NUREG–1302

# Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors

Generic Letter 89–01, Supplement No. 1


**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Reactor Regulation**

W. W. Meinke, T. H. Essig

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Generic Letter 89–01, Supplement No. 1

Date Published: April 1991

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**Division of Radiation Protection and Emergency Preparedness**
**Office of Nuclear Reactor Regulation**
**U.S. Nuclear Regulatory Commission**
**Washington, DC 20555**

## ABSTRACT

This report contains guidance which may be voluntarily used by licensees who choose to implement the provision of Generic Letter 89-01, which allows Radiological Effluent Technical Specifications (RETS) to be removed from the main body of the Technical Specifications and placed in the Offsite Dose Calculation Manual (ODCM). Guidance is provided for Standard Effluent Controls definitions, Controls for effluent monitoring instrumentation, Controls for effluent releases, Controls for radiological environmental monitoring, and the basis for Controls.

Guidance on the formulation of RETS has been available in draft form (NUREG-0472 and -0473) for a number of years; the current effort simply recasts those RETS into Standard Radiological Effluent Controls for application to the ODCM. Also included for completeness are: (1) radiological environmental monitoring program guidance previously which had been available as a Branch Technical Position (Rev. 1, November 1979); (2) existing ODCM guidance; and (3) a reproduction of Generic Letter 89-01.

# PREFACE

This compilation of Standard Radiological Effluent Controls (SREC) contains all of the controls addressed in Generic Letter 89-01, to be incorporated into a licensee's Offsite Dose Calculation Manual (ODCM) at the time the procedural details of the current Radiological Effluent Technical Specifications (RETS) are transferred out of the licensee's Technical Specifications (TS). It has been developed by recasting the RETS of the most current Standard Technical Specifications from the "LCO" format into the "Controls" format of an ODCM entry. Note that these GE-SREC have been patterned after the W-SREC. The following text guidance incorporates the wording of the most recent SREC, however, no attempt has been made to translate REC numbering of the W-SREC into that of the BWR numbering system.

The following GE-SREC provide the latest version of staff guidance, and document current practice in the operating procedures required by 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36(a), and Appendix I to 10 CFR Part 50. This document contains no new requirements and its use is completely voluntary.

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# FOREWORD

## RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS

Licensee Technical Specification (TS) amendment requests for incorporation of Radiological Effluent Technical Specifications (RETS) pursuant to 10 CFR 50.36a and Appendix I to 10 CFR Part 50 were approved in the mid-1980s for most operating reactors licensed before 1979 (ORs). Plants licensed after 1979 (NTOLs), included the RETS as part of their initial Technical Specifications. By November 1987, the RETS were implemented by all licensees of operating power reactors. Detailed Safety Evaluation Reports (SERs) documented the acceptability of the plant-specific RETS of the ORs, while the acceptance of the RETS for the NTOLs followed the regular pattern of the Standard Technical Specifications (STS). Thus, for all operating plants, the compliance of the licensee with 10 CFR 50.36a and Appendix I to 10 CFR Part 50 is a matter of record.

Early draft revisions of model RETS, distributed to licensees in mid-1978, contained equations for dose calculations, setpoint determinations and meteorological dispersion factors, as well as the procedural details for complying with Appendix I to 10 CFR Part 50. In later revisions, including Revision 2 used as the bench mark for the NRC staff's acceptance of OR RETS, the equations were removed and incorporated into an Offsite Dose Calculation Manual (ODCM) prepared by the licensee and provided to NRC for review along with the proposed RETS.

Early guidance for preparation of the Radiological Effluent Technical Specifications (RETS) and Offsite Dose Calculation Manual (ODCM) was published in NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978. Copies of model RETS, however, have been available only in draft form as NUREG-0472, Revision 2, "Radiological Effluent Technical Specifications for PWRs," February 1, 1980; NUREG-0473, Revision 2, "Radiological Effluent Technical Specifications for BWRs," February 1, 1980; and succeeding draft revisions. Staff guidance for the Radiological Environmental Monitoring Program is contained in the Radiological Assessment Branch Technical Position (RAB-BTP), originally issued in March 1978 and upgraded by Revision 1 in November 1979 as a result of the accident at Three Mile Island. This Revision 1 to the RAB-BTP was forwarded to all operating reactor licensees in November 1979 and remains in effect at the present time. Since this BTP was never incorporated into the Regulatory Guide System, a copy is reproduced in this document as Appendix A. Even though it has been used extensively in reviewing ODCMs, guidance for the contents of the ODCM is found only in an appendix to a paper presented at an Atomic Industrial Forum conference in 1981, and has had only informal distribution since that time.

## OFFSITE DOSE CALCULATION MANUAL

The potential for augmentation of a licensee's ODCM through transfer of the procedural details of the RETS following the guidance of Generic Letter 89-01, provides an opportunity to assemble in one set of documents the staff guidance for the ODCM.

The current overview guidance for development of the ODCM was prepared originally in July 1978 and revised in February 1979 after discussions with committees of the Atomic Industrial Forum. This guidance was made generally available as "Appendix B - General Contents of the Offsite Dose Calculation Manual (ODCM) (Revision 1, February 1979)" to the paper authored by C. A. Willis and F. J. Congel, "Status of NRC Radiological Effluent Technical Specification Activities" presented at the Atomic Industrial Forum Conference on NEPA and Nuclear Regulation, October 4-7, 1981, Washington, D.C. -A copy of this guidance that continues in effect to date, is reproduced in this document as Appendix B.

During the discussions leading up to the implementation of the RETS by the ORs, it became important to record in a "living" document certain interpretations and understandings reached in these discussions. The ODCM thus became a repository for such interpretations, as well as for other information requested by the staff in connection with its evaluation of licensee's commitments and performance under 10 CFR 50.36a and Appendix I to 10 CFR Part 50.

## TECHNICAL SPECIFICATION IMPROVEMENT PROGRAM

Recently, the NRC staff has examined the contents of the RETS in relation to the Commission's Interim Policy Statement on Technical Specification Improvements. The staff has determined that programmatic controls can be implemented in the Administrative Controls section of the Technical Specifications (TS) to satisfy existing regulatory requirements for RETS. At the same time, the procedural details of the current TS on radioactive effluents and radiological environmental monitoring can be relocated to the Offsite Dose Calculation Manual (ODCM).

To initiate the change, new programmatic controls for radioactive effluents and radiological environmental monitoring are incorporated in the TS to conform to the regulatory requirements of 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50. The procedural details included in licensees' present TS on radioactive effluents, environmental monitoring, and associated reporting requirements will be relocated to the ODCM. Licensees will handle future changes to these procedural details in the ODCM under the administrative controls for changes to the ODCM. Detailed guidance to effect the transfer of the RETS to the ODCM is given in Generic Letter 89-01, reproduced in its entirety as Appendix C.

## GUIDANCE FOR THE TRANSFER OF RETS TO ODCM

Enclosure 1 of Generic Letter (GL) 89-01 of Appendix B provides detailed guidance for the preparation of a license amendment request to implement the transfer of RETS to ODCM. Page 1 of the enclosure states:

> "The NRC staff's intent in recommending --- the relocation of procedural details of the current RETS to the ODCM is to fulfill the goal of the Commission Policy Statement for Technical Specification Improvements. It is not the staff's intent to reduce the level of radiological effluent control. Rather, this amendment will provide programmatic controls for RETS consistent with regulatory requirements and allow relocation of the procedural details of current RETS to the ODCM."

Page 2 of Enclosure 1 states:

> "...the procedural details covered in the licensee's current RETS, consisting of the limiting conditions for operation, their applicability, remedial actions, surveillance requirements, and the Bases section of the TS for these requirements, are to be relocated to the ODCM --- in a manner that ensures that these details are incorporated in plant operating procedures. The NRC staff does not intend to repeat technical reviews of the relocated procedural details because their consistency with the applicable regulatory requirements is a matter of record from past NRC reviews of RETS."

## DISCUSSION

For the purpose of the transfer described in GL 89-01 of Appendix B, the RETS will consist of the specifications from the STS listed in Enclosure 2 of Appendix B of GL 89-01. Licensees with nonstandard TS should consider the analogous TS in their format.

It is suggested that the most straightforward method of transferring a licensee's commitments in the RETS to the ODCM in accordance with GL 98-01 is to recast the RETS in the licensee's present TS from the "Limiting Condition for Operation (LCO)" format of the TS into the "Controls" format of the ODCM entry. The accompanying package provides an example of this recasting into Standard Radiological Effluent Controls (SREC) from the model RETS for Boiling Water Reactors (BWRs). This recasting is in format only. The TS pages have been transferred to the ODCM without change except for the substitution of "Controls" for "LCO." Plants that have RETS that closely follow the STS format will be able to use the accompanying examples directly as guidance. For plants with nonstandard RETS, the transfer of TS commitments to the ODCM should be made similarly page by page, again with the substitution of "Controls" for "LCO."

This NUREG report contains no new requirements; licensee implementation of this guidance is completely voluntary.

## SUMMARY

As part of the license amendment request for TS improvement relative to the RETS, a licensee confirms that the guidance of Generic Letter 89-01 has been followed. This guidance includes the following:

> "The procedural details covered in the licensee's current RETS, consisting of the limiting conditions for operation, their applicability, remedial actions, surveillance requirements, and the Bases section of the TS for these requirements, are to be relocated to the ODCM --- in a manner that ensures that these details are incorporated in plant operating procedures."

The Standard Radiological Effluent Controls (SREC) compiled in this report document current staff practice in the operating procedures required by 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36(a), and Appendix I to 10 CFR Part 50. Thus they contain all of the controls required by Generic Letter 89-01, to be incorporated into a licensee's ODCM at the time the procedural details of the current RETS are transferred out of the licensee's TS.

NOTE

These GE-SREC have been patterned after the W-SREC. The following text guidance incorporates the wording of the most recent SREC; however, no attempt has been made to translate the REC numbering of the W-SREC into that of the BWR numbering system

# SECTION 1.0

# DEFINITIONS

## 1.0 DEFINITIONS

The defined terms of this section appear in capitalized type and are applicable throughout these Controls.

### ACTION

1.1 ACTION shall be that part of a Control that prescribes remedial measures required under designated conditions.

### CHANNEL CALIBRATION

1.4 An CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel such that it responds within the required range and accuracy to known values of input. The CHANNEL CALIBRATION shall encompass the entire channel including the sensors and alarm, interlock and/or trip functions and shall include the CHANNEL FUNCTIONAL TEST. The CHANNEL CALIBRATION may be performed by any series of sequential, overlapping, or total channel steps such that the entire channel is calibrated.

### CHANNEL CHECK

1.5 A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

### CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels - the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions and channel failure trips.

b. Bistable channels - the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

The CHANNEL FUNCTIONAL TEST may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is tested.

DOSE EQUIVALENT I-131

1.10 DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microCurie/gram) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in [Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites" or Table E-7 of NRC Regulatory Guide 1.109, Revision 1, October 1977].

FREQUENCY NOTATION

1.13 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.1.

GASEOUS RADWASTE TREATMENT SYSTEM

1.14 A GASEOUS RADWASTE TREATMENT SYSTEM (e.g., the "augmented offgas system") is any system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the main condenser evacuation system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

MEMBER(S) OF THE PUBLIC

1.16 MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the licensee, its contractors, or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

OFFSITE DOSE CALCULATION MANUAL

1.17 The OFFSITE DOSE CALCULATION MANUAL (ODCM) shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Section 6.8.4 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Semiannual Radioactive Effluent Release Reports required by TS 6.9.1.3 and 6.9.1.4.

OPERABLE - OPERABILITY

1.18 A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s), and when all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing their related support function(s).

OPERATIONAL CONDITION - CONDITION

1.19 An OPERATIONAL CONDITION, i.e., CONDITION, shall be any one inclusive combination of mode switch position and average reactor coolant temperatures as specified in Table 1.2.

PURGE - PURGING

1.23 PURGE or PURGING shall be any controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.

RATED THERMAL POWER

1.25 RATED THERMAL POWER shall be a total reactor core heat transfer rate to the reactor coolant of ____MWt.

REPORTABLE EVENT

1.27 A REPORTABLE EVENT shall be any of those conditions specified in Section 50.73 of 10 CFR Part 50.

SITE BOUNDARY

1.30 The SITE BOUNDARY shall be that line beyond which the land is neither owned, nor leased, nor otherwise controlled by the licensee.

SOURCE CHECK

1.33 A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a source of increased radioactivity.

THERMAL POWER

1.35 THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

UNRESTRICTED AREA

1.38 An UNRESTRICTED AREA shall be any area at or beyond the SITE BOUNDARY access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

VENTILATION EXHAUST TREATMENT SYSTEM

1.39 A VENTILATION EXHAUST TREATMENT SYSTEM shall be any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment. Such a system is not considered to have any effect on noble gas effluents. Engineered Safety Features Atmospheric Cleanup Systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.

VENTING

1.40 VENTING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration, or other operating condition, in such a manner that replacement air or gas is not provided or required during VENTING. Vent, used in system names, does not imply a VENTING process.

## TABLE 1.1

## FREQUENCY NOTATION

| NOTATION | FREQUENCY |
|---|---|
| S | At least once per 12 hours. |
| D | At least once per 24 hours. |
| W | At least once per 7 days. |
| M | At least once per 31 days. |
| Q | At least once per 92 days. |
| SA | At least once per 184 days. |
| R | At least once per 18 months. |
| S/U | Prior to each reactor startup. |
| N.A. | Not applicable. |
| P | Completed prior to each release. |

## TABLE 1.2

## OPERATIONAL CONDITIONS

| CONDITION | MODE SWITCH POSITION | AVERAGE REACTOR COOLANT TEMPERATURE |
|---|---|---|
| 1. POWER OPERATION | Run | Any temperature |
| 2. STARTUP | Startup/Hot Standby | Any temperature |
| 3. HOT SHUTDOWN | Shutdown#,*** | > 200°F |
| 4. COLD SHUTDOWN | Shutdown#,##,*** | ≦ 200°F |
| 5. REFUELING* | Shutdown or Refuel**,# | ≦ 140°F |

#The reactor mode switch may be placed in the Run or Startup/Hot Standby position to test the switch interlock functions provided that the control rods are verified to remain fully inserted by a second licensed operator or other technically qualified member of the unit technical staff.

##The reactor mode switch may be placed in the Refuel position while a single control rod drive is being removed from the reactor pressure vessel per Specification 3.9.10.1.

*Fuel in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

**See Special Tests Exceptions 3.10.1 and 3.10.3.

***The reactor mode switch may be placed in the Refuel position while a single control rod is being recoupled provided that the one-rod-out interlock is OPERABLE.

# SECTIONS 3.0 AND 4.0

# CONTROLS

# AND

# SURVEILLANCE REQUIREMENTS

## 3/4 CONTROLS AND SURVEILLANCE REQUIREMENTS

### 3/4.0 APPLICABILITY

### CONTROLS

3.0.1 Compliance with the Controls contained in the succeeding controls is required during the OPERATIONAL CONDITIONS or other conditions specified therein; except that upon failure to meet the Control, the associated ACTION requirements shall be met.

3.0.2 Noncompliance with a control shall exist when the requirements of the Control and associated ACTION requirements are not met within the specified time intervals. If the Control is restored prior to expiration of the specified time intervals, completion of the ACTION requirements is not required.

3.0.3 When a Control is not met, except as provided in the associated ACTION requirements, within 1 hour action shall be initiated to place the unit in an OPERATIONAL CONDITION in which the control does not apply by placing it, as applicable, in:

1. At least STARTUP within the next 6 hours,

2. At least HOT SHUTDOWN within the following 6 hours, and

3. At least COLD SHUTDOWN within the subsequent 24 hours.

Where corrective measures are completed that permit operation under the ACTION requirements, the action may be taken in accordance with the specified time limits as measured from the time of failure to meet the Control. Exceptions to these requirements are stated in the individual controls.

This control is not applicable in OPERATIONAL CONDITIONS 4 or 5.

3.0.4 Entry into an OPERATIONAL CONDITION or other specified condition shall not be made unless the conditions for the Control are met without reliance on provisions contained in the ACTION requirements. This provision shall not prevent passage through or to OPERATIONAL CONDITIONS as required to comply with ACTION requirements. Exceptions to these requirements are stated in the individual controls.

## SURVEILLANCE REQUIREMENTS

4.0.1 Surveillance Requirements shall be met during the OPERATIONAL CONDITIONS or other conditions specified for individual Controls unless otherwise stated in an individual Surveillance Requirement.

4.0.2 Each Surveillance Requirement shall be performed within the specified time interval with:

a. A maximum allowable extension not to exceed 25% of the surveillance interval, but

b. The combined time interval for any three consecutive surveillance intervals shall not exceed 3.25 times the specified surveillance interval.

4.0.3 Failure to perform a Surveillance Requirement within the specified time interval shall constitute a failure to meet the OPERABILITY requirements for a Control. Exceptions to these requirements are stated in the individual controls. Surveillance Requirements do not have to be performed on inoperable equipment.

4.0.4 Entry into an OPERATIONAL CONDITION or other specified applicable condition shall not be made unless the Surveillance Requirement(s) associated with the Control has been performed within the applicable surveillance interval or as otherwise specified.

## RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

### CONTROLS

3.3.3.10 In accordance with [plant name] TS 6.8.4.g.1), the radioactive liquid effluent monitoring instrumentation channels shown in Table 3.3-12 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of Control 3.11.1.1 are not exceeded. The Alarm/Trip Setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

APPLICABILITY: At all times.

ACTION:

a. With a radioactive liquid effluent monitoring instrumentation channel Alarm/Trip Setpoint less conservative than required by the above control, immediately suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable, or change the setpoint so it is acceptably conservative.

b. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-12. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report pursuant to Control 6.9.1.4 why this inoperability was not corrected in a timely manner.

c. The provisions of Controls 3.0.3 and 3.0.4 are not applicable. Report all deviations in the Semiannual Radioactive Effluent Release Report.

### SURVEILLANCE REQUIREMENTS

4.3.3.10 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST at the frequencies shown in Table 4.3-8.

## TABLE 3.3-12

## RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

| INSTRUMENT | MINIMUM CHANNELS OPERABLE | ACTION |
|---|---|---|
| 1. Radioactivity Monitors Providing Alarm and Automatic Termination of Release | | |
| a. Liquid Radwaste Effluent Line | 1 | 35 |
| 2. Radioactivity Monitors Providing Alarm But Not Providing Automatic Termination of Release | | |
| a. Service Water System Effluent Line | 1 | 37 |
| b. Component Cooling Water System Effluent Line | 1 | 37 |
| 3. (Not Used) | | |
| 4. Flow Rate Measurement Devices | | |
| a. Liquid Radwaste Effluent Line | 1 | 38 |
| b. Discharge Canal | 1 | 38 |
| 5. Radioactivity Recorders* | | |
| a. Liquid Radwaste Effluent Line | 1 | 39 |

*Required only if Alarm/Trip Setpoint is based on recorder-controller.

(NOT USED)

TABLE 3.3-12 (Continued)

ACTION STATEMENTS

ACTION 35 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Control 4.11.1.1.1, and

b. At least two technically qualified members of the facility staff independently verify the release rate calculations and discharge line valving.

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 37 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided that, at least once per 12 hours, grab samples are collected and analyzed for radioactivity at a lower limit of detection of no more than $10^{-7}$ microCurie/ml.

ACTION 38 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours during actual releases. Pump performance curves generated in place may be used to estimate flow.

ACTION 39 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the radioactivity level is determined at least once per 4 hours during actual releases.

TABLE 4.3-8

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE CHECK | CHANNEL CALIBRATION | CHANNEL FUNCTIONAL TEST |
|---|---|---|---|---|
| 1. Radioactivity Monitors Providing Alarm and Automatic Termination of Release | | | | |
| a. Liquid Radwaste Effluent Line | D | P | R(3) | Q(1) |
| 2. Radioactivity Monitors Providing Alarm But Not Providing Automatic Termination of Release | | | | |
| a. Service Water System Effluent Line | D | M | R(3) | Q(2) |
| b. Component Cooling Water System Effluent Line | D | M | R(3) | Q(2) |
| 3. (Not Used) | | | | |
| 4. Flow Rate Measurement Devices | | | | |
| a. Liquid Radwaste Effluent Line | D(4) | N.A. | R | Q |
| b. Discharge Canal | D(4) | N.A. | R | Q |
| 5. Radioactivity Recorders* | | | | |
| a. Liquid Radwaste Effluent Line | D | N.A. | R | Q |

*Required only if Alarm/Trip Setpoint in based on recorder-controller.

(NOT USED)

TABLE 4.3-8 (Continued)

TABLE NOTATIONS

(1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exists:

a. Instrument indicates measured levels above the Alarm/Trip Setpoint, or

b. Circuit failure, or

c. Instrument indicates a downscale failure, or

d. Instrument controls not set in operate mode.

(2) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

a. Instrument indicates measured levels above the Alarm Setpoint, or

b. Circuit failure, or

c. Instrument indicates a downscale failure, or

d. Instrument controls not set in operate mode.

(3) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards (NBS) 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.

(4) CHANNEL CHECK shall consist of verifying indication of flow during periods of release. CHANNEL CHECK shall be made at least once per 24 hours on days on which continuous, periodic, or batch releases are made.

## RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

### CONTROLS

3.3.3.11 In accordance with [plant name] TS 6.8.4.g.1), the radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.3-13 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of Control 3.11.2.1 are not exceeded. The Alarm/Trip Setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the ODCM.

APPLICABILITY: As shown in Table 3.3-13

ACTION:

a. With a radioactive gaseous effluent monitoring instrumentation channel Alarm/Trip Setpoint less conservative than required by the above control, immediately suspend the release of radioactive gaseous effluents monitored by the affected channel, or declare the channel inoperable, or change the setpoint so it is acceptably conservative.

b. With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-13. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semi-annual Radioactive Effluent Release Report pursuant to Control 6.9.1.4 why this inoperability was not corrected in a timely manner.

c. The provisions of Controls 3.0.3 and 3.0.4 are not applicable. Report all deviations in the Semiannual Radioactive Effluent Release Report.

### SURVEILLANCE REQUIREMENTS

4.3.3.11 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 at the frequencies shown in Table 4.3-9.

## TABLE 3.3-13

## RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

| INSTRUMENT | MINIMUM CHANNELS OPERABLE | APPLICABILITY | ACTION |
|---|---|---|---|
| 1. Main Condenser Offgas Treatment System Effluent Monitoring System | | | |
| a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Effluent System Flow Rate Measuring Device | 1 | * | 46 |
| e. Sampler Flow Rate Measuring Device | 1 | * | 46 |
| 2A. NOT USED | | | |
| 2B. NOT USED | | | |

TABLE 3.3-13 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

| INSTRUMENT | MINIMUM CHANNELS OPERABLE | APPLICABILITY | ACTION |
|---|---|---|---|
| 3. Reactor Building Ventilation/Purge System | | | |
| a. Noble Gas Activity Monitor | 1 | * | 48 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |
| 4. Main Stack System | | | |
| a. Noble Gas Activity Monitor | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |
| 5. Turbine Building Ventilation System | | | |
| a. Noble Gas activity Monitor | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |

TABLE 3.3-13 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

| INSTRUMENT | MINIMUM CHANNELS OPERABLE | APPLICABILITY | ACTION |
|---|---|---|---|
| 5. Turbine Building Ventilation System (Continued) | | | |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |
| 6. Auxiliary Building Ventilation System | | | |
| a. Noble Gas Activity Monitor | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |
| 7. Fuel Storage Area Ventilation System | | | |
| a. Noble Gas Activity Monitor | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |

TABLE 3.3-13 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

| INSTRUMENT | MINIMUM CHANNELS OPERABLE | APPLICABILITY | ACTION |
|---|---|---|---|
| 8. Radwaste Area Ventilation System | | | |
| a. Noble Gas Activity Monitor | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |
| 9. Turbine Gland Seal Condenser Vent and Mechanical Vacuum Pump Exhaust System | | | |
| a. Noble Gas Activity Monitor | 1 | * | 47 |
| b. Iodine Sampler | 1 | * | 51 |
| c. Particulate Sampler | 1 | * | 51 |
| d. Flow Rate Monitor | 1 | * | 46 |
| e. Sampler Flow Rate Monitor | 1 | * | 46 |
| 10. Condenser Air Ejector Radioactivity Monitor (Prior to Input to Holdup System) | | | |
| a. Noble Gas Activity Monitor | 1 | *** | 45 |

(NOT USED)

## TABLE 3.3-13 (Continued)

## TABLE NOTATIONS

*At all times.

**During main condenser offgas treatment system operation.

***During operation of the main condenser air ejector.

## ACTION STATEMENTS

ACTION 45 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, releases to the environment may continue for up to 72 hours provided:

a. The offgas system is not bypassed, and

b. The offgas delay system noble gas activity effluent (downstream) monitor is OPERABLE;

Otherwise, be in at least HOT STANDBY within 12 hours.

ACTION 46 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours.

ACTION 47 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are taken at least once per 12 hours and these samples are analyzed for radioactivity within 24 hours.

ACTION 48 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, immediately suspend release of radioactive effluents via this pathway.

ACTION 49 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, operation of the main condenser offgas treatment system may continue provided grab samples are collected at least once per 4 hours and analyzed within the following 4 hours.

ACTION 50 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, operation of this system may continue for up to 14 days.

ACTION 51 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via the affected pathway may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 4.11-2.

(NOT USED)

## TABLE 4.3-9

## RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE CHECK | CHANNEL CALIBRATION | CHANNEL FUNCTIONAL TEST | MODES FOR WHICH SURVEILLANCE IS REQUIRED |
|---|---|---|---|---|---|
| 1. Main Condenser Offgas Treatment System Effluent Monitoring System | | | | | |
| a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release | D | D | R(3) | Q(1) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Effluent System Flow Rate Measuring Device | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |
| 2A. NOT USED | | | | | |
| 2B. NOT USED | | | | | |

TABLE 4.3-9 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE CHECK | CHANNEL CALIBRATION | CHANNEL FUNCTIONAL TEST | MODES FOR WHICH SURVEILLANCE IS REQUIRED |
|---|---|---|---|---|---|
| 3. Reactor Building Ventilation/Purge System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(1) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |
| 4. Main Stack System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |

TABLE 4.3-9 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE CHECK | CHANNEL CALIBRATION | CHANNEL FUNCTIONAL TEST | MODES FOR WHICH SURVEILLANCE IS REQUIRED |
|---|---|---|---|---|---|
| 5. Turbine Building Ventilation System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |
| 6. Auxiliary Building Ventilation System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |

TABLE 4.3-9 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE CHECK | CHANNEL CALIBRATION | CHANNEL FUNCTIONAL TEST | MODES FOR WHICH SURVEILLANCE IS REQUIRED |
|---|---|---|---|---|---|
| 7. Fuel Storage Area Ventilation System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |
| 8. Radwaste Area Ventilation System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |

TABLE 4.3-9 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE CHECK | CHANNEL CALIBRATION | CHANNEL FUNCTIONAL TEST | MODES FOR WHICH SURVEILLANCE IS REQUIRED |
|---|---|---|---|---|---|
| 9. Turbine Gland Seal Condenser Vent and Mechanical Vacuum Pump Exhaust System | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | * |
| b. Iodine Sampler | W | N.A. | N.A. | N.A. | * |
| c. Particulate Sampler | W | N.A. | N.A. | N.A. | * |
| d. Flow Rate Monitor | D | N.A. | R | Q | * |
| e. Sampler Flow Rate Monitor | D | N.A. | R | Q | * |
| 10. Condenser Air Ejector Radioactivity Monitor (Prior to Input to Holdup System) | | | | | |
| a. Noble Gas Activity Monitor | D | M | R(3) | Q(2) | *** |

## TABLE 4.3-9 (Continued)

## TABLE NOTATIONS

*At all times.
**During main condenser offgas treatment system operation.
***During operation of the main condenser air ejector.

(1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occurs if any of the following conditions exists:

a. Instrument indicates measured levels above the Alarm/Trip Setpoint, or

b. Circuit failure, or

c. Instrument indicates a downscale failure, or

d. Instrument controls not set in operate mode.

(2) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

a. Instrument indicates measured levels above the Alarm Setpoint, or

b. Circuit failure, or

c. Instrument indicates a downscale failure, or

d. Instrument controls not set in operate mode.

(3) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards (NBS) 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.

(4) The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

a. One volume percent hydrogen, balance nitrogen, and

b. Four volume percent hydrogen, balance nitrogen.

(5) The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

a. One volume percent oxygen, balance nitrogen, and

b. Four volume percent oxygen, balance nitrogen.

## 3/4.11 RADIOACTIVE EFFLUENTS

### 3/4.11.1 LIQUID EFFLUENTS

#### CONCENTRATION

#### CONTROLS

3.11.1.1 In accordance with [plant name] TS 6.8.4.g.2) and 3), the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (see Figure 5.1-3) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to $2 \times 10^{-4}$ microCurie/ml total activity.

APPLICABILITY: At all times.

ACTION:

a. With the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeding the above limits, immediately restore the concentration to within the above limits.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.11.1.1.1 Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Table 4.11-1.

4.11.1.1.2 The results of the radioactivity analyses shall be used in accordance with the methodology and parameters in the ODCM to assure that the concentrations at the point of release are maintained within the limits of Control 3.11.1.1.

TABLE 4.11-1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

| LIQUID RELEASE TYPE | SAMPLING FREQUENCY | MINIMUM ANALYSIS FREQUENCY | TYPE OF ACTIVITY ANALYSIS | LOWER LIMIT OF DETECTION (LLD)[1] (μCi/ml) |
|---|---|---|---|---|
| 1. Batch Waste Release Tanks[2] | P Each Batch | P Each Batch | Principal Gamma Emitters[3] | $5x10^{-7}$ |
| | | | I-131 | $1x10^{-6}$ |
| a. _____ | P One Batch/M | M | Dissolved and Entrained Gases (Gamma Emitters) | $1x10^{-5}$ |
| b. _____ | P Each Batch | M Composite[4] | H-3 | $1x10^{-5}$ |
| | | | Gross Alpha | $1x10^{-7}$ |
| c. _____ | P Each Batch | Q Composite[4] | Sr-89, Sr-90 | $5x10^{-8}$ |
| | | | Fe-55 | $1x10^{-6}$ |
| 2. Continuous Releases[5] | Continuous[6] | W Composite[6] | Principal Gamma Emitters[3] | $5x10^{-7}$ |
| | | | I-131 | $1x10^{-6}$ |
| a. _____ | M Grab Sample | M | Dissolved and Entrained Gases (Gamma Emitters) | $1x10^{-5}$ |
| b. _____ | Continuous[6] | M Composite[6] | H-3 | $1x10^{-5}$ |
| | | | Gross Alpha | $1x10^{-7}$ |
| c. _____ | Continuous[6] | Q Composite[6] | Sr-89, Sr-90 | $5x10^{-8}$ |
| | | | Fe-55 | $1x10^{-6}$ |

## TABLE NOTATIONS

(1) The LLD is defined, for purposes of these controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD = the "a priori" lower limit of detection (microCurie per unit mass or volume),

$s_b$ = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

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

$2.22 \times 10^6$ = the number of disintegrations per minute per microCurie,

Y = the fractional radiochemical yield, when applicable,

$\lambda$ = the radioactive decay constant for the particular radionuclide ($sec^{-1}$), and

$\Delta t$ = the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and $\Delta t$ should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

(2) A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analyses, each batch shall be isolated, and then thoroughly mixed by a method described in the ODCM to assure representative sampling.

TABLE 4.11-1 (Continued)

TABLE NOTATIONS (Continued)

(3) The principal gamma emmiters for which the LLD control applies include the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, and Ce-141. Ce-144 shall also be measured, but with an LLD of $5 \times 10^{-6}$. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to Control 6.9.1.4 in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.

(4) A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen that is representative of the liquids released.

(5) A continuous release is the discharge of liquid wastes of a nondiscrete volume, e.g., from a volume of a system that has an input flow during the continuous release.

(6) To be representative of the quantities and concentrations of radioactive materials in liquid effluents, samples shall be collected continuously in proportion to the rate of flow of the effluent stream. Prior to analyses, all samples taken for the composite shall be thoroughly mixed in order for the composite sample to be representative of the effluent release.

RADIOACTIVE EFFLUENTS

DOSE

CONTROLS

3.11.1.2 In accordance with [plant name] TS 6.8.4.g.4) and 6.8.4.9.5), the dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each unit, to UNRESTRICTED AREAS (see Figure 5.1-3) shall be limited:

a. During any calendar quarter to less than or equal to 1.5 mrems to the whole body and to less than or equal to 5 mrems to any organ, and

b. During any calendar year to less than or equal to 3 mrems to the whole body and to less than or equal to 10 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits. This Special Report shall also include: (1) the results of radiological analyses of the drinking water source, and (2) the radiological impact on finished drinking water supplies with regard to the requirements of 40 CFR Part 141, Safe Drinking Water Act.*

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.2 Cumulative dose contributions from liquid effluents for the current calendar quarter and the current calendar year shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

*The requirements of ACTION a.(1) and (2) are applicable only if drinking water supply is taken from the receiving water body within 3 miles of the plant discharge. In the case of river-sited plants this is 3 miles downstream only.

## LIQUID RADWASTE TREATMENT SYSTEM

### CONTROLS

3.11.1.3 In accordance with [plant name] TS 6.8.4.g.6), the Liquid Radwaste Treatment System shall be OPERABLE and appropriate portions of the system shall be used to reduce releases of radioactivity when the projected doses due to the liquid effluent, from each unit, to UNRESTRICTED AREAS (see Figure 5.1-3) would exceed 0.06 mrem to the whole body or 0.2 mrem to any organ in a 31-day period.

APPLICABILITY: At all times.

ACTION:

a. With radioactive liquid waste being discharged without treatment and in excess of the above limits and any portion of the Liquid Radwaste Treatment System not in operation, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that includes the following information:

   1. Explanation of why liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability,

   2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

   3. Summary description of action(s) taken to prevent a recurrence.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.1.3.1 Doses due to liquid releases from each unit to UNRESTRICTED AREAS shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM when Liquid Radwaste Treatment Systems are not being fully utilized.

4.11.1.3.2 The installed Liquid Radwaste Treatment System shall be considered OPERABLE by meeting Controls 3.11.1.1 and 3.11.1.2.

RADIOACTIVE EFFLUENTS

3/4.11.1.4 (NOT USED)

RADIOACTIVE EFFLUENTS

3/4.11.2 GASEOUS EFFLUENTS

DOSE RATE

CONTROLS

3.11.2.1 In accordance with [plant name] TS 6.8.4.g.3) and 7), the dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

a. For noble gases: Less than or equal to 500 mrems/yr to the whole body and less than or equal to 3000 mrems/yr to the skin, and

b. For Iodine-131, for Iodine-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the dose rate(s) exceeding the above limits, immediately restore the release rate to within the above limit(s).

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.1.1 The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters in the ODCM.

4.11.2.1.2 The dose rate due to Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters in the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table 4.11-2.

## TABLE 4.11-2

## RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

| GASEOUS RELEASE TYPE | SAMPLING FREQUENCY | MINIMUM ANALYSIS FREQUENCY | TYPE OF ACTIVITY ANALYSIS | LOWER LIMIT OF DETECTION (LLD)(1) (μCi/ml) |
|---|---|---|---|---|
| 1. Offgas Treatment System | M<br>Grab Sample | M | Principal Gamma Emitters(2) | $1x10^{-4}$ |
| 2. Containment PURGE OR VENT | P<br>Each PURGE(3)<br>Grab Sample | P<br>Each PURGE(3) | Principal Gamma Emitters(2) | $1x10^{-4}$ |
| | | M | H-3 (oxide) | $1x10^{-6}$ |
| 3. a. (List other release points where gaseous effluents are released from the facility) | M(3),(5)<br>Grab Sample | M(3) | Principal Gamma Emitters(2) | $1x10^{-4}$ |
| | | | H-3 (oxide) | $1x10^{-6}$ |
| 4. All Release Types as listed in 1., 2., and 3. above | Continuous(6) | W(7)<br>Charcoal Sample | I-131 | $1x10^{-12}$ |
| | Continuous(6) | W(7)<br>Particulate Sample | Principal Gamma Emitters(2) | $1x10^{-11}$ |
| | Continuous(6) | M<br>Composite Particulate Sample | Gross Alpha | $1x10^{-11}$ |
| | Continuous(6) | Q<br>Composite Particulate Sample | Sr-89, Sr-90 | $1x10^{-11}$ |
| | Continuous(6) | Noble Gas Monitor | Noble Gases<br>Gross Beta or Gamma | $1x10^{-6}$ |

TABLE 4.11-2 (Continued)

TABLE NOTATIONS

(1) The LLD is defined, for purposes of these controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD = the "a priori" lower limit of detection (microCurie per unit mass or volume),

$s_b$ = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

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

$2.22 \times 10^6$ = the number of disintegrations per minute per microCurie,

Y = the fractional radiochemical yield, when applicable,

$\lambda$ = the radioactive decay constant for the particular radionuclide ($sec^{-1}$), and

$\Delta t$ = the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and $\Delta t$ should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

TABLE 4.11-2 (Continued)

TABLE NOTATIONS (Continued)

(2) The principal gamma emitters for which the LLD control applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141 and Ce-144 in Iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to Control 6.9.1.4 in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.

(3) Sampling and analysis shall also be performed following shutdown, startup, or a THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period.

(4) Not applicable.

(5) Tritium grab samples shall be taken at least once per 7 days from the ventilation exhaust from the spent fuel pool area, whenever spent fuel is in the spent fuel pool.

(6) The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Controls 3.11.2.1, 3.11.2.2, and 3.11.2.3.

(7) Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup, or THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period and analyses shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if: (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the reactor coolant has not increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.

RADIOACTIVE EFFLUENTS

DOSE - NOBLE GASES

CONTROLS

3.11.2.2 In accordance with [plant name] TS 6.8.4.g.5) and 8), the air dose due to noble gases released in gaseous effluents, from each unit, to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 5 mrads for gamma radiation and less than or equal to 10 mrads for beta radiation, and

b. During any calendar year: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation.

APPLICABILITY: At all times.

ACTION

a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.2 Cumulative dose contributions for the current calendar quarter and current calendar year for noble gases shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

## DOSE - IODINE-131, IODINE-133, TRITIUM, AND RADIOACTIVE MATERIAL IN PARTICULATE FORM

### CONTROLS

3.11.2.3 In accordance with [plant name] TS 6.8.4.g.5) and 9), the dose to a MEMBER OF THE PUBLIC from Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each unit, to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 7.5 mrems to any organ and,

b. During any calendar year: Less than or equal to 15 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of Iodine-131, Iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days, in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.2.3 Cumulative dose contributions for the current calendar quarter and current calendar year for Iodine-131, Iodine-133, tritium and radionuclides in particulate form with half-lives greater than 8 days shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

## GASEOUS RADWASTE TREATMENT SYSTEM

### CONTROLS

3.11.2.4 The GASEOUS RADWASTE TREATMENT SYSTEM shall be in operation.

APPLICABILITY: Whenever the main condenser air ejector (evacuation) system is in operation.

ACTION:

a. With gaseous radwaste from the main condenser air ejector system being discharged without treatment for more than 7 days, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that includes the following information:

   1. Identification of the inoperable equipment or subsystems and the reason for inoperability,

   2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

   3. Summary description of action(s) taken to prevent a recurrence.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.2.4 The readings of the relevant instruments shall be checked every 12 hours when the main condenser air ejector is in use to ensure that the gaseous radwaste treatment system is functioning.

## VENTILATION EXHAUST TREATMENT SYSTEM

### CONTROLS

3.11.2.5 The VENTILATION EXHAUST TREATMENT SYSTEM shall be OPERABLE and appropriate portions of this system shall be used to reduce releases of radioactivity when the projected doses in 31 days due to gaseous effluent releases, from each unit, to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) would exceed:

a. 0.2 mrad to air from gamma radiation, or

b. 0.4 mrad to air from beta radiation, or

c. 0.3 mrem to any organ of a MEMBER OF THE PUBLIC.

APPLICABILITY: At all times.

ACTION:

a. With radioactive gaseous waste being discharged without treatment and in excess of the above limits, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that includes the following information:

   1. Identification of any inoperable equipment or subsystems, and the reason for the inoperability,

   2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

   3. Summary description of action(s) taken to prevent a recurrence.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.2.5.1 Doses due to gaseous releases from each unit to areas at and beyond the SITE BOUNDARY shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM when the Ventilation Exhaust Treatment System is not being fully utilized.

4.11.2.5.2 The installed VENTILATION EXHAUST TREATMENT SYSTEM shall be considered OPERABLE by meeting Controls 3.11.2.1, and either 3.11.2.2 or 3.11.2.3.

3/4.11.2.6 (NOT USED)

3/4.11.2.7 (NOT USED)

## MARK I or II CONTAINMENT

### CONTROLS

3.11.2.8 VENTING or PURGING of the Mark I or II containment drywell shall be through the Standby Gas Treatment System.

APPLICABILITY: Whenever the drywell is vented or purged.

ACTION:

a. With the requirements of the above control not satisfied, suspend all VENTING and PURGING of the drywell.

b. The provisions of controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.2.8 The containment drywell shall be determined to be aligned for VENTING or PURGING through the Standby Gas Treatment System within 4 hours prior to start of and at least once per 12 hours during VENTING or PURGING of the drywell.

RADIOACTIVE EFFLUENTS

3/4.11.3 (NOT USED)

## 3/4.11.4 TOTAL DOSE

### CONTROLS

3.11.4 In accordance with [plant name] TS 6.8.4.g.11), the annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrems to the whole body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems.

APPLICABILITY: At all times.

ACTION:

a. With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Control 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 units (including outside storage tanks etc.) to determine whether the above limits of Control 3.11.4 have been exceeded. If such is the case, prepare and submit to the Commission within 30 days, pursuant to Control 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 20.405(c), 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.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.4.1 Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Controls 4.11.1.2, 4.11.2.2, and 4.11.2.3, and in accordance with the methodology and parameters in the ODCM.

4.11.4.2 Cumulative dose contributions from direct radiation from the units (including outside storage tanks etc.) shall be determined in accordance with the methodology and parameters in the ODCM. This requirement is applicable only under conditions set forth in ACTION a. of Control 3.11.4.

## 3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

### 3/4.12.1 MONITORING PROGRAM

CONTROLS

3.12.1 In accordance with [plant name] TS 6.8.4.h.1), the Radiological Environmental Monitoring Program shall be conducted as specified in Table 3.12-1.

APPLICABILITY: At all times.

ACTION:

a. With the Radiological Environmental Monitoring Program not being conducted as specified in Table 3.12-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report required by Control 6.9.1.3, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.

b. With the level of radioactivity as the result of plant effluents in an environmental sampling medium at a specified location exceeding the reporting levels of Table 3.12-2 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose* to a MEMBER OF THE PUBLIC is less than the calendar year limits of Controls 3.11.1.2, 3.11.2.2, or 3.11.2.3. When more than one of the radionuclides in Table 3.12-2 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{reporting level (1)}} + \frac{\text{concentration (2)}}{\text{reporting level (2)}} + \ldots \geq 1.0$$

When radionuclides other than those in Table 3.12-2 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose* to a MEMBER OF THE PUBLIC from all radionuclides is equal to or greater than the calendar year limits of Control 3.11.1.2, 3.11.2.2, or 3.11.2.3. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report required by Control 6.9.1.3.

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*The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report.

CONTROLS

ACTION (Continued)

c. With milk or fresh leafy vegetation samples unavailable from one or more of the sample locations required by Table 3.12-1, identify specific locations for obtaining replacement samples and add them within 30 days to the Radiological Environmental Monitoring Program given in the ODCM. The specific locations from which samples were unavailable may then be deleted from the monitoring program. Pursuant to Control 6.14, submit in the next Semiannual Radioactive Effluent Release Report documentation for a change in the ODCM including a revised figure(s) and table for the ODCM reflecting the new location(s) with supporting information identifying the cause of the unavailability of samples and justifying the selection of the new location(s) for obtaining samples.

d. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.1 The radiological environmental monitoring samples shall be collected pursuant to Table 3.12-1 from the specific locations given in the table and figure(s) in the ODCM, and shall be analyzed pursuant to the requirements of Table 3.12-1 and the detection capabilities required by Table 4.12-1.

TABLE 3.12-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM*

| EXPOSURE PATHWAY AND/OR SAMPLE | NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS(1) | SAMPLING AND COLLECTION FREQUENCY | TYPE AND FREQUENCY OF ANALYSIS |
|---|---|---|---|
| 1. Direct Radiation(2) | Forty routine monitoring stations (DR1-DR40) either with two or more dosimeters or with one instrument for measuring and recording dose rate continuously, placed as follows:<br><br>An inner ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY (DR1-DR16);<br><br>An outer ring of stations, one in each meteorological sector in the 6- to 8-km range from the site (DR17-DR32); and<br><br>The balance of the stations (DR33-DR40) to be placed in special interest areas such as population centers, nearby residences, schools, and in one or two areas to serve as control stations. | Quarterly. | Gamma dose quarterly. |

*The number, media, frequency, and location of samples may vary from site to site. This table presents an acceptable minimum program for a site at which each entry is applicable. Local site characteristics must be examined to determine if pathways not covered by this table may significantly contribute to an individual's dose and should be included in the sample program. The code letters in parentheses, e.g., DR1, A1, provide one way of defining sample locations in this control that can be used to identify the specific locations in the map(s) and table in the ODCM.

TABLE 3.12-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

| EXPOSURE PATHWAY AND/OR SAMPLE | NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS(1) | SAMPLING AND COLLECTION FREQUENCY | TYPE AND FREQUENCY OF ANALYSIS |
|---|---|---|---|
| 2. Airborne | | | |
| Radioiodine and Particulates | Samples from five locations (A1-A5):<br><br>Three samples (A1-A3) from close to the three SITE BOUNDARY locations, in different sectors, of the highest calculated annual average ground-level D/Q;<br><br>One sample (A4) from the vicinity of a community having the highest calculated annual average ground-level D/Q; and<br><br>One sample (A5) from a control location, as for example 15 to 30 km distant and in the least prevalent wind direction. | Continuous sampler operation with sample collection weekly, or more frequently if required by dust loading. | Radioiodine Cannister: I-131 analysis weekly.<br><br>Particulate Sampler: Gross beta radioactivity analysis following filter change;(3) and gamma isotopic analysis(4) of composite (by location) quarterly. |
| 3. Waterborne | | | |
| a. Surface(5) | One sample upstream (Wa1).<br>One sample downstream (Wa2). | Composite sample over 1-month period.(6) | Gamma isotopic analysis(4) monthly. Composite for tritium analysis quarterly. |
| b. Ground | Samples from one or two sources (Wb1, Wb2), only if likely to be affected(7). | Quarterly. | Gamma isotopic(4) and tritium analysis quarterly |

TABLE 3.12-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

| EXPOSURE PATHWAY AND/OR SAMPLE | NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1] | SAMPLING AND COLLECTION FREQUENCY | TYPE AND FREQUENCY OF ANALYSIS |
|---|---|---|---|
| 3. Waterborne (Continued) | | | |
| c. Drinking | One sample of each of one to three (Wc1 - Wc3) of the nearest water supplies that could be affected by its discharge.<br><br>One sample from a control location (Wc4). | Composite sample over 2-week period[6] when I-131 analysis is performed; monthly composite otherwise. | I-131 analysis on each composite when the dose calculated for the consumption of the water is greater than 1 mrem per year[8]. Composite for gross beta and gamma isotopic analyses[4] monthly. Composite for tritium analysis quarterly. |
| d. Sediment from Shoreline | One sample from downstream area with existing or potential recreational value (Wd1). | Semiannually. | Gamma isotopic analysis[4] semiannually. |
| 4. Ingestion | | | |
| a. Milk | Samples from milking animals in three locations (Ia1 - Ia3) within 5 km distance having the highest dose potential. If there are none, then one sample from milking animals in each of three areas (Ia1 - Ia3) between 5 to 8 km distant where doses are calculated to be greater than 1 mrem per yr.[8] One sample from milking animals at a control location (Ia4), 15 to 30 km distant and in the least prevalent wind direction. | Semimonthly when animals are on pasture; monthly at other times. | Gamma isotopic[4] and I-131 analysis semimonthly when animals are on pasture; monthly at other times. |

TABLE 3.12-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

| EXPOSURE PATHWAY AND/OR SAMPLE | NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1] | SAMPLING AND COLLECTION FREQUENCY | TYPE AND FREQUENCY OF ANALYSIS |
|---|---|---|---|
| 4. Ingestion (Continued) | | | |
| b. Fish and Invertebrates | One sample of each commercially and recreationally important species in vicinity of plant discharge area. (Ib1 - Ib__). | Sample in season, or semiannually if they are not seasonal. | Gamma isotopic analysis[4] on edible portions. |
| | One sample of same species in areas not influenced by plant discharge (Ib10 - Ib__). | | |
| c. Food Products | One sample of each principal class of food products from any area that is irrigated by water in which liquid plant wastes have been discharged (Ic1 - Ic__). | At time of harvest[9]. | Gamma isotopic analyses[4] on edible portion. |
| | Samples of three different kinds of broad leaf vegetation grown nearest each of two different offsite locations of highest predicted annual average ground level D/Q if milk sampling is not performed (Ic10 - Ic13). | Monthly during growing season. | Gamma isotopic[4] and I-131 analysis. |
| | One sample of each of the similar broad leaf vegetation grown 15 to 30 km distant in the least prevalent wind direction if milk sampling is not performed (Ic20 - Ic23). | Monthly during growing season. | Gamma isotopic[4] and I-131 analysis. |

TABLE 3.12-1 (Continued)

TABLE NOTATIONS

(1) Specific parameters of distance and direction sector from the centerline of one reactor, and additional description where pertinent, shall be provided for each and every sample location in Table 3.12-1 in a table and figure(s) in the ODCM. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979. Deviations are permitted from the required sampling schedule if specimens are unobtainable due to circumstances such as hazardous conditions, seasonal unavailability, and malfunction of automatic sampling equipment. If specimens are unobtainable due to sampling equipment malfunction, effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.3. It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the Radiological Environmental Monitoring Program given in the ODCM. Pursuant to Control 6.14, submit in the next Semiannual Radioactive Effluent Release Report documentation for a change in the ODCM including a revised figure(s) and table for the ODCM reflecting the new location(s) with supporting information identifying the cause of the unavailability of samples for the pathway and justifying the selection of the new location(s) for obtaining samples.

(2) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purposes of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation. (The 40 stations is not an absolute number. The number of direct radiation monitoring stations may be reduced according to geographical limitations; e.g., at an ocean site, some sectors will be over water so that the number of dosimeters may be reduced accordingly. The frequency of analysis or readout for TLD systems will depend upon the characteristics of the specific system used and should be selected to obtain optimum dose information with minimal fading.)

(3) Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air particulate samples is greater than 10 times the yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

TABLE 3.12-1 (Continued)

TABLE NOTATIONS (Continued)

(4) Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

(5) The "upstream sample" shall be taken at a distance beyond significant influence of the discharge. The "downstream" sample shall be taken in an area beyond but near the mixing zone. "Upstream" samples in an estuary must be taken far enough upstream to be beyond the plant influence. Salt water shall be sampled only when the receiving water is utilized for recreational activities.

(6) A composite sample is one in which the quantity (aliquot) of liquid sampled is proportional to the quantity of flowing liquid and in which the method of sampling employed results in a specimen that is representative of the liquid flow. In this program composite sample aliquots shall be collected at time intervals that are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure obtaining a representative sample.

(7) Groundwater samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

(8) The dose shall be calculated for the maximum organ and age group, using the methodology and parameters in the ODCM.

(9) If harvest occurs more than once a year, sampling shall be performed during each discrete harvest. If harvest occurs continuously, sampling shall be monthly. Attention shall be paid to including samples of tuberous and root food products.

TABLE 3.12-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

REPORTING LEVELS

| ANALYSIS | WATER (pCi/l) | AIRBORNE PARTICULATE OR GASES (pCi/m$^3$) | FISH (pCi/kg, wet) | MILK (pCi/l) | FOOD PRODUCTS (pCi/kg, wet) |
|---|---|---|---|---|---|
| H-3 | 20,000* | | | | |
| Mn-54 | 1,000 | | 30,000 | | |
| Fe-59 | 400 | | 10,000 | | |
| Co-58 | 1,000 | | 30,000 | | |
| Co-60 | 300 | | 10,000 | | |
| Zn-65 | 300 | | 20,000 | | |
| Zr-Nb-95 | 400 | | | | |
| I-131 | 2** | 0.9 | | 3 | 100 |
| Cs-134 | 30 | 10 | 1,000 | 60 | 1,000 |
| Cs-137 | 50 | 20 | 2,000 | 70 | 2,000 |
| Ba-La-140 | 200 | | | 300 | |

*For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used.

**If no drinking water pathway exists, a value of 20 pCi/l may be used.

TABLE 4.12-1

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS(1) (2)

LOWER LIMIT OF DETECTION (LLD)(3)

| ANALYSIS | WATER (pCi/l) | AIRBORNE PARTICULATE OR GASES (pCi/m$^3$) | FISH (pCi/kg, wet) | MILK (pCi/l) | FOOD PRODUCTS (pCi/kg, wet) | SEDIMENT (pCi/kg, dry) |
|---|---|---|---|---|---|---|
| Gross Beta | 4 | 0.01 | | | | |
| H-3 | 2000* | | | | | |
| Mn-54 | 15 | | 130 | | | |
| Fe-59 | 30 | | 260 | | | |
| Co-58,60 | 15 | | 130 | | | |
| Zn-65 | 30 | | 260 | | | |
| Zr-Nb-95 | 15 | | | | | |
| I-131 | 1** | 0.07 | | 1 | 60 | |
| Cs-134 | 15 | 0.05 | 130 | 15 | 60 | 150 |
| Cs-137 | 18 | 0.06 | 150 | 18 | 80 | 180 |
| Ba-La-140 | 15 | | | 15 | | |

*If no drinking water pathway exists, a value of 3000 pCi/l may be used.

**If no drinking water pathway exists, a value of 15 pCi/l may be used.

TABLE 4.12-1 (Continued)

TABLE NOTATIONS

(1)This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.3.

(2)Required detection capabilities for thermoluminescent dosimeters used for environmental measurements shall be in accordance with the recommendations of Regulatory Guide 4.13.

(3)The LLD is defined, for purposes of these controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

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

Where:

LLD = the "a priori" lower limit of detection (picoCuries per unit mass or volume),

$s_b$ = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

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

2.22 = the number of disintegrations per minute per picoCurie,

Y = the fractional radiochemical yield, when applicable,

$\lambda$ = the radioactive decay constant for the particular radionuclide ($sec^{-1}$), and

$\Delta t$ = the elapsed time between environmental collection, or end of the sample collection period, and time of counting (sec).

Typical values of E, V, Y, and $\Delta t$ should be used in the calculation.

TABLE 4.12-1 (Continued)

TABLE NOTATIONS (Continued)

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.3.

## 3/4.12.2 LAND USE CENSUS

### CONTROLS

3.12.2 In accordance with [plant name] TS 6.8.4.h.2), a Land Use Census shall be conducted and shall identify within a distance of 8 km (5 miles) the location in each of the 16 meteorological sectors of the nearest milk animal, the nearest residence, and the nearest garden* of greater than 50 $m^2$ (500 $ft^2$) producing broad leaf vegetation. [For elevated releases as defined in Regulatory Guide 1.111, Revision 1, July 1977, the Land Use Census shall also identify within a distance of 5 km (3 miles) the locations in each of the 16 meteorological sectors of all milk animals and all gardens of greater than 50 $m^2$ producing broad leaf vegetation.]

APPLICABILITY: At all times.

ACTION:

a. With a Land Use Census identifying a location(s) that yields a calculated dose or dose commitment greater than the values currently being calculated in Control 4.11.2.3, pursuant to Control 6.9.1.4, identify the new location(s) in the next Semiannual Radioactive Effluent Release Report.

b. With a Land Use Census identifying a location(s) that yields a calculated dose or dose commitment (via the same exposure pathway) 20% greater than at a location from which samples are currently being obtained in accordance with Control 3.12.1, add the new location(s) within 30 days to the Radiological Environmental Monitoring Program given in the ODCM. The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment(s), via the same exposure pathway, may be deleted from this monitoring program after [October 31] of the year in which this Land Use Census was conducted. Pursuant to Control 6.14, submit in the next Semiannual Radioactive Effluent Release Report documentation for a change in the ODCM including a revised figure(s) and table(s) for the ODCM reflecting the new location(s) with information supporting the change in sampling locations.

c. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

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*Broad leaf vegetation sampling of at least three different kinds of vegetation may be performed at the SITE BOUNDARY in each of two different direction sectors with the highest predicted D/Qs in lieu of the garden census. Controls for broad leaf vegetation sampling in Table 3.12-1, Part 4.c., shall be followed, including analysis of control samples.

SURVEILLANCE REQUIREMENTS

4.12.2 The Land Use Census shall be conducted during the growing season at least once per 12 months using that information that will provide the best results, such as by a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the Land Use Census shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.3.

## 3/4.12.3 INTERLABORATORY COMPARISON PROGRAM

### CONTROLS

3.12.3 In accordance with [plant name] TS 6.8.4.h.3), analyses shall be performed on all radioactive materials, supplied as part of an Interlaboratory Comparison Program that has been approved by the Commission, that correspond to samples required by Table 3.12-1.

APPLICABILITY: At all times.

ACTION:

a. With analyses not being performed as required above, report the corrective actions taken to prevent a recurrence to the Commission in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.3.

b. The provisions of Controls 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.12.3 The Interlaboratory Comparison Program shall be described in the ODCM. A summary of the results obtained as part of the above required Interlaboratory Comparison Program shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.3.

# BASES FOR

# SECTIONS 3.0 AND 4.0

# CONTROLS

# AND

# SURVEILLANCE REQUIREMENTS

## NOTE

The BASES contained in succeeding pages summarize the reasons for the Controls in Sections 3.0 and 4.0, but are not part of these Controls.

## 3/4.3.3.10 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The Alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

## 3/4.3.3.11 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

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 Alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

## 3/4.11 RADIOACTIVE EFFLUENTS

## BASES

### 3/4.11.1 LIQUID EFFLUENTS

#### 3/4.11.1.1 CONCENTRATION

This control is provided to ensure that the concentration of radioactive materials released in liquid waste effluents to UNRESTRICTED AREAS will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2. This limitation provides additional assurance that the levels of radioactive materials in bodies of water in UNRESTRICTED AREAS will result in exposures within: (1) the Section II.A design objectives of Appendix I, 10 CFR Part 50, to a MEMBER OF THE PUBLIC, and (2) the limits of 10 CFR Part 20.106(e) to the population. The concentration limit for dissolved or entrained noble gases is based upon the assumption that Xe-135 is the controlling radioisotope and its MPC in air (submersion) was converted to an equivalent concentration in water using the methods described in International Commission on Radiological Protection (ICRP) Publication 2.

This control applies to the release of radioactive materials in liquid effluents from all units at the site.

The required detection capabilities for radioactive materials in liquid waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD, and other detection limits can be found in Currie, L. A., "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements," NUREG/CR-4007 (September 1984), and in the HASL Procedures Manual, HASL-300.

#### 3/4.11.1.2 DOSE

This control is provided to implement the requirements of Sections II.A, III.A, and IV.A of Appendix I, 10 CFR Part 50. The Control implements the guides set forth in Section II.A of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents to UNRESTRICTED AREAS will be kept "as low as is reasonably achievable." Also, for fresh water sites with drinking water supplies that can be potentially affected by plant operations, there is reasonable assurance that the operation of the facility will not result in radionuclide concentrations in the finished drinking water that are in excess of the requirements of 40 CFR Part 141. The dose calculation methodology and parameters in the ODCM implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of

DOSE (Continued)

Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977.

This control applies to the release of radioactive materials in liquid effluents from each unit at the site. For units with shared Radwaste Systems, the liquid effluents from the shared system are to be proportioned among the units sharing that system.

## 3/4.11.1.3 LIQUID RADWASTE TREATMENT SYSTEM

The OPERABILITY of the Liquid Radwaste Treatment System ensures that this system will be available for use whenever liquid effluents require treatment prior to release to the environment. The requirement that the appropriate portions of this system be used when specified provides assurance that the releases of radioactive materials in liquid effluents will be kept "as low as is reasonably achievable." This control implements the requirements of 10 CFR 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the Liquid Radwaste Treatment System were specified as a suitable fraction of the dose design objectives set forth in Section II.A of Appendix I, 10 CFR Part 50 for liquid effluents.

This control applies to the release of radioactive materials in liquid effluents from each unit at the site. For units with shared Radwaste Systems, the liquid effluents from the shared system are to be proportioned among the units sharing that system.

## 3/4.11.2 GASEOUS EFFLUENTS

### 3/4.11.2.1 DOSE RATE

This control is provided to ensure that the dose at any time at and beyond the SITE BOUNDARY from gaseous effluents from all units on the site will be within the annual dose limits of 10 CFR Part 20 to UNRESTRICTED AREAS. The annual dose limits are the doses associated with the concentrations of 10 CFR Part 20, Appendix B, Table II, Column I. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a MEMBER OF THE PUBLIC 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 MEMBERS OF THE PUBLIC who may at times be within the SITE BOUNDARY, the occupancy of that MEMBER OF THE PUBLIC will usually be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the SITE BOUNDARY. Examples of calculations for such MEMBERS OF THE PUBLIC, with the appropriate occupancy factors, shall be given in the ODCM. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to a MEMBER OF THE PUBLIC at or beyond the SITE BOUNDARY to less than or equal to 500 mrems/year to the whole body or to less than or equal to 3000 mrems/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to a child via the inhalation pathway to less than or equal to 1500 mrems/year.

This control applies to the release of radioactive materials in gaseous effluents from all units at the site.

The required detection capabilities for radioactive material in gaseous waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD, and other detection limits can be found in Currie, L. A., "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements," NUREG/CR-4007 (September 1984), and in the HASL Procedures Manual, HASL-300.

### 3/4.11.2.2 DOSE - NOBLE GASES

This control is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10 CFR Part 50. The control implements the guides set forth in Section I.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents to UNRESTRICTED AREAS will be kept "as low as is reasonably achievable." The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The dose calculation

DOSE-NOBLE GASES (Continued)

methodology and parameters established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision I, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors," Revision 1, July 1977. The ODCM equations provided for determining the air doses at and beyond the SITE BOUNDARY are based upon the historical average atmospheric conditions.

This control applies to the release of radioactive materials in gaseous effluents from each unit at the site. For units with shared Radwaste Treatment Systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

3/4.11.2.3 DOSE - IODINE-131, IODINE-133, TRITIUM, AND RADIOACTIVE MATERIAL IN PARTICULATE FORM

This control is provided to implement the requirements of Sections II.C, III.A and IV.A of Appendix I, 10 CFR Part 50. The Controls are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive materials in gaseous effluents to UNRESTRICTED AREAS will be kept "as low as is reasonably achievable." The ODCM calculational methods specified in the Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The ODCM calculational methodology and parameters for calculating the doses due to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate controls for Iodine-131 Iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days are dependent upon the existing radionuclide pathways to man in the

DOSE - IODINE-131, IODINE-133, TRITIUM, AND RADIOACTIVE MATERIAL IN PARTICULATE FORM (Continued)

areas at and beyond the SITE BOUNDARY. The pathways that were examined in the development of the calculations were: (1) individual inhalation of airborne radionuclides, (2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, (3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man, and (4) deposition on the ground with subsequent exposure of man.

This control applies to the release of radioactive materials in gaseous effluents from each unit at the site. For units with shared Radwaste Treatment Systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

3/4.11.2.4 AND 3/4.11.2.5 GASEOUS RADWASTE TREATMENT SYSTEM AND VENTILATION EXHAUST TREATMENT SYSTEM

The OPERABILITY of the WASTE GAS HOLDUP SYSTEM and the VENTILATION EXHAUST TREATMENT SYSTEM ensures that the systems will be available for use whenever gaseous effluents require treatment prior to release to the environment. The requirement that the appropriate portions of these systems be used, when specified, provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable." This control implements the requirements of 10 CFR 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objectives given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

This control applies to the release of radioactive materials in gaseous effluents from each unit at the site. For units with shared Radwaste Treatment Systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

3/4 11.2.6 NOT USED

3/4 11.2.7 NOT USED

3/4.11.2.8 MARK I CONTAINMENT

This specification provides reasonable assurance that releases from drywell purging operations will not exceed the annual dose limits of 10 CFR part 20 for unrestricted areas.

3/4.11.3 NOT USED

3/4.11.4 TOTAL DOSE

This control is provided to meet the dose limitations of 10 CFR Part 190 that have been incorporated into 10 CFR Part 20 by 46 FR 18525. The control requires the preparation and submittal of a Special Report whenever the calculated doses due to releases of radioactivity and to radiation from uranium fuel cycle sources exceed 25 mrems to the whole body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems. For sites containing up to four reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR Part 190 if the individual reactors remain within twice the dose design objectives of Appendix I, and if direct radiation doses from the units

TOTAL DOSE (Continued)

(including outside storage tanks, etc.) are kept small. The Special Report will describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR Part 190 limits. For the purposes of the Special Report, it may be assumed that the dose commitment to the MEMBER of the PUBLIC from other uranium fuel cycle sources is negligible, with the exception that dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 8 km must be considered. If the dose to any MEMBER OF THE PUBLIC is estimated to exceed the requirements of 40 CFR Part 190, the Special Report with a request for a variance (provided the release conditions resulting in violation of 40 CFR Part 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11 and 10 CFR 20.405c, is considered to be a timely request and fulfills the requirements of 40 CFR Part 190 until NRC staff action is completed. The variance only relates to the limits of 40 CFR Part 190, and does not apply in any way to the other requirements for dose limitation of 10 CFR Part 20, as addressed in Controls 3.11.1.1 and 3.11.2.1. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

## 3/4.12.1 MONITORING PROGRAM

The Radiological Environmental Monitoring Program required by this control provides representative measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposure of MEMBERS OF THE PUBLIC resulting from the plant operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the Radiological Effluent Monitoring Program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways. Guidance for this monitoring program is provided by the Radiological Assessment Branch Technical Position on Environmental Monitoring, Revision 1, November 1979. The initially specified monitoring program will be effective for at least the first 3 years of commercial operation. Following this period, program changes may be initiated based on operational experience.

The required detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLDs). The LLDs required by Table 4.12-1 are considered optimum for routine environmental measurements in industrial laboratories. It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

Detailed discussion of the LLD, and other detection limits, can be found in Currie, L. A., "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements," NUREG/CR-4007 (September 1984), and in the HASL Procedures Manual, HASL-300.

## 3/4.12.2 LAND USE CENSUS

This control is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the Radiological Environmental Monitoring Program given in the ODCM are made if required by the results of this census. The best information from the door-to-door survey, from aerial survey or from consulting with local agricultural authorities shall be used. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 50 $m^2$ provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were made: (1) 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and (2) a vegetation yield of 2 $kg/m^2$.

## 3/4.12.3 INTERLABORATORY COMPARISON PROGRAM

The requirement for participation in an approved Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are valid for the purposes of Section IV.B.2 of Appendix I to 10 CFR Part 50.

# APPENDIX A

Radiological Assessment Branch Technical Position,
Revision 1, November 1979

Revision 1
November 1979

## Branch Technical Position

### Background

Regulatory Guide 4.8, Environmental Technical Specifications for Nuclear Power Plants, issued for comment in December 1975, is being revised based on comments received. The Radiological Assessment Branch issued a Branch Position on the radiological portion of the environmental monitoring program in March, 1978. The position was formulated by an NRC working group which considered comments received after the issuance of the Regulatory Guide 4.8. This is Revision 1 of that Branch Position paper. The changes are marked by a vertical line in the right margin. The most significant change is the increase in direct radiation measurement stations.

10 CFR Parts 20 and 50 require that radiological environmental monitoring programs be established to provide data on measurable levels of radiation and radioactive materials in the site environs. In addition, Appendix I to 10 CFR Part 50 requires that the relationship between quantities of radioactive material released in effluents during normal operation, including anticipated operational occurrences, and resultant radiation doses to individuals from principals pathways of exposure be evaluated. These programs should be conducted to verify the effectiveness of in-plant measures used for controlling the release of radioactive materials. Surveillance should be established to identify changes in the use of unrestricted areas (e.g., for agricultrual purposes) to provide a basis for modifications in the monitoring programs for evaluating doses to individuals from principal pathways of exposure. NRC Regulatory Guide 4.1, Rev. 1, "Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants," provides an acceptable basis for the design of programs to monitor levels of radiation and radioactivity in the station environs.

This position sets forth an example of an acceptable minimum radiological monitoring program. Local site characteristics must be examined to determine if pathways not covered by this guide may significantly contribute to an individual's dose and should be included in the sampling program.

# AN ACCEPTABLE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

## Program Requirements

Environmental samples shall be collected and analyzed according to Table 1 at locations shown in Figure 1.[1] Analytical techniques used shall be such that the detection capabilities in Table 2 are achieved.

The results of the radiological environmental monitoring are intended to supplement the results of the radiological effluent monitoring by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. Thus, the specified environmental monitoring program provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures of individuals resulting from the station operation. The initial radiological environmental monitoring program should be conducted for the first three years of commercial operation (or other period corresponding to a maximum burnup in the initial core cycle). Following this period, program changes may be proposed based on operational experience.

The specified detection capabilities are state-of-the-art for routine environmental measurements in industrial laboratories.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the annual report.

The laboratories of the licensee and licensee's contractors which perform analyses shall participate in the Environmental Protection Agency's (EPA's) Environmental Radioactivity Laboratory Intercomparisons Studies (Crosscheck) Program or equivalent program. This participation shall include all of the determinations (sample medium-radionuclide combination) that are offered by EPA and that also are included in the monitoring program. The results of analysis of these crosscheck samples shall be included in the annual report. The participants in the EPA crosscheck program may provide their EPA program code so that the NRC can review the EPA's participant data directly in lieu of submission in the annual report.

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[1] It may be necessary to require special studies on a case-by-case and site specific basis to establish the relationship between quantities of radioactive material released in effluents, the concentrations in environmental media, and the resultant doses for important pathways.

If the results of a determination in the EPA crosscheck program (or equivalent program) are outside the specified control limits, the laboratory shall investigate the cause of the problem and take steps to correct it. The results of this investigation and corrective action shall be included in the annual report.

The requirement for the participation in the EPA crosscheck program, or similar program, is based on the need for independent checks on the precision and accuracy of the measurements of radioactive material in environmental sample matrices as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are reasonably valid.

A census shall be conducted annually during the growing season to determine the location of the nearest milk animal and nearest garden greater than 50 square meters (500 sq. ft.) producing broad leaf vegetation in each of the 16 meteorological sectors within a distance of 8 km (5 miles).[2] For elevated releases as defined in Regulatory Guide 1.111, Rev. 1., the census shall also identify the locations of all milk animals, and gardens greater than 50 square meters producing broad leaf vegetation out to a distance of 5 km. (3 miles) for each radial sector.

If it is learned from this census that the milk animals or gardens are present at a location which yields a calculated thyroid dose greater than those previously sampled, or if the census results in changes in the location used in the radioactive effluent technical specifications for dose calculations, a written report shall be submitted to the Director of Operating Reactors, NRR (with a copy to the Director of the NRC Regional Office) within 30 days identifying the new location (distance and direction). Milk animal or garden locations resulting in higher calculated doses shall be added to the surveillance program as soon as practicable.

The sampling location (excluding the control sample location) having the lowest calculated dose may then be dropped from the surveillance program at the end of the grazing or growing season during which the census was conducted. Any location from which milk can no longer be obtained may be dropped from the surveillance program after notifying the NRC in writing that they are no longer obtainable at that location. The results of the land-use census shall be reported in the annual report.

The census of milk animals and gardens producing broad leaf vegetation is based on the requirement in Appendix I of 10 CFR Part 50 to "Identify changes in the use of unrestricted areas (e.g., for agricultural purposes) to permit modifications in monitoring programs for evaluating doses to individuals from principal pathways of exposure." The consumption of milk from animals grazing on contaminated pasture and of leafy vegetation contaminated by airborne

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[2] Broad leaf vegetation sampling may be performed at the site boundary in a sector with the highest D/Q in lieu of the garden census.

radioiodine is a major potential source of exposure. Samples from milk animals are considered a better indicator of radioiodine in the environment than vegetation. If the census reveals milk animals are not present or are unavailable for sampling, then vegetation must be sampled.

The 50 square meter garden, considering 20% used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and a vegetation yield of 2 kg/m$^2$, will produce the 26 kg/yr assumed in Regulatory Guide 1.109, Rev 1., for child consumption of leafy vegetation. The option to consider the garden to be broad leaf vegetation at the site boundary in a sector with the highest D/Q should be conservative and that location may be used to calculate doses due to radioactive effluent releases in place of the actual locations which would be determined by the census. This option does not apply to plants with elevated releases as defined in Regulatory Guide 1.111, Rev. 1.

The increase in the number of direct radiation stations is to better characterize the individual exposure (mrem) and population exposure (man-rem) in accordance with Criterion 64 - Monitoring radioactivity releases, of 10 CFR Part 50, Appendix A. The NRC will place a similar amount of stations in the area between the two rings designated in Table 1.

NOTE

Guidance on the subjects contained on pages 4 through 16 of the Radiological Assessment Branch Technical Position (RAB-BTP) has been modified and upgraded based on operating experience since Revision 1 was published in 1979. The current staff guidance for the following items has been incorporated in the Section 3/4-12 and Section 6 Controls of NUREG-1301 and 1302.

- Reporting Requirement
- Table 1: Operational Radiological Environmental Monitoring Report
- Table 2: Detection Capabilities for Environmental Sample Analysis
- Table 4: Reporting Levels for Radioactivity Concentrations in Environmental Samples

The following items remain unchanged:

- Footnote to Table 1 on page 10
- Table 3 of page 14
- Figure 1 of page 16

Pages 5, 6, 7, 8, 9, 11, 12, 13, 15

The above pages have been superceded by text and tables in NUREG-1301 and 1302.

TABLE 1 (Continued)

Note: In addition to the above guidance for operational monitoring, the following material is supplied for guidance on preoperational programs.

Preoperational Environmental Surveillance Program

A Preoperational Environmental Surveillance Program should be instituted two years prior to the institution of station plant operation.

The purposes of this program are:

1. To measure background levels and their variations along the anticipated critical pathways in the area surrounding the station.

2. To train personnel

3. To evaluate procedures, equipment and techniques

The elements (sampling media and type of analysis) of both preoperational and operational programs should be essentially the same. The duration of the preoperational program, for specific media, presented in the following table should be followed:

Duration of Preoperational Sampling Program for Specific Media

| 6 months | 1 year | 2 years |
|---|---|---|
| . airborne iodine | . airborne particulates | . direct radiation |
| . iodine in milk (while animals are in pasture) | . milk (remaining analyses) | . fish and invertebrates |
| | . surface water | . food products |
| | . groundwater | . sediment from shoreline |
| | . drinking water | |

TABLE 3

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility _____ Docket No. _____

Location of Facility _____ Reporting Period _____
(County, State)

| Medium or Pathway Sampled (Unit of Measurement) | Type and Total Number of Analyses Performed | Lower Limit of Detection[a] (LLD) | All Indicator Locations Mean (f)[b] Range | Location with Highest Annual Mean: Name, Distance & Direction | Mean (f)[b] Range | Control locations Mean (f)[b] Range | Number of Nonroutine Reported Measurements |
|---|---|---|---|---|---|---|---|
| Air Particulates ($pCi/m^3$) | Gross β 416 | 0.01 | 0.08(200/312) (0.05-2.0) | Middletown 5 miles 340° | 0.10 (5/52) (0.08-2.0) | 0.08 (8/104) (0.05-1.40) | 1 |
| | γ-Spec. 32 | | | | | | |
| | $^{137}Cs$ | 0.01 | 0.05 (4/24) (0.03-0.13) | Smithville 2.5 miles 160° | 0.08 (2/4) (0.03-2.0) | <LLD | 4 |
| | $^{131}I$ | 0.07 | 0.12 (2/24) (0.09-0.18) | Podunk 4.0 miles 270° | 0.20 (2/4) (0.10-0.31) | 0.02 (2/4) | 1 |
| Fish pCi/kg (wet weight) | γ-Spec. 8 | | | | | | |
| | $^{137}Cs$ | 130 | <LLD | - | <LLD | 90 (1/4) | 0 |
| | $^{134}Cs$ | 130 | <LLD | - | <LLD | <LLD | 0 |
| | $^{60}Co$ | 130 | 180 (3/4) (150-225) | River Mile 35 | See Column 4 | <LLD | 0 |

[a]See Table 2, note b.

[b]Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses. (f)

Note: The example data are provided for illustrative purposes only.

Figure 1

(This figure shall be of a suitable scale to show the distance and direction of each monitoring station. A key shall be provided to indicate what is sampled at each location.)

## APPENDIX B

"Appendix B - General Contents of the Offsite Dose Calculation Manual (ODCM) (Revision 1, February 1979)" to the paper authored by C. A. Willis and F. J. Congel, "Status of NRC Radiological Effluent Technical Specification Activities" presented at the Atomic Industrial Forum Conference on NEPA and Nuclear Regulation, October 4-7, 1981, Washington, D.C.

APPENDIX B

GENERAL CONTENTS OF THE OFFSITE DOSE CALCULATION MANUAL (ODCM*)
(Rev. 1, February 1979)

Section 1 - Set Points

Provide the equations and methodology to be used at the station or unit for each alarm and trip set point on each effluent release point according to the Specifications 3.3.3.8 and 3.3.3.9. The instrumentation for each alarm and trip set point, including radiation monitoring and sampling systems and effluent control features, should be identified by reference to the FSAR (or Final Hazard Summary). This information should be consistent with the recommendations of Section I of Standard Review Plan 11.5, NUREG-75/087, (Revision 1). If the alarm and/or trip set point value is variable, provide the equation to determine the set point value to be used, based on actual release conditions, that will assure that the Specification is met at each release point; and provide the value to be used when releases are not in progress. If dilution or dispersion is used, state the onsite equipment and measurement method used during release, the site related parameters and the set points used to assure that the Specification is met at each release point. The fixed and variable set points should consider the radioactive effluent to have a radionuclide distribution represented by normal and anticipated operational occurrences.

Section 2 - Liquid Effluent Concentration

Provide the equations and methodology to be used at the station or unit for each liquid release point according to the Specification 3.11.1.1. For systems with continuous or batch releases, and for systems designed to monitor and control both continuous and batch releases, provide the assumptions and parameters to be used to compare the output of the monitor with the liquid concentration specified. State the limitations for combined discharges to the same release point. In addition, describe the method and assumptions for obtaining representative samples from each batch and use of previous post-release analyses or composite sample analyses to meet the Specification.

Section 3 - Gaseous Effluent Dose Rate

Provide the equations and methodology to be used at the station or unit for each gaseous release point according to Specification 3.11.2.1. Consider the various pathways, release point elevations, site related parameters and radionuclide contribution to the dose impact limitation. Provide the

*The format for the ODCM is left up to the licensee and may be simplified by tables and grid printout. Each page should be numbered and indicate the facility approval and effective date.

dose factors to be used for the identified radionuclides released. Provide the annual average dispersion values (X/Q and D/Q), the site specific parameters and release point elevations.

Section 4 - Liquid Effluent Dose

Provide the equations and methodology to be used at the station or unit for each liquid release point according to the dose objectives given in Specification 3.11.1.2. The section should describe how the dose contributions are to be calculated for the various pathways and release points, the equations and assumptions to be used, the site specific parameters to be measured and used, the receptor location by direction and distance, and the method of estimating and updating cumulative doses due to liquid releases. The dose factors, pathway transfer factors, pathway usage factors, and dilution factors for the points of pathway origin, etc., should be given, as well as receptor age group, water and food consumption rate and other factors assumed or measured. Provide the method of determining the dilution factor at the discharge during any liquid effluent release and any site specific parameters used in these determinations.

Section 5 - Gaseous Effluent Dose

Provide the equations and methodology to be used at the station or unit for each gaseous release point according to the dose objectives given in Specifications 3.11.2.2 and 3.11.2.3. The section should describe how the dose contributions are to be calculated for the various pathways and release points, the equations and assumptions to be used, the site specific parameters to be measured and used, the receptor location by direction and distance, and the method to be used for estimating and updating cumulative doses due to gaseous releases. The location, direction and distance to the nearest residence, cow, goat, meat animal, garden, etc., should be given, as well as receptor age group, crop yield, grazing time and other factors assumed or measured. Provide the method of determining dispersion values (X/Q and D/Q) for releases and any site specific parameters and release point elevations used in these determinations.

Section 6 - Projected Doses

For liquid and gaseous radwaste treatment systems, provide the method of projecting doses due to effluent releases for the normal and alternate pathways of treatment according to the specifications, describing the components and subsystems to be used.

Section 7 - Operability of Equipment

Provide a flow diagram(s) defining the treatment paths and the components of the radioactive liquid, gaseous and solid waste management systems that are to be maintained and used, pursuant to 10 CFR 50.36a, to meet Technical Specifications 3.11.1.3, 3.11.2.4 and 3.11.3.1. Subcomponents of packaged equipment can be identified by a list. For operating reactors whose construction permit applications were filed prior to January 2, 1971, the flow diagram(s) shall be consistent with the information provided in conformance with Section V.B.1 of Appendix I to 10 CFR Part 50. For OL applications whose construction permits were filed after January 2, 1971, the flow diagram(s) shall be consistent with the information provided in Chapter 11 of the Final Safety Analysis Report (FSAR) or amendments thereto.

Section 8 - Sample Locations

Provide a map of the Radiological Environmental Monitoring Sample Locations indicating the numbered sampling locations given in Table 3.12-1. Further clarification on these numbered sampling locations can be provided by a list, indicating the direction and distance from the center of the building complex of the unit or station, and may include a discriptive name for identification purposes.

## APPENDIX C

GENERIC LETTER 89-01

IMPLEMENTATION OF PROGRAMMATIC CONTROLS FOR RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS IN THE ADMINISTRATIVE CONTROLS SECTION OF THE TECHNICAL SPECIFICATIONS AND THE RELOCATION OF PROCEDURAL DETAILS OF RETS TO THE OFFSITE DOSE CALCULATION MANUAL OR TO THE PROCESS CONTROL PROGRAM

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

January 31, 1989

TO ALL POWER REACTOR LICENSEES AND APPLICANTS

SUBJECT: IMPLEMENTATION OF PROGRAMMATIC CONTROLS FOR RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS IN THE ADMINISTRATIVE CONTROLS SECTION OF THE TECHNICAL SPECIFICATIONS AND THE RELOCATION OF PROCEDURAL DETAILS OF RETS TO THE OFFSITE DOSE CALCULATION MANUAL OR TO THE PROCESS CONTROL PROGRAM (GENERIC LETTER 89-01)

The NRC staff has examined the contents of the Radiological Effluent Technical Specifications (RETS) in relation to the Commission's Interim Policy Statement on Technical Specification Improvements. The staff has determined that programmatic controls can be implemented in the Administrative Controls section of the Technical Specifications (TS) to satisfy existing regulatory requirements for RETS. At the same time, the procedural details of the current TS on radioactive effluents and radiological environmental monitoring can be relocated to the Offsite Dose Calculation Manual (ODCM). Likewise, the procedural details of the current TS on solid radioactive wastes can be relocated to the Process Control Program (PCP). These actions simplify the RETS, meet the regulatory requirements for radioactive effluents and radiological environmental monitoring, and are provided as a line-item improvement of the TS, consistent with the goals of the Policy Statement.

New programmatic controls for radioactive effluents and radiological environmental monitoring are incorporated in the TS to conform to the regulatory requirements of 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50. Existing programmatic requirements for the PCP are being retained in the TS. The procedural details included in licensees' present TS on radioactive effluents, solid radioactive wastes, environmental monitoring, and associated reporting requirements will be relocated to the ODCM or PCP as appropriate. Licensees will handle future changes to these procedural details in the ODCM and the PCP under the administrative controls for changes to the ODCM or PCP. Finally, the definitions of the ODCM and PCP are updated to reflect these changes.

Enclosure 1 provides guidance for the preparation of a license amendment request to implement these alternatives for RETS. Enclosure 2 provides a listing of existing RETS and a description of how each is addressed. Enclosure 3 provides model TS for programmatic controls for RETS and its associated reporting requirements. Finally, Enclosure 4 provides model specifications for retaining existing requirements for explosive gas monitoring instrumentation requirements that apply on a plant-specific basis. Licensees are encouraged to propose changes to TS that are consistent with the guidance provided in the enclosures. Conforming amendment requests will be expeditiously reviewed by

the NRC Project Manager for the facility. Proposed amendments that deviate from this guidance will require a longer, more detailed review. Please contact the appropriate Project Manager if you have questions on this matter.

Sincerely,

Steven A. Varga
Acting Associate Director for Projects
Office of Nuclear Reactor Regulation

Enclosures:
1 through 4 as stated

# GUIDANCE FOR THE IMPLEMENTATION OF PROGRAMMATIC CONTROLS FOR RETS IN THE ADMINISTRATIVE CONTROLS SECTION OF TECHNICAL SPECIFICATIONS AND THE RELOCATION OF PROCEDURAL DETAILS OF CURRENT RETS TO THE OFFSITE DOSE CALCULATION MANUAL OR PROCESS CONTROL PROGRAM

## INTRODUCTION

This enclosure provides guidance for the preparation of a license amendment request to implement programmatic controls in Technical Specifications (TS) for radioactive effluents and for radiological environmental monitoring conforming to the applicable regulatory requirements. This will allow the relocation of existing procedural details of the current Radiological Effluent Technical Specifications (RETS) to the Offsite Dose Calculation Manual (ODCM). Procedural details for solid radioactive wastes will be relocated to the Process Control Program (PCP). A proposed amendment will (1) incorporate programmatic controls in the Administrative Controls section of the TS that satisfy the requirements of 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36a. and Appendix I to 10 CFR Part 50, (2) relocate the existing procedural details in current specifications involving radioactive effluent monitoring instrumentation, the control of liquid and gaseous effluents, equipment requirements for liquid and gaseous effluents, radiological environmental monitoring, and radiological reporting details from the TS to the ODCM, (3) relocate the definition of solidification and existing procedural details in the current specification on solid radioactive wastes to the PCP, (4) simplify the associated reporting requirements, (5) simplify the administrative controls for changes to the ODCM and PCP, (6) add record retention requirements for changes to the ODCM and PCP, and (7) update the definitions of the ODCM and PCP consistent with these changes.

The NRC staff's intent in recommending these changes to the TS and the relocation of procedural details of the current RETS to the ODCM and PCP is to fulfill the goal of the Commission Policy Statement for Technical Specification Improvements. It is not the staff's intent to reduce the level of radiological effluent control. Rather, this amendment will provide programmatic controls for RETS consistent with regulatory requirements and allow relocation of the procedural details of current RETS to the ODCM or PCP. Therefore, future changes to these procedural details will be controlled by the controls for changes to the ODCM or PCP included in the Administrative Controls section of the TS. These procedural details are not required to be included in TS by 10 CFR 50.36a.

## DISCUSSION

Enclosure 2 to Generic Letter 89- provides a summary listing of specifications that are included under the heading of RETS in the Standard Technical Specifications (STS) and their disposition. Most of these specifications will be addressed by programmatic controls in the Administrative Controls section of the TS. Some specifications under the heading of RETS are not covered by the new programmatic controls and will be retained as requirements in the existing plant TS. Examples include requirements for explosive gas monitoring instrumentation, limitations on the quantity of radioactivity in liquid or gaseous holdup or storage tanks or in the condenser exhaust for BWRs, or limitations on explosive gas mixtures in offgas treatment systems and storage tanks.

Licensees with nonstandard TS should follow the guidance provided in Enclosure 2 for the disposition of similar requirements in the format of their TS.

Because solid radioactive wastes are addressed under existing programmatic controls for the Process Control Program, which is a separate program from the new programmatic controls for liquid and gaseous radioactive effluents, the requirements for solid radioactive wastes and associated solid waste reporting requirements in current TS are included as procedural details that will be relocated to the PCP as part of this line-item improvement of TS. Also, the staff has concluded that records of licensee reviews performed for changes made to the ODCM and PCP should be documented and retained for the duration of the unit operating license. This approach is in lieu of the current requirements that the reasons for changes to the ODCM and PCP be addressed in the Semiannual Effluent Release Report.

The following items are to be included in a license amendment request to implement these changes. First, the model specifications in Enclosure 3 to Generic Letter 89- should be incorporated into the TS to satisfy the requirements of 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50. The definitions of the ODCM and PCP should be updated to reflect these changes. The programmatic and reporting requirements are general in nature and do not contain plant-specific details. Therefore, these changes to the Administrative Controls section of the TS are to replace corresponding requirements in plant TS that address these items. They should be proposed for incorporation into the plant's TS without change in substance to replace existing requirements. If necessary, only changes in format should be proposed. If the current TS include requirements for explosive gas monitoring instrumentation as part of the gaseous effluent monitoring instrumentation requirements, these requirements should be retained. Enclosure 4 to Generic Letter 89- provides model specifications for retaining such requirements.

Second, the procedural details covered in the licensee's current RETS, consisting of the limiting conditions for operation, their applicability, remedial actions, surveillance requirements, and the Bases section of the TS for these requirements, are to be relocated to the ODCM or PCP as appropriate and in a manner that ensures that these details are incorporated in plant operating procedures. The NRC staff does not intend to repeat technical reviews of the relocated procedural details because their consistency with the applicable regulatory requirements is a matter of record from past NRC reviews of RETS. If licensees make other than editorial changes in the procedural details being transferred to the ODCM, each change should be identified by markings in the margin and the requirements of new Specification 6.14a.(1) and (2) followed.

Finally, licensees should confirm in the amendment request that changes for relocating the procedural details of current RETS to either the ODCM or PCP have been prepared in accordance with the proposed changes to the Administrative Controls section of the TS so that they may be implemented immediately upon issuance of the proposed amendment. A complete and legible copy of the revised ODCM should be forwarded with the amendment request for NRC use as a reference. The NRC staff will not concur in or approve the revised ODCM.

Licensees should refer to "Generic Letter 89- " in the Subject line of license amendment requests implementing the guidance of this Generic Letter. This will facilitate the staff's tracking of licensees' responses to this Generic Letter.

## SUMMARY

The license amendment request for the line-item improvements of the TS relative to the RETS will entail (1) the incorporation of programmatic controls for radioactive effluents and radiological environmental monitoring in the Administrative Controls section of the TS, (2) incorporatation of the procedural details of the current RETS in the ODCM or PCP as appropriate, and (3) confirmation that the guidance of this Generic Letter has been followed.

## DISPOSITION OF SPECIFICATIONS AND ADMINISTRATIVE CONTROLS INCLUDED UNDER THE HEADING OF RETS IN THE STANDARD TECHNICAL SPECIFICATIONS

| SPECIFICATION | TITLE | DISPOSITION OF EXISTING SPECIFICATION |
|---|---|---|
| 1.17 | OFFSITE DOSE CALCULATION MANUAL | Definition is updated to reflect the change in scope of the ODCM. |
| 1.22 | PROCESS CONTROL PROGRAM | Definition is updated to reflect the change in scope of the PCP. |
| 1.32 | SOLIDIFICATION | Definition is relocated to the PCP. |
| 3/4.3.3.10 | RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION | Programmatic controls are included in 6.8.4 g. Item 1). Existing specification procedural details are relocated to the ODCM. |
| 3/4.3.3.11 | RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION | Programmatic controls are included in 6.8.4 g. Item 1). Existing specification procedural details are relocated to the ODCM. Existing requirements for explosive gas monitoring instrumentation should be retained. Model specifications for these requirements are provided in Enclosure 4. |
| 3/4.11.1.1 | LIQUID EFFLUENTS: CONCENTRATION | Programmatic controls are included in 6.8.4 g. Items 2) and 3). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.1.2 | LIQUID EFFLUENTS: DOSE | Programmatic controls are included in 6.8.4 g. Items 4) and 5). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.1.3 | LIQUID EFFLUENTS: LIQUID RADWASTE TREATMENT SYSTEM | Programmatic controls are included in 6.8.4 g. Item 6). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.1.4 | LIQUID HOLDUP TANKS | Existing specification requirements to be retained. |

DISPOSITION OF SPECIFICATIONS AND ADMINISTRATIVE CONTROLS
INCLUDED UNDER THE HEADING OF RETS IN THE STANDARD TECHNICAL SPECIFICATIONS (Cont.)

| SPECIFICATION | TITLE | DISPOSITION OF EXISTING SPECIFICATION |
|---|---|---|
| 3/4.11.2.1 | GASEOUS EFFLUENTS: DOSE RATE | Programmatic controls are included in 6.8.4 g. Items 3) and 7). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.2.2 | GASEOUS EFFLUENTS: DOSE-NOBLE GASES | Programmatic controls are included in 6.8.4 g. Items 5) and 8). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.2.3 | GASEOUS EFFLUENTS: DOSE--IODINE-131, IODINE-133, TRITIUM, AND RADIOACTIVE MATERIAL IN PARTICULATE FORM | Programmatic controls are included in 6.8.4 g. Items 5) and 9). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.2.4 | GASEOUS EFFLUENTS: GASEOUS RADWASTE TREATMENT or VENTILATION EXHAUST TREATMENT SYSTEM | Programmatic controls are included in 6.8.4 g. Item 6). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.2.5 | EXPLOSIVE GAS MIXTURE | Existing specification requirements should be retained. |
| 3/4.11.2.6 | GAS STORAGE TANKS | Existing specification requirements should be retained. |
| 3/4.11.2.7 | MAIN CONDENSER (BWR) | Existing specification requirements should be retained. |
| 3/4.11.2.8 | PURGING AND VENTING (BWR Mark II containments) | Programmatic controls are included in 6.8.4 g. Item 10). Existing specification procedural details are relocated to the ODCM. |
| 3/4.11.3 | SOLID RADIOACTIVE WASTES | Existing specification procedural details are relocated to the PCP. |
| 3/4.11.4 | RADIOACTIVE EFFLUENTS: TOTAL DOSE | Programmatic controls are included in 6.8.4 g. Item 11). Existing specification procedural details are relocated to the ODCM. |

## DISPOSITION OF SPECIFICATIONS AND ADMINISTRATIVE CONTROLS INCLUDED UNDER THE HEADING OF RETS IN THE STANDARD TECHNICAL SPECIFICATIONS (Cont.)

| SPECIFICATION | TITLE | DISPOSITION OF EXISTING SPECIFICATION |
|---|---|---|
| 3/4.12.1 | RADIOLOGICAL ENVIRONMENTAL MONITORING: MONITORING PROGRAM | Programmatic controls are included in 6.8.4 h. Item 1). Existing specification procedural details are relocated to the ODCM. |
| 3/4.12.2 | RADIOLOGICAL ENVIRONMENTAL MONITORING: LAND USE CENSUS | Programmatic controls are included in 6.8.4 h. Item 2). Existing specification procedural details are relocated to the ODCM. |
| 3/4.12.3 | RADIOLOGICAL ENVIRONMENTAL MONITORING: INTERLABORATORY COMPARISON PROGRAM | Programmatic controls are included in 6.8.4 h. Item 3). Existing specification procedural details are relocated to the ODCM. |
| 5.1.3 | DESIGN FEATURES: SITE - MAP DEFINING UNRESTRICTED AREAS AND SITE BOUNDARY FOR RADIOACTIVE GASEOUS AND LIQUID EFFLUENTS | Existing specification requirements should be retained. |
| 6.9.1.3 | REPORTING REQUIREMENTS: ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT | Specification simplified and existing reporting details are relocated to the ODCM. |
| 6.9.1.4 | REPORTING REQUIREMENTS: SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT | Specification simplified and existing reporting details are relocated to the ODCM or PCP as appropriate. |
| 6.13 | PROCESS CONTROL PROGRAM | Specification requirements are simplified. |
| 6.14 | OFFSITE DOSE CALCULATION MANUAL | Specification requirements are simplified. |
| 6.15 | MAJOR CHANGES TO LIQUID, GASEOUS, AND SOLID RADWASTE TREATMENT SYSTEMS | Existing procedural details are relocated to the ODCM or PCP as appropriate. |

## TECHNICAL SPECIFICATIONS TO BE REVISED

| | |
|---|---|
| 1.17 | DEFINITIONS: OFFSITE DOSE CALCULATION MANUAL |
| 1.22 | DEFINITIONS: PROCESS CONTROL PROGRAM |
| 6.8.4 g. | PROCEDURES AND PROGRAMS: RADIOACTIVE EFFLUENT CONTROLS |
| 6.8.4 h. | PROCEDURES AND PROGRAMS: RADIOLOGICAL ENVIRONMENTAL MONITORING |
| 6.9.1.3 | REPORTING REQUIREMENTS: ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT |
| 6.9.1.4 | REPORTING REQUIREMENTS: SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT |
| 6.10 | RECORD RETENTION |
| 6.13 | PROCESS CONTROL PROGRAM (PCP) |
| 6.14 | OFFSITE DOSE CALCULATION MANUAL (ODCM) |

## MODEL TECHNICAL SPECIFICATION REVISIONS
(To supplement or replace existing specifications)

## 1.0 DEFINITIONS

### OFFSITE DOSE CALCULATION MANUAL

1.17 The OFFSITE DOSE CALCULATION MANUAL (ODCM) shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Section 6.8.4 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Semiannual Radioactive Effluent Release Reports required by Specifications 6.9.1.3 and 6.9.1.4.

1.22 The PROCESS CONTROL PROGRAM (PCP) shall contain the current formulas, sampling, analyses, test, and determinations to be made to ensure that processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10 CFR Parts 20, 61, and 71, State regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.

## 6.0 ADMINISTRATIVE CONTROLS

### 6.8 PROCEDURES AND PROGRAMS

6.8.4 The following programs shall be established, implemented, and maintained:

g. Radioactive Effluent Controls Program

A program shall be provided conforming with 10 CFR 50.36a for the control of radioactive effluents and for maintaining the doses to MEMBERS OF THE PUBLIC from radioactive effluents as low as reasonably achievable. The program (1) shall be contained in the ODCM, (2) shall be implemented by operating procedures, and (3) shall include remedial actions to be taken whenever the program limits are exceeded. The program shall include the following elements:

1) Limitations on the operability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in the ODCM,

2) Limitations on the concentrations of radioactive material released in liquid effluents to UNRESTRICTED AREAS conforming to 10 CFR Part 20, Appendix B, Table II, Column 2,

3) Monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with 10 CFR 20.106 and with the methodology and parameters in the ODCM,

4) Limitations on the annual and quarterly doses or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released from each unit to UNRESTRICTED AREAS conforming to Appendix I to 10 CFR Part 50,

5) Determination of cumulative and projected dose contributions from radioactive effluents for the current calendar quarter and current calendar year in accordance with the methodology and parameters in the ODCM at least every 31 days,

6) Limitations on the operability and use of the liquid and gaseous effluent treatment systems to ensure that the appropriate portions of these systems are used to reduce releases of radioactivity when the projected doses in a 31-day period would exceed 2 percent of the guidelines for the annual dose or dose commitment conforming to Appendix I to 10 CFR Part 50,

7) Limitations on the dose rate resulting from radioactive material released in gaseous effluents to areas beyond the SITE BOUNDARY conforming to the doses associated with 10 CFR Part 20, Appendix B, Table II, Column 1,

ADMINISTRATIVE CONTROLS

6.8.4 g. Radioactive Effluent Controls Program (Cont.)

8) Limitations on the annual and quarterly air doses resulting from noble gases released in gaseous effluents from each unit to areas beyond the SITE BOUNDARY conforming to Appendix I to 10 CFR Part 50,

9) Limitations on the annual and quarterly doses to a MEMBER OF THE PUBLIC from Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from each unit to areas beyond the SITE BOUNDARY conforming to Appendix I to 10 CFR Part 50,

10) Limitations on venting and purging of the Mark II containment through the Standby Gas Treatment System to maintain releases as low as reasonably achievable (BWRs w/Mark II containments), and

11) Limitations on the annual dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources conforming to 40 CFR Part 190.

h. Radiological Environmental Monitoring Program

A program shall be provided to monitor the radiation and radionuclides in the environs of the plant. The program shall provide (1) representative measurements of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. The program shall (1) be contained in the ODCM, (2) conform to the guidance of Appendix I to 10 CFR Part 50, and (3) include the following:

1) Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM,

2) A Land Use Census to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census, and

3) Participation in a Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring.

ADMINISTRATIVE CONTROLS

## 6.9 REPORTING REQUIREMENTS

### ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT*

6.9.1.3 The Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted before May 1 of each year. The report shall include summaries, interpretations, and analysis of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in (1) the ODCM and (2) Sections IV.B.2, IV.B.3, and IV.C of Appendix I to 10 CFR Part 50.

### SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT**

6.9.1.4 The Semiannual Radioactive Effluent Release Report covering the operation of the unit during the previous 6 months of operation shall be submitted within 60 days after January 1 and July 1 of each year. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit. The material provided shall be (1) consistent with the objectives outlined in the ODCM and PCP and (2) in conformance with 10 CFR 50.36a and Section IV.B.1 of Appendix I to 10 CFR Part 50.

## 6.10 RECORD RETENTION

6.10.3 The following records shall be retained for the duration of the unit Operating License:

o. Records of reviews performed for changes made to the OFFSITE DOSE CALCULATION MANUAL and the PROCESS CONTROL PROGRAM.

## 6.13 PROCESS CONTROL PROGRAM (PCP)

Changes to the PCP:

a. Shall be documented and records of reviews performed shall be retained as required by Specification 6.10.3o. This documentation shall contain:

1) Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s) and

*A single submittal may be made for a multi-unit station.

**A single submittal may be made for a multi-unit station. The submittal should combine those sections that are common to all units at the station; however, for units with separate radwaste systems, the submittal shall specify the releases of radioactive material from each unit.

ADMINISTRATIVE CONTROLS

6.13 PROCESS CONTROL PROGRAM (PCP) (Cont.)

2) A determination that the change will maintain the overall conformance of the solidified waste product to existing requirements of Federal, State, or other applicable regulations.

b. Shall become effective after review and acceptance by the [URG] and the approval of the Plant Manager.

6.14 OFFSITE DOSE CALCULATION MANUAL (ODCM)

Changes to the ODCM:

a. Shall be documented and records of reviews performed shall be retained as required by Specification 6.10.3o. This documentation shall contain:

1) Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s) and

2) A determination that the change will maintain the level of radioactive effluent control required by 10 CFR 20.106, 40 CFR Part 190, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50 and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

b. Shall become effective after review and acceptance by the [URG] and the approval of the Plant Manager.

c. Shall be submitted to the Commission in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Semiannual Radioactive Effluent Release Report for the period of the report in which any change to the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (e.g., month/year) the change was implemented.

# MODIFICATION OF THE SPECIFICATION FOR RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION TO RETAIN REQUIREMENTS FOR EXPLOSIVE GAS MONITORING INSTRUMENTATION

## INSTRUMENTATION
## EXPLOSIVE
## ~~RADIOACTIVE GASEOUS EFFLUENT~~ MONITORING INSTRUMENTATION

### LIMITING CONDITION FOR OPERATION

3.3.3.11 The ~~radioactive~~ explosive ~~gaseous-effluent~~ monitoring instrumentation channels shown in Table 3.3-13 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of Specifications ~~3.11.2.1~~ and 3.11.2.5 are not exceeded. ~~The Alarm/Trip Setpoints of these channels meeting Specification 3.11.2.1 shall be determined and adjusted in accordance with the methodology and parameters in the ODCM.~~

APPLICABILITY: As shown in Table 3.3-13

ACTION:

a. With an ~~radioactive~~ explosive ~~gaseous-effluent~~ monitoring instrumentation channel Alarm/Trip Setpoint less conservative than required by the above specification; ~~immediately suspend the release of radioactive gaseous effluents monitored by the affected channel;~~ or declare the channel inoperable and take the ACTION shown in Table 3.3-13.

b. With less than the minimum number of ~~radioactive~~ explosive ~~gaseous-effluent~~ monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-13. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful ~~explain in the next Semi-annual Radioactive Effluent Release Report~~ prepare and submit a Special Report to the Commission pursuant to Specification ~~6.9.1.4~~ 6.9.2 to explain why this inoperability was not corrected in a timely manner.

c. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.3.3.11 Each ~~radioactive~~ explosive ~~gaseous-effluent~~ monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, ~~SOURCE CHECK,~~ CHANNEL CALIBRATION and ANALOG CHANNEL OPERATIONAL TEST at the frequencies shown in Table 4.3-9.

## TABLE 3.3-13

## EXPLOSIVE ~~RADIOACTIVE~~ GASEOUS EFFLUENT MONITORING INSTRUMENTATION

| INSTRUMENT | MINIMUM CHANNELS OPERABLE | APPLICABILITY | ACTION |
|---|---|---|---|
| 1. (Not used) | | | |
| 2A. WASTE GAS HOLDUP SYSTEM Explosive Gas Monitoring System (for systems designed to withstand the effects of a hydrogen explosion) | | | |
| a. Hydrogen Monitor (Automatic Control) | 1 | ** | 49 |
| b. Hydrogen or Oxygen Monitor (Process) | 1 | ** | 49 |
| 2B. WASTE GAS HOLDUP SYSTEM Explosive Gas Monitoring System (for systems not designed to withstand the effects of a hydrogen explosion) | | | |
| a. Hydrogen Monitors (Automatic Control, redundant) | 2 | ** | 50, 52 |
| b. Hydrogen or Oxygen Monitors (Process, dual) | 2 | ** | 50 |

TABLE 3.3-13 (Continued)

* (Not used)

** During WASTE GAS HOLDUP SYSTEM operation.

ACTION STATEMENTS

ACTION 45 - (Not used)

ACTION 46 - (Not used)

ACTION 47 - (Not used)

ACTION 48 - (Not used)

ACTION 49 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, operation of this WASTE GAS HOLDUP SYSTEM may continue provided grab samples are collected at least once per 4 hours and analyzed within the following 4 hours.

ACTION 50 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, operation of this system may continue provided grab samples are taken and analyzed at least once per 24 hours. With both channels inoperable, operation may continue provided grab samples are taken and analyzed at least once per 4 hours during degassing operations and at least once per 24 hours during other operations.

ACTION 51 - (Not used)

ACTION 52 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend oxygen supply to the recombiner.

## TABLE 4.3-9

## EXPLOSIVE ~~RADIOACTIVE~~ GASEOUS ~~EFFLUENT~~ MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

| INSTRUMENT | CHANNEL CHECK | SOURCE ~~CHECK~~ | CHANNEL CALIBRATION | CHANNEL OPERATIONAL TEST | MODES FOR WHICH SURVEILLANCE IS REQUIRED |
|---|---|---|---|---|---|
| 1. (Not used) | | | | | |
| 2A. WASTE GAS HOLDUP SYSTEM Explosive Gas Monitoring System (for systems designed to withstand the effects of a hydrogen explosion) | | | | | |
| a. Hydrogen Monitor (Automatic Control) | D | N~~A~~ | Q(4) | M | ** |
| b. Hydrogen or Oxygen Monitor (Process) | D | N~~A~~ | Q(4) or Q(5) | M | ** |
| 2B. WASTE GAS HOLDUP SYSTEM Explosive Gas Monitoring System (for systems not designed to withstand the effects of a hydrogen explosion) | | | | | |
| a. Hydrogen Monitors (Automatic Control, redundant) | D | N~~A~~ | Q(4) | M | ** |
| b. Hydrogen or Oxygen Monitors (Process, dual) | D | N~~A~~ | Q(4) or Q(5) | M | ** |

TABLE 4.3-9 (Continued)

TABLE NOTATIONS

* (Not used)

** During WASTE GAS HOLDUP SYSTEM operation.

(1) (Not used)

(2) (Not used)

(3) (Not used)

(4) The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

a. One volume percent hydogen, balance nitrogen, and

c. Four volume percent hydrogen, balance nitrogen.

(5) The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

a. One volume percent oxygen, balance nitrogen, and

b. Four volume percent oxygen, balance nitrogen.

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11. ABSTRACT *(200 words or less)*

This report contains guidance which may be voluntarily used by licensees who choose to implement the provision of Generic Letter 89-01, which allows Radiological Effluent Technical Specifications (RETS) to be removed from the main body of the Technical Specifications and placed in the Offsite Dose Calculation Manual (ODCM). Guidance is provided for Standard Effluent Controls definitions, Controls for effluent monitoring instrumentation, Controls for effluent releases, Controls for radiological environmental monitoring, and the basis for Controls.

Guidance on the formulation of RETS has been available in draft form (NUREG-0472 and -0473) for a number of years; the current effort simply recasts those RETS into Standard Radiological Effluent Controls for application to the ODCM. Also included for completeness are: (1) radiological environmental monitoring program guidance previously which had been available as a Branch Technical Position (Rev. 1, November 1979); (2) existing ODCM guidance; and (3) a reproduction of Generic Letter 89-01.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*

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