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United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. George W. Knighton, Chief
Licensing Branch 3
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2
Docket No. 50-412
BV-2 Meteorological Data Reduction Methodology Exclusion Area
Boundary Changes and Open Items 26, 28, and 29

Gentlemen:

As discussed in a meeting with the staff on January 15, 1985, and in a subsequent phone call on January 18, 1985, the methodology used to reduce Meteorology Data (Attachment 1) and the Exclusion Area Boundary (EAB) changes (Attachment 2) are enclosed. The meteorological data reduction methodology was used to digitize the 1976 and 1977 strip chart wind speed data. The EAB for BV-2 will be increased to a 2000 ft. radius centered on Unit 1 containment with an additional area extending to the North Shore of the Ohio River in the Northwest and North Northwest sectors. This increase in the EAB will effectively reduce x/q values and associated doses to individuals at the EAB to less than part 10CFR100 guidelines. This rearrangement of the EAB should then, after staff review, close out Open Items 26 (x/q), 28 (Radiological Consequences of a Loss of Coolant DBA), and 29 (Radiological Consequences of Control Rod Ejection DBA). The EAB changes will be incorporated into the next FSAR amendment.

If you have any questions, please contact T. J. Zoglmann at (412) 787-5141.

DUQUESNE LIGHT COMPANY

By

E. J. Woolever
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Attachment

cc: Mr. B. K. Singh, Project Manager (w/c)
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BVPS-2 METEOROLOGICAL DATA REDUCTION METHODOLOGY

The onsite meteorological data base used in the design basis accident X/Q calculations consists of 35-ft wind speed and wind direction and 150-35 ft ΔT for the years 1976-1980. Within this period, the data for the years 1976 and 1977 were recorded on analog strip charts and the data for 1978-1980 were recorded by computer using an analog to digital converter. Therefore, the data base is a mixture of analog and digital data.

The wind speed data for the years 1976 and 1977 were originally reduced manually by examining 15 minutes of analog trace centered on each hour and estimating the average wind speed by eye using the equal area method (as much trace above as below a straight line). Upon examining the 1976 and 1977 wind speed data, a very strong bias toward 0.5 mph increments introduced by this "eyeball" reduction technique was detected, although the data were reported to the nearest 0.1 mph. In order to remove this bias and obtain a more accurate and objective data base, a vendor (ENVIRODATA CORP.) was subcontracted to electronically digitize the strip charts using a full hour (or at least 15 minutes, whichever was greater) of analog trace. Before sending the strip charts to the vendor, an experienced meteorologist examined each strip chart for missing analog data and indications of bad traces which should not be digitized.

After the strip charts were edited for missing and bad wind speed traces, a detailed scope of work was prepared for the vendor to electronically digitize the strip charts. This scope of work included the following requirements which were adhered to by the vendor:

- * the analog strip charts were digitized to an accuracy of ± 0.1 mph
- * data reduction and compilation were in accordance with R.G. 1.23 and SRP 2.3.2, Rev. 1
- * hourly averages for continuous trace were determined using a minimum of 12 points per hour equally spaced across the hour, and more points were read when values changed rapidly
- * hourly averages were computed only if at least 15 minutes of reliable data were available
- * a minimum of 14 percent of all data on a chart was redigitized as an indicator of accuracy, such that a difference of ± 0.5 percent of full scale between the mean daily average wind speeds required a complete redigitization of that chart
- * a written Quality Assurance (QA) program was submitted prior to the start of work

The electronically-digitized data base produced by Envirodata contains 140 fewer valid wind speeds than the manually-reduced data. There are several factors that explain the difference in the number of valid wind speeds appearing in the two data bases. In some cases, a valid wind speed trace appears within but not centered on the hour, such that the manual reduction technique recorded the wind speed as missing and the electronic digitization procedure provided a value based on at least 15 minutes of trace within the hour. In

other cases, a wind speed trace is missing between exact hours (e.g., between hours 10:00 and 11:00) but appears just after the exact hour (11:00) such that the manual method applied that portion of the trace to hour 11 while the electronic method recorded no value for hour 11. However, the primary reason for fewer wind speeds in the electronically-digitized data base is that the original data base contains substituted extrapolated wind speeds from higher tower levels for missing data at 35 ft or substituted control room chart data when missing on the tower chart recorder. Making data substitutions during the electronic digitization process was not considered because the data recovery for that year was already acceptable at 90 percent.

The digital portion of the BVPS-2 meteorological data base was produced by a computerized data processing system which collects and reduces data on a real-time basis. This system utilizes a Digital Equipment Corporation PDP-8/E 12-bit minicomputer for this purpose. The meteorological data were averaged for four 15-minute samples each hour with the sampling rate for each parameter approximately four times per second. Standard statistical equations were used to compute the 15-minute average values from the instantaneous values, which were then averaged to obtain hourly values.

In addition, portions of the 1980 digital wind speed data which were missing had later been filled in with analog strip chart data using the eyeball reduction technique. These periods of analog data, which amounted to approximately four days, were also electronically digitized by Envirodata Corp. to remove the human bias in the recorded wind speeds.

BVPS-2 FSAR

CHAPTER 2

THE SITE

2.1 GEOGRAPHY AND DEMOGRAPHY

2.1.1 Site Location and Description

2.1.1.1 Specification of Location

The Beaver Valley Power Station (BVPS) is located in Shippingport Borough, Beaver County, Pennsylvania, on the south bank of the Ohio River. The site is approximately 1 mile southeast of Midland, Pennsylvania, 5 miles east of East Liverpool, Ohio, and approximately 25 miles northwest of Pittsburgh, Pennsylvania. The coordinates of the Beaver Valley Power Station - Unit 2 (BVPS-2) reactor containment are 40 degrees 37 minutes 23 seconds north and 80 degrees 25 minutes 57 seconds west; the Universal Transverse Mercator coordinates are 548,010 meters east and 4,496,890 meters north. Figure 2.1-1 shows the general site location.

2.1.1.2 Site Area Map

The BVPS site contains approximately 501 acres including 26 acres of right-of-way. Approximately 479.5 acres are owned by the Duquesne Light Company (DLC) and 21.5 acres are owned jointly by the Central Area Power Coordinating Group (CAPCO) pool members as tenants-in-common without right of partition. Immediately to the west of the BVPS-2 reactor location, and also onsite, are Beaver Valley Power Station - Unit 1 (BVPS-1) and the Shippingport Atomic Power Station (SAPS). The SAPS is managed by DLC for the Division of Naval Reactors, U.S. Department of Energy (USDOE). The SAPS terminated operations October 1, 1982 and is scheduled for decommissioning by the USDOE. The SAPS area is leased by DLC to the USDOE. The Pennsylvania Department of Transportation has a right-of-way across the eastern end of the site on which a portion of Pennsylvania Route 168, including the southerly approach to the Shippingport Bridge, is located. Local site topography, site boundary, and exclusion area are shown on Figure 2.1-2, and the general site plan is shown on Figure 1.2-1.

2.1.1.3 Boundaries for Establishing Effluent Release Limits

^{BVPS-2}
The ^{2,000} exclusion area is defined by a ^{2,000} 1,500-foot radius around the BVPS-2 containment building and extending in part to the north shore of the Ohio River (Figure 2.1-2). The exclusion area provides the basis for the Technical Specification limits on gaseous effluents and meets the requirements of 10 CFR 100. The BVPS-2 gaseous releases will occur at the containment building, at the BVPS-1 cooling tower, and at the auxiliary building and turbine building ventilation vents. The shortest distance to the site boundary from the BVPS-2

containment building is approximately 1,500 feet. The nearest occupied residence is located approximately 2,323 feet from the centerpoint of the BVPS-1 and BVPS-2 reactor containment locations. Within the site boundary there is a residence located on a 1 acre parcel not owned by DLC (Figure 2.1-2). The residence is located approximately 4,000 feet SSW of the BVPS-2 containment.

Boundaries for establishing effluent release limits are defined and controlled as required by 10 CFR 20 to ensure that individuals are protected from exposure to radiation and radioactive materials. The description of the restricted area boundary required by this section should be understood to be that presently approved for use in the Radiological Control Manual established for BVPS. The Radiological Control Manual describes how access to any areas required under this section is controlled for radiation protection purposes, including monitoring of access to these areas.

2.1.2 Exclusion Area Authority and Control

2.1.2.1 Authority

A ²⁰⁰⁰1500-foot radius around the BVPS-¹2 containment building and an extension to the north shore of the Ohio River constitutes the exclusion area (Figure 2.1-2) as defined by 10 CFR 100.3(a). The Dravo Corporation, owner of Phillis Island which is located approximately 400 feet off the shoreline from BVPS, 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. An updated agreement, binding on Dravo Corporation or on any future purchaser or leasee has extended the expiration date to 2010 and further delineates and restricts the uses which can be made of the island. BVPS-2

The Applicant owns all other land within the exclusion area, including the mineral rights to it and SAPS, which is leased from the Applicant by the USDOE.

A Consolidated Rail Corporation (ConRail) right-of-way on the site is approximately 400 feet from the BVPS-2 containment at its closest point. The line is controlled by DLC and its use is limited to servicing SAPS and BVPS-1 and BVPS-2. The Pennsylvania Department of Transportation has a right-of-way across the eastern end of the property on which a portion of Pennsylvania Route 168, the southerly approach to the Shippingport Bridge, is located. Route 168 from the south follows along the northeast and east corner of the site and, crossing the Shippingport Bridge, joins State Highway 68.

2.1.2.2 Control of Activities Unrelated to Plant Operation

As required by 10 CFR 100.3(a) and as discussed in the BVPS Emergency Preparedness Plan referenced in Section 13.3, the Applicant has control of removal of personnel and property from the exclusion area.

TABLE 2.3-38

0.5 PERCENT SECTOR-DEPENDENT 0- TO 2-HOUR χ/Q VALUES
AT THE EXCLUSION AREA BOUNDARY

Downwind Sector	Downwind Distance*(meters)	0- to 2-Hour χ/Q ($\times 10^3 \text{ sec/m}^3$)
N	457	0.88
NNE	457	0.50
NE	457	0.33
ENE	457	0.26
E	457	0.24
ESE	<u>457</u> 490	<u>0.23</u> .20
SE	<u>457</u> 550	<u>0.24</u> .18
SSE	<u>457</u> 615	<u>0.28</u> .17
S	<u>457</u> 695	<u>0.37</u> .18
SSW	<u>457</u> 755	<u>0.50</u> .21
SW	<u>457</u> 780	<u>0.75</u> .30
WSW	<u>457</u> 710	<u>1.01</u> .49
W	<u>480</u> 610	<u>1.40</u> .95
WNW	558	1.40
NW	547	1.44
NNW	547	1.06
Worst (NW)	547	1.44
5% overall site χ/Q value		<u>1.22</u> 1.10

NOTE:

*Regulatory Guide 1.145 extended distances.

TABLE 2.3-38a

FIFTY PERCENT SECTOR-DEPENDENT 0- TO 2-HOUR χ/Q VALUES
AT THE EXCLUSION AREA BOUNDARY

Downwind Sector	Downwind Distance*(meters)	0- to 2-Hour χ/Q ($\times 10^4 \text{ sec/m}^3$)
N	457	2.88
NNE	457	1.67
NE	457	1.40
ENE	457	1.12
E	457	1.04
ESE	457 490	0.67 .60
SE	457 530	1.03 .76
SSE	457 615	1.60 .07
S	457 695	0.82 .41
SSW	457 755	0.17 .04
SW	457 780	2.14 .86
WSW	457 710	2.49 1.18
W	480 610	4.78 3.21
WNW	558	8.11
NW	547	9.41 9.91
NNW	547	5.03
Worst (NW)	558 547	9.91
50% overall site χ/Q value		1.67 1.31

NOTE:

*Regulatory Guide 1.145 extended distances.



FIGURE 2.1-2
LOCAL SITE TOPOGRAPHY
BEAVER VALLEY POWER STATION - UNIT 2
FINAL SAFETY ANALYSIS REPORT