THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

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MURRAY R. EDELMAN
VICE PRESIDENT
NUCLEAR

July 17, 1985
PY-CEI/NRR-0283 L

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Response to Comments on
the Perry Unit 1 Offsite
Dose Calculation Manual (ODCM)

Dear Mr. Youngblood:

Attached is our response to your comments transmitted May 20, 1985 on the Perry Unit 1 Offsite Dose Calculation Manual. We have also included a proposed change to ODCM Section 2.3.2 in Attachment 2 for your review. The ODCM will be revised to reflect the changes made in these attachments and transmitted to the NRC by August 15, 1985.

Please feel free to contact me if you have any questions concerning this matter.

Very truly yours,

Murray R. Edelman
Vice President
Nuclear Group

MRE:njc

Attachments

cc: Jay Silberg, Esq.
John Stefano (2)
J. Grobe

A009
1/1

Comment 1 - Section 2.0

Provide in Section 2 a flow diagram of the liquid radioactive waste treatment systems, including the discharge point and the Radwaste Discharge Radiation Monitor. This should be a simple diagram with as little extraneous detail as possible.

Response:

A simplified flow diagram (Attachment 1-1) showing the pertinent aspects of discharge is attached and will be included in the revised ODCM. Detailed drawings of the liquid radioactive waste treatment systems are provided in FSAR Figure 11.2-11, sheets 1 through 15.

Comment 2 - Section 2.0/2.2

All potential release points from the PNPP are not batch releases. Some can be continuous. They include:

(1) Emergency Service Water Loops;
(2) Liquid radwaste discharge, sanitary discharge; and
(3) Underdrain system

ODCM should contain a discussion of these release points.

Response:

The ODCM will be revised to contain the following discussion of the Emergency Service Water release point although this system is not expected to become a radioactive release point.

Emergency Service Water Radiation Monitoring

This system consists of two channels, one for monitoring downstream of equipment in emergency service water system Loop A and the other for Loop B. Monitors are set to alarm at 3 times background level. If a high radiation level is detected, the affected emergency service water line can be manually isolated. Whether to isolate or not is dependent upon other conditions. The PNPP staff will take appropriate action to limit release.

The liquid radwaste discharge, sanitary discharge has been permanently capped and therefore does not offer a release path. The underdrain system should not be included in the ODCM as there are no connections to PNPP plant systems. The underdrain system is considered a "passive" system since no other plant systems drain to or through the underdrain system. The purpose of the underdrain system is to direct ground water flow around the plant foundation. Analyses detailed in the FSAR show that the underdrain system does not pose an environmental problem even with a postulated waste tank failure. Therefore, it is not necessary to include a discussion of the Underdrain System in the ODCM.

Comment 3 - Section 2.1.2

From pg. 11.2-20 of the FSAR it would appear that mdf=10,000 rather than 30,000 gpm.

Response:

The minimum dilution flow (mdf) for liquid releases is 30,000 gpm. A low dilution water flow rate of 30,000 gpm actuates solenoid valves G50F154 and F156 which close the main process isolation valves G50F153 and F155 as shown in Attachment 1-1 of this attachment (Response 1 above), thus terminating the release.

FSAR section 11.2.3.2 will be revised to clarify this point (Attachment 1-2).

Comment 4 - Section 2.1.3

Use of the factor of 1.25 in Equation 2.1-5 is inappropriate. This section does not address how the Applicant will establish the alarm trip setpoint. We suggest reference to other ODCM's that have been approved. Alarm/trip setpoints should account for effluents such as tritium which are not gamma or X-ray emitting and would not be seen by gamma scintillation detectors.

Setpoints are usually established based upon the maximum possible flow. The method presented in Section 2.1.3 would always be based upon the concentration in the release tank and would not be sensitive to changes in release rates.

Response:

Use of the factor 1.25 in Equation 2.1-5 is appropriate since PNPP will control the maximum allowable tank discharge flow rate (f_{max}) in eqn. 2.1-3. The concentration in the tank to be released will be measured and the process control valves throttled to limit the discharge flow rate and thus the radioactive release rate, rather than relying solely on a discharge monitor to perform this function. The discharge monitor will augment the process control valves and will ensure that sampling of the tank was representative of the contents. The factor 1.25 in equation 2.1-5 is offset by the factor 0.8 in equation 2.1-3 for determining f_{max} and has been incorporated to prevent spurious alarms.

Tritium and other non-gamma emitting isotopes are accounted for in equation 2.1-1. C_i values for tritium and other non-gamma emitting isotopes will be those most recently determined (previous month/quarter). Sampling and analysis will be performed in accordance with the Technical Specifications. Initial values for releases will be taken from FSAR Table 11.2-13 for non-gamma emitting isotopes listed in the Technical Specifications (until monthly/quarterly analysis results become available).

Comment 5 - Section 2.2.1

Equation 2.2-1 should have f as the maximum possible discharge rate from the given tank.

Response:

(f) is a function of tank waste concentration and not of system (pipe/valve size) limitations. It is controlled by throttling process control valves G50F153 and F155. (f) in equation 2.2-1 can never exceed maximum allowed flow rate (f_{max}) calculated in equation 2.1-3.

The definition of (f) in equation 2.2-1 will be revised as follows:

f = the radwaste tank flow rate for the batch to be released, in gpm. This value equals f_{max} (equation 2.1-3) if f_{max} does not exceed system limitations.

Comment 6 - Section 2.2

In equations (2.2-2) and (2.2-4), use of the limiting MPC_i of 10 CFR 20, Appendix B, Table II, column 2 should be specified.

Response:

It is our intent to use the limiting MPC_i and equations 2.2-2 and 2.2-4 will be relabeled to reflect this.

Comment 7 - Section 2.3.1

The ODCM should contain sufficient information to enable calculation of doses for the necessary pathways. For use in Section 2.3.1, additional site specific information should be provided. Provide a listing of the points of exposure, the points of withdrawal of drinking water and the points of harvest of aquatic food, identifying the location and the dilution factor Mp for each. Provide in the ODCM a map showing the locations of the closer drinking water intakes.

Response:

A discussion of the three pathways of concern for liquid radioactive releases at PNPP is attached (Attachment 1-3). A summary of the dilution factors used in our analyses will be provided in the ODCM (Attachment 1-4).

A map showing the radiological environmental monitoring program sampling locations (including drinking water intakes) within 5 miles will be incorporated into the ODCM (Attachment 1-5). There are two drinking water intakes within 5 miles of the site: (1) Location 36 - Painesville Water Supply Intake - 3.9 mi. and (2) Location 37 - Ohio Water Service Co. Pump Station - 4.1 mi.

Comment 8 - Section 2.3.1

In Section 2.3.1, the period of time exposure t_b, is set at 15 years. This should be the period to the midpoint of plant life; if plant life is to be 40 years, then t_b should be 20 years.

Response:

Time of exposure, t_b will be changed to 20 yrs. and calculations revised accordingly.

Comment 9 - Section 2.3.2

Section 2.3.2 indicates that the Applicant will perform an analysis of possible impacts through the drinking water pathway with regard to the requirements of 40 CFR 141. Include an explanation of how that analysis will be performed. Provide the necessary site specific data.

Response:

The ODCM will be revised to delete the statement concerning 40 CFR 141 analyses since they are not required by NUREG 0473, Rev. 3. This NUREG requires 40CFR141 analyses only if drinking water supply is taken from the receiving water body within 3 miles of the plant discharge. Since there are no drinking water intakes within 3 miles of the plant discharge (the closest being 3.9 miles WSW), there is no need to perform the 40CFR141 analyses.

Comment 10 - Section 3.0

With Section 3.0 Gaseous Effluents, provide flow diagrams of gaseous radioactive waste treatment systems leading to each of the four environmental release points. Show the location of each radioactivity release monitor for gaseous effluents. Provide the location and a brief description of each release vent point, including whether the vent is equipped with a deflector.

Response:

The gaseous radwaste system flow diagram is provided as Attachment 1-6. This diagram will be incorporated into the ODCM.

The plant vents for Units 1 and 2 are located on top of the Intermediate Bldg., elevation 753'9". The Heater Bay/Turbine Bldg. vent is located on top of the Heater Bay Bldg., elevation 722'0". The Offgas Bldg. vent is located on top of the Offgas Bldg., elevation 723'0".

These vents are not equipped with deflectors and releases from them are considered to be ground level. These descriptions will be incorporated into the ODCM.

Comment 11 - Section 3.0/3.1

The steam packing exhauster should be added to this section as a potential release point.

Response:

The steam packing exhauster vents through the Offgas Vent Pipe, Unit 1 as indicated in Attachment 1-6, and is therefore not a potential release point.

Comment 12 - Section 3.1

The determination of the set point seems to imply that each monitor may be allowed to go above the 500 mrem and 3000 mrem skin limits. Releases should be apportioned to each release point such that the total from all release points is less than 500 mrem whole body and less than 3000 mrem skin.

Response:

Technical Specifications require us to comply with the 10CFR20 dose rate limits for noble gas releases. Each of the four gaseous effluent noble gas radiation monitors is set to alarm at a small fraction of these dose rate limits (10% of limit). Upon receipt of this alert level alarm, operators will take action to control or stop the release. A higher level alarm occurs at 70% of the 10CFR20 limit to further warn the operator of a potential problem. Since no automatic actions are associated with these monitors, we believe that these setpoints, along with the Technical Specificaiton requirements, are adequate to ensure we remain within the 10CFR20 limits.

Comment 13 - Section 3.1

Initial estimates of the gaseous source terms for Section 3.1.1 should be provided, especially the "mix" i.e., the selection of radionuclides and their relative proportions.

Response:

Initial estimates of the gaseous source terms for Section 3.1.1 are provided in FSAR Table 11.3.9. This table will be referenced in the ODCM.

Comment 14 - Section 3.2

In Section 3.2, provide a map of the site showing clearly the Site Boundary and the boundary to the Unrestricted Area. Show the compass directions and a scale of distance, such as provided in Figure 5.1-2.

Response:

A map clearly showing the Site Boundary and the Unrestricted Area as well as a scale of distance and a North arrow is provided as Attachment 1-7. It will be incorporated into the ODCM.

Comment 15 - Section 3.2.3

In Section 3.2.3, at the bottom of page 37 reference is made to Table 3.2-15 which is for the average individual. Table 3.2-14, for the maximum individual, should be referenced here instead.

Response:

Table 3.2-14 for the maximum individual will be referenced in Section 3.2.3 in place of Table 3.2-15.

Comment 16- Section 3.2.3

The abbreviation "ft" for feet should be used throughout, rather than "f". Use of "f" is confusing because it is also used for the flowrate; in Section 3.2.3 it is used both ways in one definition.

Response:

The abbreviation "ft" versus "f" will be used for feet.

Comment 17 - Section 3.2

Pages 51 through 58 appear to be duplicates of pages 14 through 21. Duplication within the ODCM is not necessary.

Response:

The duplication is provided for ease of user reference.

Comment 18 - Section 4.1

In the third paragraph of Section 4.1, the Applicant proposes to seek a variance if it is discovered that PNPP operations have violated the 40 CFR 190 standard. The intent of the variance provision is to permit continued operation while a problem which might lead to a violation is corrected. The variance provision is not a device to expunge a violation which has already occurred.

Response:

The second and third paragraphs of Section 4.1 will be replaced with the following paragraph:

> "PNPP does not intend to exceed 40 CFR190 limits during normal operation. However, if such a situation should occur, violations would be handled as per Technical Specification 3/4.11.4a. which require the following:

With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specification 3.11.1.2a., 3.11.1.2b., 3.11.2.2a., 3.11.2.2b., 3.11.2.3a., or 3.11.2.3b., calculations shall be made including direct radiation contributions from the reactor units and from outside storage tanks to determine whether the above limits of Specification 3.11.4 have been exceeded. If such is the case, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits and includes the schedule for achieving conformance with the above limits. This Special Report, as defined in 10 CFR 20.405c, shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentrations of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the above limits, and if the release condition resulting in violation of 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report is considered a timely request, and a variance is granted until staff action on the request is complete."

Comment 19 - Section 5.1

In Table 5.1-1, under the Location column, in addition to the sampling point number, a brief description should be provided, giving the principal characteristics appropriate for locations for each specific type of sample medium listed. Such information complements the information provided in Table 5.1-4.

Response:

The following footnote will be included in Table 5.1-1: "Sampling locations were selected on the basis of local ecology, meteorology, physical characterizations of the region, and demographic and land use features of the site vicinity. Other factors considered were applicable regulatory guidelines (Appendix I to 10CFR50, Regulatory Guides 4.1, 4.2, and 4.8), population distribution (from environmental report), ease of access to sampling stations, security, future program integrity (e.g., not placing TLD's near areas under construction or where the potential for vandalism is high, and the NRC Radiological Assessment Branch Technical Position on radiological environmental monitoring as revised in Revision 1, November 1979 (reference 1). In addition, certain locations where PNPP operations are unlikely to affect levels of radiation or radioactivity were selected as control locations."

Comment 20- Section 5.1

Drinking water sampling (Table 5.1-1) should also include the Lake County supply for which the intake is located about 1.5 miles west of PNPP.

Response:

The Lake County drinking water supply is located 3.9 miles from the Perry site at the former location of the Industrial Rayon Corporation intake and is identified as location 36 on the Radiological Environmental Monitoring Program sampling location map (Attachment 1-5). The Final Environmental Statement stated that this intake would be in service soon and that it is 1.5 miles southwest of the Perry site. It is in service now; however, the intake is 3.9 miles from the PNPP site vs. 1.5 miles.

Comment 21 - Section 5-1

In Table 5.1-4, the sample location descriptions should not rely on markers such as, in No. 3, the rusted manure spreader which may not be sufficiently permanent.

Response:

Attachment I-8 provides a better description of this sample location. The ODCM will be revised to reflect the locations contained in Attachment I-8.

Comment 22 - Section 5.1

Figures 5.1-1 and 5.1-2 are not clear enough. Provide either large, clear foldouts or supplement clear versions of these figures with clear figures giving more detail of the vicinty of sampling locations or groups of locations.

Response:

Figures 5.1-1 and 5.1-2 will be replaced with clearer representations.

Comment 23 - Section 5.2

Provide a copy of the latest Land Use Census, used to determine the locations for collecting milk and produce samples and to determine receptor locations for dose calculations for various pathways. Include the date the data was gathered.

Response:

A copy of the latest Land Use Census dated November 1984, is provided as Attachment I-9. The Land Use Census is contained in the Radiological Environmental Monitoring Program and will be referenced in the ODCM. This latest Land Use Census was performed on July 9 and 10, 1984.

Comment 24 - Appendices A & B

APPENDIX A

a) PAGE 80/81 Identify T_f (a figure or algorithm would suffice) and provide a reference.

b) PAGE 80 Identify the level of measurement for μ (presumably the wind speed at the 10m level).

c) PAGE 80 Provide the value of H_c.

d) PAGE 80 Provide either a figure indicating the relationship of σ_z to stability and downwind distance or an appropriate reference (e.g., Regulatory Guide 1.111).

e) PAGE 80 The description of the information contained in Tables A-2 through A-5 should specify the data base by identifying "the three FSAR years of meteorological data."

f) APPENDIX B In the last paragraph of Appendix B, correct the references to tables.

Response:

Appendix A:

a) T_f = terrain correction factor
FSAR Table 2.3-26 provides values

b) μ = wind speed (measured at 10m) in m/sec.

c) H_c = building height (44.8m)

d) σ_z = vertical dispersion coefficient in m (per R.G. 1.111)

e) Line 8, page 83 will be changed to read: "Dispersion values are based on the three FSAR years of meteorological data (May 1, 1972 to April 30, 1974 and September 1, 1977 to August 31, 1978), ground-level release assumptions, sector spread for purge calculations, and twelve wind speed classes.

Appendix B:

f) The last paragraph on page 98 will be changed to read: Analyses shall be performed in such a manner that the LLD's listed in Tables 4.11.1.1.1-1, 4.11.2.1.2-1, and 4.12.1-1 of the Radiological Effluent Technical Specifications for the Perry Nuclear Power Plant will be achieved under routine conditions.

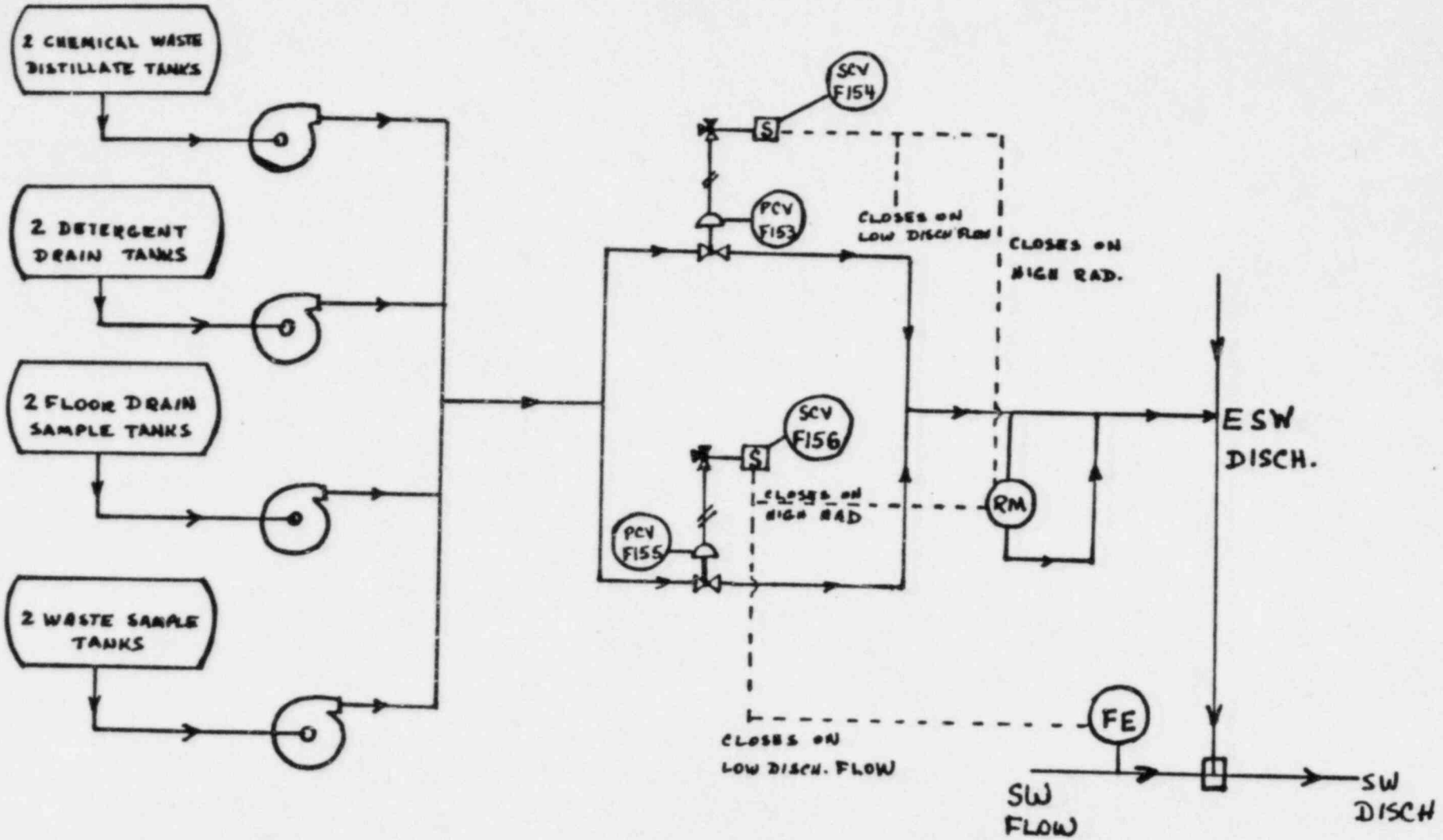
1. We propose changing ODCM Section 2.3.3 to reflect the method we intend to use to project doses. The revised Section 2.3.3 will read as follows:

2.3.3 Projection of Doses

Anticipated doses resulting from the release of liquid effluents will be projected monthly. If the projected dose, when averaged over 31 days, exceeds 0.06 mrem to the total body or 0.2 mrem to any organ, the liquid radwaste system will be used to process waste. The values for the projected impact correspond to approximately one forty-eighth of the Appendix I design objective. If continued at this rate for one year, the projected impact would correspond to less than one-fourth of the Appendix I limit.

The doses calculated for the present month will be used as the projected doses unless information exists indicating that actual releases could differ signficantly in the next month. In this case, the source term should be adjusted to reflect this information and the justifiction for the adjustment noted. This adjustment should account for any radwaste equipment which was operated during the previous month that could be out of service in the coming month.

LIQUID RADIOACTIVE WASTE TREATMENT SYSTEM



ATTACHMENT 1-1

11.2.3.2 Dilution Factors

The liquid waste discharged to the environment is diluted by the cooling tower blowdown and excess service water of Units 1 and 2. After Unit 1 is placed in operation, the normal dilution flow will be between 30,000 and 61,500 gpm. When both the emergency service water and normal service water are discharging into the discharge tunnel, the dilution flow may temporarily increase to approximately 100,000 gpm.

Values in Table 11.2-13 were calculated using the normal minimum dilution flow of 30,000 gpm. During certain operating conditions or certain seasons, flows may be less than normal minimum flow indicated. However, flows will exceed the normal minimum flow a substantial portion of the year, thus the values in Table 11.2-13 are a valid conservative estimate of annual discharges. In no case will discharges be made when dilution flow is less than 30,000 gpm, although dilution flow may drop below 10,000 gpm during normal operating conditions. Low dilution water flow actuates solenoid valves G50F154 and G156 which close main process valves G50F153 and F155 to terminate radwaste release at 30,000 gpm.

PERRY NUCLEAR POWER PLANT
LRW DISCHARGE DILUTION FACTORS

The following description outlines the rationale used in determining the liquid radioactive waste dilution factors used in calculating maximum individual and population doses for routine releases from Perry Nuclear Power Plant. There are three pathways of concern for liquid radioactive releases at PNPP:

1. potable water ingestion,
2. fresh water fish ingestion, and
3. shoreline deposit exposure.

The irrigated food pathways, discussed in Regulatory Guide 1.109, will not be of concern at PNPP because little or no water from Lake Erie is used for irrigation in the nearby Ohio counties of Lake, Ashtabula, Cuyahoga, and Lorain. Nursery businesses and other agricultural activities that require supplemental water generally rely on water drawn from small ponds and streams.

POTABLE WATER INGESTION

For the determination of the dilution factors for the potable water ingestion pathway, the assumption is made that the maximum exposed individual will drink water from the Painesville Water Supply, the nearest Lake Erie potable water intake to PNPP, located 3.9 miles to the WSW. The maximum exposed individual dilution factor is conservative in that it is not current-frequency factor adjusted. The population dose assessment dilution factor is the sum of the population-weighted dilution factors for each potable water intake within 50 miles of PNPP. (Weighted dilution factors are the product of the annual current-frequency factor adjusted-dilution factor and the percentage of the total population within 50 miles ingesting potable water taken from Lake Erie for each specific intake.)

Dilution factors for this exposure pathway were obtained from Table 5.1-10 of PNPP's Environmental Report - Operating License Stage, "Annual Average Dilution Factors for Lake Water Intakes within 50 Miles of PNPP." The maximum exposed individual dilution factor is equal to 31.5, and the dilution factor to be used for population dose assessment is equal to 316.

FRESH WATER FISH INGESTION

For the determination of the dilution factor for the fresh water fish ingestion pathway, the conservative assumption made is that the fish consumed by the maximum exposed individual, as well as the rest of the population, are caught in the area of the discharge structure. Therefore, only initial (near field) dilution is taken into account.

The discharge delta temperature will be in the range of 16.5 to 15.2 degrees fahrenheit, and the maximum surface delta temperature will be in the range of 1.6 to 1.3 degrees fahrenheit. Ratioing of the median values for the above ranges yields a dilution factor of 10.9. The dilution factor for the maximum exposed individual is the same as for population dose calculations.

SHORELINE DEPOSIT EXPOSURE

For the determination of the dilution factors for the shoreline deposit exposure pathway, the assumption is made that the maximum exposed individual is exposed at the PNPP site boundary at the edge of Lake Erie, 0.7 miles (approximately the same distance in both the ENE and WSW directions) downshore of the plant discharge structure. Because it is assumed that a very large number of people are going to be exposed via this pathway, i.e., 2.4 million, the location chosen for population dose assessment is the Headlands Beach State Park, the nearest large public beach to PNPP, located 7.7 miles to the WSW of the plant.

The maximum exposed individual dilution factor is a noncurrent-frequency factor adjusted-factor equal to 14.5. The dilution factor to be used for population dose assessment is a current-frequency factor adjusted-factor equal to 162.

Maximum Individual Dilution Factors

Pathway	Location	$\frac{M}{P}$
Potable Water Ingestion	3.9 mile WSW of site	31.5
Fresh Water Fish Ingestion	Near Discharge Structure	10.9
Shoreline Exposure Pathway	0.7 mile ENE of site	14.5

Population Dose Dilution Factors

Pathway	Location	$\frac{M}{P}$
Potable Water Ingestion	Population Weighted Average	316
Fresh Water Fish Ingestion	Near Discharge Structure	10.9
Shoreline Exposure Pathway	7.7 mile WSW of site	162


L A K E E R I E
34
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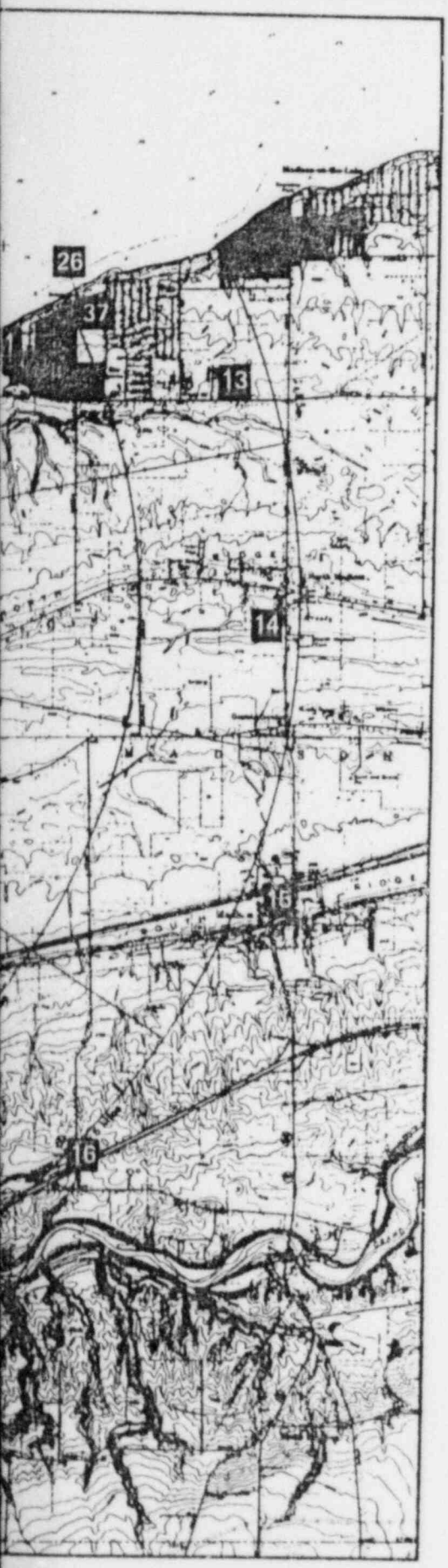
17

ATTACHMENT 1-5

PNPP ENVIRONMENTAL
RADIOLOGICAL MONITORING PROGRAM
SAMPLING LOCATIONS WITHIN 5 MILES OF SITE



0 1 2 3 4 Miles

LEGEND

Station No.	Media	Direction
1	Air – TLD	ENE
2	TLD	E
3	Air – TLD	SE
4	Air – TLD	S
5	Air – TLD	SW
7	TLD	NE
8	TLD	ENE
9	TLD	ESE
10	TLD	SSE
11	TLD	SSW
12	TLD	WSW
13	TLD	ENE
14	TLD	E
15	TLD	ESE
16	TLD	SE
17	TLD	SSE
18	TLD	S
19	TLD	SSW
20	TLD	SW
21	TLD	WSW
25	Sediment – Fish	NNW
26	Sediment	ENE
29	Milk	ESE
30	Milk	SSW
31	Milk	ESE
34	Water	NW
35	Air – TLD	E
36	Water	WSW
37	Water	ENE
38	Food Products	E
39	Food Products	SSW
40	Food Products	E
41	TLD	SW
42	TLD	S
43	TLD	SSE
44	VL	SSE
45	TLD	SSW

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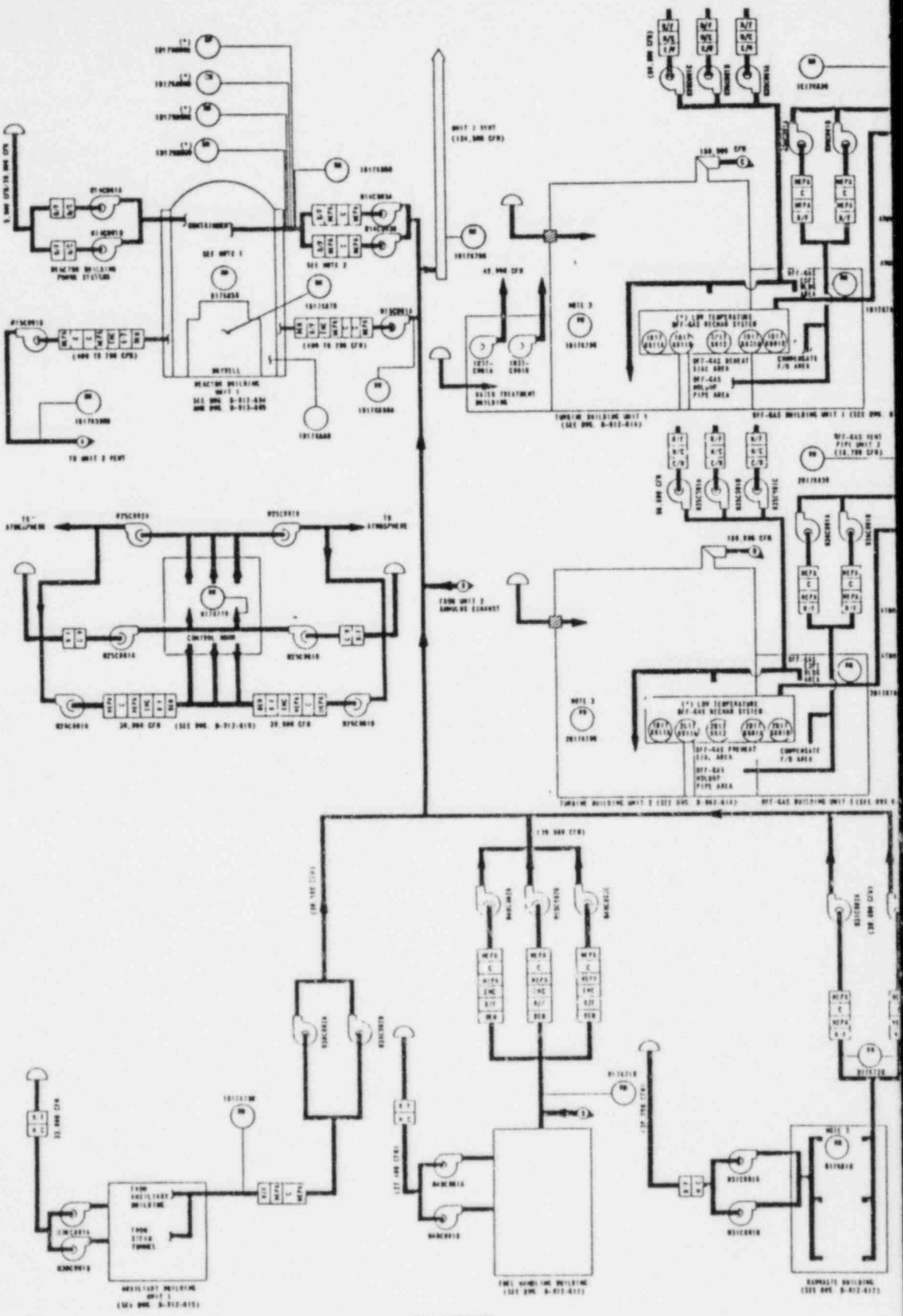


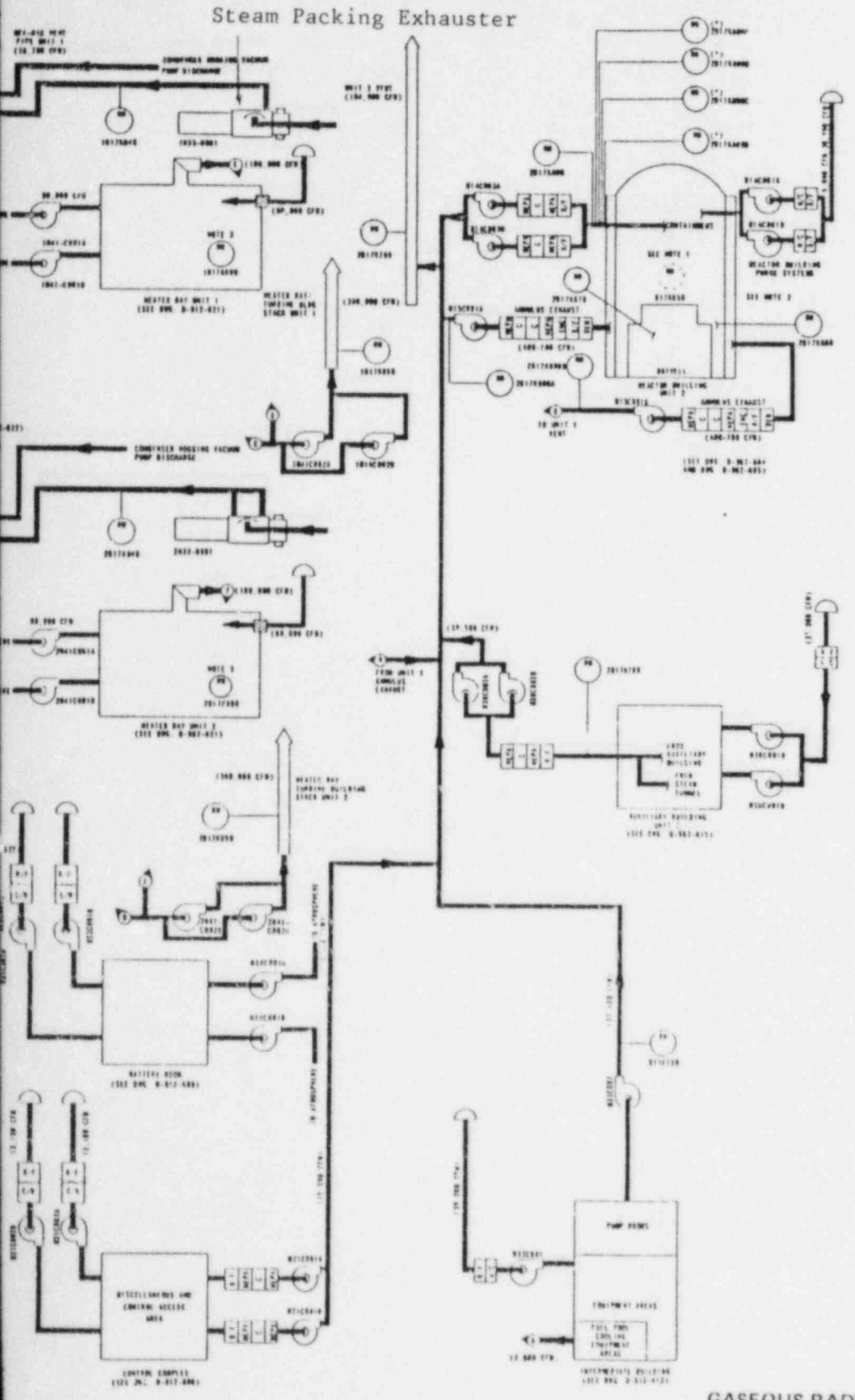
NOTES:

1. RADIATION MONITOR NO. 0175650 IS A PORTABLE MONITORING UNIT USED TO SERVICE 3 UNIT BWR DURING REFUELING.
2. DETECTORS MONITORING THE MAIN STEAM LINES ARE LOCATED JUST DOWNSTREAM FROM THE OUTBOARD ISOLATION VALVES

0175650A	0175650C
0175650B	0175650D
0175651C	0175651A
0175651D	0175651B

NOTES: (CONTINUED)

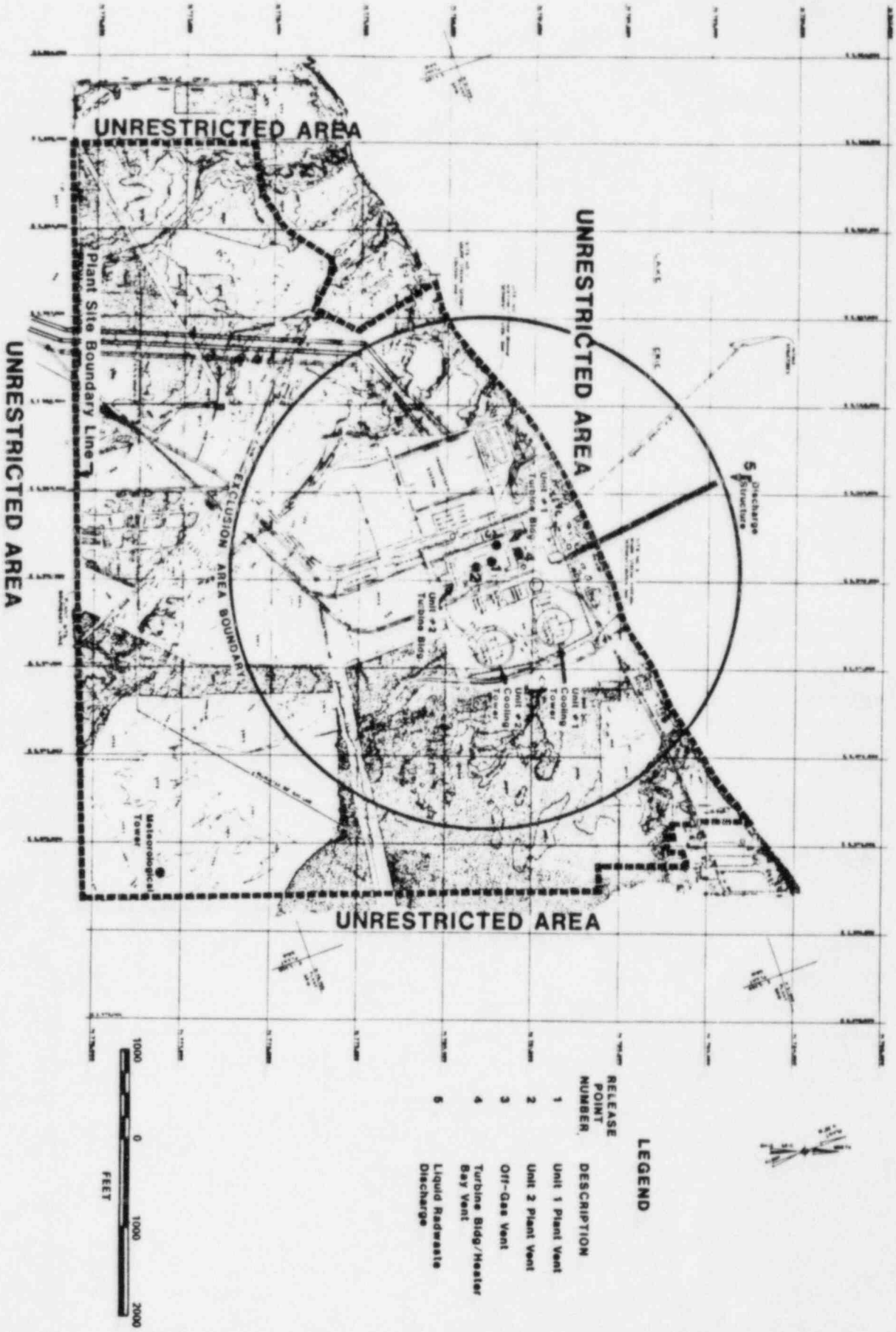
3. RADIATION MONITORS: 0175650 ARE PORTABLE MONITORING UNITS
   0175650
   0175650
   0175650
   0175650
   0175650
4. (7) SUPPLIED BY GENERAL ELECTRIC



GASEOUS RADWASTE SYSTEM FLOW DIAGRAM

PERRY NUCLEAR POWER PLANT 1 & 2

THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY


UNRESTRICTED AREA
UNRESTRICTED AREA
UNRESTRICTED AREA
UNRESTRICTED AREA
Plant Site Boundary Line
EXCLUSION AREA BOUNDARY
Unit #1 Turbine Bldg.
Unit #2 Turbine Bldg.
Unit #1 Cooling Tower
Unit #2 Cooling Tower
Meteorological Tower
5 Discharge Structure
LEGEND
RELEASE POINT NUMBER
DESCRIPTION
1 Unit 1 Plant Vent
2 Unit 2 Plant Vent
3 Off-Gas Vent
4 Turbine Bldg./Heater Bay Vent
5 Liquid Radwaste Discharge
1000
0
1000
2000
FEET

ATTACHMENT I-8

Sample Locations and Media for the
Radiological Environmental Monitoring Program
(Sheet 1 of 5)

Location No.	Description	Distance (Miles)	Direction	Media (1)
1	Redbird (Haines Road, north of West Chapel Road) TLD located on pole 3303609, first pole south of first driveway on left	3.4	ENE	APT, AI, TLD, PR, SO
2.	Site Boundary: Tree line, Ash tree with white dot approximately 1000 ft. NNW of second transmission tower from road	0.7	E	TLD, SO
3.	Meteorological Tower On fence surrounding the equipment shelter	1.0	SE	APT, AI, TLD
4.	On pole No. W79/SPG5-30; inside auxiliary road gate of Parmly Road	0.7	S	APT, AI, TLD, SO
5.	Quincy Substation On pole No. L1283/9300, east side of substation	0.6	SW	APT, AI, TLD
6.	Concord Service Center (Control) Auburn Road, south of Rt. 90, on inside rear fence next to gate	11.0	SSW	APT, AI, TLD, PR, SO
7.	Site Boundary; Lockwood Road bus turnaround, to the right, 100 feet past turnaround on tree with white dot	0.6	NE	TLD
8.	Site Boundary; Tree line, behind nursery off Antioch Road, follow road to end of nursery. On tree near creek with white dot	0.8	ENE	TLD
9.	Site Boundary; Transmission line tower, third tower from Antioch Road toward the plant	0.7	ESE	TLD

Sample Locations and Media for the
Radiological Environmental Monitoring Program
(Sheet 2 of 5)

Location No.	Description	Distance (Miles)	Directions	Media (1)
10.	South-Southeast corner of security fence. On pole at corner of fence.	0.8	SSE	TLD
11.	Transmission line tower On tower at SW corner of Center and Parmly Roads.	0.6	SSW	TLD
12.	Site Boundary; Transmission line tower; access road from north side of Parmly just west of location #5	0.6	WSW	TLD, PR, SO
13.	Madion-on-the-Lake --at the end of Whitewood Drive, north of Chapel Road, NW side of turnaround, on pole No. 835803	4.7	ENE	TLD
14.	Hubbard Road (south of North Ridge Road). On pole No. 28974 on west side of road, south side of McMackin Creek.	4.9	E	TLD, SO
15.	Madison substation (Eagle Street). On utility pole inside substation fence.	5.1	ESE	TLD
16.	Dayton Road (north of Interstate 90). On pole No. 572203 on left after dirt driveway just after sharp left on Dayton.	5.0	SE	TLD
17.	Chadwick Road (dead end south of Interstate 90) On pole No. 276222/118Z011. Last pole on left.	5.2	SSE	TLD
18.	Blair Road On pole, left side, just after road makes 90 degree left curve down hill heading towards river	5.0	S	TLD, SO

Sample Locations and Media for the
Radiological Environmental Monitoring Program
(Sheet 3 of 5)

Location No.	Description	Distance (Miles)	Direction	Media (1)
19.	Lane Road and South Ridge Road On pole No. PC5648, 100 feet north of intersection	5.3	SSW	TLD
20.	Nursery Road at Rt. 2 overpass On pole No. 828976 across from entrance to Rt. 2	5.3	SW	TLD, SO
21.	Hardy Road at Painesville Township Park On pole No. 378345, east of park entrance	5.1	WSW	TLD
22.	Painesville On south side of Main Street across from Evergreen Cemetery On tree with white dot 60 feet west of pole No. DBPG296	6.9	SW	TLD
23.	Fairport Harbor (High Street and New Street) On pole near substation facing street	7.9	WSW	TLD
24.	St. Clair Avenue Substation (Control) In Mentor; on rear fence corner near railroad track	15.1	SW	TLD
25.	PNPP Discharge	0.6	NNW	SED, FSH
26.	Offshore at Redbird, vicinity of Ohio Water Service Co. Intake	4.2	ENE	SED
27.	Offshore, vicinity of Fairport Harbor Water Supply System Intake	7.9	WSW	SED
28.	Ashtabula (Control) CEI Generating Station Intake	22.0	ENE	WTR
29.	Deleted.			
30.	Milk Farm, Manley residence North Ridge Road, Perry	2.3	SSW	MLK
31.	Milk Farm, Hoffer residence Antioch Road, Perry	1.4	ESE	MLK

Sample Locations and Media for the
Radiological Environmental Monitoring Program
(Sheet 4 of 5)

Location No.	Description	Distance (Miles)	Direction	Media (1)
32.	Mentor-on-the-Lake (Control)	15.8	WSW	SED, FSH
33.	Brookglen Farm (Control) Greig residence Callow Road, Leroy	10.2	S	MLK
34.	PNPP Intake	0.7	NW	WTR
35.	Site Boundary, north of Transmission line, next to transformer, follow tree line	0.6	E	APT, AI, TLD
36.	Painesville Water Supply Intake	3.9	WSW	WTR
37.	Ohio Water Service Co. Pump Station Green Road, Madison	4.1	ENE	WTR
38.	Seith Farm, 2861 Antioch Road 0.5 miles from North Ridge Road	1.1	E	FP
39.	Goldings Farm Stand 3515 North Ridge Road	1.8	SSW	FP
40.	Rideout residence, 2768 Antioch Road 0.7 miles from North Ridge Road	1.1	E	FP
41.	Clark Road One-half mile from Center Road. On pole No. 561969, south side of road	1.1	SW	TLD
42.	Parmly Road One half-mile from Center Road, located on utility pole No. 582923 near southwest corner of plant fence	0.8	S	TLD

Sample Locations and Media for the
Radiological Environmental Monitoring Program
(Sheet 5 of 5)

Location No.	Description	Distance (Miles)	Direction	Media (1)
43.	Parmly Road Approximately 0.6 miles from Center Road next to stream. Tree with white dot 50 feet from road, left of stream	1.0	SSE	TLD
44.	Parmly Road Approximately 0.6 miles from Center Road. Green vegetation along roadside and field	1.0	SSE	VL
45.	Clark Road Approximately 0.2 miles from Center Road on pole No. 561960, south side of road	0.9	SSW	TLD

(1) APT = Air Particulate
AI = Air Iodine
TLD = Ambient gamma dose rate
SED = Sediment
WTR = Water
FSH = Fish
MLK = Milk
FP = Food Products
SO = Soil
PR = Precipitation
VL = Vegetable