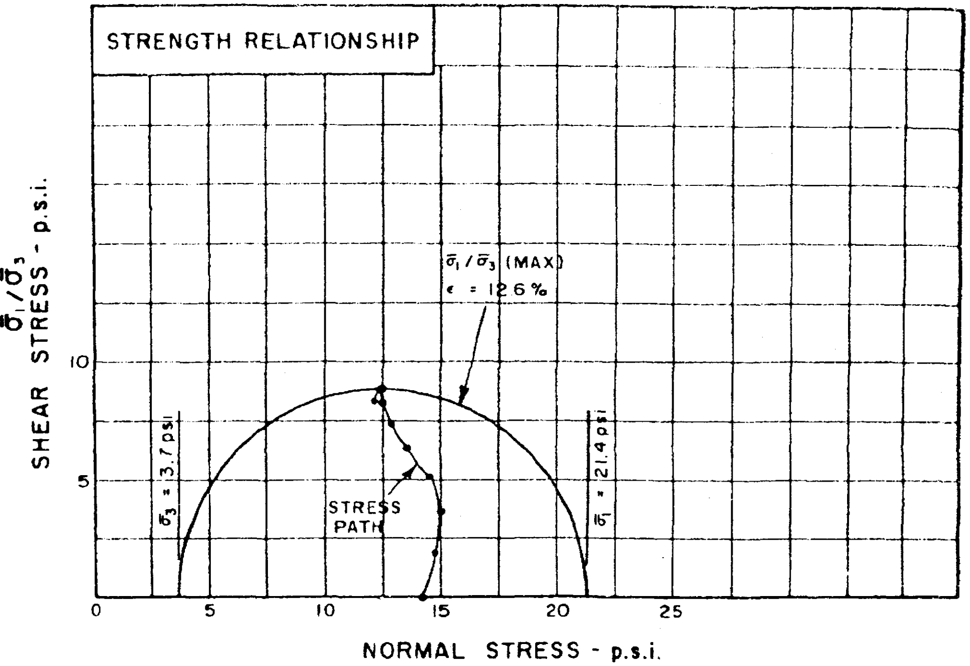
FIGURE 2H-31
TRIAXIAL TESTS
BORING 308 - SHEET 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T7.1.2		BORING 308	14.2	W_i = 77.5% γ = 100 pcf
		SAMPLE 4		μ_b = 72.8 psi TYPE TEST CU
		DEPTH 7.5' - 7.9'		STRAIN RATE = 0.19%/min.
				PORE PRESSURE RESPONSE = 98%
		MOTTLED BROWN		
		SILTY CLAY		

BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

TRIAXIAL TESTS
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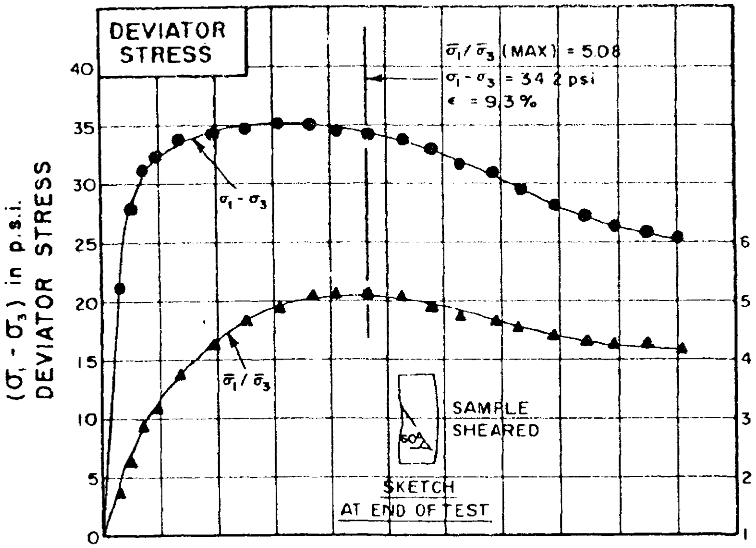
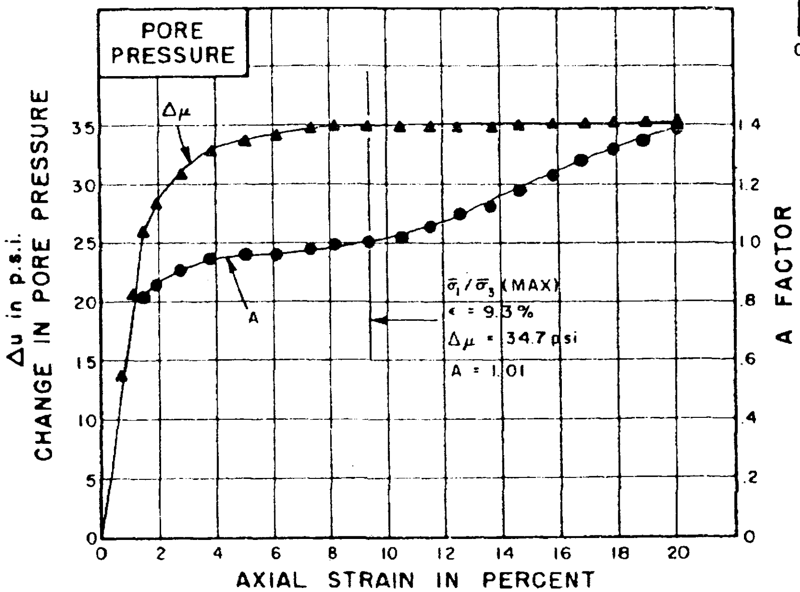
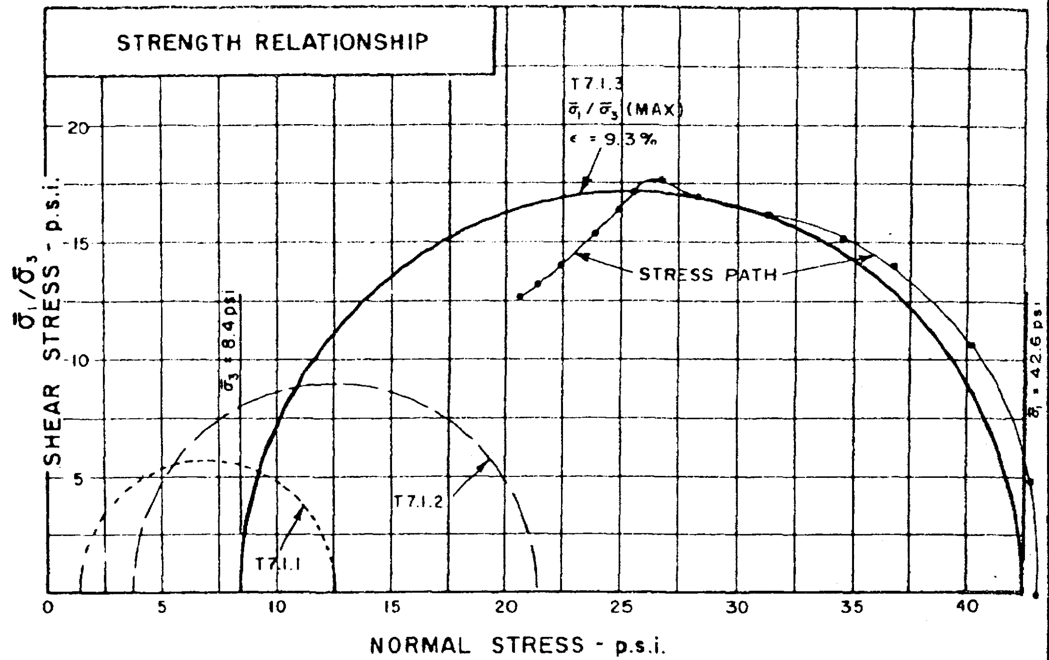
FIGURE 2H-32
TRIAXIAL TESTS
BORING 308 - SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT







TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T7.1.3		BORING 308	43.1	W_i = 79.3% γ = 98 pcf
		SAMPLE 4		μ_b = 91.8 psi TYPE TEST CU
		DEPTH 7.5'- 7.9'		STRAIN RATE = 0.18%/min.
				PORE PRESSURE RESPONSE = 97%
		MOTTLED BROWN		
		SILTY CLAY		

BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

TRIAXIAL TESTS
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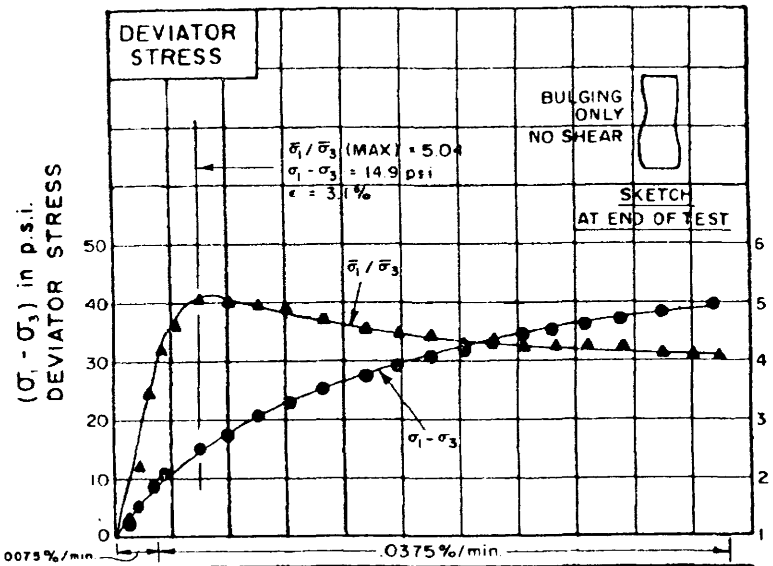
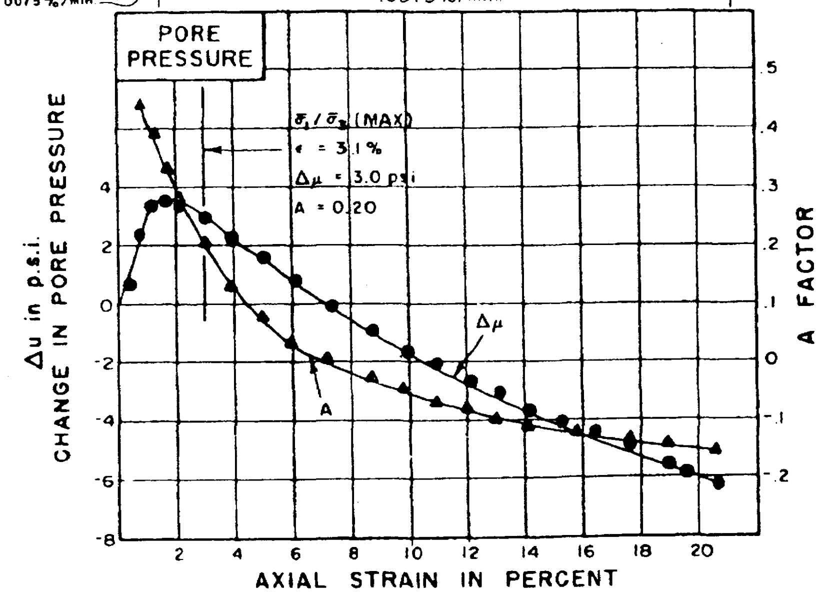
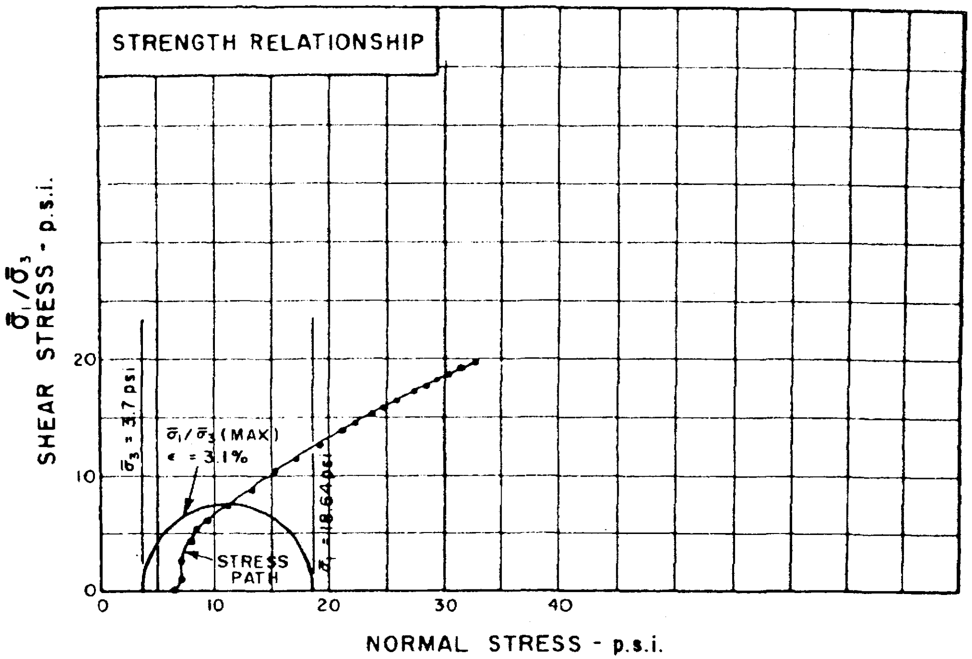
FIGURE 2H-33
TRIAXIAL TESTS
BORING 308 - SHEET 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)







TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i	REMARKS
T10.1.1		BORING 310	6.7	W_i = 26.9 % γ = 130 pcf
		DEPTH 24.3' - 24.7'		μ_b = 57.0 psi TYPE TEST CU
				STRAIN RATE = SEE PLOT
				PORE PRESSURE RESPONSE = 100%
		BROWN CLAYEY SAND		

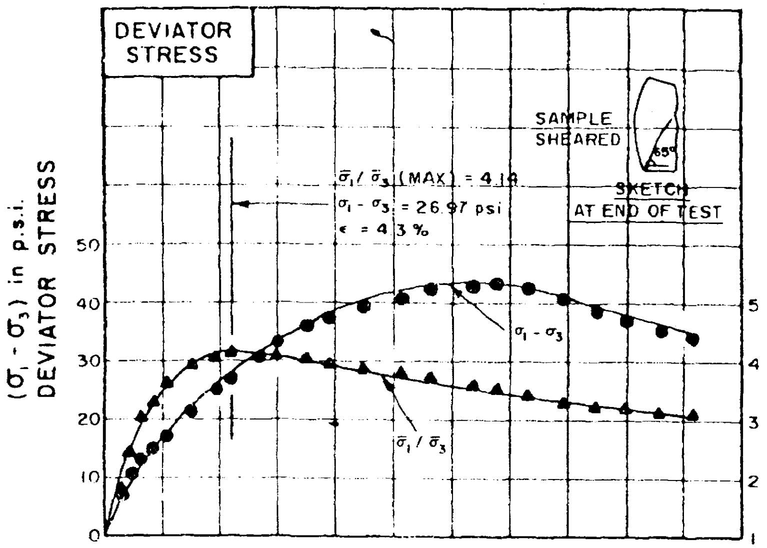
BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

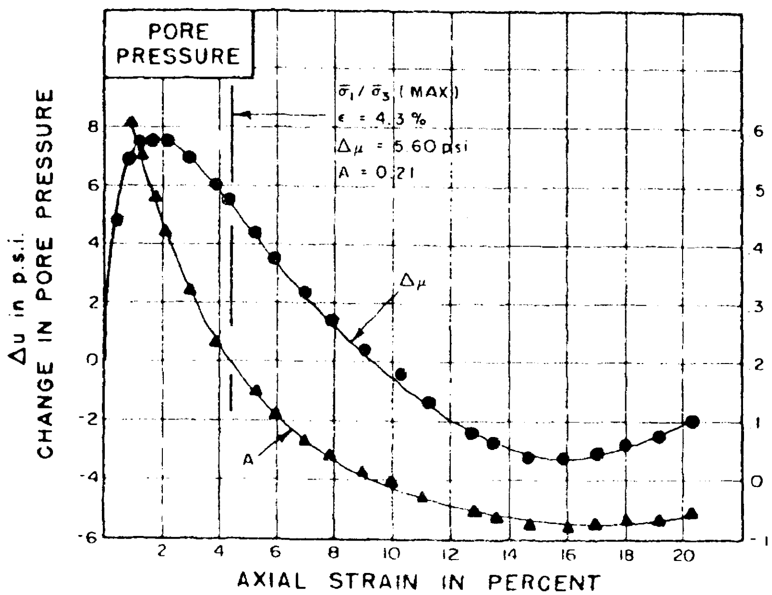
TRIAXIAL TESTS
(CONSOLIDATED UNDRAINED)

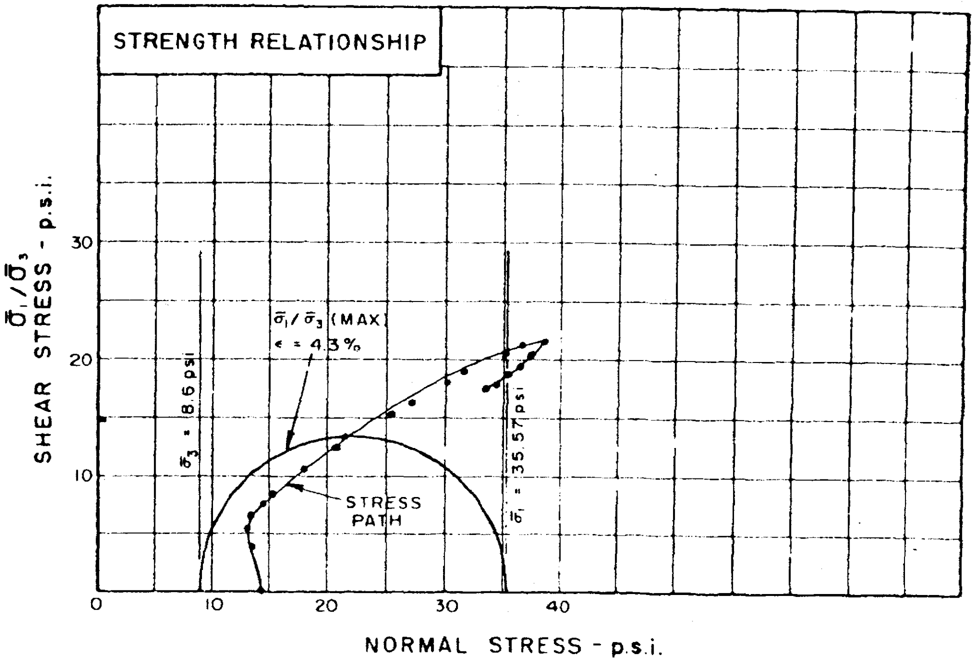
FILE NO. 511 DATE SEPT./69

FIGURE 2H-34
TRIAXIAL TESTS
BORING 310 - SHEET 1
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)







TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. psi	REMARKS
T10.12		BORING 310	14.2	w_l = 25.1% γ = 128 pcf
		DEPTH 247'-25.0'		μ_b = 62.8 psi TYPE TEST CU
				STRAIN RATE = .0365%/min
				PORE PRESSURE RESPONSE = 100%
		BROWN CLAYEY SAND		

BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

TRIAXIAL TESTS
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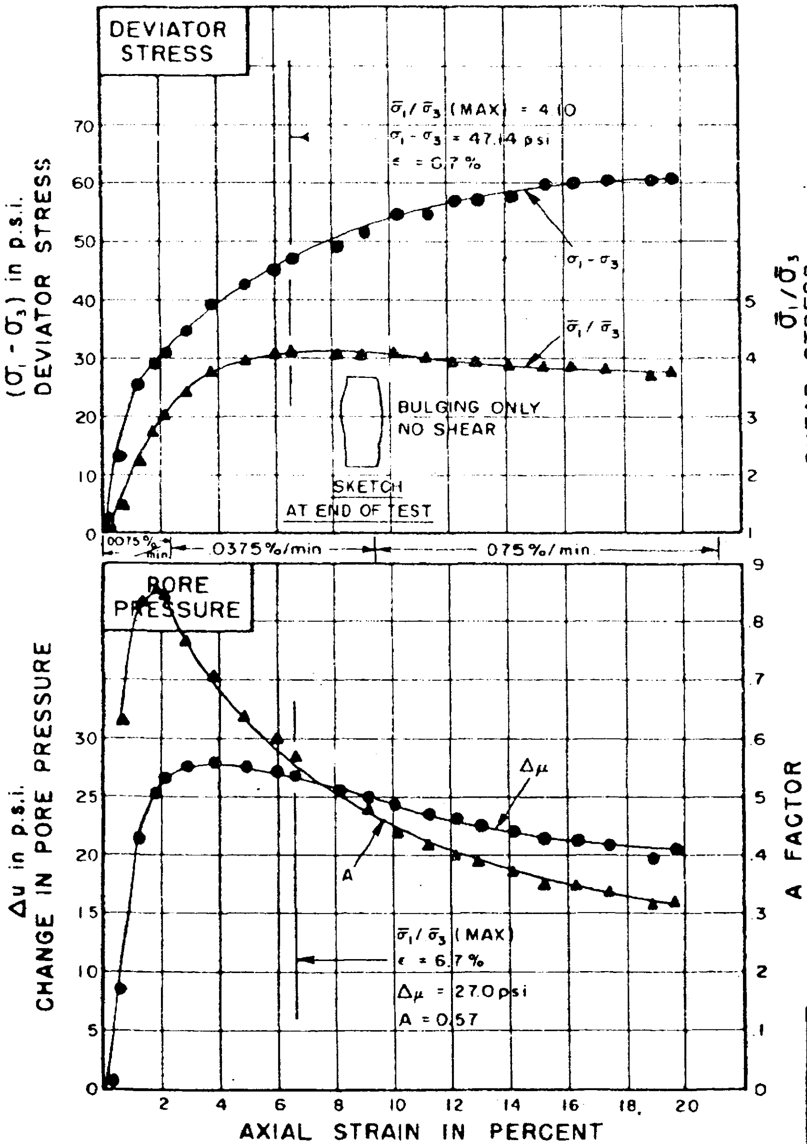
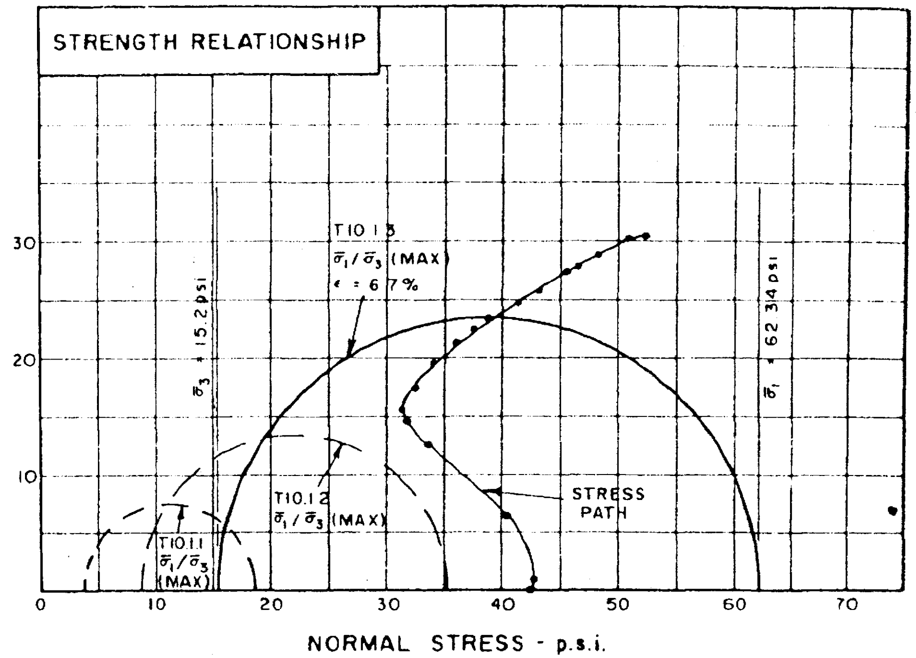
FIGURE 2H-35
TRIAXIAL TESTS
BORING 310 - SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)





TEST NO.	SYM.	MATERIAL SOURCE	CONS. PRESS. p.s.i.	REMARKS
T10.1.3		BORING 310	42.2	W_i = 24.6 % γ = 128 pcf
		DEPTH 25.0' - 25.3'		μ_b = 61.2 psi TYPE TEST CU
				STRAIN RATE = SEE PLOT
				PORE PRESSURE RESPONSE = 98 %
		BROWN CLAYEY SAND		

BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

TRIAXIAL TESTS
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FIGURE 2H-36
TRIAXIAL TESTS
BORING 310 - SHEET 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

PROJECT: BEAVER VALLEY POWER STATION | FILE NO. 511 | DATE Sept./1969

TABLE 1 SUMMARY OF LABORATORY TEST RESULTS | SHEET 1 OF ___

IDENTIFICATION			TEST NO	PROPERTIES				TRIAXIAL TESTS					OTHER TESTS AND REMARKS
					ATTERBERG LIMITS				AT FAILURE σ_1/σ_3 (MAX)				
BORING SAMPLE	SOIL DESCRIPTION	DEPTH (FEET)	—	NAT WATER CONTENT (%)	LL	PL	UNIT WT (PCF)	TEST TYPE	ϵ %	σ_1/σ_3	$\sigma_1-\sigma_3$ psi	σ_c psi	
302/4	Brown Clayey SAND AND GRAVEL; Gravel sizes ¼" to 2". Tube partially disturbed	17.0' to 18.6'	1				136						
		17.1	W1.1	12.8									
		17.3	W1.2	16.0									
304/4	Mottled brown to gray CLAY-SILT AND sandy SILTS with layers of fine sand. Many open vertical cracks, some partially cemented with ferruginous material. Few decomposed twigs, roots and other organic debris.	5.0' to 7.2'	2				85						
		6.1	W2.1	41.7									
		7.2	W2.2	53.1									
305/3	Brown to dark gray organic silty SANDS and sandy SILTS: stratified. Organic materials consist of partially decomposed leaves and fine roots (mat-like) with silt and fine sand, alternating with layers of silty sand and/or sandy silt with fine-grained organic particles throughout.	4.0' to 6.0'	3				83						
		4.0'-4.5	T3.1.1	77.6			83	CU	11.2	60.3*	11.9	7.6	* See plot Evol.=2.8%
		4.3	W3.1	77.7									
		4.5	W3.2	23.6**									**taken in silty-sand layer
		5.2'-5.5	L3.1	47.5	51	39							Organic Contents=9-26%
		5.2-5.5	T3.1.2	58.6			94	CU	8.2	5.36	13.5	14.3	Evol.=4.8%
		5.5-5.9	L3.2	47.9	46	38							
		5.5-5.9	T3.1.3	49.8			99	CU	13.3	4.78	40.8	43.3	Evol.=12.6%
306/5	Mottled brown CLAY-SILT with fine sand; friable with many open cracks (voids), most of which were partially cemented with red ferruginous material. Occasional wood fragment in sample.	8.0-10.0	4				83						
		8.0-8.4	T4.1.1	67.0			88	CU	7.0	6.83	11.7	7.2	Evol.=2.6%
		8.4-8.7	T4.1.2	76.6			88	CU	6.1	6.34	14.9	14.2	Evol.=6.0%
		8.7-9.0	W4.1	84.6									
		9.0-9.4	T4.1.3	69.2			94	CU	7.3	3.91	29.1	42.2	Evol.=12.4%
		9.5	W4.2	79.6									
		9.4-9.6	L4.1	73.0	83	44							
309/4	Mottled brown CLAY-SILT and sandy silt; appears stratified with thin sand layers. Blocky structure, cracked and partially cemented with ferruginous material. Fine roots throughout sample.	6.0-8.0	5				76						
			W5.1	54.4									
			W5.2	54.6									
			W5.3	60.7									
			W5.4	49.0									
			W5.5	43.7									
			W5.6	49.0									
301/3	Mottled brown sandy, clayey SILT, with few pebbles to ¼". Sample enclosed large void* 1" x 6" near top (11.2' to 11.7' depth)	11.0-12.5	6				93*						* Note "void" in soil description
		11.2	W6.1	24.6									
		11.5	W6.2	21.1									
		11.8-12.1	T6.1.1	23.5			126	CU	2.3	4.58	15.4	7.2	Evol.=0.5%
		11.8-12.1	T6.1.2	23.6			126	CU	3.1	4.42	25.7	13.6	Evol.= 1.3%
		12.1-12.5	W6.3	22.8									
		12.1-12.5	T6.1.3	22.3			128	CU	5.2	3.49	53.0	41.5	Evol.=4.2%
		11.8-12.5	L6.1	23.1	43	24							

FIGURE 2H-37
SUMMARY OF LABORATORY
TEST RESULTS - SHEET 1

REV. 0 (1/82)

PROJECT BEAVER VALLEY POWER STATION — FILE NO. 511

TABLE 1 SUMMARY OF LABORATORY TEST RESULTS — DATE Sept./1969 — SHEET 2 OF

IDENTIFICATION			TEST NO	PROPERTIES				TRIAXIAL TESTS					OTHER TESTS AND REMARKS
BORING SAMPLE	SOIL DESCRIPTION	DEPTH (FEET)	—	NAT WATER CONTENT (%)	ATTERBERG LIMITS LL	PL	UNIT WT (PCF)	TEST TYPE	AT FAILURE $\bar{\sigma}_1/\bar{\sigma}_3$ (MAX) ϵ %	$\bar{\sigma}_1/\bar{\sigma}_3$	$\sigma_1 - \sigma_3$ psi	$\bar{\sigma}_c$ psi	
308/4	Mottled brown CLAY-SILT; friable with open cracks (voids), most of which were partially cemented with red ferruginous material. Sample appears to be stratified. Some layers include fine sand.	6.0-8.0	7				85						*
		6.5	W7.1	66.1									
		6.8	L7.1	69.0	76	42							
		6.9	W7.2	76.6									
		7.1	W7.3	63.7									
		6.8-7.2	T7.1.1	74.3			89	CU	17.0	9.10	11.3	7.0	Evol.=1.9%
		7.2-7.5	L7.2	62.8	57	34							
		7.5-7.9	T7.1.2	77.5			100	CU	12.6	5.77	17.7	14.2	Evol.=6.3%
		7.5-7.9	T7.1.3	79.3			98	CU	9.3	5.08	34.2	43.1	Evol.=19.9%
		7.9	W7.4	72.0									
310/11	Brown CLAYEY SILTS, CLAYEY SANDS and SANDY SILTS; stratified. Non-plastic layers of silty sand (1/8" to 1/4" thick) between layers of clayey silt and/or clayey sand of low to moderate plasticity. Layers distorted throughout (up-warped); sample disturbed.	20-22	8				109						
		20.7	W8.1	26.1									
		21.5	W8.2	27.2									
		22.0	W8.3	25.2									
310/12	Brown sandy clayey SILT. Thoroughly disturbed 12" recovery includes 6" jet hole* washed into sample (filled)	22-23	9				122*						*Note - filled jet hole in soil description
		22.5	W9.1	26.5									
		23.0	W9.2	25.5									
310,	Brown CLAYEY SANDS and SILTY SANDS; appears to be stratified with pockets or lenses of clayey silt. Occasional vertical roots. Top and bottom of tube disturbed -- remainder of tube questionable but stable	24-26	10				123						
		24.2	W10.1	24.1									
		24.3-24.6	T10.1.1	26.9			130	CU	3.1	5.04	14.9	6.7	Evol.=2.8%
		24.5	W10.2	26.2									
		24.9	W10.3	27.1									
		25.0-25.3	T10.1.2	25.1			128	CU	4.3	4.13	27.0	14.2	Evol.=4.9%
		25.2	W10.4	24.6									
		25.3-25.6	T10.1.3	25.4			128	CU	6.7	4.10	47.1	42.2	Evol.=8.2%
		25.7	W10.5	23.6									
		25.3-25.7	L10.1	25.2	28	18							

FIGURE 2H-38
SUMMARY OF LABORATORY
TEST RESULTS - SHEET 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

APPENDIX A

NOTATION

$\sigma_c, \bar{\sigma}_c$	-	Total and Effective Cell Pressure
$\sigma_1, \bar{\sigma}_1$	-	Total and Effective Major Principal Stress
$\sigma_3, \bar{\sigma}_3$	-	Total and Effective Minor Principal Stress
u	-	Pore Water Pressure
u_b	-	Back Pressure Used in Test
A	-	Skemptons A Parameter
ϵ	-	Axial Strain
w	-	Water Content
w_i	-	Molded Water Content
opt. w	-	Optimum Water Content in Compaction Test
γ_D	-	Dry Density
γ_{Di}	-	Molded Dry Density
k	-	Permeability
L.L.	-	Liquid Limit
P.L.	-	Plastic Limit
UU	-	Unconsolidated Undrained Triaxial Test
CU	-	Consolidated Undrained Triaxial Test
Stress Path	-	$\frac{\sigma_1 + \sigma_3}{2}, \frac{\sigma_1 - \sigma_3}{2}$

APPENDIX B
BEAVER VALLEY POWER STATION
DUQUESNE LIGHT COMPANY

LABORATORY TEST PROCEDURES

1. The following tests were performed in accordance with the noted ASTM Test designations.

TEST	ASTM DESIGNATION
Liquid Limit	D 423-66
Plastic Limit	D 424-59

2. Test Procedures for Triaxial Tests

2.1 Sample Preparation

Soil samples were extruded from each Shelby Tube in 4 inch sections and trimmed to approximately 1.4" diameter, 3.5" height dimensions. Water contents were determined from the trimmings adjacent to the test specimen and specimen dimensions were verified. The trim and remainder of the tube samples were placed and sealed in moisture proof jars.

2.2 Consolidated Undrained Triaxial Tests

2.2.1 Test specimens were prepared as outlined above.

2.2.2 Each test specimen was placed on a previously deaired triaxial cell base and porous stone. Filter strips were placed in contact with the porous stone and at hexagonal points of the specimen.

2.2.3 Samples consolidated to approximately 7, 14, and 42 psi were back pressured under a 1 psi to 2 psi effective stress to create complete saturation of the sample. The back pressure generally used was 60 psi to 90 psi and was arrived at in increments. During this period the change in axial dimension and volume of the sample was measured. The chamber pressure was increased such that the desired consolidation effective stress was obtained while maintaining the back pressure. The specimen was allowed to consolidate under the effective stress for the test for 12 hours to 24 hours. During the consolidation phase, readings of volume change versus time were recorded.

2.2.4 The consolidation phase being complete, the cell was then attached to a pore pressure device. The apparatus for measuring volume change was disconnected creating a closed system eliminating any further drainage. The response of this system was then checked to insure against entrapped air or leakage.

2.2.5 The response of the soil sample was then observed by increasing the cell pressure and measuring the increase in pore pressure. The specimens were loaded under strain control conditions allowing no drainage during shear. The strain rate was established from the observed rate of consolidation considering both the rate of pore pressure buildup and time for 90% consolidation. Such considerations permitted change in the strain rates to take place after large initial increases in pore pressure buildup had been completed.

2.2.6 When failure* was reached, the sample was removed from the cell; the entire sample weight was obtained and it's water content determined.

* (or 20% strain)

FIGURE 2H-39
LABORATORY TEST PROCEDURES
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

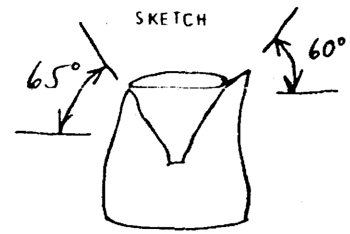
REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY, SOME SAND LENSES AND GRAVEL
DATE 8/14/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8
TEST BY MB,KLP

J.O. NO 11700
BORING 301
SAMPLE ST2
DEPTH 9-11 FT.
TEST NO 301-2N

SKETCH



WATER CONTENT

SPECIMEN LOCATION	BOTTOM	TOP
CONTAINER NO	36	67
WT CONTAINER + WET SOIL (G)	137.80	117.50
WT CONTAINER + DRY SOIL (G)	114.80	99.20
WT WATER (G)	23.00	18.30
WT CONTAINER (G)	16.70	17.60
WT DRY SOIL (G)	98.10	81.60
WATER CONTENT PERCENT	23.45	22.43

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
3.70						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	6.562	0.04291	0.600	0.357	152.911
	0.040	17.186	0.04307	1.000	0.714	399.046
	0.060	27.810	0.04322	1.400	1.071	643.406
	0.080	38.434	0.04338	1.800	1.429	885.991
	0.100	51.715	0.04354	2.300	1.786	1187.807
	0.120	59.683	0.04370	2.600	2.143	1365.838
	0.140	70.307	0.04386	3.000	2.500	1603.100
	0.160	75.619	0.04402	3.200	2.857	1717.907
	0.180	83.587	0.04418	3.500	3.214	1891.945
	0.200	88.899	0.04434	3.700	3.571	2004.756
	0.220	96.867	0.04451	4.000	3.929	2176.354
	0.240	99.523	0.04468	4.100	4.286	2227.715
	0.260	102.180	0.04484	4.200	4.643	2278.634
	0.280	107.492	0.04501	4.400	5.000	2388.117
	0.300	107.492	0.04518	4.400	5.357	2379.139
	0.320	107.492	0.04535	4.400	5.714	2370.161
	0.340	112.804	0.04552	4.600	6.071	2477.869
	0.360	107.492	0.04570	4.400	6.429	2352.205
	0.380	104.836	0.04587	4.300	6.786	2285.327
	0.400	102.180	0.04605	4.200	7.143	2218.894
	0.420	99.523	0.04623	4.100	7.500	2152.904

RATE OF STRAIN IS 2.027(PERCENT/MIN)

MAX COMP STRESS 2477.869

FIGURE 2H-40
UNCONFINED COMPRESSION TEST
BORING 301 - TEST NO. 301 - 2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

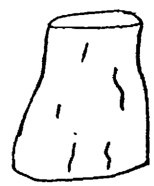
REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY, SOME SAND LENSES AND GRAVEL
DATE 8/14/65

JOB SITE BEAVER VALLEY
INIT. DIA 2.8
TEST BY MB,KLP

J.O. NO 11700
BORING 301
SAMPLE ST2
DEPTH 9-11 FT.
TEST NO 301-2R

SKETCH



WATER CONTENT

SPECIMEN LOCATION	MIDDLE
CONTAINER NO	24
WT CONTAINER + WET SOIL (G)	338.70
WT CONTAINER + DRY SOIL (G)	289.10
WT WATER (G)	49.60
WT CONTAINER (G)	16.70
WT DRY SOIL (G)	272.40
WATER CONTENT PERCENT	18.21

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
5.90	0.0	0.0	0.04276	0.0	0.0	0.0
	0.040	6.562	0.04307	0.600	0.714	152.363
	0.080	11.874	0.04338	0.800	1.429	273.721
	0.120	19.842	0.04370	1.100	2.143	454.087
	0.160	25.154	0.04402	1.300	2.857	571.452
	0.200	35.778	0.04434	1.700	3.571	806.835
	0.240	46.403	0.04468	2.100	4.286	1038.667
	0.280	57.027	0.04501	2.500	5.000	1266.951
	0.320	64.995	0.04535	2.800	5.714	1433.120
	0.360	75.619	0.04570	3.200	6.429	1654.749
	0.400	83.587	0.04605	3.500	7.143	1815.150
	0.440	94.211	0.04641	3.900	7.857	2030.123
	0.480	107.492	0.04677	4.400	8.571	2298.338
	0.520	115.460	0.04714	4.700	9.286	2449.422
	0.560	126.084	0.04751	5.100	10.000	2653.747
	0.600	134.052	0.04789	5.400	10.714	2799.064
	0.640	139.364	0.04828	5.600	11.429	2886.702
	0.680	144.676	0.04867	5.800	12.143	2972.566
	0.720	147.332	0.04907	5.900	12.857	3002.528
	0.760	147.332	0.04947	5.900	13.571	2977.917
	0.800	147.332	0.04989	5.900	14.286	2953.306

RATE OF STRAIN IS 2.421(PERCENT/MIN)

MAX COMP STRESS 3002.528

FIGURE 2H-41
UNCONFINED COMPRESSION TEST
BORING 301 - TEST NO 301 - 2R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

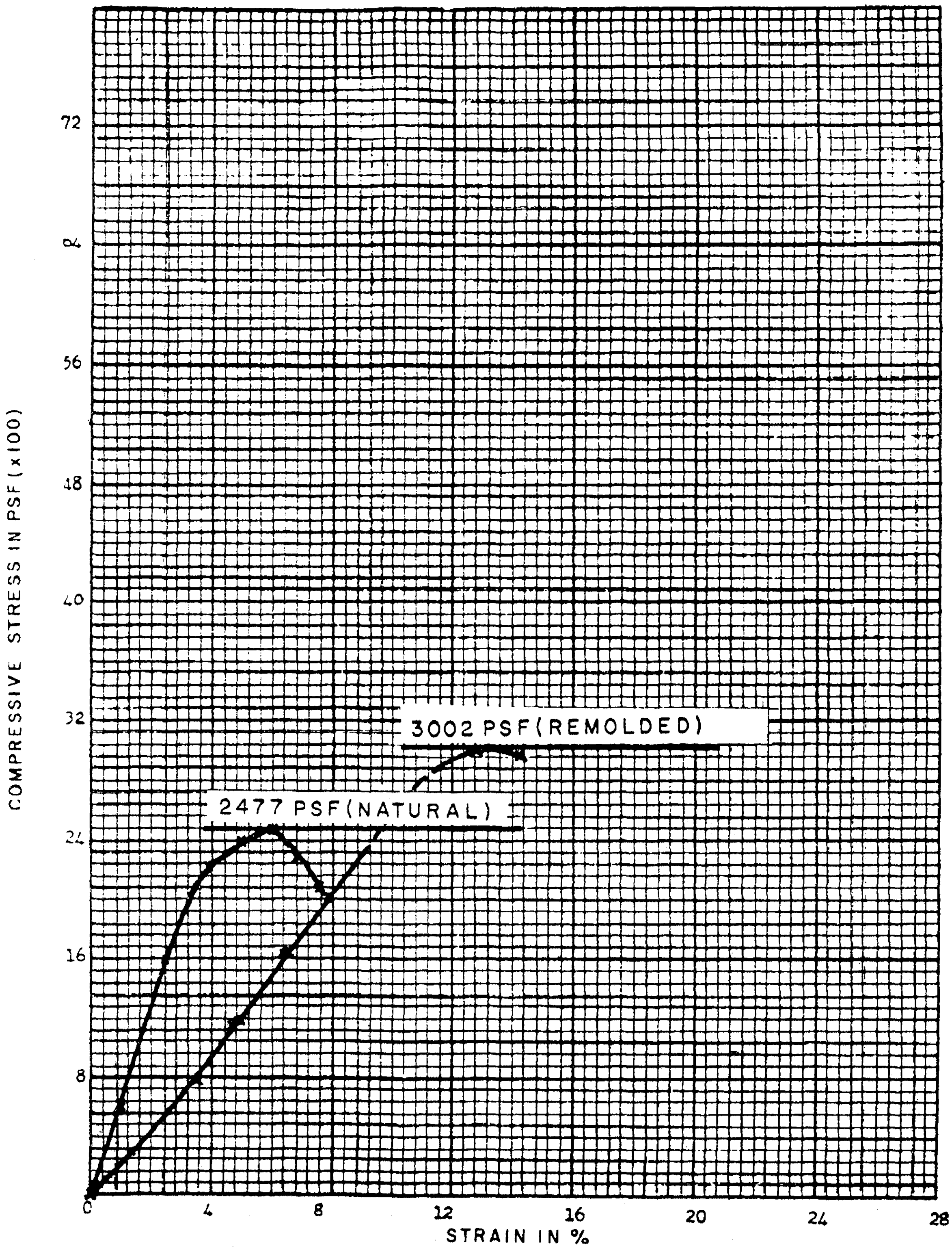


FIGURE 2H-42
COMPRESSIVE STRESS VS STRAIN
TEST NO 301 - 2 N+R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

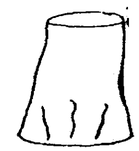
REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION GRAY CLAYEY ORG. SILT, TRACE OF SAND & GRAVEL
DATE 8/14/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8
TEST BY MB, KLP

J.O. NO 11700
BORING 301
SAMPLE ST5
DEPTH 15-17 FT.
TEST NO 301-5N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		BOTTOM	TOP
CONTAINER NO		33	16
WT CONTAINER + WET SOIL	(G)	127.00	176.60
WT CONTAINER + DRY SOIL	(G)	99.80	148.80
WT WATER	(G)	27.20	27.80
WT CONTAINER	(G)	16.00	16.50
WT DRY SOIL	(G)	83.80	132.30
WATER CONTENT	PERCENT	32.46	21.01

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
5.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	9.218	0.04291	0.700	0.357	214.804
	0.040	17.186	0.04307	1.000	0.714	399.046
	0.060	25.154	0.04322	1.300	1.071	581.957
	0.080	30.466	0.04338	1.500	1.429	702.310
	0.100	38.434	0.04354	1.800	1.786	882.781
	0.120	43.747	0.04370	2.000	2.143	1001.138
	0.140	51.715	0.04386	2.300	2.500	1179.168
	0.160	57.027	0.04402	2.500	2.857	1295.529
	0.180	62.339	0.04418	2.700	3.214	1411.002
	0.200	70.307	0.04434	3.000	3.571	1585.483
	0.220	75.619	0.04451	3.200	3.929	1698.960
	0.240	83.587	0.04468	3.500	4.286	1871.001
	0.260	88.899	0.04484	3.700	4.643	1982.481
	0.280	94.211	0.04501	3.900	5.000	2093.073
	0.300	96.867	0.04518	4.000	5.357	2143.992
	0.320	102.180	0.04535	4.200	5.714	2253.031
	0.340	110.148	0.04552	4.500	6.071	2419.527
	0.360	115.460	0.04570	4.700	6.429	2526.569
	0.380	118.116	0.04587	4.800	6.786	2574.825
	0.400	118.116	0.04605	4.800	7.143	2564.960
	0.420	120.772	0.04623	4.900	7.500	2612.551
	0.440	120.772	0.04641	4.900	7.857	2602.464
	0.460	123.428	0.04659	5.000	8.214	2649.389
	0.480	128.740	0.04677	5.200	8.571	2752.661
	0.500	128.740	0.04695	5.200	8.929	2741.908
	0.520	128.740	0.04714	5.200	9.286	2731.156
	0.540	128.740	0.04732	5.200	9.643	2720.403
	0.560	128.740	0.04751	5.200	10.000	2709.650
	0.580	128.740	0.04770	5.200	10.357	2698.898
	0.600	128.740	0.04789	5.200	10.714	2688.145
	0.620	128.740	0.04808	5.200	11.071	2677.393

RATE OF STRAIN IS 2.214(PERCENT/MIN)

MAX COMP STRESS 2752.661

FIGURE 2H-43
UNCONFINED COMPRESSION TEST
BORING 301 - TEST NO. 301 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

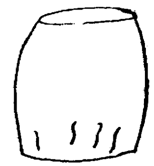
REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION GRAY CLAYEY ORG. SILT, TRACE OF SAND & GRAVEL
DATE 8/14/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8
TEST BY MB, KLP

J.O. NO 11700
BORING 301
SAMPLE ST5
DEPTH 15-17 FT.
TEST NO 301-5R

SKETCH



WATER CONTENT

SPECIMEN LOCATION	MIDDLE
CONTAINER NO	19
WT CONTAINER + WET SOIL (G)	287.20
WT CONTAINER + DRY SOIL (G)	227.70
WT WATER (G)	59.50
WT CONTAINER (G)	16.60
WT DRY SOIL (G)	211.10
WATER CONTENT PERCENT	28.19

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
7.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.040	9.218	0.04307	0.700	0.714	214.034
	0.080	14.530	0.04338	0.900	1.429	334.948
	0.120	17.186	0.04370	1.000	2.143	393.304
	0.160	22.498	0.04402	1.200	2.857	511.113
	0.200	27.810	0.04434	1.400	3.571	627.146
	0.240	33.122	0.04468	1.600	4.286	741.406
	0.280	38.434	0.04501	1.800	5.000	853.890
	0.320	43.747	0.04535	2.000	5.714	964.600
	0.360	49.059	0.04570	2.200	6.429	1073.535
	0.400	57.027	0.04605	2.500	7.143	1238.373
	0.440	64.995	0.04641	2.800	7.857	1400.549
	0.480	70.307	0.04677	3.000	8.571	1503.273
	0.520	75.619	0.04714	3.200	9.286	1604.222
	0.560	78.275	0.04751	3.300	10.000	1647.493
	0.600	83.587	0.04789	3.500	10.714	1745.337
	0.640	86.243	0.04828	3.600	11.429	1786.390
	0.680	88.899	0.04867	3.700	12.143	1826.555
	0.720	91.555	0.04907	3.800	12.857	1865.833
	0.760	96.867	0.04947	4.000	13.571	1957.909
	0.800	102.180	0.04989	4.200	14.286	2048.210
	0.840	102.180	0.05031	4.200	15.000	2031.142
	0.880	107.492	0.05073	4.400	15.714	2118.780
	0.920	107.492	0.05117	4.400	16.429	2100.824

RATE OF STRAIN IS 2.347(PERCENT/MIN)

MAX COMP STRESS 2118.780

FIGURE 2H-44
UNCONFINED COMPRESSION TEST
BORING 301 - TEST NO. 301-5R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

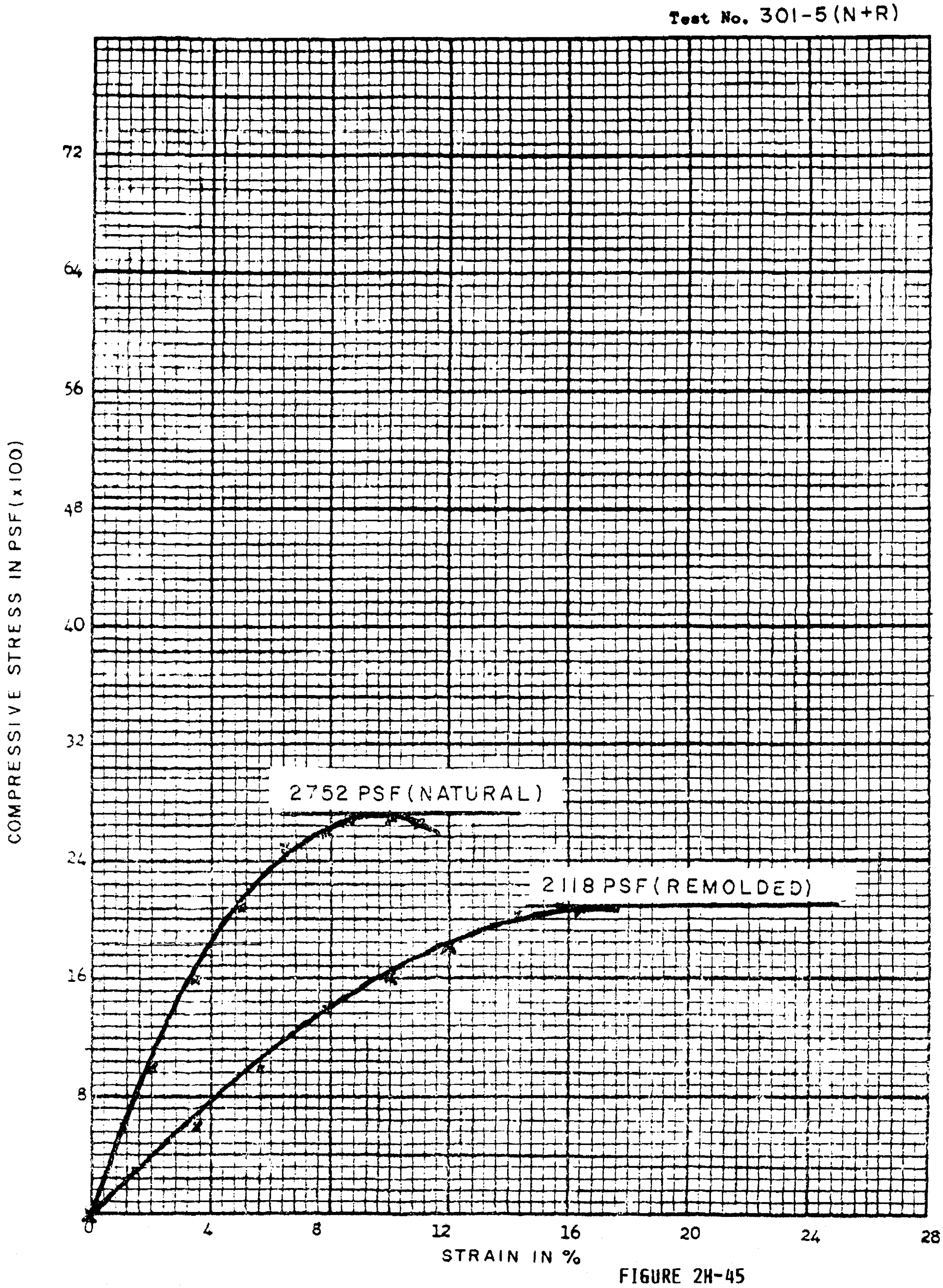


FIGURE 2H-45
COMPRESSIVE STRESS VS STRAIN
TEST NO. 301 - 5 N+R
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY SAND AND GRAVEL

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

J.O. NO 11700
BORING 302
SAMPLE ST3
DEPTH 15-17 FT.
TEST NO 302-3N

DATE 8/15/69

TEST BY MB.KLP

SKETCH

WATER CONTENT

SPECIMEN LOCATION	BOTTOM	TOP	MIDDLE
CONTAINER NO	48	13	19
WT CONTAINER + WET SOIL (G)	211.10	257.70	237.10
WT CONTAINER + DRY SOIL (G)	188.70	226.50	208.70
WT WATER (G)	22.40	31.20	28.40
WT CONTAINER (G)	32.70	16.40	16.60
WT DRY SOIL (G)	156.00	210.10	192.10
WATER CONTENT PERCENT	14.36	14.85	14.78

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
5.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.300	0.357	0.0
	0.040	1.250	0.04307	0.400	0.714	29.022
	0.060	1.250	0.04322	0.400	1.071	28.917
	0.080	3.906	0.04338	0.500	1.429	90.040
	0.100	3.906	0.04354	0.500	1.786	89.714
	0.120	6.562	0.04370	0.600	2.143	150.171
	0.140	9.218	0.04386	0.700	2.500	210.184
	0.160	9.218	0.04402	0.700	2.857	209.414
	0.180	11.874	0.04418	0.800	3.214	268.762
	0.200	14.530	0.04434	0.900	3.571	327.667
	0.220	17.186	0.04451	1.000	3.929	386.127
	0.240	17.186	0.04468	1.000	4.286	384.692
	0.260	19.842	0.04484	1.100	4.643	442.486
	0.280	19.842	0.04501	1.100	5.000	440.829
	0.300	22.498	0.04518	1.200	5.357	497.959
	0.320	22.498	0.04535	1.200	5.714	496.080
	0.340	22.498	0.04552	1.200	6.071	494.201
	0.360	25.154	0.04570	1.300	6.429	550.443
	0.380	25.154	0.04587	1.300	6.786	548.342
	0.400	25.154	0.04605	1.300	7.143	546.241
	0.420	25.154	0.04623	1.300	7.500	344.140
	0.440	25.154	0.04641	1.300	7.857	542.039
	0.460	25.154	0.04659	1.300	8.214	539.938
	0.480	25.154	0.04677	1.300	8.571	537.837

RATE OF STRAIN IS 1.714(PERCENT/MIN)

MAX COMP STRESS 550.443

FIGURE 2H-46
UNCONFINED COMPRESSION TEST
BORING 302 - TEST NO. 302 - 3N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

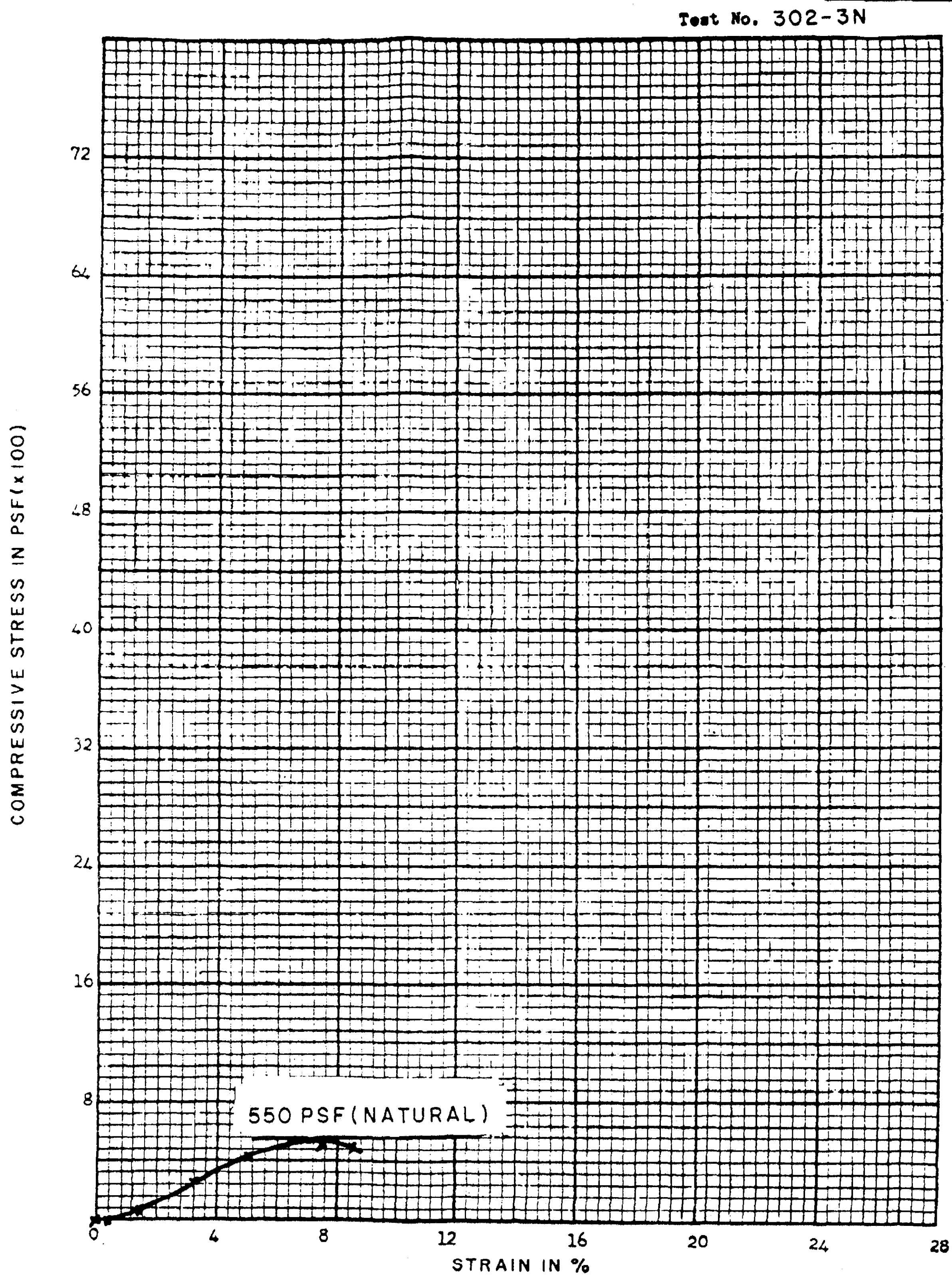


FIGURE 2H-47
COMPRESSIVE STRESS VS STRAIN
TEST NO. 302 - 3N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY SAND AND GRAVEL

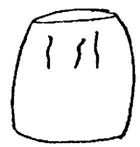
DATE 8/15/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 302
SAMPLE ST5
DEPTH 19-21 FT.
TEST NO 302-5N

SKETCH



WATER CONTENT

SPECIMEN LOCATION	TOP	BOTTOM	MIDDLE
CONTAINER NO	50	46	58
WT CONTAINER + WET SOIL (G)	206.40	212.50	247.90
WT CONTAINER + DRY SOIL (G)	182.00	188.30	216.80
WT WATER (G)	24.40	24.20	31.10
WT CONTAINER (G)	17.70	35.80	16.60
WT DRY SOIL (G)	164.30	152.50	200.20
WATER CONTENT PERCENT	14.85	15.87	15.53

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
6.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	1.250	0.04291	0.400	0.357	29.126
	0.040	1.250	0.04307	0.400	0.714	29.022
	0.060	1.250	0.04322	0.400	1.071	28.917
	0.080	3.906	0.04338	0.500	1.429	90.040
	0.100	3.906	0.04354	0.500	1.786	89.714
	0.120	6.562	0.04370	0.600	2.143	150.171
	0.140	6.562	0.04386	0.600	2.500	149.623
	0.160	9.218	0.04402	0.700	2.857	209.414
	0.180	9.218	0.04418	0.700	3.214	208.644
	0.200	9.218	0.04434	0.700	3.571	207.875
	0.220	11.874	0.04451	0.800	3.929	266.779
	0.240	11.874	0.04468	0.800	4.286	265.787
	0.260	11.874	0.04484	0.800	4.643	264.795
	0.280	14.530	0.04501	0.900	5.000	322.812
	0.300	14.530	0.04518	0.900	5.357	321.599
	0.320	17.186	0.04535	1.000	5.714	378.950
	0.340	17.186	0.04552	1.000	6.071	377.515
	0.360	17.186	0.04570	1.000	6.429	376.079
	0.380	19.842	0.04587	1.100	6.786	432.543
	0.400	19.842	0.04605	1.100	7.143	430.886
	0.420	19.842	0.04623	1.100	7.500	429.228
	0.440	19.842	0.04641	1.100	7.857	427.571
	0.460	19.842	0.04659	1.100	8.214	425.914
	0.480	22.498	0.04677	1.200	8.571	481.047
	0.500	22.498	0.04695	1.200	8.929	479.168
	0.520	22.498	0.04714	1.200	9.286	477.289
	0.540	22.498	0.04732	1.200	9.643	475.410
	0.560	22.498	0.04751	1.200	10.000	473.531
	0.580	22.498	0.04770	1.200	10.357	471.652
	0.600	22.498	0.04789	1.200	10.714	469.773

RATE OF STRAIN IS 1.786(PERCENT/MIN)

MAX COMP STRESS 481.047

FIGURE 2H-48
UNCONFINED COMPRESSION TEST
BORING 302 - TEST NO. 302 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

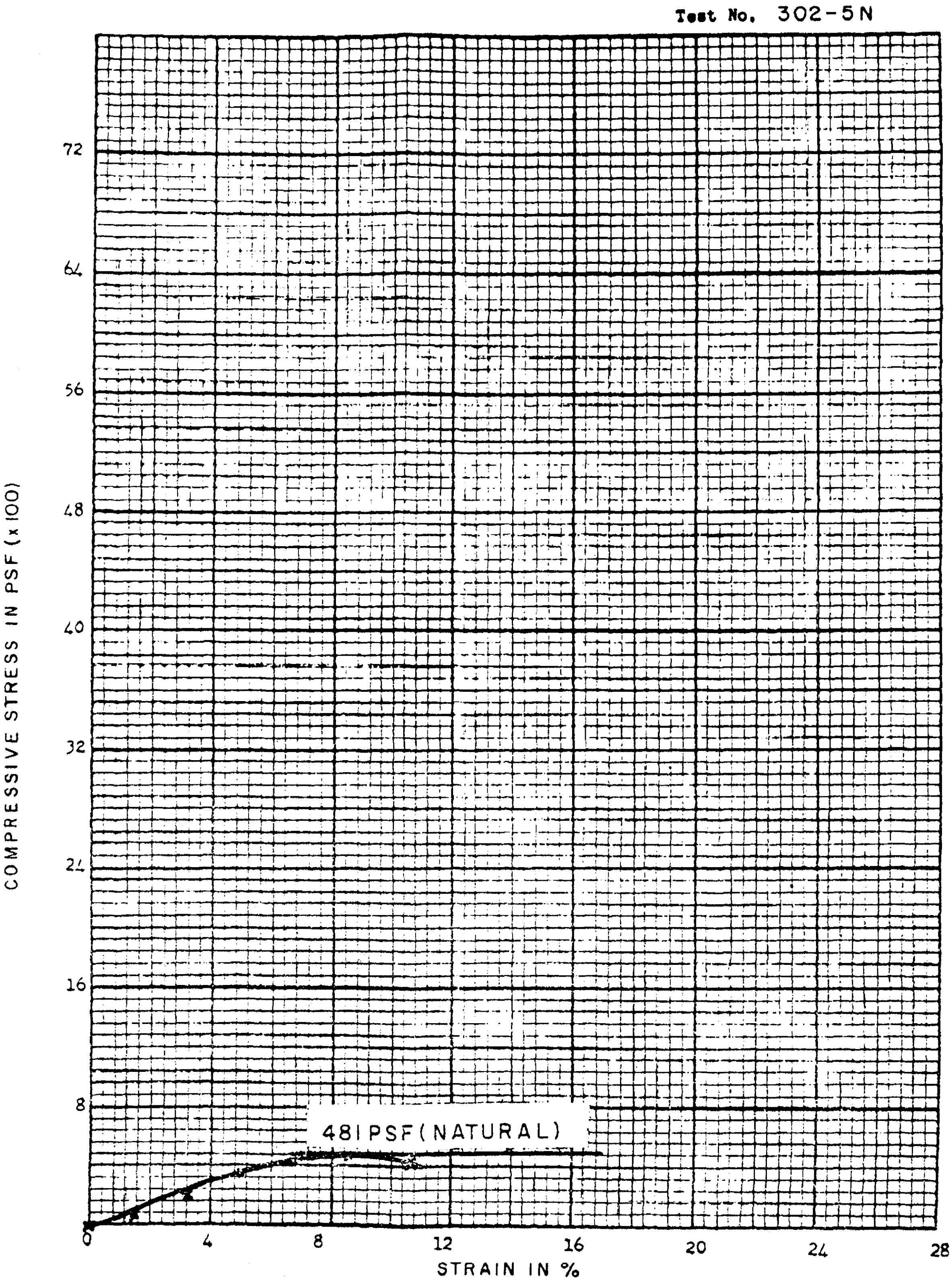


FIGURE 2H-49
COMPRESSIVE STRESS VS STRAIN
TEST NO. 302 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY SAND WITH GRAVEL

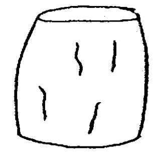
DATE 8/15/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KLP

J.O. NO 11700
BORING 303
SAMPLE ST5
DEPTH 8-10 FT.
TEST NO 303-5N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP	BOTTOM	MIDDLE
CONTAINER NO		39	63	52
WT CONTAINER + WET SOIL	(G)	245.60	167.40	337.50
WT CONTAINER + DRY SOIL	(G)	208.70	147.50	294.50
WT WATER	(G)	36.90	19.90	43.00
WT CONTAINER	(G)	16.40	18.50	17.70
WT DRY SOIL	(G)	192.30	129.00	276.80
WATER CONTENT	PERCENT	19.19	15.43	15.53

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
6.10						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	1.250	0.04291	0.400	0.357	29.126
	0.040	1.250	0.04307	0.400	0.714	29.022
	0.060	3.906	0.04322	0.500	1.071	90.366
	0.080	6.562	0.04338	0.600	1.429	151.267
	0.100	6.562	0.04354	0.600	1.786	150.719
	0.120	9.218	0.04370	0.700	2.143	210.954
	0.140	11.874	0.04386	0.800	2.500	270.746
	0.160	11.874	0.04402	0.800	2.857	269.754
	0.180	14.530	0.04418	0.900	3.214	328.880
	0.200	17.186	0.04434	1.000	3.571	387.563
	0.220	17.186	0.04451	1.000	3.929	386.127
	0.240	19.842	0.04468	1.100	4.286	444.144
	0.260	22.498	0.04484	1.200	4.643	501.717
	0.280	22.498	0.04501	1.200	5.000	499.838
	0.300	25.154	0.04518	1.300	5.357	556.746
	0.320	25.154	0.04535	1.300	5.714	554.645
	0.340	25.154	0.04552	1.300	6.071	552.544
	0.360	25.154	0.04570	1.300	6.429	550.443
	0.380	27.810	0.04587	1.400	6.786	606.241
	0.400	27.810	0.04605	1.400	7.143	603.919
	0.420	27.810	0.04623	1.400	7.500	601.596
	0.440	30.466	0.04641	1.500	7.857	656.507
	0.460	30.466	0.04659	1.500	8.214	653.963
	0.480	30.466	0.04677	1.500	8.571	651.418
	0.500	30.466	0.04695	1.500	8.929	648.874
	0.520	30.466	0.04714	1.500	9.286	646.329
	0.540	30.466	0.04732	1.500	9.643	643.784

RATE OF STRAIN IS 1.581(PERCENT/MIN)

MAX COMP STRESS 656.507

FIGURE 2lH-50
UNCONFINED COMPRESSION TEST
BORING 303 - TEST NO. 303 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

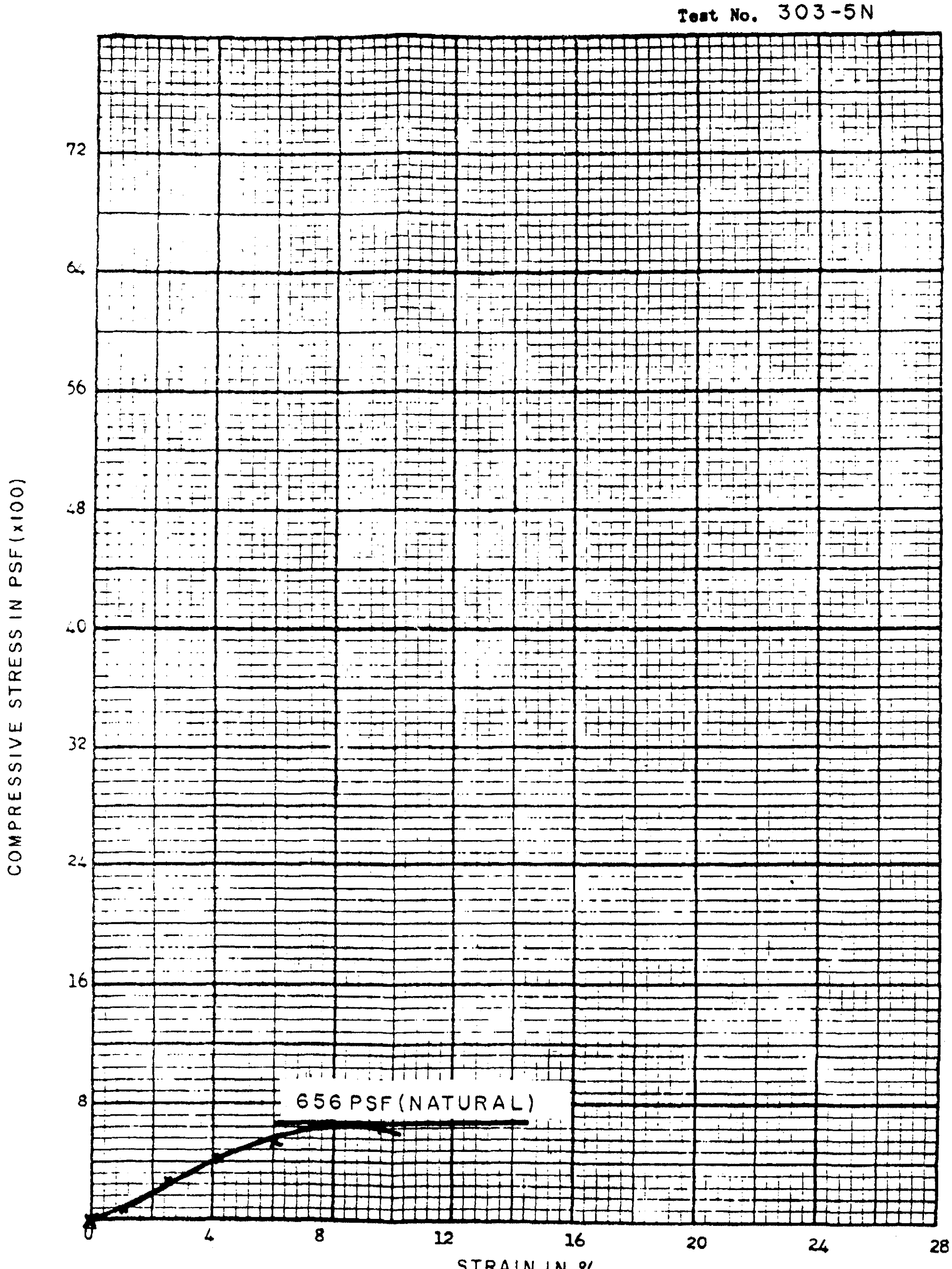


FIGURE 2H-51
COMPRESSIVE STRESS VS STRAIN
TEST NO 303 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY CLAY

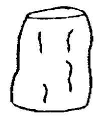
DATE 8/15/69

JOB SITE BEAVER VALLEY
INIT. DIA 2.8

TEST BY KCP

J.O. NO 11700
BORING 303
SAMPLE ST12
DEPTH 22-24 FT.
TEST NO 303-12N

SKETCH



WATER CONTENT

SPECIMEN LOCATION		TOP	BOTTOM	MIDDLE
CONTAINER NO		60	51	49
WT CONTAINER + WET SOIL	(G)	249.30	242.50	262.90
WT CONTAINER + DRY SOIL	(G)	200.10	198.20	213.40
WT WATER	(G)	49.20	44.30	49.50
WT CONTAINER	(G)	18.20	16.80	32.60
WT DRY SOIL	(G)	181.90	181.40	180.80
WATER CONTENT	PERCENT	27.05	24.42	27.38

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
9.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	1.250	0.04291	0.400	0.357	29.126
	0.040	3.906	0.04307	0.500	0.714	90.692
	0.060	6.562	0.04322	0.600	1.071	151.815
	0.080	11.874	0.04338	0.800	1.429	273.721
	0.100	14.530	0.04354	0.900	1.786	333.734
	0.120	17.186	0.04370	1.000	2.143	393.304
	0.140	22.498	0.04386	1.200	2.500	512.992
	0.160	25.154	0.04402	1.300	2.857	571.452
	0.180	27.810	0.04418	1.400	3.214	629.469
	0.200	30.466	0.04434	1.500	3.571	687.042
	0.220	33.122	0.04451	1.600	3.929	744.172
	0.240	35.778	0.04468	1.700	4.286	800.858
	0.260	38.434	0.04484	1.800	4.643	857.100
	0.280	41.091	0.04501	1.900	5.000	912.899
	0.300	43.747	0.04518	2.000	5.357	968.254
	0.320	43.747	0.04535	2.000	5.714	964.600
	0.340	46.403	0.04552	2.100	6.071	1019.289
	0.360	49.059	0.04570	2.200	6.429	1073.535
	0.380	51.715	0.04587	2.300	6.786	1127.337
	0.400	54.371	0.04605	2.400	7.143	1180.696
	0.420	57.027	0.04623	2.500	7.500	1233.610
	0.440	59.683	0.04641	2.600	7.857	1286.081
	0.460	59.683	0.04659	2.600	8.214	1281.076
	0.480	62.339	0.04677	2.700	8.571	1332.902
	0.500	62.339	0.04695	2.700	8.929	1327.696
	0.520	64.995	0.04714	2.800	9.286	1378.835
	0.540	67.651	0.04732	2.900	9.643	1429.532
	0.560	70.307	0.04751	3.000	10.000	1479.784
	0.580	70.307	0.04770	3.000	20.357	1473.912
	0.600	72.963	0.04789	3.100	10.714	1523.500
	0.620	72.963	0.04808	3.100	11.071	1517.406
	0.640	75.619	0.04828	3.200	11.429	1566.327
	0.660	78.275	0.04847	3.300	11.786	1614.605
	0.680	78.275	0.04867	3.300	12.143	1608.267
	0.700	78.275	0.04887	3.300	12.500	1601.729
	0.720	80.931	0.04907	3.400	12.857	1649.320
	0.740	80.931	0.04927	3.400	13.214	1642.561
	0.760	83.587	0.04947	3.500	13.571	1689.486
	0.780	83.587	0.04968	3.500	13.929	1682.505
	0.800	86.243	0.04989	3.600	14.286	1728.764
	0.820	86.243	0.05010	3.600	14.643	1721.561
	0.840	88.899	0.05031	3.700	15.000	1767.155
	0.860	88.899	0.05052	3.700	15.357	1759.730
	0.880	88.899	0.05073	3.700	15.714	1752.305
	0.900	88.899	0.05075	3.700	16.071	1744.880
	0.920	91.555	0.05117	3.800	16.429	1789.365
	0.940	91.555	0.05139	3.800	16.786	1781.718

303-12N (CONT'D)

RATE OF STRAIN IS 1.865 (PERCENT/MIN)

MAX COMP STRESS 1789.365

FIGURE 2H-52
UNCONFINED COMPRESSION TEST
BORING 303 - TEST NO 303 - 12N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

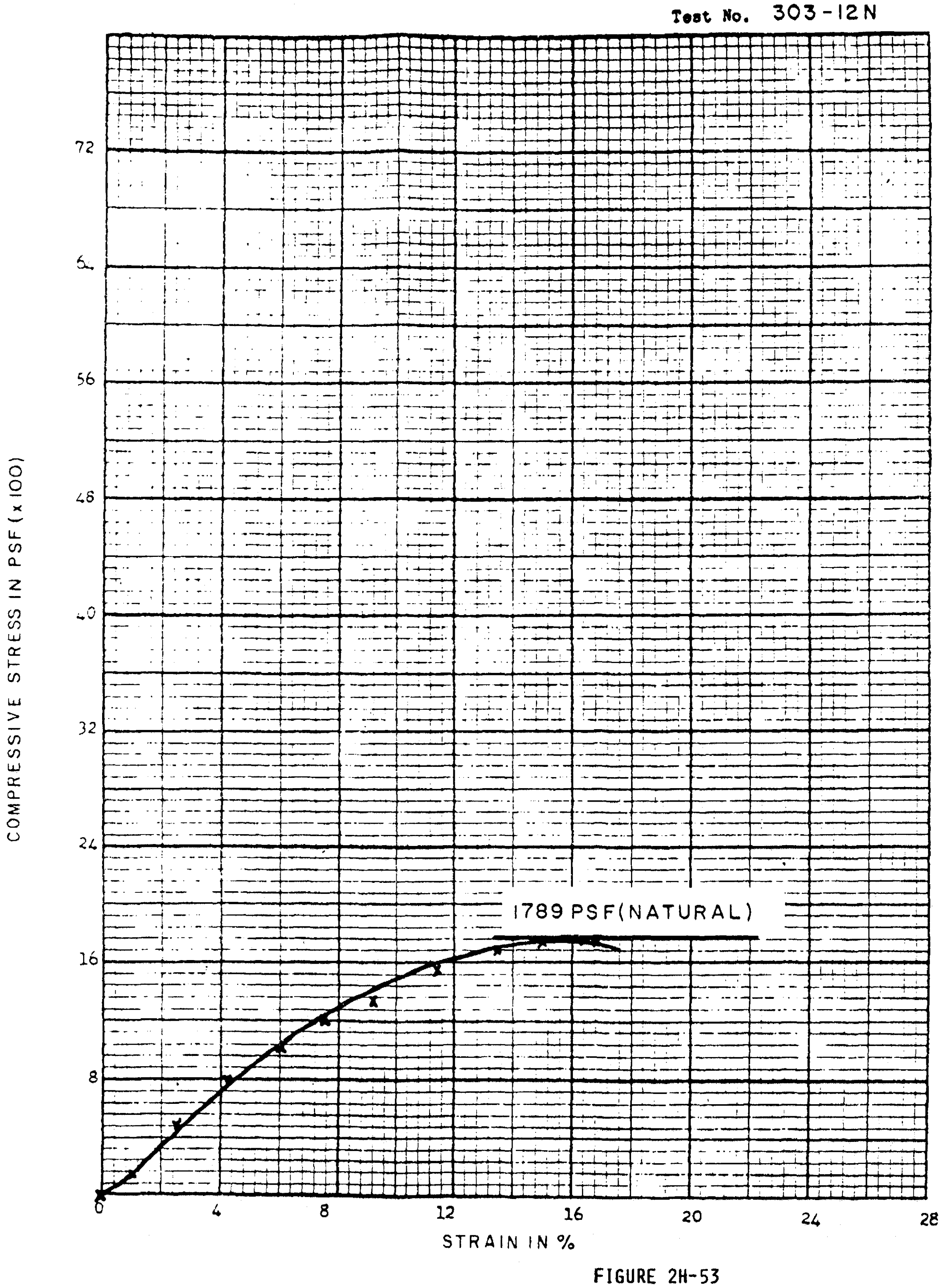


FIGURE 2H-53
COMPRESSIVE STRESS VS STRAIN
TEST NO. 303 - 12N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION ORGANIC SANDY SILT WITH TRACE OF CLAY

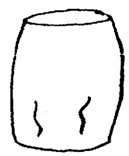
JOB SITE BEAVER VALLEY
INIT. DIA 2.8

J.O. NO 11700
BORING 305
SAMPLE ST5
DEPTH 8-10 FT.
TEST NO 305-5N

DATE 8/18/69

TEST BY MB

SKETCH



WATER CONTENT

SPECIMEN LOCATION		BOTTOM	TOP	MIDDLE
CONTAINER NO		58	63	39
WT CONTAINER + WET SOIL	(G)	163.90	157.90	287.60
WT CONTAINER + DRY SOIL	(G)	110.80	118.70	218.50
WT WATER	(G)	53.10	39.20	69.10
WT CONTAINER	(G)	16.60	18.50	16.40
WT DRY SOIL	(G)	94.20	100.20	202.10
WATER CONTENT	PERCENT	56.37	39.12	34.19

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
4.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.200	0.357	0.0
	0.040	0.0	0.04307	0.300	0.714	0.0
	0.060	1.250	0.04322	0.400	1.071	28.917
	0.080	3.906	0.04338	0.500	1.429	90.040
	0.100	3.906	0.04354	0.500	1.786	89.714
	0.120	6.562	0.04370	0.600	2.143	150.171
	0.140	9.218	0.04386	0.700	2.500	210.184
	0.160	11.874	0.04402	0.800	2.857	269.754
	0.180	14.530	0.04418	0.900	3.214	328.880
	0.200	14.530	0.04434	0.900	3.571	327.667
	0.220	17.186	0.04451	1.000	3.929	386.127
	0.240	17.186	0.04468	1.000	4.286	384.692
	0.260	19.842	0.04484	1.100	4.643	442.486
	0.280	19.842	0.04501	1.100	5.000	440.829
	0.300	22.498	0.04518	1.200	5.357	497.959 -
	0.360	22.498	0.04570	1.200	6.429	492.322
	0.380	22.498	0.04587	1.200	6.786	490.443
	0.400	22.498	0.04605	1.200	7.143	488.563
	0.420	22.498	0.04623	1.200	7.500	486.684
	0.440	22.498	0.04641	1.200	7.857	484.805
	0.460	22.498	0.04659	1.200	8.214	482.926
	0.480	22.498	0.04677	1.200	8.571	481.047
	0.500	22.498	0.04695	1.200	8.929	479.168
	0.520	22.498	0.04714	1.200	9.286	477.289

RATE OF STRAIN IS 2.321(PERCENT/MIN)

MAX COMP STRESS 497.959

FIGURE 2H-54
UNCONFINED COMPRESSION TEST
BORING 301 - TEST NO. 305 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

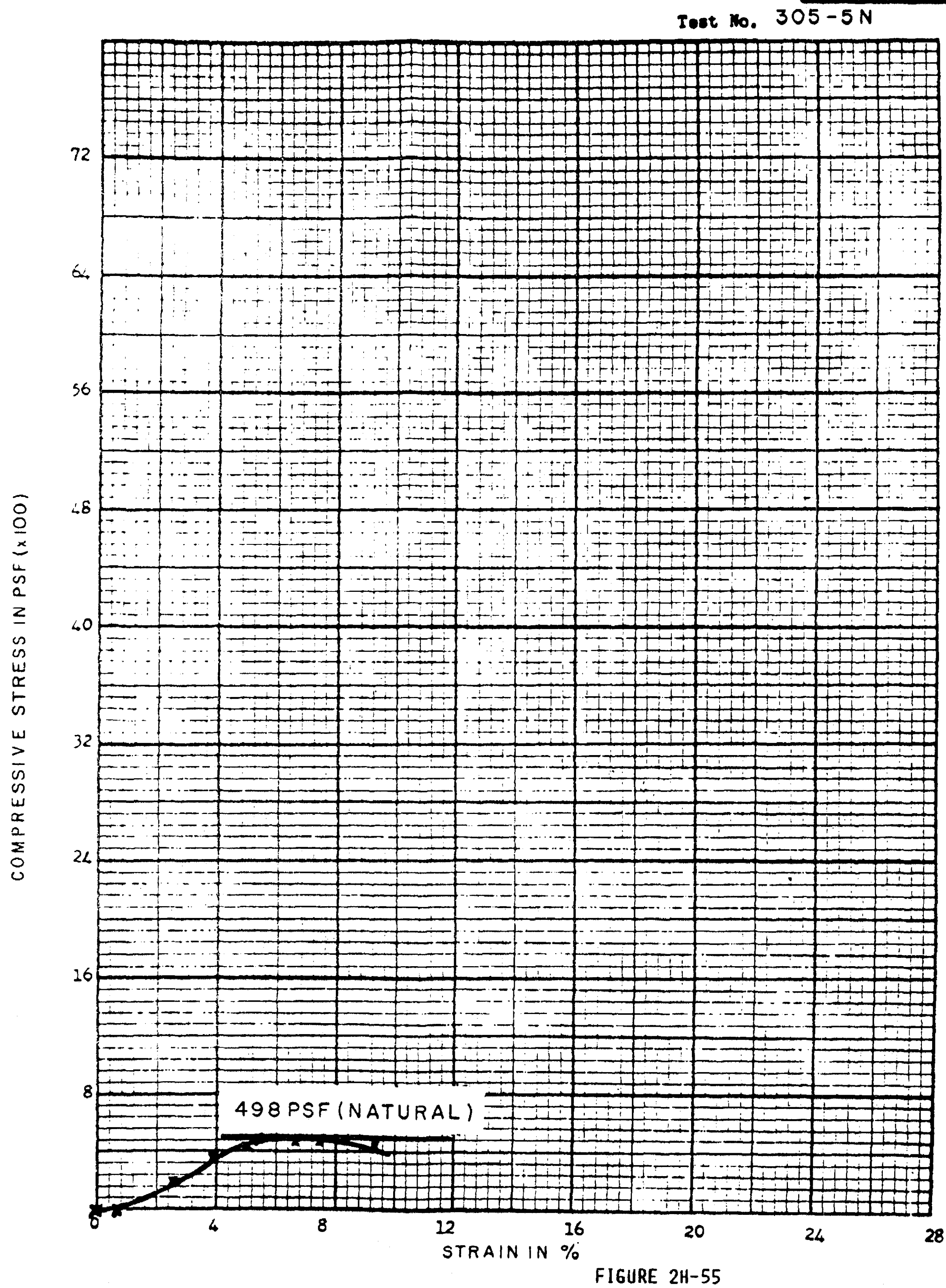


FIGURE 2H-55
COMPRESSIVE STRESS VS STRAIN
TEST NO. 305 - 5N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN SILTY SAND WITH ORGANIC MATTER

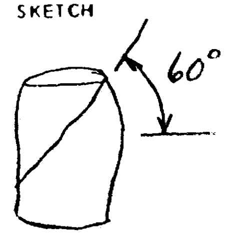
JOB SITE BEAVER VALLEY
INIT. DIA 2.8

J.O. NO 11700
BORING 306
SAMPLE ST2
DEPTH 2-4 FT.
TEST NO 306-2N

DATE 8/19/69

TEST BY MB

SKETCH



WATER CONTENT

SPECIMEN LOCATION		BOTTOM	TOP	MIDDLE
CONTAINER NO		67	36	24
WT CONTAINER + WET SOIL	(G)	187.40	165.70	172.20
WT CONTAINER + DRY SOIL	(G)	119.30	112.70	111.60
WT WATER	(G)	68.10	53.00	60.60
WT CONTAINER	(G)	17.60	16.70	16.70
WT DRY SOIL	(G)	101.70	96.00	94.90
WATER CONTENT	PERCENT	66.96	55.21	63.86

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
3.00						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.100	0.357	0.0
	0.040	0.0	0.04307	0.300	0.714	0.0
	0.060	1.250	0.04322	0.400	1.071	28.917
	0.080	3.906	0.04338	0.500	1.429	90.040
	0.100	9.218	0.04354	0.700	1.786	211.724
	0.120	11.874	0.04370	0.800	2.143	271.738
	0.140	11.874	0.04386	0.800	2.500	270.746
	0.160	14.530	0.04402	0.900	2.857	330.094
	0.180	17.186	0.04418	1.000	3.214	388.998
	0.200	17.186	0.04434	1.000	3.571	387.563
	0.220	19.842	0.04451	1.100	3.929	445.801
	0.240	19.842	0.04468	1.100	4.286	444.144
	0.260	19.842	0.04484	1.100	4.643	442.486
	0.280	19.842	0.04501	1.100	5.000	440.829

RATE OF STRAIN IS 1.667(PERCENT/MIN)

MAX COMP STRESS 445.801

FIGURE 2H-56
UNCONFINED COMPRESSION TEST
BORING 306 - TEST NO 306 - 2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

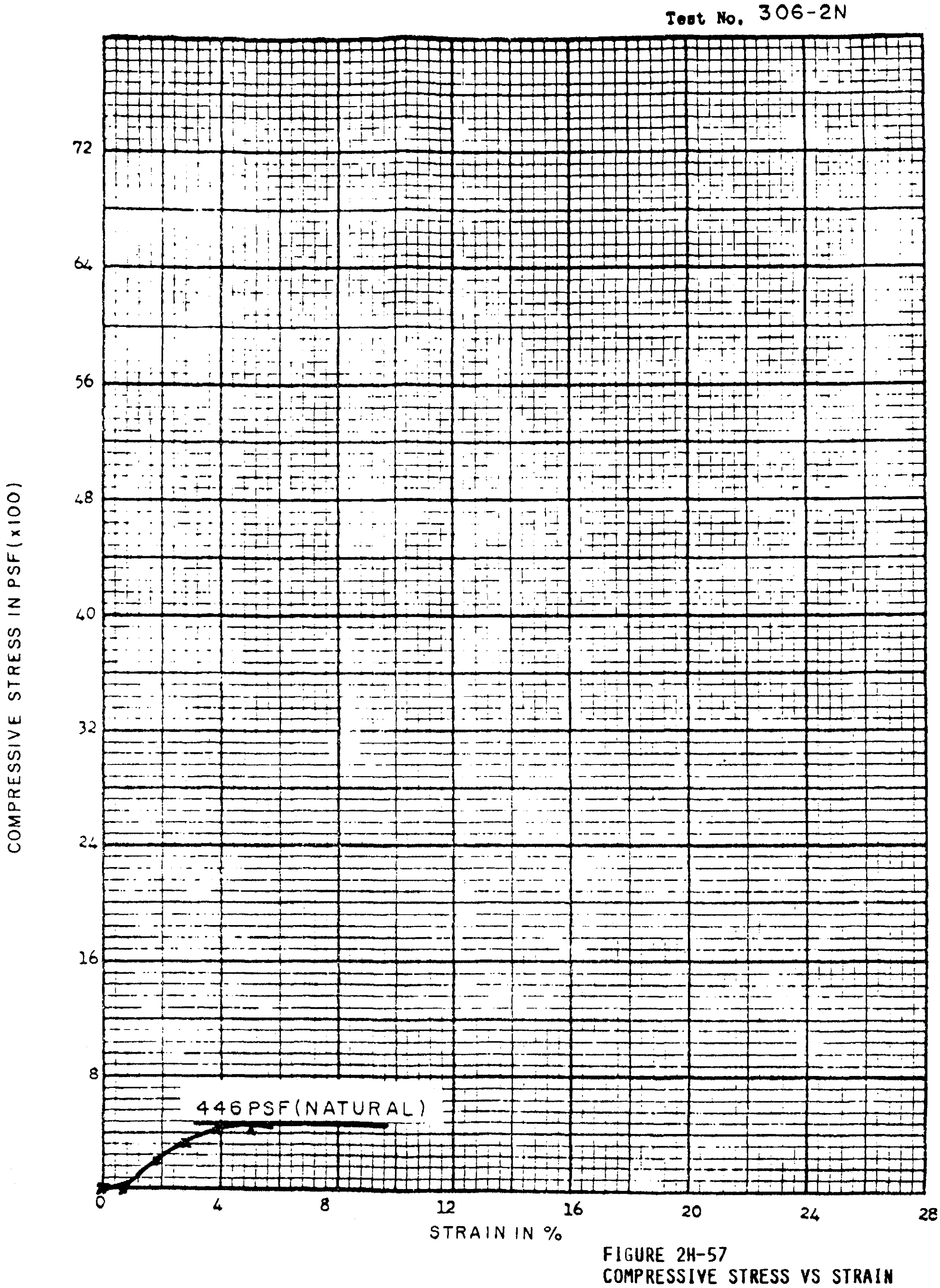


FIGURE 2H-57
COMPRESSIVE STRESS VS STRAIN
TEST NO. 306 - 2N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION BROWN CLAYEY SILT WITH FINE SAND

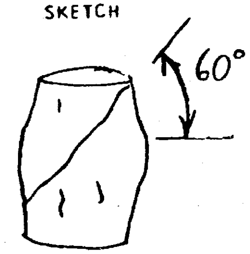
JOB SITE BEAVER VALLEY
INIT. DIA 2.8

J.O. NO 11700
BORING 307
SAMPLE ST3
DEPTH 4-6 FT.
TEST NO 307-3N

DATE 8/19/69

TEST BY MB

SKETCH



WATER CONTENT

SPECIMEN LOCATION	BOTTOM	TOP	MIDDLE
CONTAINER NO	33	39	58
WT CONTAINER + WET SOIL (G)	149.60	129.90	146.60
WT CONTAINER + DRY SOIL (G)	91.50	80.20	88.40
WT WATER (G)	58.10	49.70	58.20
WT CONTAINER (G)	16.00	16.40	16.60
WT DRY SOIL (G)	75.50	63.80	71.80
WATER CONTENT PERCENT	76.95	77.90	81.06

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
1.6C						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.200	0.357	0.C
	C.040	1.250	0.04307	0.400	0.714	29.022
	0.060	14.530	0.04322	0.900	1.071	336.162
	0.080	25.154	0.04338	1.300	1.429	579.856
	C.100	33.122	0.04354	1.600	1.786	760.771
	0.120	38.434	0.04370	1.800	2.143	879.571

RATE OF STRAIN IS 1.339(PERCENT/MIN)

MAX COMP STRESS 879.571

FIGURE 2H-58
UNCONFINED COMPRESSION TEST
BORING 307 - TEST NO. 307 - 3N

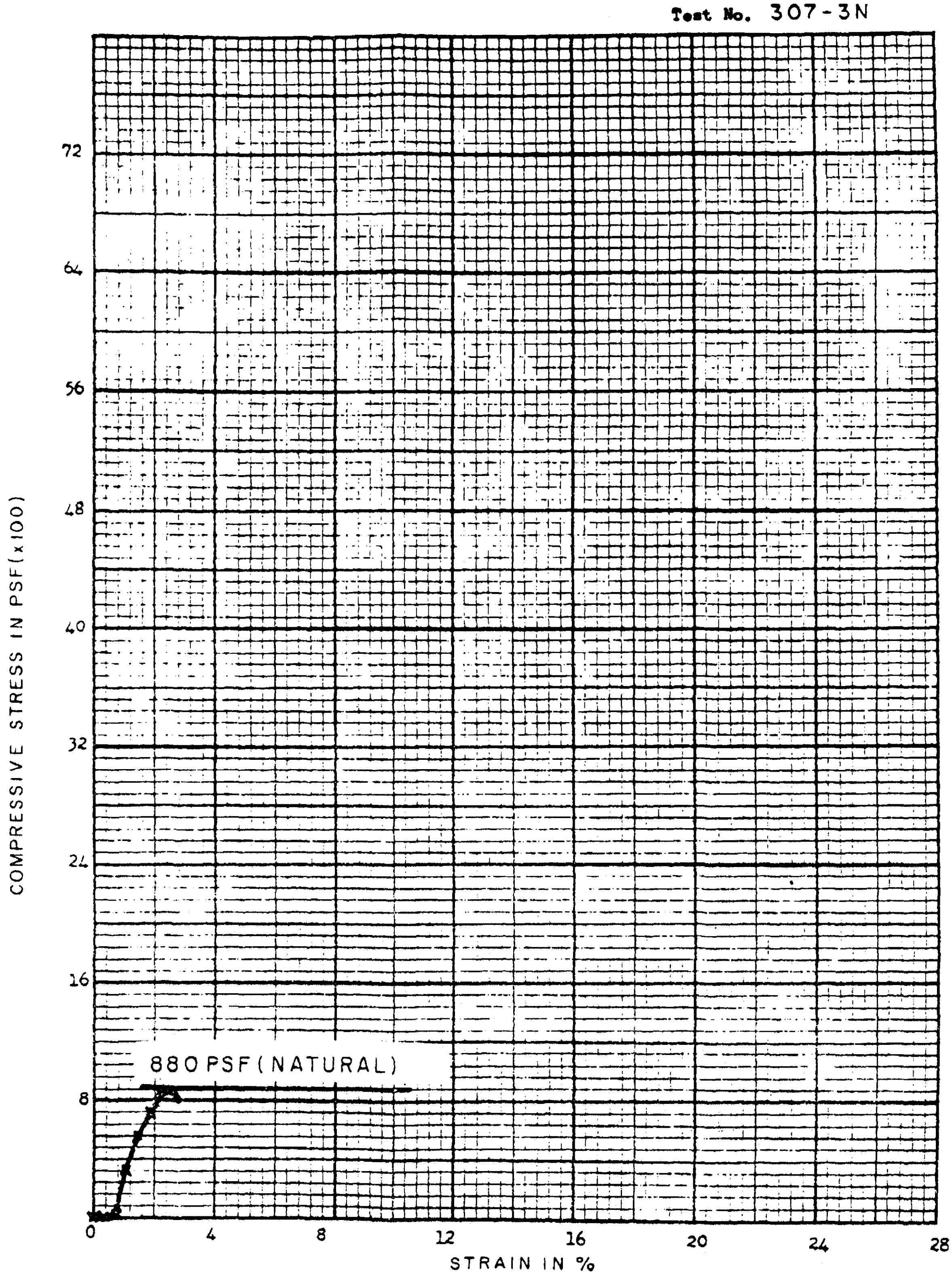


FIGURE 2H-59
COMPRESSIVE STRESS VS STRAIN
TEST NO. 307 - 3N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

CLIENT DUQUESNE
INIT. LTH 5.6
VISUAL CLASSIFICATION DARK ORGANIC SILTY SAND

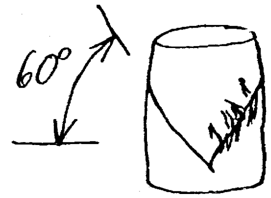
JOB SITE BEAVER VALLEY
INIT. DIA 2.8

J.O. NO 11700
BORING 307
SAMPLE ST7
DEPTH 12-14 FT.
TEST NO 307-7N

DATE 8/19/69

TEST BY MB

SKETCH



WATER CONTENT

		MIDDLE	TOP
SPECIMEN LOCATION		MIDDLE	TOP
CONTAINER NO		52	48
WT CONTAINER + WET SOIL	(G)	188.70	271.70
WT CONTAINER + DRY SOIL	(G)	158.60	188.10
WT WATER	(G)	30.10	83.60
WT CONTAINER	(G)	17.70	32.70
WT DRY SOIL	(G)	140.90	155.40
WATER CONTENT	PERCENT	21.36	53.80

ELAPSED TIME (MINS)	VERT DIAL (IN)	AXIAL LOAD (LBS)	CORRECTED AREA (FT**2)	GAGE READING (PSI)	STRAIN (PERCENT)	COMP. STRESS (LBS/FT**2)
2.30						
	0.0	0.0	0.04276	0.0	0.0	0.0
	0.020	0.0	0.04291	0.100	0.357	0.0
	0.040	0.0	0.04307	0.200	0.714	0.0
	0.060	0.0	0.04322	0.300	1.071	0.0
	0.080	0.0	0.04338	0.300	1.429	0.0
	0.100	1.250	0.04354	0.400	1.786	28.708
	0.120	1.250	0.04370	0.400	2.143	28.604
	0.140	3.906	0.04386	0.500	2.500	89.061
	0.160	3.906	0.04402	0.500	2.857	88.735
	0.180	6.562	0.04418	0.600	3.214	148.527
	0.200	9.218	0.04434	0.700	3.571	207.875
	0.220	11.874	0.04451	0.800	3.929	266.779
	0.240	11.874	0.04468	0.800	4.286	265.787
	0.260	14.530	0.04484	0.900	4.643	324.026
	0.280	14.530	0.04501	0.900	5.000	322.812

RATE OF STRAIN IS 2.174 (PERCENT/MIN)

MAX COMP STRESS 324.026

FIGURE 2H-60
UNCONFINED COMPRESSION TEST
BORING 307 - TEST NO. 307 - 7N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

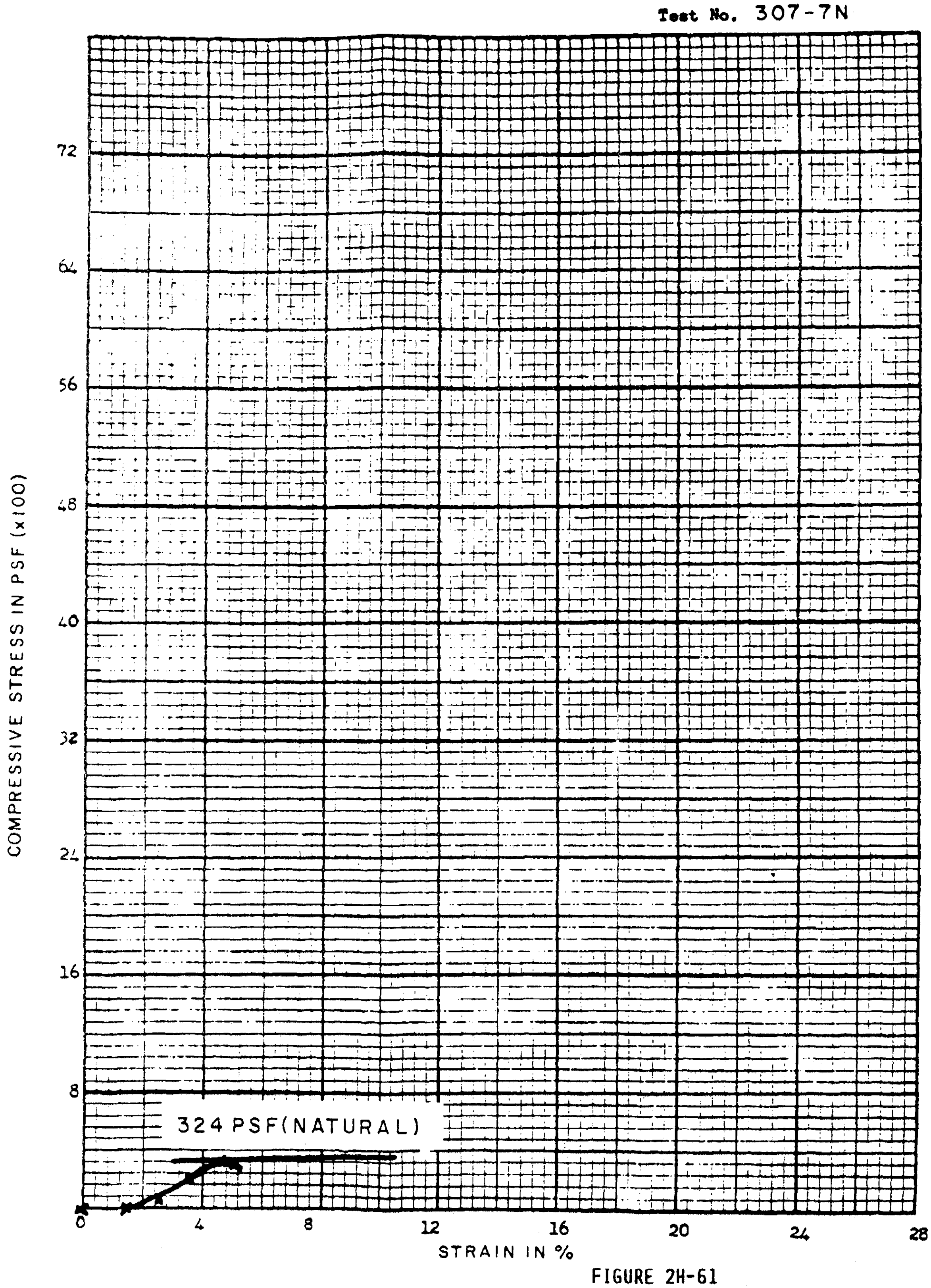
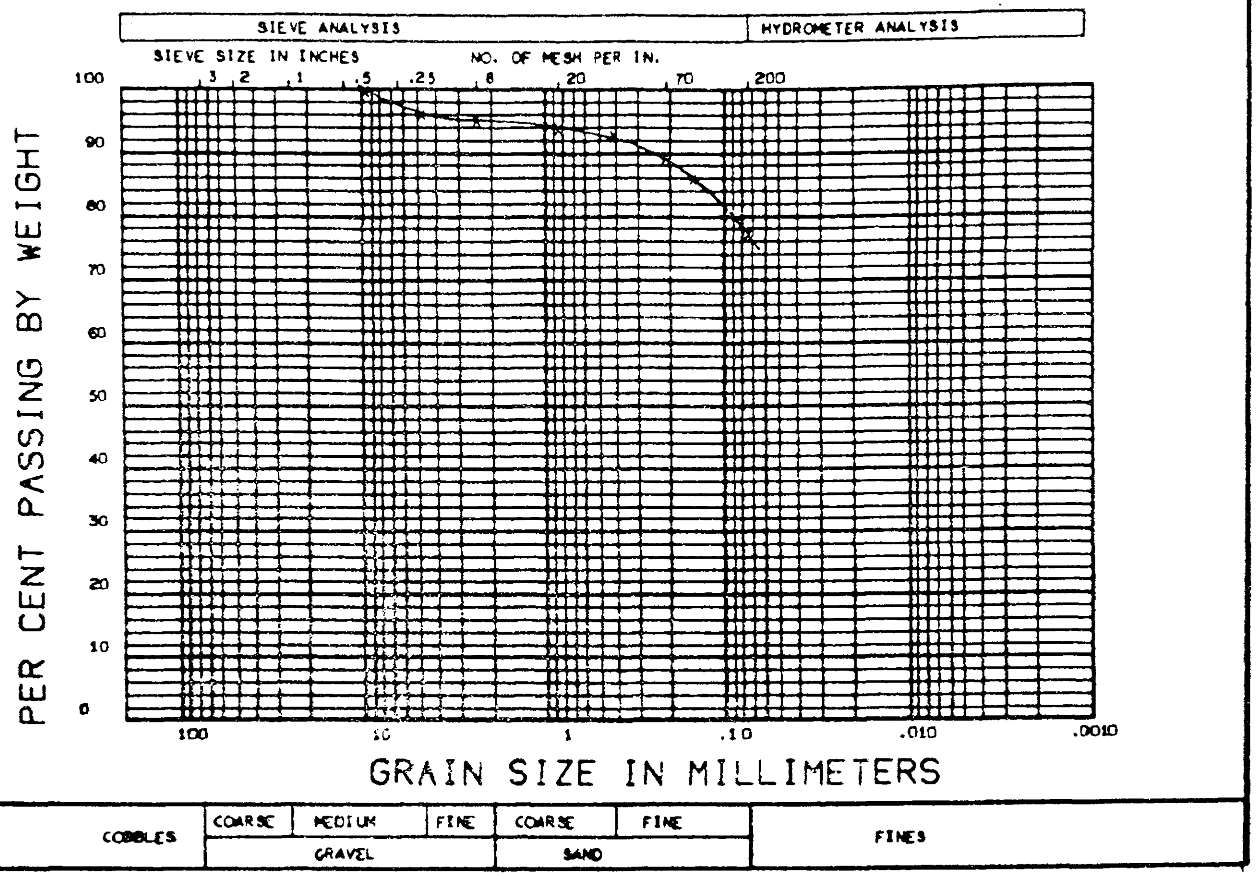


FIGURE 2H-61
COMPRESSIVE STRESS VS STRAIN
TEST NO. 307 - 7N
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 301-2 DATE 8/15/80

LOCATION BEAVER VALLEY DEPTH 9-11 FT.

TYPE MATERIAL BROWN SILTY CLAY;MEDUIM SAND AND GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN. DRILLING TESTED BY MB,KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 77.2

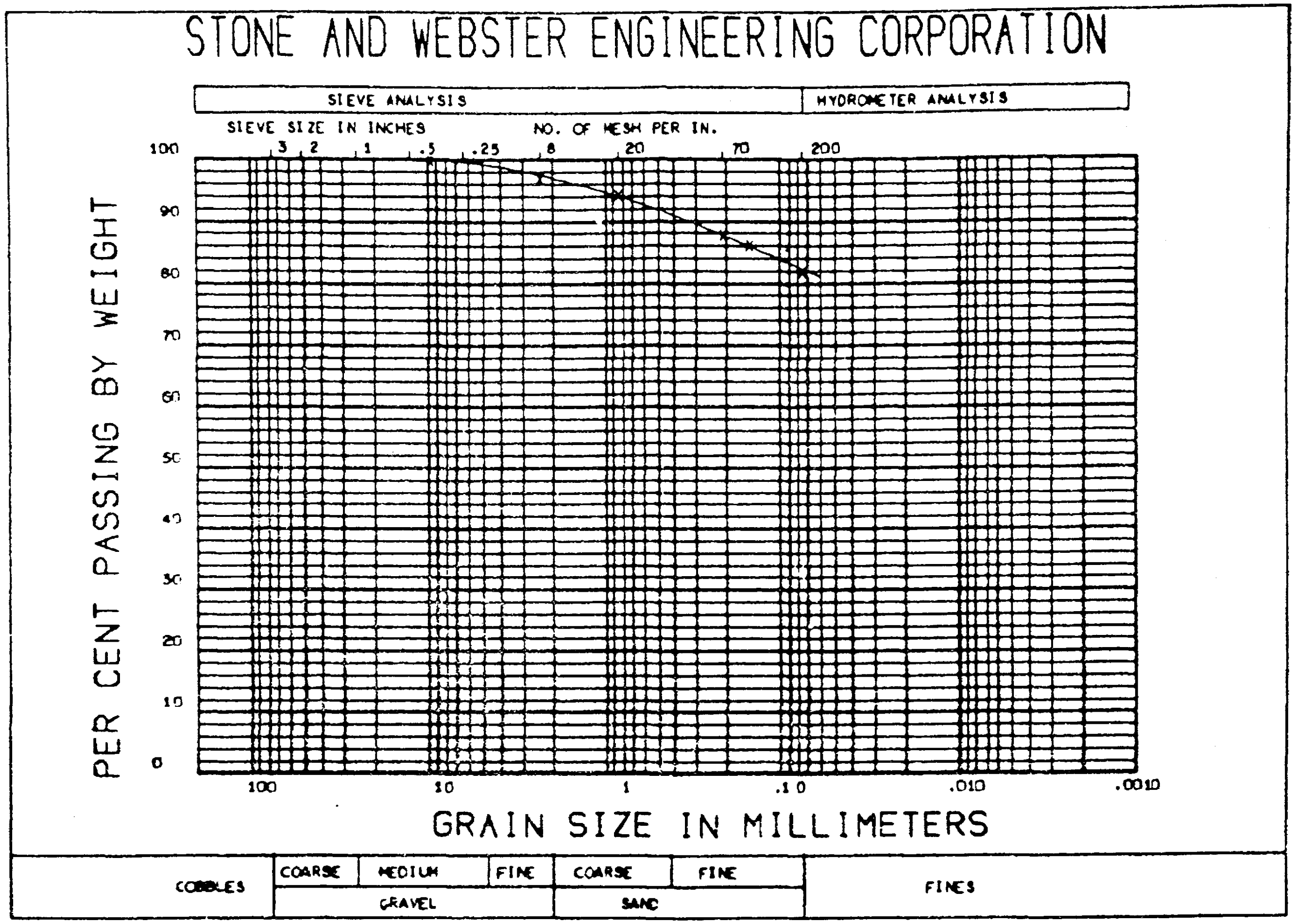
WT. OF ORIG SAMPLE 451.7 WT. AFTER PREWASHING 97.8
WASHING LOSS 353.9

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.375	9.520	0.0	460.6	100.0
4	4.699	17.6	443.0	96.2
8	2.362	3.6	439.4	95.4
20	0.833	6.3	433.1	94.0
40	0.417	6.1	427.0	92.7
70	0.208	15.2	411.8	89.4
100	0.147	15.1	396.7	86.1
200	0.074	41.1	355.6	77.2

WT. RETAINED ON PAN	1.7
WASHING LOSS	353.9
PAN TOTAL	355.6
TOTAL	460.6

FIGURE 2H-62
GRAIN SIZE - TEST NO. 301 - 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)



TEST NO. 301-5 DATE 8/15/69

LOCATION BEAVER VALLEY DEPTH 15-17 FT.

TYPE MATERIAL GRAY CLAYEY ORGANIC SILT, TRACE OF SAND

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN. DRILLING TESTED BY HB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 82.0

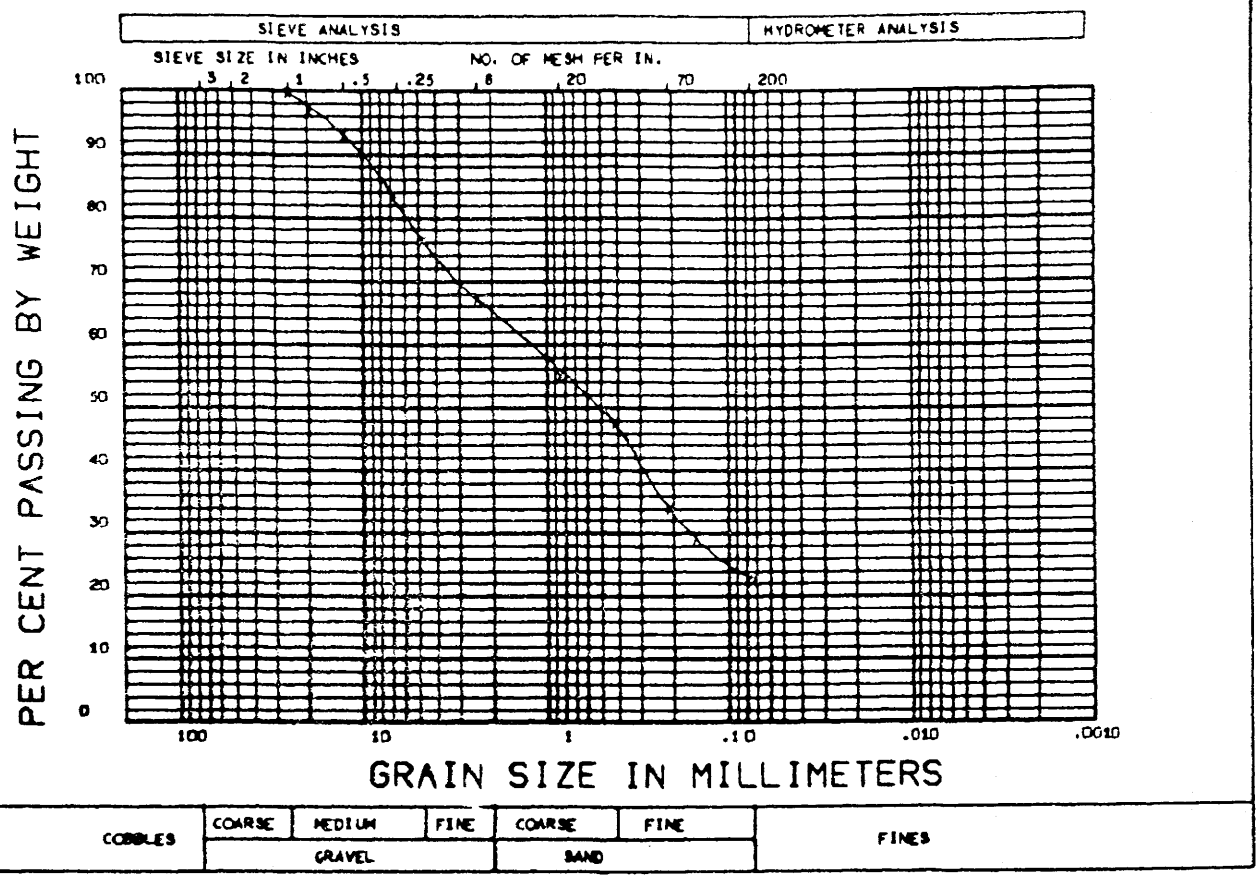
WT. OF ORIG SAMPLE 426.8 WT. AFTER PREWASHING 77.0
WASHING LOSS 349.8

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.375	9.520	0.0	427.2	100.0
8	2.362	12.6	414.6	97.1
20	0.833	11.8	402.8	94.3
70	0.208	27.6	375.2	87.8
100	0.147	6.6	368.6	86.3
200	0.074	18.2	350.4	82.0

WT. RETAINED ON PAN 0.6
WASHING LOSS 349.8
PAN TOTAL 350.4
TOTAL 427.2

FIGURE 2H-63
GRAIN SIZE - TEST NO. 301 - 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 302-3 DATE 8/18/80

LOCATION BEAVER VALLEY DEPTH 15-17 FT.

TYPE MATERIAL BROWN SILTY SAND AND GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB,KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 22.7

WT. OF ORIG SAMPLE 558.3 WT. AFTER PREWASHING 435.1
WASHING LOSS 123.2

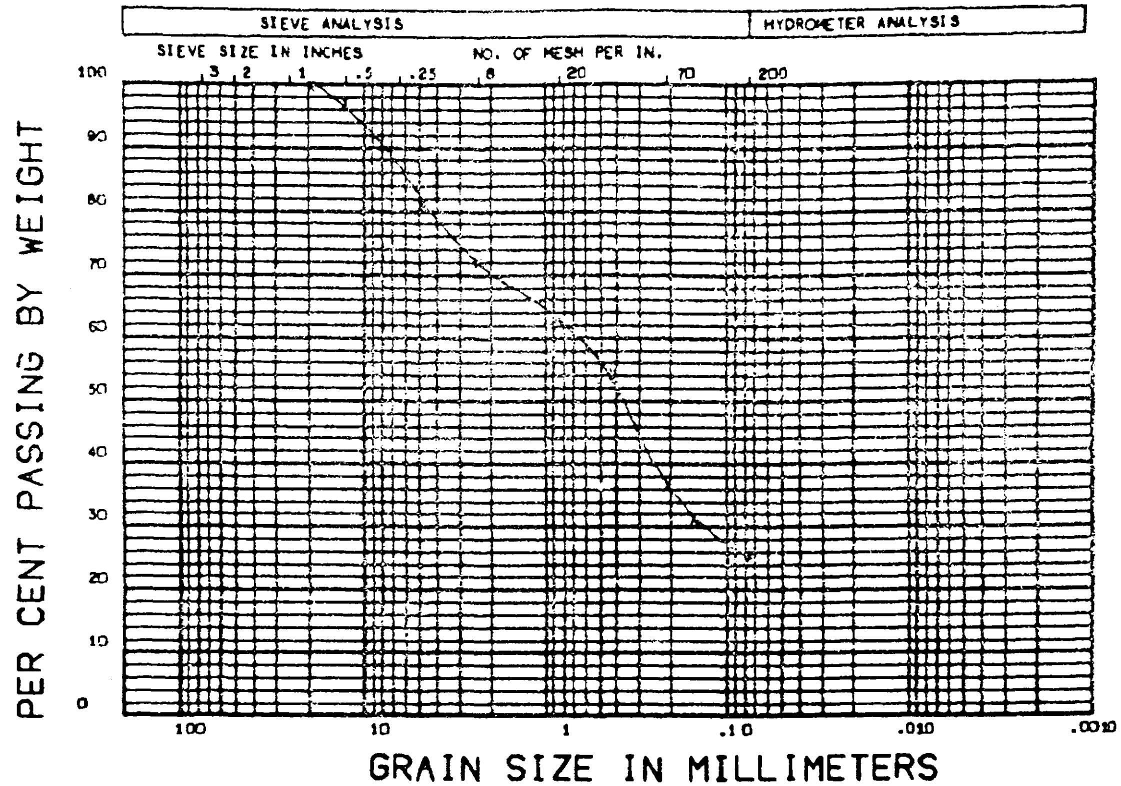
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.	25.400	0.0	557.5	100.0
.75	19.100	18.0	539.5	96.8
.5	12.700	21.3	518.2	93.0
4	4.699	92.4	425.8	76.4
8	2.362	49.8	376.0	67.4
20	0.833	68.9	307.1	55.1
40	0.417	40.7	266.4	47.8
70	0.208	76.1	190.3	34.1
100	0.147	26.1	164.2	29.5
200	0.074	37.8	126.4	22.7

WT. RETAINED ON PAN 3.2
WASHING LOSS 123.2
PAN TOTAL 126.4
TOTAL 557.5

FIGURE 2H-64
GRAIN SIZE - TEST NO. 302 - 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	COARSE	MEDIUM	FINE	COARSE	FINE	FINES
	GRAVEL			SAND		

TEST NO. 302-4 DATE 9/2/89

LOCATION BEAVER VALLEY DEPTH 17-19 FT

TYPE MATERIAL BROWN SAND AND GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, RLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 25.6

WT. OF ORIG SAMPLE 782.8 WT. AFTER PREWASHING 584.4

WASHING LOSS 198.4

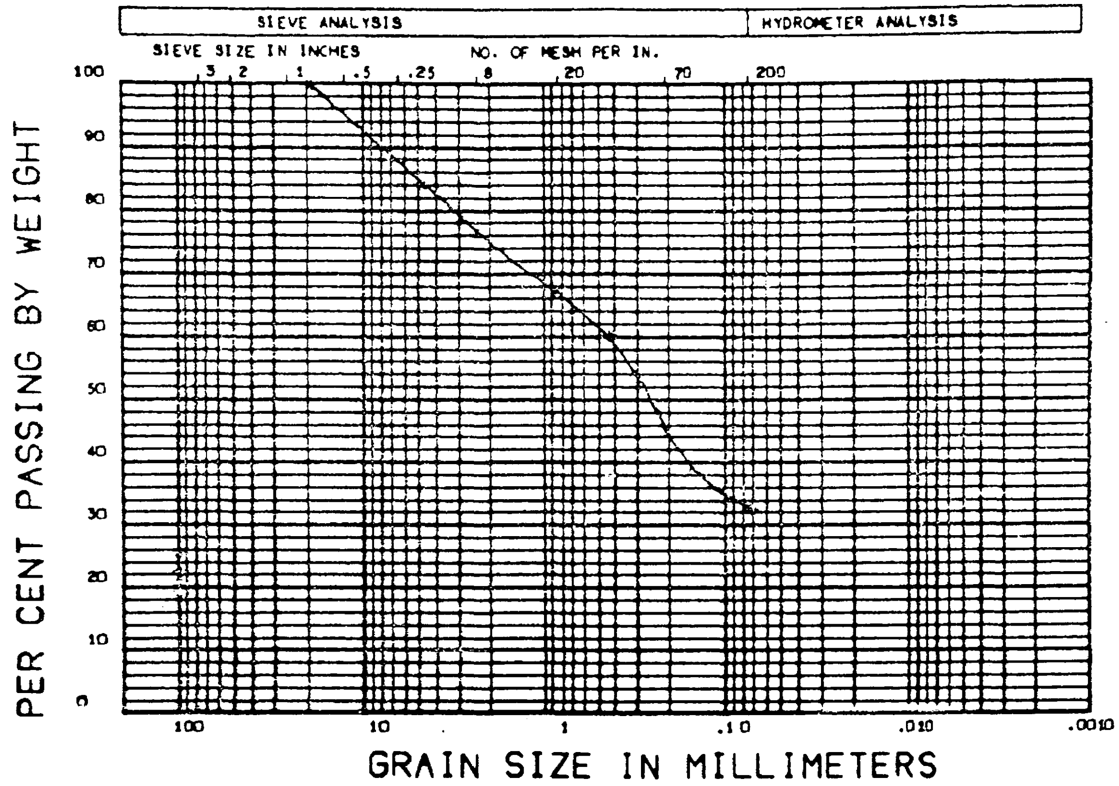
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.75	19.100	0.0	783.0	100.0
.5	12.700	20.9	762.1	97.3
4	4.699	127.1	635.0	81.1
8	2.362	69.3	565.7	72.2
20	0.833	77.1	488.6	62.4
40	0.417	62.2	426.4	54.5
70	0.208	138.3	288.1	36.8
100	0.147	42.2	245.9	31.4
200	0.074	45.1	200.8	25.6

WT. RETAINED ON PAN	2.4
WASHING LOSS	198.4
PAN TOTAL	200.8
TOTAL	783.0

FIGURE 2H-65
GRAIN SIZE - TEST NO. 302 - 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	GRAVEL			SAND		FINES
	COARSE	MEDIUM	FINE	COARSE	FINE	

TEST NO. 302-5 DATE 8/18/80

LOCATION BEAVER VALLEY DEPTH 19-21 FT.

TYPE MATERIAL BROWN SILTY SAND AND GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 32.8

WT. OF ORIG SAMPLE 516.3 WT. AFTER PREWASHING 343.8
WASHING LOSS 172.5

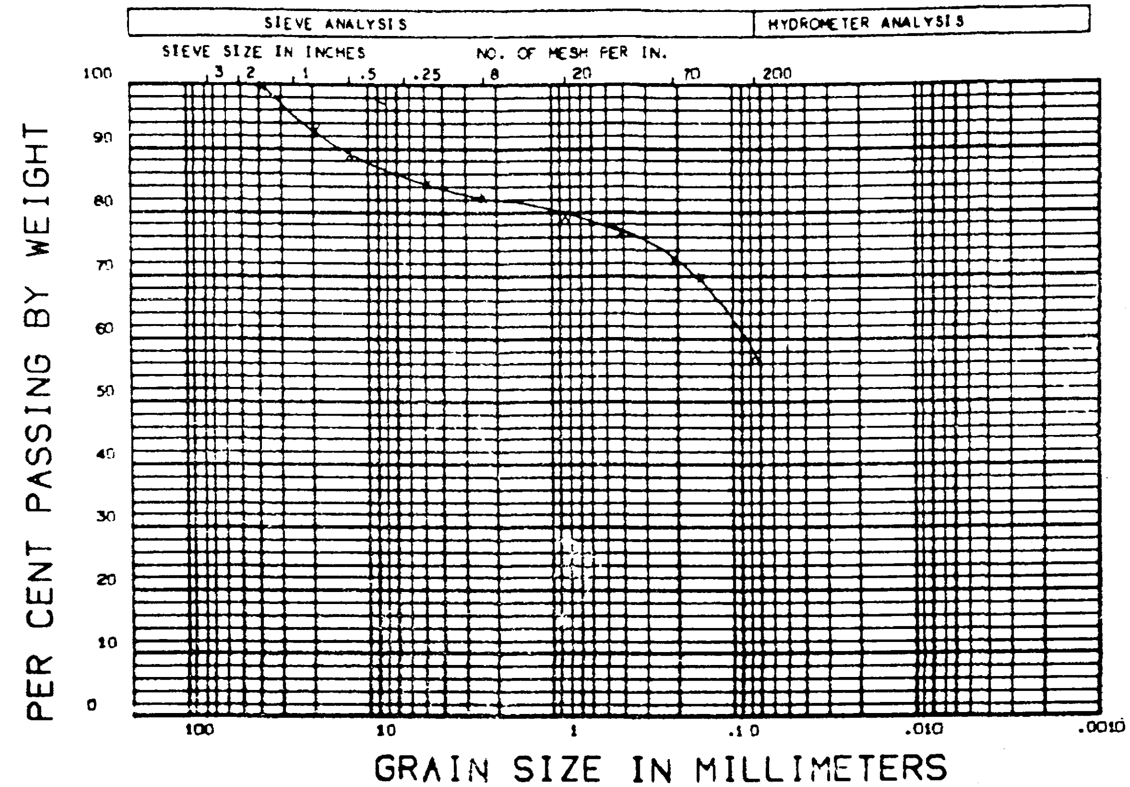
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
.75	19.100	0.0	532.6	100.0
4	4.699	83.6	449.0	84.3
8	2.362	40.8	408.2	76.6
20	0.833	48.7	359.5	67.5
40	0.417	38.3	321.2	60.3
70	0.208	82.1	239.1	44.9
100	0.147	28.4	210.7	39.6
200	0.074	36.2	174.5	32.8

WT. RETAINED ON PAN 2.0
WASHING LOSS 172.5
PAN TOTAL 174.5
TOTAL 532.6

FIGURE 2H-66
GRAIN SIZE - TEST NO. 302 - 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	COARSE	MEDIUM	FINE	COARSE	FINE	FINES
	GRAVEL			SAND		

TEST NO. 303-4 DATE 8/18/69

LOCATION BEAVER VALLEY DEPTH 6-8 FT.

TYPE MATERIAL BROWN SILTY SAND AND MEDIUM GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 57.6

WT. OF ORIG SAMPLE 532.0 WT. AFTER PREWASHING 232.4
WASHING LOSS 299.6

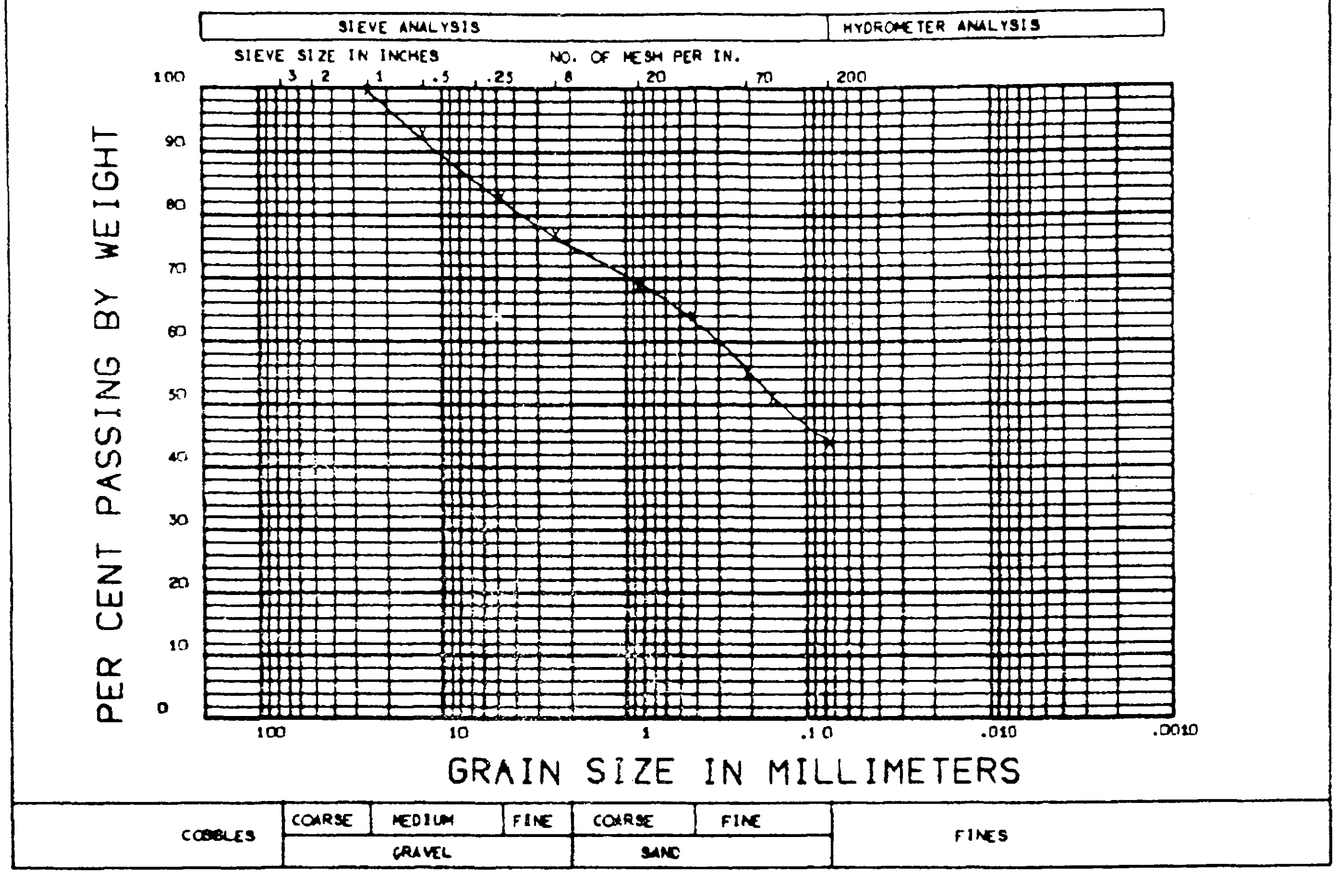
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	38.100	0.0	531.0	100.0
.75	19.100	37.0	494.0	93.0
.5	12.700	20.0	474.0	89.3
4	4.699	24.3	449.7	84.7
8	2.362	12.1	437.6	82.4
20	0.833	15.6	422.0	79.5
40	0.417	13.6	408.4	76.9
70	0.208	23.0	385.4	72.6
100	0.147	13.8	371.6	70.0
200	0.074	65.9	305.7	57.6

WT. RETAINED ON PAN 6.1
WASHING LOSS 299.6
PAN TOTAL 305.7
TOTAL 531.0

FIGURE 2H-67
GRAIN SIZE - TEST NO. 303 - 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 303-5 DATE 8/18/80

LOCATION BEAVER VALLEY DEPTH 8-10 FT.

TYPE MATERIAL BROWN SILTY SAND WITH GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY NB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 44.0

WT. OF ORIG SAMPLE 597.8 WT. AFTER PREWASHING 338.8
WASHING LOSS 259.0

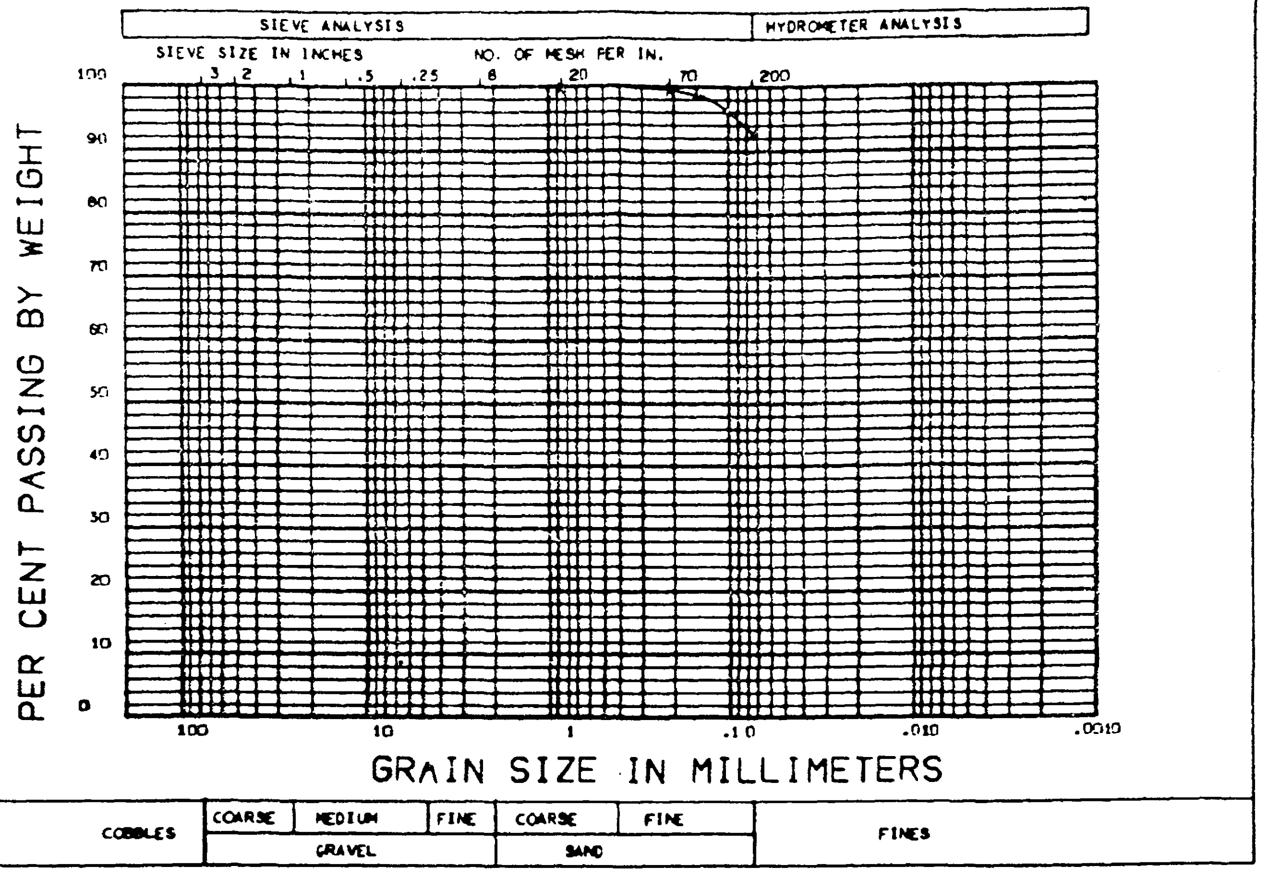
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.	25.400	0.0	596.9	100.0
.5	12.700	42.1	554.8	92.9
4	4.699	59.9	494.9	82.9
8	2.362	34.6	460.3	77.1
20	0.833	48.3	412.0	69.0
40	0.417	28.6	383.4	64.2
70	0.208	55.2	328.2	55.0
100	0.147	21.2	307.0	51.4
200	0.074	44.4	262.6	44.0

WT. RETAINED ON PAN 3.6
WASHING LOSS 259.0
PAN TOTAL 262.6
TOTAL 596.9

FIGURE 2H-68
GRAIN SIZE - TEST NO. 303 - 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 303-12 DATE 8/18/69

LOCATION BEAVER VALLEY DEPTH 22-24 FT.

TYPE MATERIAL BROWN SILTY CLAY

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10) = ---

PER CENT PASSING 200 SIEVE 92.7

WT. OF ORIG SAMPLE 540.5 WT. AFTER PREWASHING 45.3
WASHING LOSS 495.2

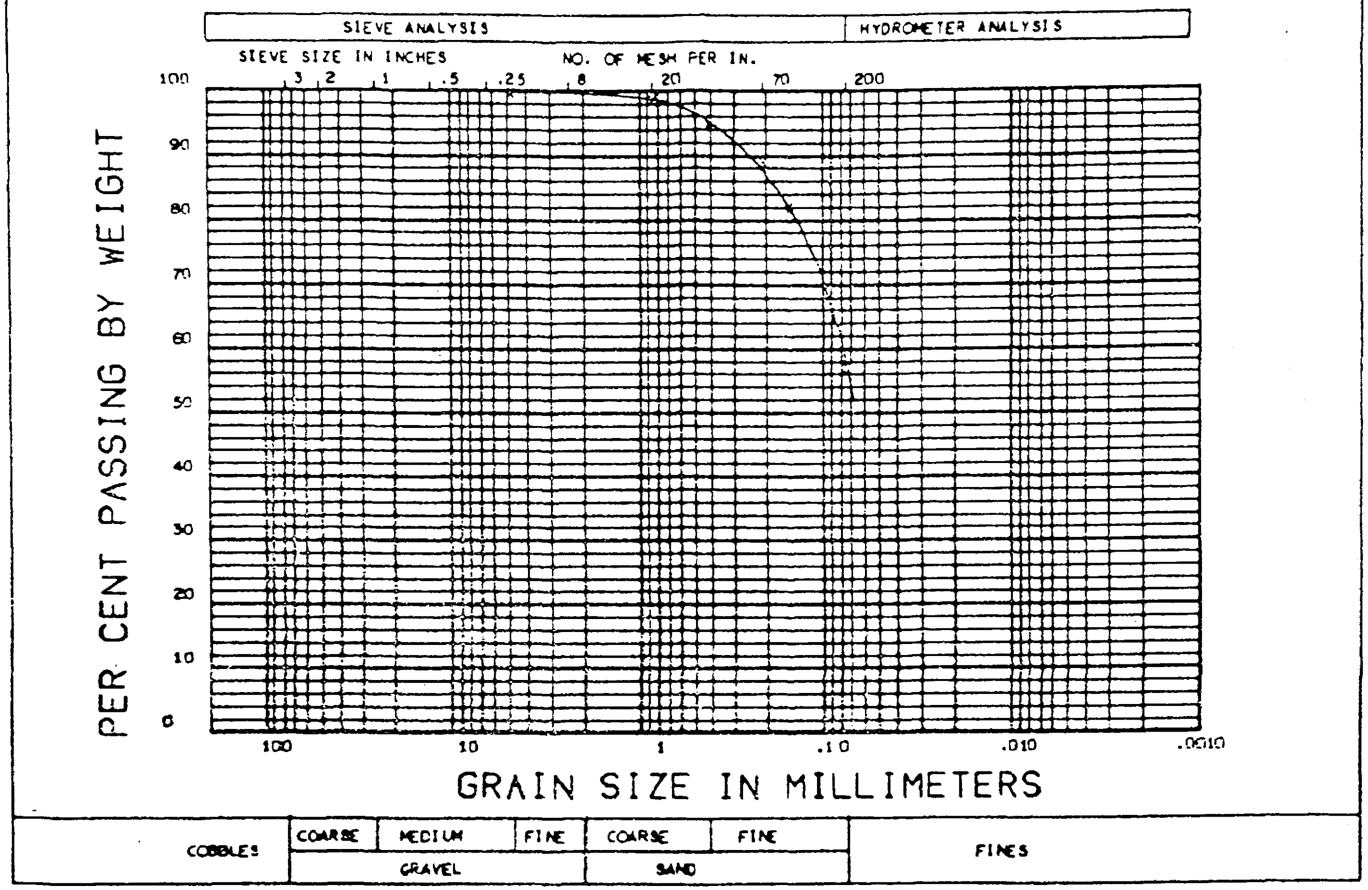
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
20	0.833	0.0	537.9	100.0
70	0.208	1.8	536.1	99.7
100	0.147	1.1	535.0	99.5
200	0.074	36.2	498.8	92.7

WT. RETAINED ON PAN	3.6
WASHING LOSS	495.2
PAN TOTAL	498.8
TOTAL	537.9

FIGURE 2H-69
GRAIN SIZE - TEST NO. 303 - 12
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 304-2 DATE 8/18/69

LOCATION BEAVER VALLEY DEPTH 2-4 FT.

TYPE MATERIAL BROWN SANDY SILT WITH ORGANIC MATERIAL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 57.1

WT. OF ORIG SAMPLE 373.4 WT. AFTER PREWASHING 164.4

WASHING LOSS 209.0

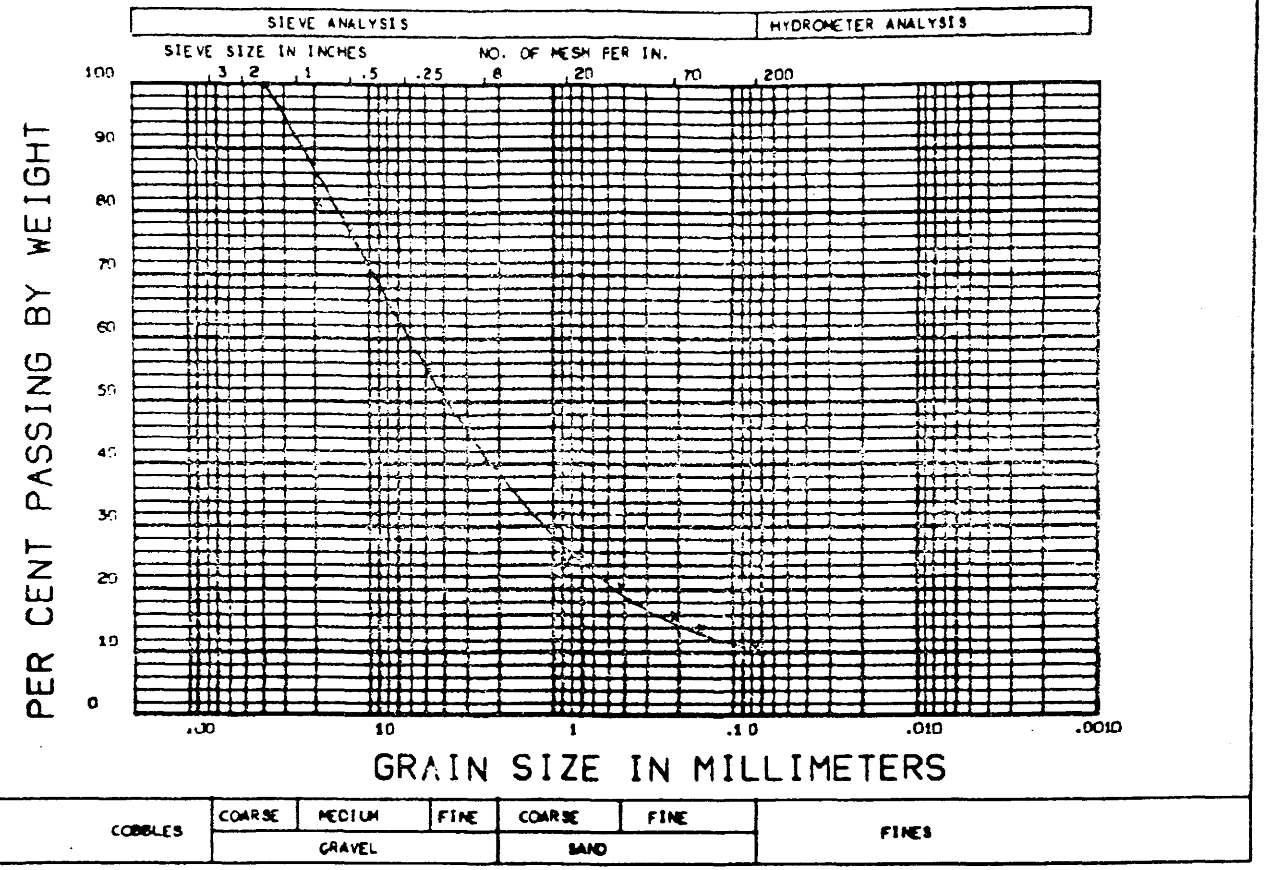
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
4	4.699	0.0	373.2	100.0
20	0.833	4.3	368.9	98.8
40	0.417	14.5	354.4	95.0
70	0.208	22.3	332.1	89.0
100	0.147	25.6	306.5	82.1
200	0.074	93.3	213.2	57.1

WT. RETAINED ON PAN	4.2
WASHING LOSS	209.0
PAN TOTAL	213.2
TOTAL	373.2

FIGURE 2H-70
GRAIN SIZE - TEST NO. 304 - 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 304-9 DATE 8/19/89

LOCATION BEAVER VALLEY DEPTH 16-18 FT.

TYPE MATERIAL BROWN SILTY SANDY GRAVEL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 10.9

WT. OF ORIG SAMPLE 722.3 WT. AFTER PREWASHING 644.9
WASHING LOSS 77.4

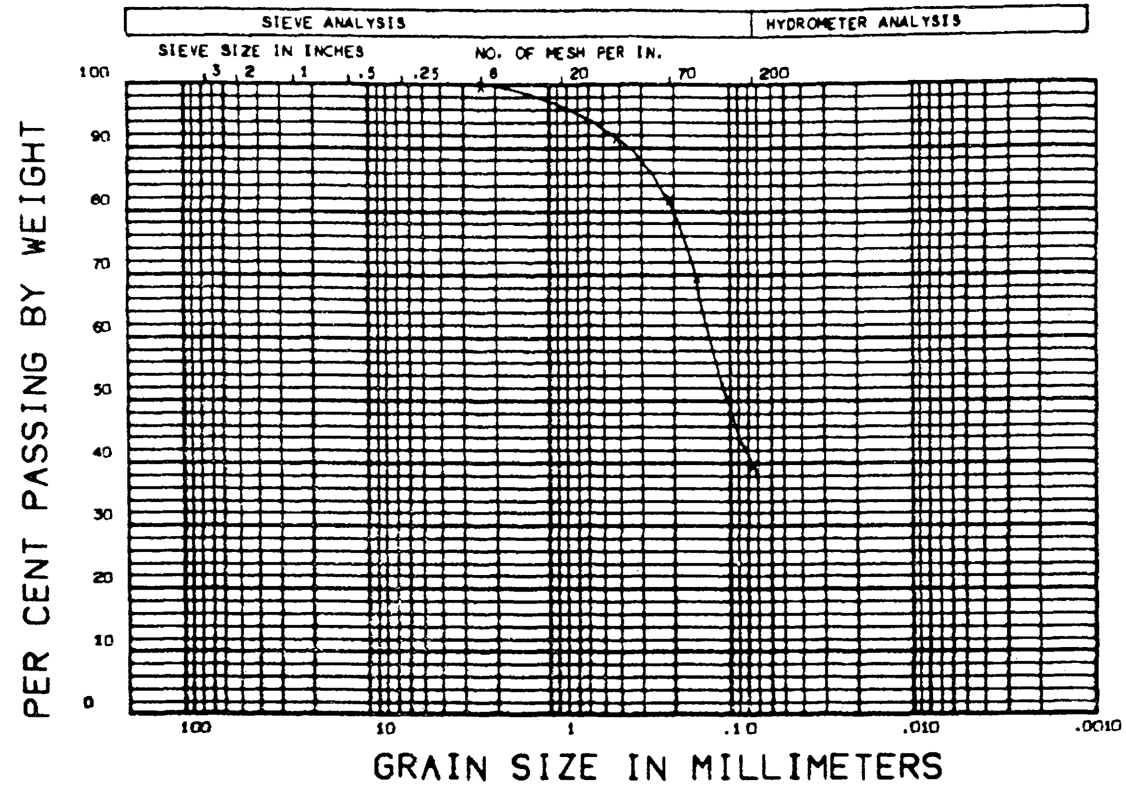
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	38.100	0.0	721.8	100.0
.75	19.100	133.6	588.2	81.5
.5	12.700	32.8	555.4	76.9
4	4.699	153.5	401.9	55.7
8	2.362	105.8	296.1	41.0
20	0.833	120.6	175.5	24.3
40	0.417	28.4	147.1	20.4
70	0.208	31.2	115.9	16.1
100	0.147	15.0	100.9	14.0
200	0.074	22.4	78.5	10.9

WT. RETAINED ON PAN 1.1
WASHING LOSS 77.4
PAN TOTAL 78.5
TOTAL 721.8

FIGURE 2H-71
GRAIN SIZE - TEST NO. 304 - 9
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	GRAVEL			SAND		FINES
	COARSE	MEDIUM	FINE	COARSE	FINE	

TEST NO. 305-2 DATE 8/19/69

LOCATION BEAVER VALLEY DEPTH 2-4 FT.

TYPE MATERIAL BROWN SILTY SAND WITH ORGANIC MATERIAL

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 39.7

WT. OF ORIG SAMPLE 266.8 WT. AFTER PREWASHING 163.8

WASHING LOSS 103.0

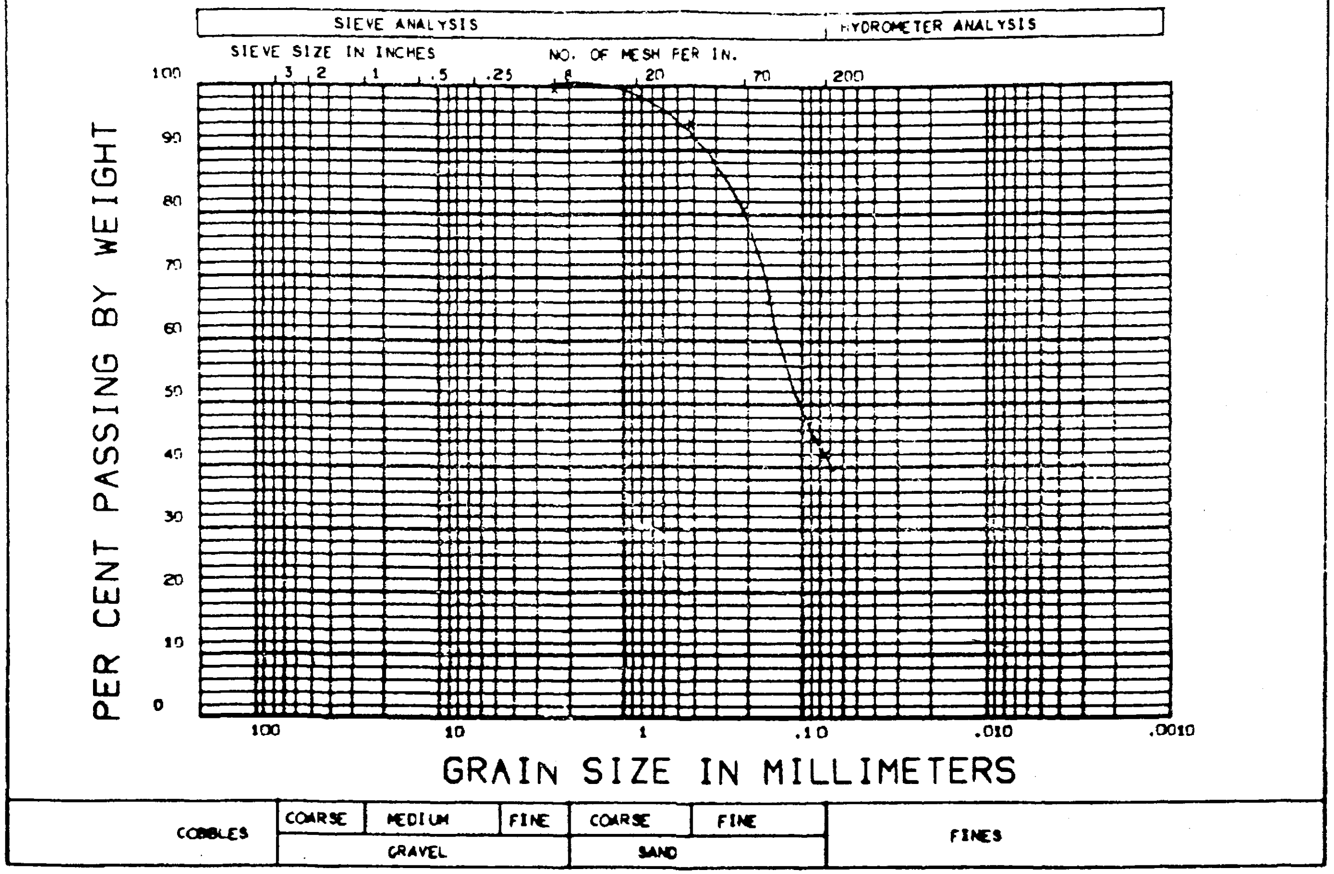
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	267.2	100.0
40	0.417	21.8	245.4	91.8
70	0.208	26.6	218.8	81.9
100	0.147	32.4	186.4	69.8
200	0.074	80.3	106.1	39.7

WT. RETAINED ON PAN	3.1
WASHING LOSS	103.0
PAN TOTAL	106.1
TOTAL	267.2

FIGURE 2H-72
GRAIN SIZE - TEST NO. 305 - 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 305-5 DATE 8/19/69

LOCATION BEAVER VALLEY DEPTH 8-10 FT.

TYPE MATERIAL ORGANIC SANDY SILT WITH TRACE OF CLAY

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB,KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 42.1

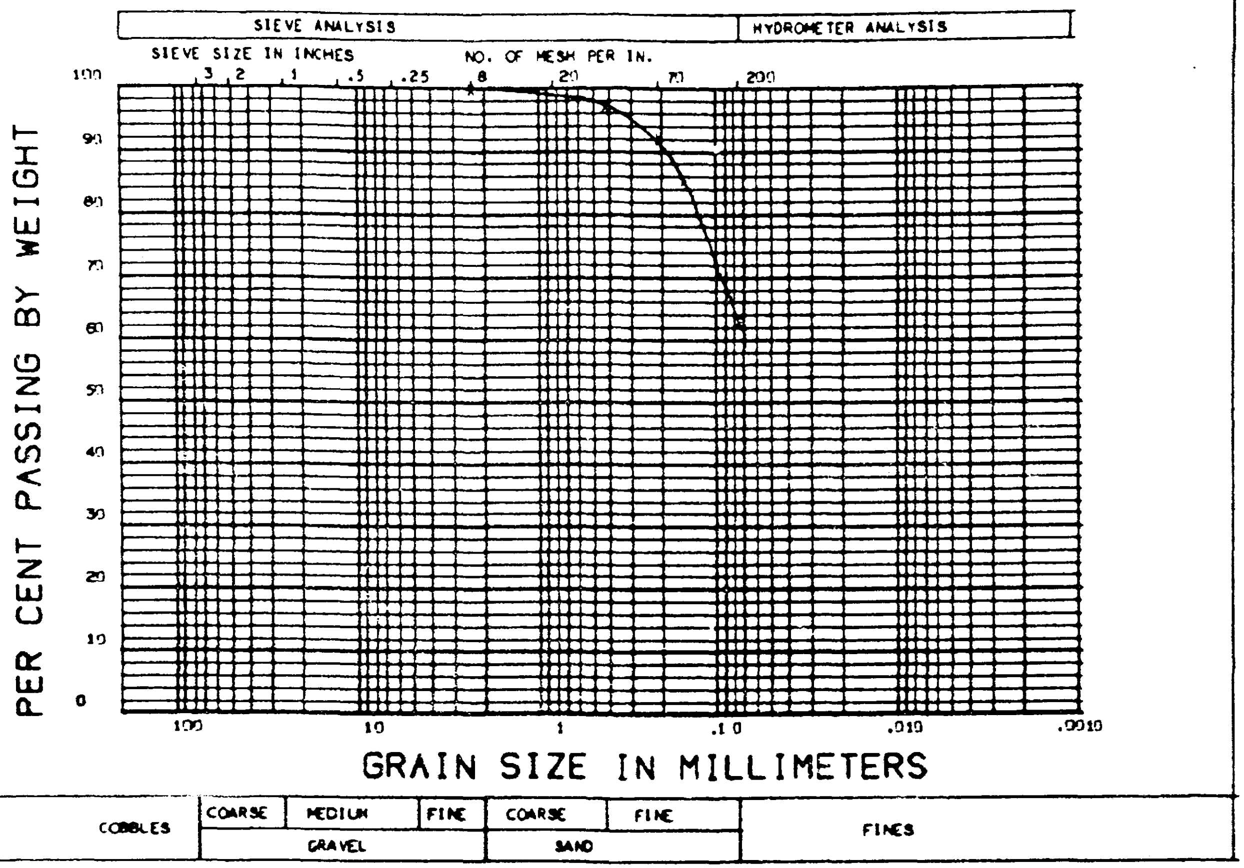
WT. OF ORIG SAMPLE 396.6 WT. AFTER PREWASHING 233.2
WASHING LOSS 163.4

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	396.6	100.0
40	0.417	23.0	373.6	94.2
70	0.208	53.3	320.3	80.8
100	0.147	55.5	264.8	66.8
200	0.074	97.9	166.9	42.1

WT. RETAINED ON PAN 3.5
WASHING LOSS 163.4
PAN TOTAL 166.9
TOTAL 396.6

FIGURE 2H-73
GRAIN SIZE - TEST NO. 305 - 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 306-2 DATE 8/28/80

LOCATION BEAVER VALLEY DEPTH 2-4 FT.

TYPE MATERIAL BROWN SILTY SAND WITH ORGANIC MATTER

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN.DRILLING TESTED BY MB, RLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 63.1

WT. OF ORIG SAMPLE 297.6 WT. AFTER PREWASHING 112.3
WASHING LOSS 185.3

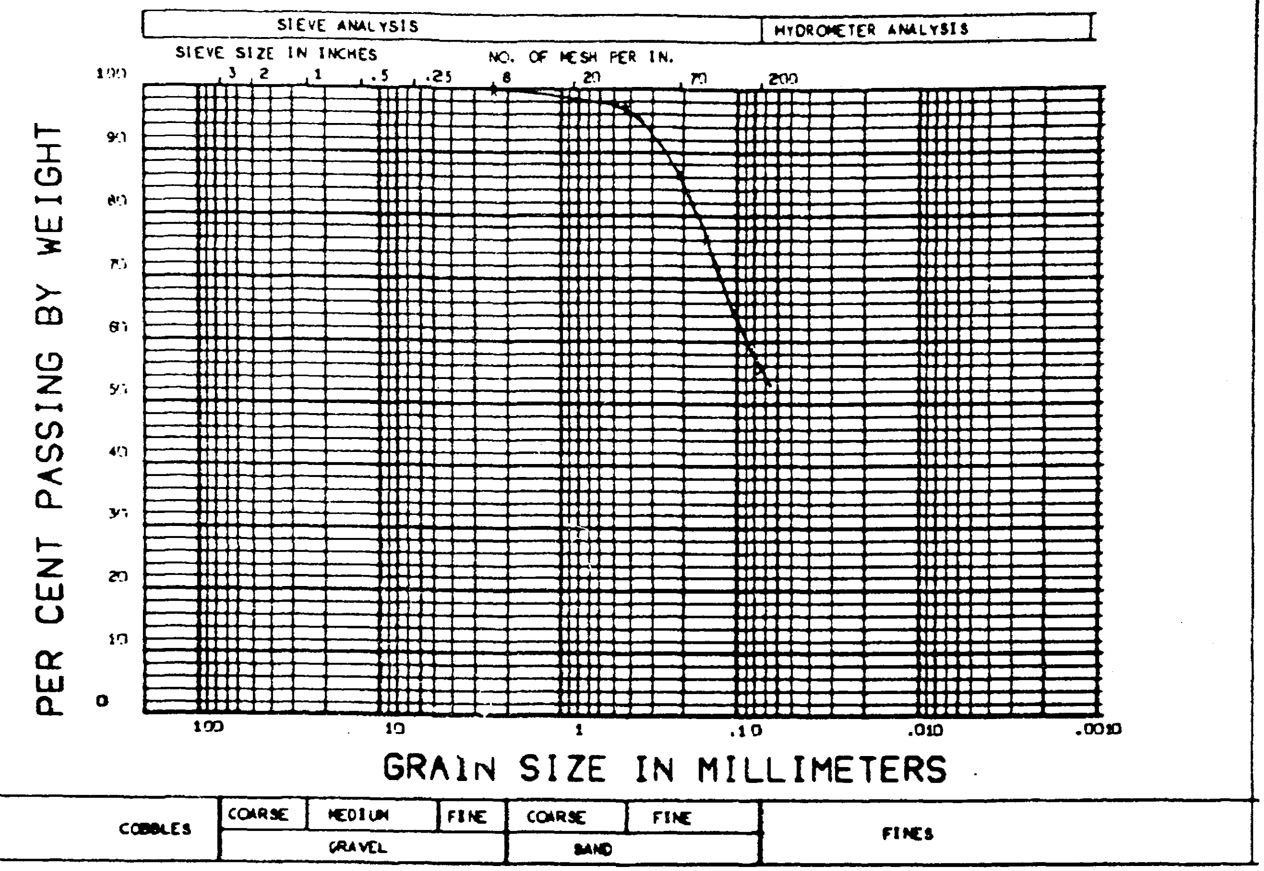
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	298.0	100.0
40	0.417	8.5	289.5	97.1
70	0.208	15.2	274.3	92.0
100	0.147	18.9	255.4	85.7
200	0.074	67.5	187.9	63.1

WT. RETAINED ON PAN	2.6
WASHING LOSS	185.3
PAN TOTAL	187.9
TOTAL	298.0

FIGURE 2H-74
GRAIN SIZE - TEST NO. 306 - 2
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 306-7 DATE 8/28/80

LOCATION BEAVER VALLEY DEPTH 12-14 FT.

TYPE MATERIAL BLACK ORGANIC SILTY SAND

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN.DRILLING TESTED BY MG, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 55.7

WT. OF ORIG SAMPLE 328.1 WT. AFTER PREWASHING 150.2
WASHING LOSS 177.8

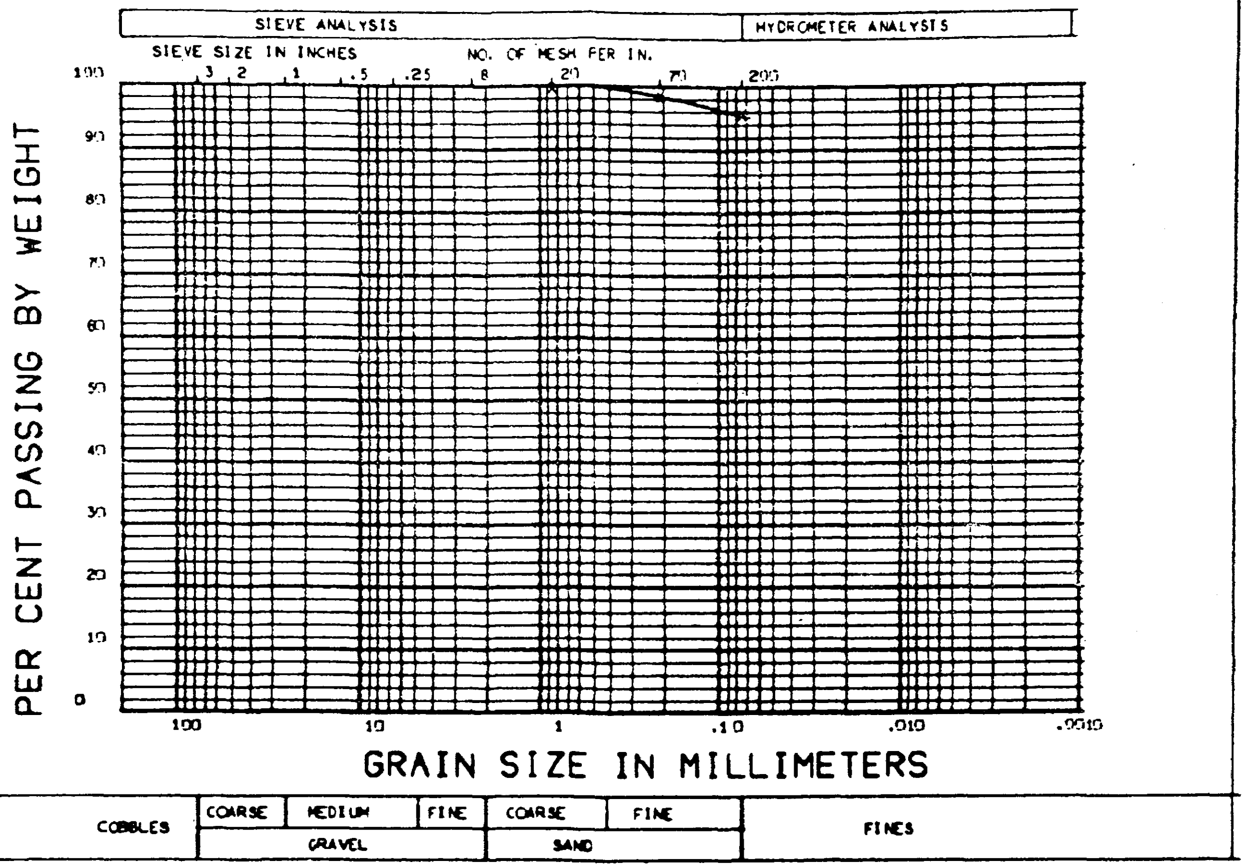
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	327.0	100.0
40	0.417	10.0	317.0	96.9
70	0.208	33.8	283.2	86.6
100	0.147	33.6	249.6	76.3
200	0.074	67.4	182.2	55.7

WT. RETAINED ON PAN 4.3
WASHING LOSS 177.9
PAN TOTAL 182.2
TOTAL 327.0

FIGURE 2H-75
GRAIN SIZE - TEST NO. 306 - 7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 307-3 DATE 8/28/89

LOCATION BEAVER VALLEY DEPTH 4-6 FT.

TYPE MATERIAL BROWN CLAYEY SILT WITH FINE SAND, TR. ORG.

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN.DRILLING TESTED BY MB,KLF

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 95.7

WT. OF ORIG SAMPLE 216.2 WT. AFTER PREWASHING 10.0
WASHING LOSS 206.2

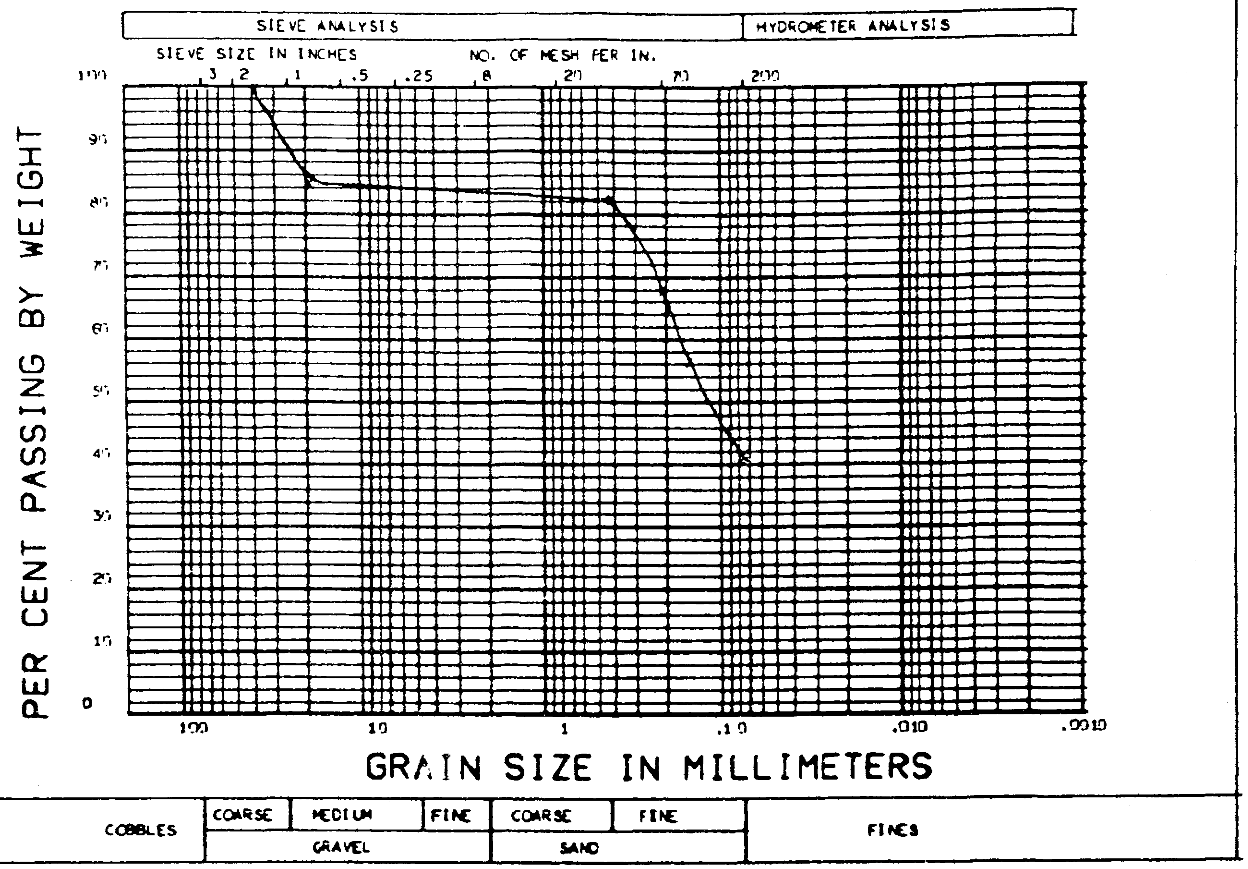
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
20	0.833	0.0	216.2	100.0
70	0.208	2.9	213.3	98.7
200	0.074	6.3	207.0	95.7

WT. RETAINED ON PAN	0.8
WASHING LOSS	206.2
PAN TOTAL	207.0
TOTAL	216.2

FIGURE 2H-76
GRAIN SIZE - TEST NO. 307 - 3
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 307-7 DATE 8/28/69

LOCATION BEAVER VALLEY DEPTH 12-14 FT.

TYPE MATERIAL DARK ORGANIC SILTY SAND

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN.DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 41.4

WT. OF ORIG SAMPLE 297.5 WT. AFTER PREWASHING 176.3
WASHING LOSS 121.2

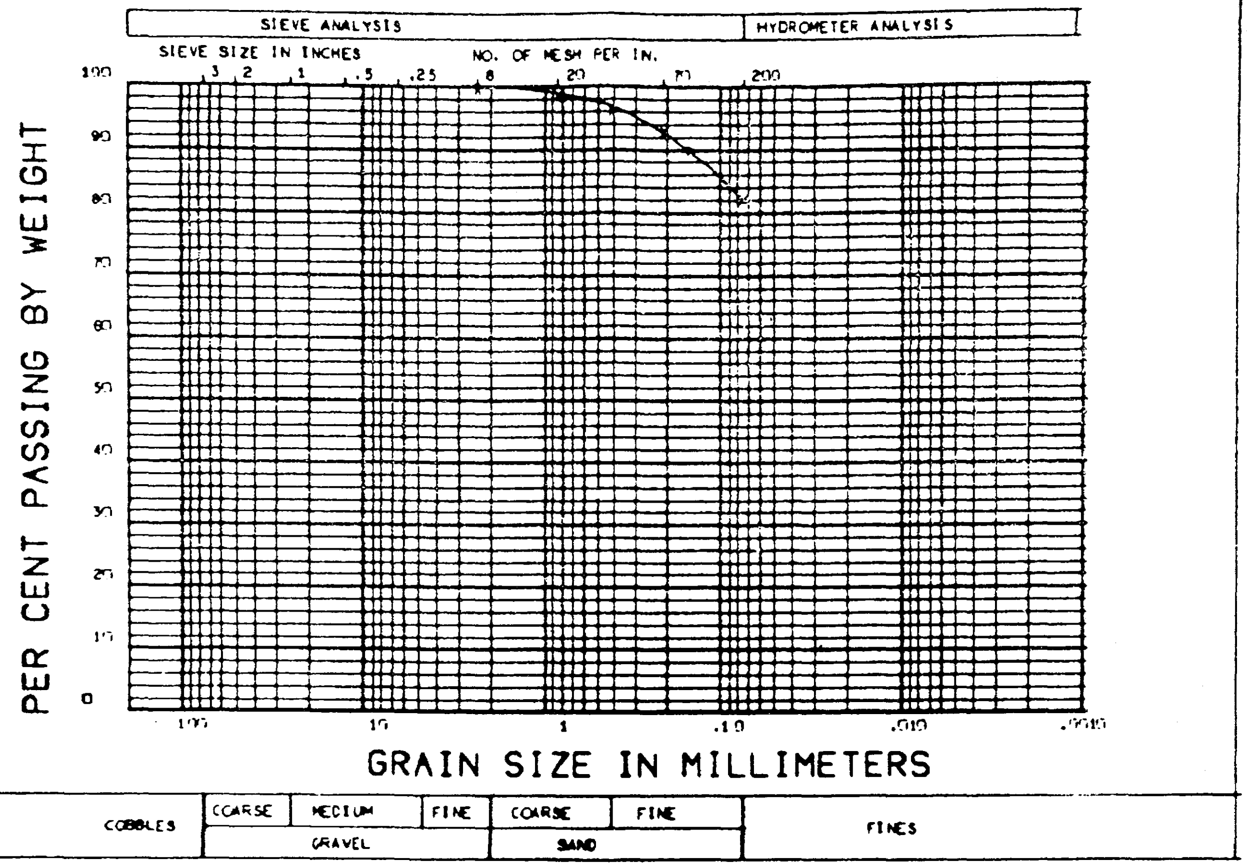
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
1.5	38.100	0.0	296.8	100.0
.75	19.100	45.3	251.5	84.7
40	0.417	7.2	244.3	82.3
70	0.208	42.9	201.4	67.9
100	0.147	33.5	167.9	56.6
200	0.074	45.0	122.9	41.4

WT. RETAINED ON PAN	1.7
WASHING LOSS	121.2
PAN TOTAL	122.9
TOTAL	296.8

FIGURE 2H-77
GRAIN SIZE - TEST NO. 307 - 7
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 308-5 DATE 8/11/80

LOCATION BEAVER VALLEY DEPTH 8-10 FT

TYPE MATERIAL SANDY SILT , TRACE OF CLAY

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN. DRILLING TESTED BY M.B., KLF

UNIFORMITY COEFFICIENT (D60/D10): ---

PER CENT PASSING 200 SIEVE 82.2

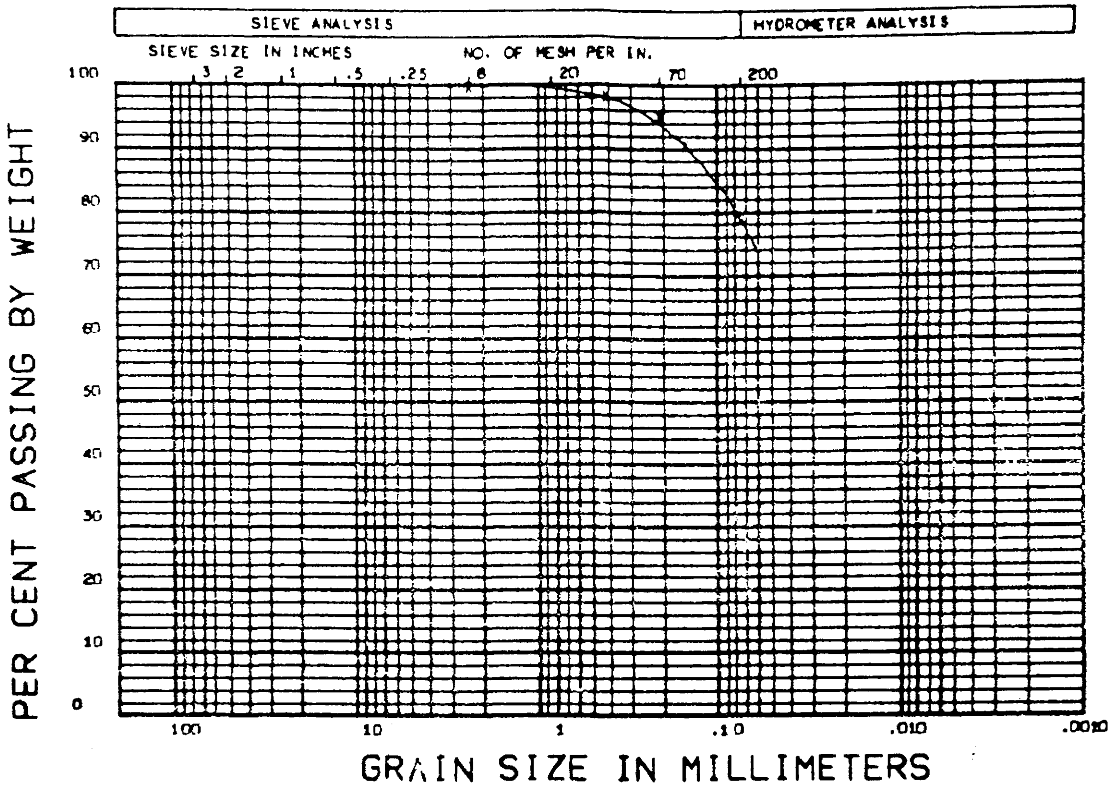
WT. OF ORIG SAMPLE 339.4 WT. AFTER PREWASHING 53.2
WASHING LOSS 276.2

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	339.7	100.0
20	0.833	3.7	336.0	98.9
40	0.417	9.0	327.0	96.3
70	0.208	11.5	315.5	92.9
100	0.147	9.5	306.0	90.1
200	0.074	26.8	279.2	82.2

WT. RETAINED ON PAN	3.0
WASHING LOSS	276.2
PAN TOTAL	279.2
TOTAL	339.7

FIGURE 2H-78
GRAIN SIZE - TEST NO. 308 - 5
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

STONE AND WEBSTER ENGINEERING CORPORATION



COBBLES	GRAVEL			SAND		FINES
	COARSE	MEDIUM	FINE	COARSE	FINE	

TEST NO. 309-4 DATE 9/2/69

LOCATION BEAVER VALLEY DEPTH 6-8 FT

TYPE MATERIAL BROWN SILTY SAND

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 79.0

WT. OF ORIG SAMPLE 319.6 WT. AFTER PREWASHING 68.4

WASHING LOSS 251.2

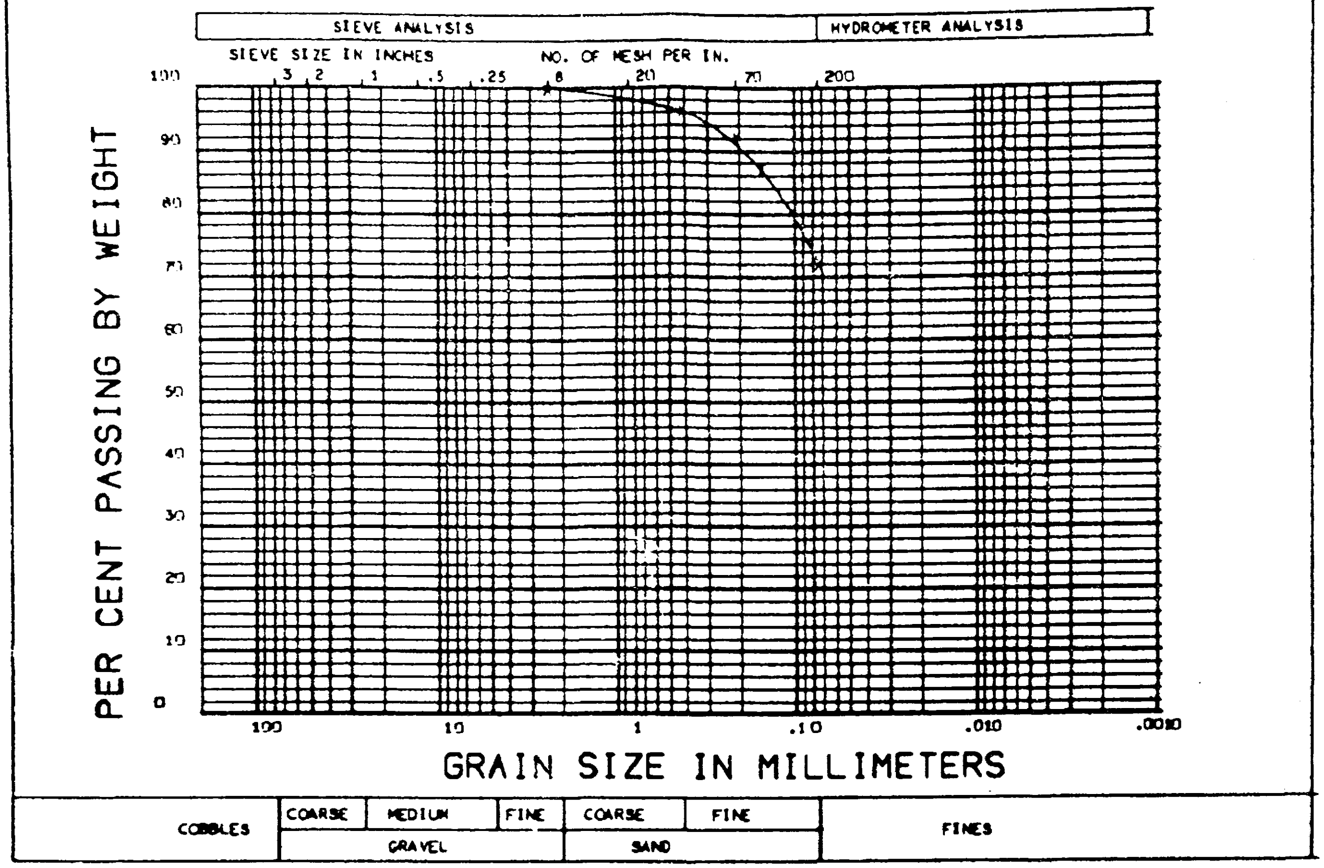
SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	319.9	100.0
40	0.417	5.0	314.9	98.4
70	0.208	10.2	304.7	95.2
100	0.147	14.7	290.0	90.7
200	0.074	37.3	252.7	79.0

WT. RETAINED ON PAN 1.5
WASHING LOSS 251.2
PAN TOTAL 252.7
TOTAL 319.9

FIGURE 2H-79
GRAIN SIZE - TEST NO. 309 - 4
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE AND WEBSTER ENGINEERING CORPORATION



TEST NO. 309-6 DATE 8/11/80

LOCATION BEAVER VALLEY DEPTH 10-12 FT.

TYPE MATERIAL BROWN CLAYEY SILTY SAND

CLIENT DUQUESNE JOB NO 11700

DRILLER PENN. DRILLING TESTED BY MB, KLP

UNIFORMITY COEFFICIENT (D60/D10)= ---

PER CENT PASSING 200 SIEVE 71.9

WT. OF ORIG SAMPLE 330.8 WT. AFTER PREWASHING 98.9
WASHING LOSS 231.9

SIEVE OR SCREEN	SIEVE OPENING	WEIGHT RETAINED	WEIGHT PASSING	PERCENT PASSING
8	2.362	0.0	331.1	100.0
40	0.417	12.0	319.1	96.4
70	0.208	14.0	305.1	92.1
100	0.147	16.5	288.6	87.2
200	0.074	50.4	238.2	71.9

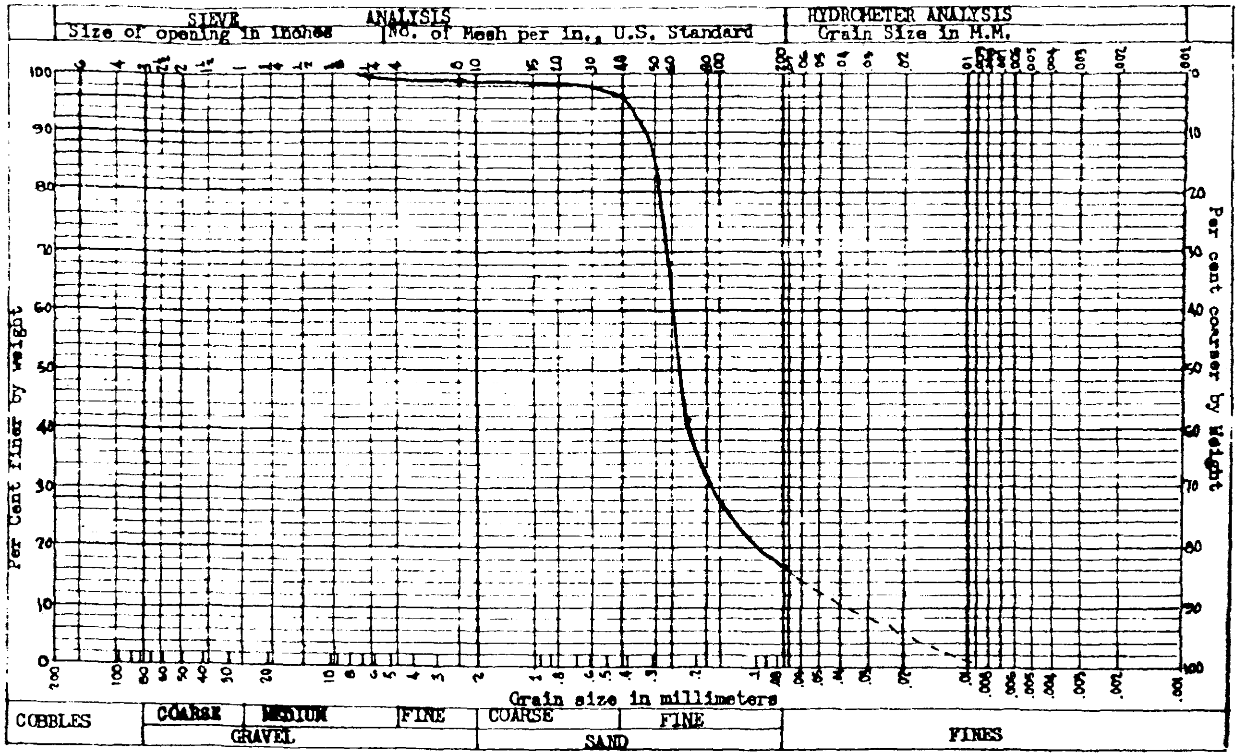
WT. RETAINED ON PAN	6.3
WASHING LOSS	231.9
PAN TOTAL	238.2
TOTAL	331.1

FIGURE 2H-80
GRAIN SIZE - TEST NO. 309 - 6
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

REV. 0 (1/82)

STONE & WEBSTER ENGINEERING CORPORATION

GRADATION CURVE



TEST NO. 1 DATE 12·5·69 SAMPLE TAKEN BY RAYMOND DRILLING COMPANY

LOCATION BORING 103 ST 19 ELEVATION 650 ± SAMPLE TESTED BY J.B

TYPE MATERIAL FINE SILTY SAND (NO LIMITS) WATER CONTENT 20.1%

~~ACTION TAKEN~~ NOTE: HYDROMETER ANALYSIS NOT RUN CURVE ASSUMED.

CLIENT DUQUESNE LIGHT COMPANY J.O. 11700 BY L. HOLISH

FIGURE 10

FIGURE 2H-81
GRAIN SIZE - BORING 103 ST 19
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT