

January 31, 1984

Docket No. 50-320

Mr. B. K. Kanga, Director
Three Mile Island Unit 2
GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

Dear Mr. Kanga:

Subject: Three Mile Island Nuclear Station, Unit 2
Operating License No. DPR-73
Docket No. 50-320
License Amendment No. 24

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The Nuclear Regulatory Commission has issued the enclosed Amendment No. 24 to Facility Operating License No. DPR-73. This amendment is in response to your request dated July 7, 1983 (4410-83-L-0143).

This amendment consists of the deletion of references to Three Mile Island Unit 1 monitoring, instrumentation, and valves that relate solely to the operation of Unit 1.

We have determined that the amendment involves an action that is insignificant from the standpoint of environmental impact and that there is reasonable assurance that the health and safety of the public will not be endangered by this action.

Having made this determination, we have further concluded that, pursuant to 10 CFR 51.5(d)(4), an environmental impact statement, negative declaration or environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Copies of the Notice of Issuance have been forwarded to the Office of the Federal Register for publication in the Commission's next Monthly FEDERAL REGISTER notice.

Sincerely,

Original signed by
B. J. Snyder

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PDR ADOCK 05000320
P PDR

Bernard J. Snyder, Program Director
Three Mile Island Program Office
Office of Nuclear Reactor Regulation

Enclosures:

*SEE PREVIOUS CONCURRENCE

OFFICE	1. Amendment No. 24 to DPR-73	TMIPO:NRR*	TMIPO:NRR*	ELD*	PD:TMIPO:NRR*
SURNAME	2. Safety Evaluation	TCPointexter	bg RWeller		BJSnyder
DATE	cc: See next page.	1/16/84	1/16/84	1/31/84	1/31/84

Mr. B. K. Kanga

-2-

cc: J. Barton
J. Byrne
J. Larson
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DATE ▶

GENERAL PUBLIC UTILITIES NUCLEAR CORPORATION

DOCKET NO. 50-320

THREE MILE ISLAND NUCLEAR STATION UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 24
License No. DPR-73

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by GPU Nuclear Corporation (the licensee), dated July 7, 1983, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter 1;
 - B. The facility will be operated in conformity with the License, the Order for Modification of License dated July 20, 1979, the application for amendment, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment will be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Operating License Technical Specifications as indicated in the attachment to this license amendment and by changing paragraph 2.C (2) to Facility Operating License No. DPR-73 to read as follows:

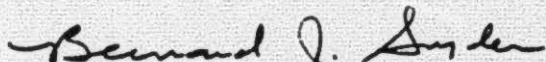
2.C (2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 24 are hereby incorporated in the license. The licensee shall operate the facility in accordance

with the Technical Specifications and all Commission Orders,
issued subsequent to March 28, 1979.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Bernard J. Snyder, Program Director
TMI Program Office
Office of Nuclear Reactor Regulation

Date of Issuance: January 31, 1984

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

GENERAL PUBLIC UTILITIES NUCLEAR CORPORATION

DOCKET NO. 50-320

THREE MILE ISLAND NUCLEAR STATION, UNIT 2

Introduction

By letter dated July 7, 1983, the General Public Utilities Nuclear Corporation (GPUNC) requested changes to the Appendix B Technical Specifications of Operating License No. DPR-73 for the Three Mile Island Nuclear Station, Unit No. 2 (TMI-2). The requested change would delete references to Three Mile Island Nuclear Station Unit 1 monitoring, instrumentation, and valves that relate solely to the operation of Unit 1.

Discussion and Evaluation

The original TMI-2 Appendix B Environmental Technical Specifications included requirements for TMI-2 and TMI-1. They were combined because they were station requirements and not individual unit requirements. Because of the now separate organizations responsible for managing and operating TMI-2 and TMI-1, and because the TMI-1 Technical Specifications were modified to incorporate appropriate requirements for Unit 1 (TMI-1 License Amendment 72, dated August 6, 1981), it is no longer necessary to include the Unit 1 requirements in the Unit 2 Technical Specifications. The change is strictly editorial and does not involve an increase nor a decrease of TMI-2 requirements.

Environmental Considerations

We have determined that the change does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the change involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR 51.5 (d)(4), that an environmental impact statement or negative declaration or environmental impact appraisal need not be prepared in connection with the issuance of this change.

Conclusion

Based upon our review of the above discussed change, the staff finds that the requested revision of the proposed Technical Specifications is acceptable.

We have also concluded, based on the considerations discussed above, that:

- (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and
- (2) such activities will be conducted in compliance with the Commission's regulations and the implementation of this change will not be inimical to the common defense and security or to the health and safety of the public.

2.1 Radioactive Discharges2.1.1 Liquid EffluentsApplicability

Applies to the controlled release of radioactive liquids from TMI Unit No. 2.

Objective

To define the limits and conditions for the controlled release of liquid radioactive effluents to the environs to ensure that these releases are as low as practicable. These releases should not result in radiation exposures to off site areas greater than a few percent of background exposures. The instantaneous releases rate for all effluent discharges should be within the limits specified in 10 CFR Part 20.

To assure that the releases of radioactive liquids to off site areas meet the "as low as practicable" concept, the following objectives apply:

a. The annual total quantity of radioactive materials in liquid waste, excluding tritium and dissolved gases, should not exceed 5 curies per radioactive waste-producing reactor, and the annual dose to the whole body or any organ of an individual should not exceed 3 mrem to the total body and shall be less than or equal to 10 mrem to any organ.

b. The annual average concentration of radioactive materials in the effluent from the Mechanical Draft Cooling Towers prior to dilution in the Susquehanna River, excluding tritium and dissolved gases, should not exceed 2×10^{-8} uci/ml.

Objective

To ensure that radioactive liquid releases from the facility are within the limits of Specifications 2.1.1 a. through f.

Objective (Cont'd)

c. The annual average concentration of tritium in liquid waste prior to dilution in the environment should not exceed 5×10^{-6} uCi/ml.

Specification

- a. The radioactivity release concentration in liquid effluents from Unit No. 2 to the environment shall not exceed the values specified in 10 CFR 20, Appendix B, for unrestricted areas.
- b. The total release of radioactive liquid effluent from Unit No. 2, excluding tritium and noble gases, shall not exceed 10 curies during any calendar quarter.
- c. The equipment installed in the liquid radioactive waste system shall be maintained and shall be operated to process all radioactive liquid wastes prior to this discharge when the activity release rate will exceed 1.25 curies, excluding tritium and dissolved gases, during any calendar quarter.
- d. The maximum radioactivity to be contained in one liquid radwaste tank, excluding tritium and dissolved gases, that can be discharged directly, to the environs, shall not exceed 10 curies.
- e. When the average release rate of radioactive effluents, excluding tritium and dissolved gases, exceeds 2.5 curies per radioactive waste-producing reactor during any calendar quarter, the licensee shall notify the NRC within 30 days, identifying the causes and describing the proposed program of action to reduce such release rates.

Specification

During release of liquid radioactive wastes from the Waste Evaporator Condensate Storage Tank and the Waste Evaporator Condensate Test Tank, the following conditions shall be met.

- A. The liquid gross activity monitor (Unit 2: WDL-R-1311) or similar device, and recorder on the radwaste effluent line shall be operable.
- B. The liquid gross activity monitors (Unit 2: WDL-R-1311) or similar device shall be set to alarm and automatically close waste discharge valve (Unit 2: WDL-V-99) respectively prior to exceeding the limits specified in 10 CFR 20, Appendix B for unrestricted areas.
- C. Liquid waste radioactivity and flow rate from the Waste Evaporator Condensate Test Tank (Unit 2) shall be continuously monitored and recorded during release. If this requirement cannot be met, continued release of liquid effluents shall be permitted only during the succeeding 48 hours provided that during this 48-hour period two independent samples of each tank shall be analyzed and two station personnel shall independently check valve line-up prior to the discharge.
- D. Facility records shall be maintained of the radioactive concentrations and volume before dilution of each batch of liquid effluent released, and the average dilution flow and length of time over which each discharge occurred. Estimates of the error associated with each reported value should be included in facility records.

LIMITING CONDITIONS FOR OPERATION

2.0

MONITORING REQUIREMENTS

Specification (Cont'd)

"For the purposes of this specification, the MPC_w(168 hour) for Xe-133 is $5 \times 10^{-3} \mu\text{Ci/ml}$. The MPC_w (168 hour) for Xe-135 is $1 \times 10^{-3} \mu\text{Ci/ml}$ ".

f. The dose or dose commitment from liquid effluents shall be less than or equal to 3 mrem total body and less than or equal to 10 mrem to any organ for the calendar year.

Bases

Liquid radioactive waste release levels to unrestricted areas should be kept "as low as practicable" and are not to exceed the concentration limits specified in 10 CFR 20. The specifications provide reasonable assurance that the resulting annual exposure to an individual in off site areas will not exceed the design objectives of Appendix I to 10 CFR Part 50, which were established as requirements for the cleanup of TMI-2 in the NRC's Statement of Policy of April 27, 1981. This assurance is based on the fact that the Susquehanna River will dilute the liquid effluents upon their release

Specification (Cont'c)

E. Radioactive liquid waste sampling and activity analysis shall be performed in accordance with Table 2.3-1. Prior to the release of each batch of liquid effluent, a sample shall be taken from that batch and analyzed for the concentration of each significant gamma emitter to demonstrate compliance with Specification "a" using the flow into which the effluent is discharged.

F. The liquid effluent radiation monitor WDL-R-1311 shall be calibrated at least quarterly by means of a known radioactive source. WDL-R-1311 shall also have an instrument channel test monthly and a source check prior to each discharge to verify that the read-out device is indicating as expected.

G. The ability of WDL-V-99 to close automatically on receipt of a high radiation alarm signal from WDL-R-1311 shall be checked annually.

Bases

Specifications A, B, and C, above require that suitable equipment to monitor the release of radioactive materials in liquid effluents are operating during any period these releases are taking place.

The surveillance requirements given in the remaining specifications provide assurance that liquid wastes are properly controlled and monitored during any planned release of radioactive materials in liquid effluents.

TABLE 2.3-1

Radioactive Liquid Waste Sampling and Analysis (4, 5)

A. Monitor Tank Releases

<u>Sampling Frequency</u>	<u>Type of Activity Analysis</u>	<u>Detectable Concentration (3)</u>
Each Batch	Individual Gamma	5×10^{-7} uci/ml (2)
	H-3	10^{-5} uci/ml
Monthly Composite (1)	Gross Alpha	10^{-7} uci/ml
	- Sr-89	5×10^{-8} uci/ml
	Sr-90	5×10^{-8} uci/ml

Notes

- (1) A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged from the plant.
- (2) For certain mixtures of gamma emitters, it may not be possible to measure radionuclides in concentrations near this sensitivity limit when other nuclides are present in the sample in much greater concentrations. Under these circumstances, it will be more appropriate to calculate the concentrations of such radionuclides using measured ratios with those radionuclides which are routinely identified and measured.
- (3) The detectability limits for radioactivity analysis are based on the technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable and when nuclides are measured below the stated limits, they should also be reported.
- (4) The results of these analyses should be used as the basis for recording and reporting the quantities of radioactive material released in liquid effluents during the sampling period. In estimating releases for a period when analyses were not performed, the average of the two adjacent data points spanning this period should be used. Such estimates should be included in the effluent records and reports; however, they should be clearly identified as estimates, and the method used to obtain these data should be described.
- (5) Deviations from the sampling/analysis regime will be noted in the report specified in Section 5.6.1.

LIMITING CONDITIONS FOR OPERATION

2.0

MONITORING REQUIREMENTS

Bases (Cont'd)

from the site. The effluents will be diluted by a factor of about 250 in the region where finfish can exist (within a one-quarter mile radius of the discharge point). At the same time these specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power under unusual operating conditions, which may temporarily result in higher than normal releases, but still within the concentration limits specified in 10 CFR 20. It is expected that by using this operational flexibility under unusual operating conditions, and exerting every effort to keep levels of radioactive material in liquid wastes as low as practicable, the annual releases will not exceed a small fraction of the annual average concentration limits specified in 10 CFR 20.

Specification a. above requires the licensee to limit the concentration of radioactive materials in liquid effluents from TMI-2 to levels specified in 10 CFR 20, Appendix B, for unrestricted areas. This specification provides assurance that no member of the general public can be exposed to liquids containing radioactive materials in excess of limits considered permissible under the commission's rules and regulations.

Specification b. above establishes an upper limit for the release of radioactive liquid effluents, excluding tritium and dissolved gases, of 10 curies during any calendar quarter. The intent of this specification is to permit the licensee the flexibility of operation to assure that the public is provided a

Bases (Cont'd)

These surveillance requirements provide the data for the licensee and the commission to evaluate the station's performance relative to radioactive liquid wastes released to the environment. Reports on the quantities of radioactive materials released in liquid effluents shall be furnished to the Commission on the basis of Section 5.6.1 of these Technical Specifications. On the basis of such reports and any additional information obtained from the licensee or others, the Commission may require the licensee to take appropriate action.

LIMITING CONDITIONS FOR OPERATION

2.0

MONITORING REQUIREMENTS

Bases (Cont'd)

dependable source of power under unusual operating conditions, which may temporarily result in releases higher than the levels normally achievable when the unit and the liquid radwaste equipment are functioning as designed. Releases of up to 10 curies during any calendar quarter will result in concentrations of radioactive materials in liquid effluents at small percentages of the limits specified in 10 CFR 20.

Specification c. requires the the licensee shall maintain and operate the equipment installed in the liquid radioactive waste system to reduce the release of radioactive materials in liquid effluents to as low as practicable, consistent with the requirements of 10 CFR 50.36a. Normal use and maintenance of installed equipment in the liquid radioactive system is expected to result in releases of not more than about five curies per year, excluding tritium and dissolved gases during normal operations. In order to keep releases of radioactive materials as low as practicable, the specification requires, as a minimum, operation of equipment whenever the rate of release exceeds 1.25 curies per quarter, excluding tritium and dissolved gases.

In addition to the limiting conditions for operation listed under Specification b., the reporting requirements of Specification e., the requirements of Section 5.6.2, delineate that the licensee shall identify the cause whenever the rate of radioactive effluents, excluding tritium and noble gases, exceeds 2.5 curies during any calendar quarter and describe the proposed program of action to reduce such release rates.

Bases (Cont'd)

Bases (Cont'd)

This report must be filed within 30 days following the calendar quarter in which the 2.5 curies release occurred.

Specification f. requires that the dose to offsite personnel be limited to the design objectives of Appendix I of 10 CFR Part 50. This will assure the dose received by the public during the cleanup is equivalent to or less than that from a normal operating reactor. The limits also assure that the environmental impacts are consistent with those assessed in the PEIS.

2.1.2 Gaseous EffluentsApplicability

Applies to the controlled release of radioactive gases from TMI Unit No. 2.

Objective

To define the limits and conditions for the controlled release of radioactive gaseous effluents to the environs to ensure that these releases are as low as practicable. These releases should not result in radiation exposures in offsite areas greater than a few percent of background exposures. The instantaneous release rate for all effluent discharges should be within the limits specified in 10 CFR 20.

To assure that the release of radioactive gases to offsite areas meet the as low as practicable concept, the following objectives apply:

a. The release rate of gaseous effluents shall not result in doses to the public exceeding the design objectives of Appendix I to 10 CFR Part 50.

Objective

To ensure that radioactive gaseous releases from the facility are within the limits of specifications.

LIMITING CONDITIONS FOR OPERATION

2.0

MONITORING REQUIREMENTS

Specification

a. The instantaneous release rate of gross gaseous activity except for halogens and particulates with half-lives longer than eight days shall not exceed:

$$\sum \frac{Q_1}{(MPC)_1} \leq 1.5 \times 10^5 \frac{m^3}{sec}$$

where Q_1 is the release rate in $\mu Ci/sec$ for isotope 1, and $(MPC)_1$ ($\mu Ci/M^3$) is the maximum permissible concentration of isotope and defined in Appendix B, Table II, Column 1. 10 CFR 20.

b. The instantaneous release rate of particulates with half-lives greater than eight days, released to the environs as part of the airborne effluents, shall not exceed 0.3 $\mu Ci/sec$.

c. The release rate of gross gaseous activity shall not exceed:

$$\sum \frac{Q_1}{(MPC)_1} \leq 2.4 \times 10^4 \frac{m^3}{sec}$$

when averaged over any calendar quarter.

d. The release rate of particulates with half-lives greater than eight days, shall not exceed: 0.024 $\mu Ci/sec$. when averaged over any calendar quarter.

e. Radioactive gaseous wastes collected in the gas decay tanks shall be held up to a minimum of 45 days, except when the release rate shall not exceed:

$$1. \sum \frac{Q_1}{(MPC)_1} \leq 3 \times 10^3 \frac{m^3}{sec}$$

(noble gases)

or

2. 0.003 $\mu Ci/sec$ (particulates with half-lives greater than 8 days)

Specification

During release of radioactive gaseous wastes, the following conditions shall be met;

A. During release of gaseous waste from the waste gas decay tanks, the following conditions shall be met:

1. Waste gas discharge monitor (Unit 2: WDG-R-1480) or similar device, shall be operable.
2. Auxiliary and Fuel Handling Building and Unit Exhaust Vent exhaust gas, iodine and particulate monitor (Unit 2: HP-R-219) on similar device, shall be operable.
3. The waste gas decay tank discharge valves (Unit 2: WDG-V-30A or 30B) shall be operable.
4. The waste gas decay tank discharge valves (Unit 2: WDG-V-30A or 30B) shall be closed on receipt of any one of the following conditions:
 - a. A high radiation signal from the waste gas discharge monitor (Unit 2: WDG-R-1480).
 - b. A high radiation signal from the Auxiliary and Fuel Building exhaust monitor (Unit 2: HP-R-219).
 - c. A high flow signal from the Waste Gas Decay Tank discharge flow transmitter (Unit 2: WDG-FT-3923).
 - d. Observation of loss of flow through the Unit vent.

B. During purge of the Reactor Building, the following conditions shall be met:

LIMITING CONDITIONS FOR OPERATION

2.0

MONITORING REQUIREMENTS

Specification (Cont'd)

f. Radioactive gas and particulates purged from the reactor building shall be filtered through the high efficiency particulate air filters.

g. The maximum activity to be contained in one gas decay tank shall not exceed 8800 curies (equivalent to Xe-133).

h. When the release rate of radioactive materials in gaseous wastes, averaged over a calendar quarter exceeds,

$$\sum \frac{Q_1}{(\text{MPC})_1} \leq 6 \times 10^3 \frac{\text{m}^3}{\text{sec}} \text{ (noble gas)}$$

or

0.006 $\mu\text{Ci/sec}$ (particulates with half-lives greater than 8 days)

the licensee shall notify the NRC within 30 days, identifying the causes and describing the proposed program of action to reduce such release rates.

i. The air dose due to noble gases in gaseous effluents shall be less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation for the calendar year.

j. The dose for radionuclides (other than noble gaseous effluents) shall be less than or equal to 15 mrem to any organ for the calendar year.

Specification (Cont'd)

1. The Reactor Building Purge Exhaust Monitor (Unit 2: HP-R-225 or HP-R-226 and HP-R-219) or similar device shall be operable.

2. The Purge Exhaust Valves (Unit 2: D5129 A/D and D5129 B/C) shall be operable.

3. The valves (Unit 2: D5129 A/D and D5129 B/C) shall be interlocked to recirculate on receipt of a high radiation signal from their respective Reactor Building Exhaust Monitors (Unit 2: HP-R-225 and HP-R-226).

C. The flow rate for radioactive effluent streams and the Auxiliary and Fuel Handling Building and the Reactor Building, shall be monitored and recorded. Gaseous effluents from the Waste Gas Decay Tanks and the Reactor Building Purge Exhaust shall be continuously monitored and recorded.

D. Radioactive gaseous waste sampling and activity analysis shall be performed in accordance with Table 2.3-2

E. The waste gas decay tank effluent monitor (Unit 2: WDG-R-1480) shall be tested using the installed check source or equivalent prior to any release of radioactive gas from a holdup tank and shall be calibrated quarterly using a referenced calibration source in a controlled reproducible geometry.

Specification (Cont'd)

F. During power operation, the condenser vacuum pump discharge shall be continuously monitored for gross gaseous activity. The monitor shall not be inoperable for more than a week. Whenever this monitor is inoperable, a grab sample shall be taken daily and analyzed for gross radioactivity. (β γ).

G. Facility records shall be maintained of radioactive concentration, release ratio and volume of each batch of gaseous effluents released and the length of time over which release occurred. Estimates of the error associated with each reported value should be included in facility records.

H. At least annually, automatic initiation and closure of the Waste Gas Decay Tank Discharge valve on alarm of (Unit 2: WDG-R-1480) shall be verified.

I. The Unit Vent monitors for TMI-2 (HP-R-219, HP-R-219A, HP-R-225, HP-R-226), respectively, shall be calibrated at least every eighteen months by means of a known radioactive source. These detectors shall have an instrument channel test at least monthly, and a sensor check at least daily, to verify that the read-out device is indicating as expected.

Bases

The specified levels provide reasonable assurance that the resulting annual exposure rate from noble gases at any location at the site boundary will not exceed 10 millirems per year. At the same

Bases

Specifications A. through I., above, require that suitable equipment to monitor the radioactive gaseous releases are operating during any period these releases are taking place.

GASEOUS EFFLUENTS

2.1.2.J The release rate of radioactive materials, other than noble gases, in gaseous effluents shall be determined to be within the limits calculated in accordance with this specification by obtaining representative samples and performing analyses in accordance with the sampling and analysis program, specified in Table 2.1-1.

BASES

2.1.2.J This specification is provided to ensure that the dose at any time at the site boundary from gaseous effluents from TMI-2 will be within the annual dose limits of 10 CFR Part 20 for unrestricted areas. The annual dose limits are the doses associated with the concentrations of 10 CFR Part 20, Appendix B, Table II, Column 1. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of an individual in an unrestricted area, either within or outside the site boundary, to annual average concentrations exceeding the limits specified in Appendix B, Table II of 10 CFR Part 20 (10 CFR Part 20.106(b)). For individuals who may at times be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to an individual at or beyond the site boundary to less than or equal to 500 mrem/yr to the total body or to less than or equal to 3000 mrem/yr to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to an infant via the cow-milk-infant pathway to less than or equal to 1500 mrem/yr for the nearest cow to the plant.

TABLE 2.1-1

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ($\mu\text{Ci/ml}$) ^a
EPICOR-II Ventilation	M ^b Grab Sample	M	Principal Gamma Emitters ^c	1×10^{-4}
			H-3	1×10^{-6}

TABLE 2.1-1 (Continued)TABLE NOTATION

- a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66 s_D}{E \cdot V \cdot 2.22 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where

LLD is the lower limit of detection as defined above (as picocurie per unit mass or volume).

s_D is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute).

E is the counting efficiency (as counts per transformation),

V is the sample size (in units of mass or volume),

2.22 is the number of transformations per minute per picocurie,

Y is the fractional radiochemical yield (when applicable),

λ is the radioactive decay constant for the particular radionuclide, and

Δt is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, nor environmental samples),

The value of s_D used in the calculation of the LLD for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. In calculating the LLD for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contributions of other radionuclides normally present in the samples. Typical values of E, V, Y, and Δt shall be used in the calculation. The background count rate is calculated from the background counts that are determined to be with \pm one FWHM (Full-width-at-Half-Maximum) energy band about the energy of the gamma ray peak used for the quantitative analysis for that radionuclide.

TABLE 2.1-1 (Continued)TABLE NOTATION

- b. Tritium grab samples shall be taken at least once per 7 days from the ventilation exhaust from the Chemical Cleaning Building.
- c. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Mn-54, Fe-55, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses shall be reported as "less than" the nuclide's LLD and shall not be reported as being present at the LLD level for that nuclide. The "less than" values shall not be used in the required dose calculations.

TABLE 2.3-2

Radioactive Gaseous Waste Sampling and Analysis (5)

Sample Type	Sampling Frequency	Type of Activity Analysis	Detectable Concentration (1)
<u>Waste Gas Decay Tank Release</u>			
Gas	Each Tank	H-3	10^{-6} uCi/cc
	Release	Individual Gamma Emitters	10^{-4} uCi/cc (2)
<u>Reactor Building Purge Releases</u>			
Gas	Each Purge	H-3	10^{-6} uCi/cc
		Individual Gamma Emitters	10^{-4} uCi/cc (2)
<u>Condenser Vacuum Pump Releases</u>			
Gas	Monthly	H-3	10^{-6} uCi/cc
	Monthly (3)	Individual Gamma Emitters	10^{-4} uCi/cc (2)
<u>Unit Exhaust</u>			
<u>Vent Release Points</u>			
Gas	Monthly (4)	H-3	10^{-6} uCi/cc
		Individual Gamma Emitters	10^{-4} uCi/cc (2)
Charcoal	Weekly (6)	I-131, I-133, I-135	10^{-12} uCi/cc
Particulates	Weekly	Individual Gamma Emitters	10^{-10} uCi/cc (2)
	Monthly Composite	Sr-89, Sr-90	10^{-11} uCi/cc
	Monthly Composite	Gross Alpha Emitters	10^{-11} uCi/cc

(1) The above detectability limits are based on technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable and when nuclides are measured below the stated limits, they should also be reported.

- (2) For certain mixtures of gamma emitters, it may be possible to measure radionuclides at levels near their sensitivity limits when other nuclides are present in the sample at much higher levels. Under these circumstances, it will be more appropriate to calculate the levels of such radionuclides using observed ratios in the gaseous component in the reactor coolant for those radionuclides which are measurable.
- (3) Analysis shall also be performed following each refueling period, start-up or similar operational occurrence which could alter the mixture of radionuclides.
- (4) Sampled during periods when no waste gas decay tank release or reactor building purge is in progress.
- (5) Deviations from the sampling and analysis regime will be noted in the report specified in Section 5.6.1.
- (6) Sample not required for Unit exhaust vent (TMI-2). However, the charcoal in the charcoal sampler should be replaced on a weekly basis although a weekly analysis is not required.

LIMITING CONDITIONS FOR OPERATIONS

2.0

MONITORING REQUIREMENTS

Bases (Cont'd)

time, these specifications permit the flexibility of operation, compatible with consideration of health and safety, to assure that the public is provided a dependable source of power under unusual operating conditions, which may temporarily result in higher than the design objective levels, but still within the concentration limits specified 10 CFR 20 and within the design objectives of Appendix I to 10 CFR 50. It is expected that using this operational flexibility under unusual operating conditions, and by exerting every effort to keep levels of radioactive material in gaseous wastes as low as practicable, the annual releases will not exceed a small fraction of the annual concentration limits specified in 10 CFR 20 and will not result in doses which exceed the design objectives of Appendix I to 10 CFR 50, which were endorsed as limits for the cleanup of TMI-2 by the NRC's statement of Policy of April 27, 1981.

These efforts should include consideration of meteorological conditions during releases.

The annual objectives have been developed taking into account a combination of system variables including fuel failures, primary system leakage, primary to secondary system leakage, and the performance of radionuclide removal mechanisms. I-131 is not specifically monitored because it has decayed to less than detectable activity since the March 28, 1979 accident.

Specification a. above, requires the licensee to limit the concentration of noble gases from TMI-2 to levels specified in 10 CFR 20, Appendix B, for unrestricted areas. Based on a

Bases (Cont'd)

The surveillance requirements given under the remaining Specifications above, provide assurance that radioactive gaseous effluents from the station are properly controlled and monitored over the life of the station. These surveillance requirements provide the data for the licensee and the Commission to evaluate the station's performance relative to radioactive gaseous wastes released to the environment.

Reports on the quantities of radioactive materials released in gaseous effluents shall be furnished to the Commission on the basis of Section 5.6.1 of these Technical Specifications. On the basis of such report and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

Bases (Cont'd)

X/Q of 6.7×10^{-6} sec/m³, this specification provides assurance that no member of the general public would be exposed to radioactive materials in excess of limits specified in the Commission's rules and regulations.

Specification b. above, requires the licensee to limit the concentration of particulates with half-lives greater than eight days, released from TMI-2 to unrestricted areas to levels such that no individual will receive more than 500 mrem/yr to the total body or 3000 mrem/yr to the skin. The absence of iodine insures that the corresponding thyroid dose rate above background to an infant via the cow-milk-infant pathway is less than or equal to 1500 mrem/yr. A grazing period of 6 months has been applied to all radionuclides in particulate form with half-lives - greater than 8 days, to allow for the milk exposure pathway.

The release rate is determined by using the methodology of Regulatory Guide I.109 (Rev. 1) and a relative deposition factor (D/Q) of 2.1×10^{-8} m⁻². The D/Q of 2.1×10^{-8} m⁻² was calculated for the nearest cow located 1.2 miles SE of the station, using on-site meteorological data.

Specifications c. and d. above, establish an upper limit for the release of gaseous activity at 16% of instantaneous release limit of noble gases and at eight percent of the release rate of particulates with half-lives greater than 8 days, averaged over any calendar quarter, respectively. The intent of this specification is to permit the licensee the flexibility of operation to assure that the public is provided a dependable source of power under

Bases (Cont'd)

unusual operating conditions which may temporarily result in higher releases than the objectives.

Specification e. above, requires a 45 day holdup time for radioactive gaseous wastes collected in the gas decay tanks to assure decay of most radionuclides. The whole body dose from noble gases at the site boundary is expected to be less than 10 mrem/yr (primarily from Kr-85). The whole body dose from particulates at the nearest farm is expected to be less than 5 mrem/yr.

Specification f. above, limits the radioactivity that may be released to the environment to "as low as practicable."

Specification g. above, limits the maximum offsite dose to well below the limits of 10 Cfr 100, postulating that the rupture of a Waste Gas Decay Tank holding the maximum activity releases all of the contents to the atmosphere.

In addition to the limiting conditions for operation listed under a, b and c above, the reporting requirements of Specification H. delineate that the licensee shall identify the cause whenever the radioactive gaseous release rate exceeds 4 percent of Specification a. or 2 percent of Specification b. above, averaged over a calendar quarter, and describe the proposed program of action to reduce such release rates. The report must be filed within 30 days following the calendar quarter in which more than twice the design release rate occurred.

2.1.3 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

The radioactive gaseous effluent monitoring instrumentation channels shown in Table 2.1-3a shall be OPERABLE.

APPLICABILITY: As shown in Table 2.1-3a.

Action:

With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 2.1-3a.

SURVEILLANCE REQUIREMENTS

Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 2.1-3b (per occupational exposure considerations and detector sensitivity in ambient radiation areas).

BASES

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criterion 64 of Appendix A to 10 CFR Part 50.

TABLE 2.1-3aRADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>ACTION</u>
10. EPICOR-II VENTILATION SYSTEM			
a. Noble Gas Activity Monitor	1	*	37
b. Deleted			
c. Particulate Sampler	1	*	41
d. Flow Rate Monitor	1	*	36
e. Sampler Flow Rate Monitor	1	*	36

TABLE NOTATION

*At all times.

ACTION 36 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once per 4 hours.

ACTION 37 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided grab samples are taken at least once per 8 hours and these samples are analyzed for gross activity within 24 hours.

ACTION 41 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via the affected pathway may continue for up to 30 days provided samples are continuously collected with auxiliary sampling equipment as required in Table 2.1-1.

TABLE 2.1-3bRADIOACTIVE GASEOUS EFFLUENT MONITORING
INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>
10. EPICOR-II VENTILATION SYSTEM				
a. Noble Gas Activity Monitor	D	M	R(3)	Q(2)
b. Deleted				
c. Particulate Sampler	W	N.A.	N.A.	N.A.
d. Flow Rate Monitor	D	N.A.	SA	SA
e. Sampler Flow Rate Monitor	D	N.A.	SA	SA

TABLE NOTATION

- (2) CHANNEL FUNCTION TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exist.
1. Instrument indicates measured levels above the alarm setpoint.
 2. Circuit failure (alarm function only).
 3. Instrument indicates a downside failure (alarm function only).
 4. Instrument controls not set in operate mode or the switch position administratively monitored and controlled.
- (3) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards or using standards that have been obtained from suppliers that participate in measurement assurance activities with NBS. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

LIMITING CONDITIONS FOR OPERATION 2.0 MONITORING REQUIREMENTS

References

- (1) Meteorology and Atomic Energy, pp. 204
- (2) Meteorology and Atomic Energy, pp. 112