ATTACHMENT
Page Changes for Proposed
Technical Specifications Change

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3.9 EFFLUENT RELEASE

Applicability

Applies to the controlled release of radioactive liquids and gases, heat, residual chlorine and other chemicals from the plant.

Objectives

To define the conditions for release of: (1) Radioactive wastes from the plant discharge mixing basin and from the plant vent to assure that any radioactive material released is kept as low as practicable and, in any event, is within the limits of 10 CFR 20; (2) chlorine residuals from the plant; (3) spent sulfuric acid from the closed-cycle condenser cooling system; and (4) thermal discharges of the closed-cycle condenser cooling system.

Specifications

Liquid Wastes

3.9.1 Specifications for operation of plant heat dissipation systems and chemical releases associated with all plant discharge water systems will be covered in the National Pollutant Discharge Elimination System Permit (NPDES).

3.9.2 During release of radioactive liquids, the MPC, as defined in 10 CFR 20, shall not be exceeded at the point of discharge to the lake.

3.9.3 Prior to release of liquid wastes, a sample shall be taken from the tank to be discharged and analyzed. The flow rate from the tank and the discharge rate from the mixing basin shall be determined in order to calculate the concentration of radioactive materials in the mixing basin to demonstrate compliance with 3.9.1 and 3.9.2 above.

3.9.4 During the release of liquid radioactive wastes, the following conditions shall be met:

a. Flow through the mixing basin shall be at least 8,000 gpm.

b. During any release, the discharge monitor shall be in operation with the exception that if it (RIA-1049) is down for maintenance, sampling of the discharge water shall be taken every four hours and each sample analyzed.

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3.9.11 Gaseous Wastes

The average annual release rates of gaseous and airborne particulate wastes shall be limited in accordance with the following equation:

$$\Sigma \frac{Q_i}{(MPC)_i} \leq 5 \times 10^{11} \text{ (cc/sec)}$$

where Q_i is the annual release rate (μCi/sec) of any radioisotope, i, and $(MPC)_i$ in the units of μCi/cc is defined in Column 1, Table II of Appendix B to 10 CFR 20.

3.9.12 The average gaseous release rate over any 15-minute period shall not exceed 10 times the yearly average limit.

3.9.13 Following isolation and prior to release of gaseous wastes from the waste gas decay tanks, the contents shall be sampled and analyzed to determine compliance with 3.9.11 and 3.9.12.

3.9.14 For purposes of calculating permissible releases by the above formula, MPC for halogens and particulates with half-lives longer than 8 days will be divided by a factor of 35 from their listed value in 10 CFR 20, Appendix B.

3.9.15 During release of gaseous wastes to the plant vent stack, the following conditions shall be met:

a. At least one main exhaust fan shall be in operation.

b. The gaseous radioactivity monitor and the particulate monitor shall be in operation during discharges with the exception that if RIA-1113 is down for maintenance, sampling of the stack effluent shall be taken every four hours and each sample analyzed.

3.9.16 During power operation, whenever the air ejector discharge monitor is inoperable, samples shall be taken from the air ejector discharge and analyzed for gross radioactivity daily.

3.9.17 Gaseous radioactive waste shall have the following minimum holdup times prior to release:

a. Potentially high-radioactivity gaseous waste collected by the waste gas surge tank - a minimum of 15 days up to 60 days of

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holdup if the concentration of xenon-133 exceeds the detection limit of 1×10^{-5} μCi/cc (except as noted in 3.9.17.c). No holdup required except as provided by the piping system itself if the concentration of xenon-133 is less than the limit of 1×10^{-5} μCi/cc.

b. Low-radioactivity gaseous waste collected by the gas collection header shown on FSAR Figure 11-3.

No holdup required except as provided by piping system itself.

c. Gaseous waste may be discharged from waste gas surge tank through a high efficiency filter or from a waste gas decay tank with less than 15 days of holdup directly to the stack for a period not to exceed 7 days if the holdup system equipment is not available and the release rates meet Specifications 3.9.11, 3.9.12 and 3.9.14.

3.9.18 It is expected that releases of radioactive materials in effluents shall be kept at small fractions of the limits specified in 20.106 of 10 CFR 20. At the same time the licensee is permitted the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such small fractions but still within the limits specified in 20.106 of 10 CFR 20. It is expected that in using this operational flexibility under unusual operating conditions, the licensee shall exert its best efforts to keep levels of radioactive material in effluents as reasonably achievable.

Bases

Liquid wastes from radioactive waste disposal system are diluted in the discharge mixing basin prior to release to the lake.(1) A minimum flow of 8,000 gpm is provided for dilution. The dilution can be achieved by use of any of the three service water pumps or either of the cooling tower blowdown dilution pumps or a combination of any or all of these pumps. Because of the low-radioactivity levels in the mixing basin, the concentrations in the mixing basin will be calculated from the measured concentrations in the various treated waste tanks, from the flow rate of the treated waste pumps and the discharge flow from the mixing basin. The flow rate in the mixing basin will be determined by means of a flowmeter or other suitable means. See Section 4.11.

Under normal operating conditions the expected release to the environment from the modified liquid waste systems will be essentially zero. All modified waste system liquids will be recycled or prepared for shipment to an authorized disposal area or areas in accordance with applicable NRC and DOT rules and regulations.

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Bases (Contd)

If the annual average concentration of liquid wastes in the mixing basin equals 2.5 x 10^{-8} μCi/cc as specified, the potential dose to the general public from laundry wastes has been estimated, using 61,300 gpm total diluted blowdown, prior to release to the lake and a dilution factor of 1,000[2] prior to the postulated consumption of water or uptake by fish. The radionuclide concentration is assumed to consist of I-131, Sr-90 and Cs-137 in the same relative abundance as in the primary coolant. It is also assumed that the person drinks water at a rate of 2,200 cc/day[3] and eats 50 grams of fish/day.[4] Based on these assumptions the potential annual dose to an individual from drinking water taken from the nearest public water supply at South Haven, Michigan, would be a total of 1.6 x 10^{-4} mRem/yr which results in an insignificant exposure to members of the public as a result of consumption of drinking water taken from the lake. If the annual average concentration of liquid wastes in the discharge were to equal MPC, the average concentration at the intake of the nearest public water supply at South Haven would be well below MPC.[2,5] Under abnormal operating conditions, such as (but not limited to) steam generator tube leakages, fire or pipe breakage, radioactive materials will be discharged to the environment after processing to reduce the discharged radioactivity to levels which are as low as is reasonably achievable.

The release limit of liquid wastes in the mixing basin is a selection based upon reasonable operating experience and will still result in a concentration at the nearest public water intake significantly below MPC.[2] It is intended that the liquid waste release limit of Specification 3.9.2 will normally be restricted to single batches of waste. The maximum amount of tritium in the discharge is limited to the value given in 10 CFR 20 by imposing a limit on the tritium concentration in the primary coolant water based on a minimum dilution of 8,000 gpm. As there is no mechanism for concentrating tritium above the concentration in the primary coolant system, there is no safety requirement to monitor the liquid waste discharge for tritium.

Prior to release to the atmosphere, gaseous wastes from the radioactive waste disposal system are mixed with the plant ventilation flow from at least one of two main (60,000 cfm) exhaust fans.[6] Further dispersion then occurs in the atmosphere.

Bases (Contd)

If the activity level in the waste gas surge tank is greater than 1×10^{-5} μCi/cc, the potentially high-radioactivity gaseous waste will be stored in the waste gas decay tanks for up to 60 days to reduce the release of radioactive gas to the environs to as low as practicable in accordance with 10 CFR 50 limits. If the activity is less than 1×10^{-5} μCi/cc, the gaseous waste can be stored in the holdup tanks. A high radiation monitor shall signal to automatically close the waste gas decay tank discharge valve when the release rate exceeds that specified in Specifications 3.9.11 or 3.9.12. Provisions are made to bypass the holdup tanks for a period up to 7 days to effect required repairs and testing of the system and to allow discharge of collected gases during heating and start-up. If the gaseous waste cannot be released at levels within the requirements of 10 CFR 20, Appendix B, the reactor shall be placed in a hot shutdown condition in order to eliminate the production of fission gases.

Holdup of a waste gas decay tank shall be considered accomplished if the tank remains isolated over the required time period and leakage from the tank does not cause greater than a 10 psi pressure drop. The 15-minute limitation on gaseous release rates in excess of 10 times the annual average limit is based on the fact that radioactivity approximately equivalent to 5% of the annual allowable dose at the site boundary could be released in 15 minutes if the radioactivity level in the primary coolant approached the maximum allowable by Specification 3.1.4.

The low-radioactivity levels associated with the gaseous waste collected by the gas collection header allow it to be piped directly to the base of the plant ventilation tank.

The reduction in allowable release rate for particulates and halogens of 35 includes the value of 243 for I-131 as given in Regulatory Guide 1.42 plus credit for a six-month grazing period and the ratio of the χ/Q value at the site boundary to that at the location of the nearest actual cow 1.5 miles southeast of the plant.

3.9 EFFLUENT RELEASE (Contd)

Bases (Contd)

The formula prescribed in the specification takes atmospheric dilution into account and insures that at the point of maximum ground concentration at the site boundary the requirements of 10 CFR 20 will not be exceeded. The limit is based on the highest long-term value of χ/Q, which occurs at the south edge of the site and is approximately 2×10^{-12} sec/cc. The following data were used to derive the formula prescribed in the specification:

Wind Direction	Average Annual Frequency of Occurrence %	Average Annual Wind Speed m/s	Distance to Site Boundary Downwind m
N	12.51	6.1	677
NNE	4.34	5.5	767
NE	3.46	4.1	Offshore
ENE	3.48	4.1	Offshore
E	4.20	4.4	Offshore
ESE	4.41	4.4	Offshore
SE	5.01	4.5	Offshore
SSE	7.12	5.0	Offshore
S	10.10	5.3	Offshore
SSW	6.21	5.6	811
SW	7.12	6.4	1052
WSW	8.13	6.2	1402
W	7.85	6.8	1315
WNW	6.07	7.9	1227
NW	4.68	6.9	1008
NNW	4.60	6.3	767
Calm	0.66	-	-

EFFLUENT RELEASE (Contd)

Bases (Contd)

From the FSAR analyses,[7] the following long-term values can be obtained:

Wind Direction	$\frac{\chi^f}{Q}\frac{sec}{m^3}$	$\frac{Q}{\chi^f}\frac{m^3}{sec}$
N	2×10^{-6}	5×10^{5}
NNE	5.64×10^{-7}	1.77×10^{6}
SSW	7.39×10^{-7}	1.35×10^{6}
SW	5.23×10^{-7}	1.91×10^{6}
WSW	3.91×10^{-7}	2.56×10^{6}
W	3.88×10^{-7}	2.58×10^{6}
WNW	2.82×10^{-7}	2.54×10^{6}
NW	3.30×10^{-7}	3.03×10^{6}
NNW	5.22×10^{-7}	1.92×10^{6}

Therefore, the highest long-term value of χ/Q at the site boundary is seen to be 2×10^{-6} sec/m^3 or 2×10^{-12} sec/cc.

The limits for the range of pH for discharge of acids and bases to the lake are consistent with the Michigan water quality standards and the NPDES Permit.

REFERENCES

1. Special Report No. 5 dated December 1, 1972.

2. FSAR Amendment No. 15, question 2.3.

3. ICRP Standard Man Model.

4. US Bureau of Commercial Fisheries Statistical Digest No. 60, 1968.

5. FSAR, Section 2.2.2.

6. FSAR, Section 9, Figure 9.15.

7. FSAR, Appendix D.

8. Final Environmental Statement, Palisades Plant, June 1972.

9. Letter dated August 9, 1976, to G. W. Knighton, Chief, Environmental Projects Branch No. 1, Directorate of Licensing, U. S. Nuclear Regulatory Commission, from D. A. Bixel, Assistant Nuclear Licensing Administrator, Consumers Power Company, including the NPDES permit for Palisades issued under Section 402 of the FWPCA of 1972 by the Michigan Water Resources Commission on August 2, 1976.

4.11 ENVIRONMENTAL MONITORING PROGRAM

Applicability

Applies to routine testing of plant environs and to an analytical evaluation of the data collected from the environmental monitoring survey carried out.

Objective

To establish a sampling and surveillance schedule which will assure recognition of changes in the environs due to plant operations and assure that effluent releases are kept as low as reasonably achievable and within Federal and State limits.

Specifications

4.11.1 Radiological environmental samples[1] shall be taken according to the following schedule:

Table 4.11.1

Specific Samples and Collection Frequency

Sample Class	Collection Frequency	Amount To Be Collected (Operational)
(a) Air	Weekly	12
(b) Lake Water	Monthly	2
(c) Well Water	Monthly When Available	3
(d) Milk	Monthly When Available	4
(e) Organic	Monthly in Season	Crops and Fish as Desired
(f) Film or TLD	Monthly	21
(g) Lake Bottom Sediment	Twice Per Year	4

4.11.2 The sensitivities listed below and in Table 4.11.2 shall be used for the samples listed in Table 4.11.1.

Air - An I-131 analysis shall be performed on all air samples. When a gross beta count reveals radioactivity levels in excess of 1 pCi/M^3, gamma spectrum analysis shall be performed.

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Basis - Radiological

The radiological environmental monitoring program for the plant is designed to meet the following objectives:

1. Measurement of radiation levels in the sampled media is done in such a manner to assure compliance with 10 CFR 20.

2. Survey design is such that releases of plant origin can be differentiated from natural or other sources of environmental radiation. This is accomplished in two ways. First of all, the commonly called "reference area approach to environmental surveillance" is used. This makes use of a calculation that shows whether or not a statistical difference exists between the levels of radioactivity detected near the site and those detected remote from the site. Secondly, specific isotopic analyses are performed. In this manner, concentrations of specific isotopes in the sampled environmental media can be related to known plant releases of the same nuclide.

3. Dose estimates to man are made if significant increases in radiation levels have been found to occur as a result of (2) above. This is meaningfully done by (a) requiring detection sensitivity to be far below any effective maximum permissible concentration, and (b) planning the survey with sample collection designed to estimate dose.

The survey consists of 12 stations. Nine are near and three are remote from the site. In addition, nine extra film-TLD stations are located at the site boundary and lake water, biota and bottom sediment are further collected at the site. In this way, inhalation, ingestion and direct dose can be estimated and because of the Lake Michigan sampling, food-chain parameters can be determined.

Meeting the objective of providing assurance that the facility's contribution to the naturally existing radioactivity in the environment is negligible requires analyses to be performed such that sensitivities

are far below those resulting in maximum permissible dose (MPD) to man. In other words, levels of radioactivity in water, air or food to be detected shall be far below those resulting in MPD to man. Levels of radioactivity in water, air or food to be detected shall be a small fraction of any effective maximum permissible concentration (MPC) allowed in such a sample. This is sometimes called the absolute contribution approach. On the other hand, there is a level of release to the environment with a resultant corresponding level in food, air and water below which it is absurd to perform any specific isotopic analyses. Consequently, the sensitivities outlined in Table 4.11.2 are a compromise between the preceding two requirements. This schedule will insure that changes in the environmental radioactivity can be detected. The materials which first show changes in radioactivity are sampled most frequently. Those which are less affected by transient changes but show long-term accumulations are sampled less frequently. After a few years of operation, it is desirable to review the established limits. Data on the actual concentrations in food or other organisms (if any are observed) will permit this reevaluation.

The lake bottom sediment samples taken twice during the summer months will be sufficient to detect any buildup in Cs-137.

The gross beta limit on 1×10^{-12} μCi/cc on air samples represents 1% of the MPC, as given in 10 CFR 20, for unknown mixtures of gamma-emitting nuclides.

Basis - Nonradiological

1. Aquatic

   Specifications for monitoring of plant heat dissipation systems and chemical releases associated with all plant discharge water systems will be covered in the NPDES Permit.

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6.9.3.c Nonradiological Environmental Monitoring Program (Contd)

during the previous 12 months of operation shall be submitted to the NRC within 90 days after January 1 of each preceding calendar year.

1. The report shall include data and narrative summaries, interpretations and statistical evaluations, where appropriate, of the results of the nonradiological environmental monitoring programs required in Section 4.11. The report, where applicable, shall include a comparison with the previous environmental monitoring results and include an assessment of the observed impacts of the plant operation on the environment. If harmful effects are detected by monitoring, the licensee shall provide an analysis of the problem. For each medium sampled during the year, a list and map of the sampling locations and total number of samples shall be included. Specifically the following information obtained during the report period shall be provided in the report:

   a. Thermal survey results.

   b. Chlorine residual monitoring results.

   c. Monitoring results of other chemical discharges including pH measurements.

   d. Other aquatic monitoring results of Section 4.11.5.

   e. Meteorological monitoring results of Section 4.11.7.

   f. Terrestrial monitoring results of Section 4.11.7.

SPECIAL TECHNICAL SPECIFICATIONS
PURSUANT TO AGREEMENT

This section is deleted under the termination of the Settlement Agreement between Consumers Power Company and the Michigan Steelhead and Salmon Fishermen's Association.