

SECTION 1.0

DEFINITIONS

## 1.0 DEFINITIONS

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The following terms are defined so that uniform interpretation of these Controls may be achieved. The defined terms appear in capitalized type and shall be applicable throughout these Controls.

### ACTIONS

ACTIONS shall be that part of a Control that prescribes remedial measures to be taken under designated conditions.

### CHANNEL CALIBRATION

A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, display and trip functions, and shall include the CHANNEL FUNCTIONAL TEST. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping or total channel steps so that the entire channel is calibrated.

### CHANNEL CHECK

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

### CHANNEL FUNCTIONAL TEST

A CHANNEL FUNCTIONAL TEST shall be the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY, including required alarm, interlock, display, and trip functions and channel failure trips. The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps so that the entire channel is tested.

### DOSE EQUIVALENT I-131

DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcuries per gram) that 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, AEC, 1962, "Calculation of Distance Factors for Power and Test Reactor Sites."

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## DEFINITIONS

### FREQUENCY NOTATION

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

### GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM

THE GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM is the system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgasses 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.

### LIQUID RADWASTE TREATMENT SYSTEM

The LIQUID RADWASTE TREATMENT SYSTEM is any process or control equipment used to reduce the amount or concentration of liquid radioactive materials prior to their discharge to UNRESTRICTED AREAS. It involves all the installed and available liquid radwaste management system equipment, as well as their controls, power instrumentation, and services that make the system functional.

### MEMBER(S) OF THE PUBLIC

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 utility, 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.

### MODE

A MODE shall correspond to any one inclusive combination of mode switch position, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.2 with fuel in the reactor vessel.

### OFFSITE DOSE CALCULATION MANUAL (ODCM)

The OFFSITE DOSE CALCULATION MANUAL 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 radiological environmental monitoring program. The ODCM shall also contain the Radioactive Effluent Controls Program required by Technical Specification 5.5.4, the Radiological Environmental Monitoring Programs and descriptions of the information that should be included in the Annual Radiological Environmental Operating and annual Radioactive Effluent Release Reports required by Technical Specifications 5.6.2 and 5.6.3.



DEFINITIONS

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VENTILATION EXHAUST TREATMENT SYSTEMS

A VENTILATION EXHAUST TREATMENT SYSTEM is 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 Feature (ESF) atmospheric cleanup systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components provided the ESF system is not utilized to treat normal releases.

VENTING

VENTING is 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.

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TABLE 1.1  
SURVEILLANCE FREQUENCY NOTATION

<u>NOTATION</u>	<u>FREQUENCY</u>
S	At last 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.
A	At least once per 366 days.
R	At least once per 24 months.
S/U	Prior to each reactor startup.
P	Completed prior to each release
N.A.	Not applicable.

TABLE 1.2

<u>MODE</u>	<u>TITLE</u>	<u>REACTOR MODE SWITCH POSITION</u>	<u>AVERAGE REACTOR COOLANT TEMPERATURE</u>
1	POWER OPERATION	Run	NA
2	STARTUP	Refuel(a) or Startup/Hot Standby	NA
3	HOT SHUTDOWN(a)	Shutdown	> 200°F
4	COLD SHUTDOWN(a)	Shutdown	≤ 200°F
5	REFUELING(b)	Shutdown or Refuel	NA

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(a) All reactor vessel head closure bolts fully tensioned.

(b) One or more reactor vessel head closure bolts less than fully tensioned.

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SECTIONS 3.0 and 4.0  
CONTROLS  
AND  
SURVEILLANCE REQUIREMENTS



### 3/4.0 APPLICABILITY

#### CONTROLS

3.0.1 Controls shall be met during the MODES or other conditions specified in the Applicability except as provided in Control 3.0.2.

3.0.2 Upon discovery of a failure to meet a Control, the requirements of the Actions shall be met except as provided in Control 3.0.5. If the Control is met or is no longer applicable prior to expiration of the specified time interval(s), completion of the Action(s) is not required, unless otherwise stated.

3.0.3 When a Control is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the Control is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:

- a. MODE 2 within 7 hours;
- b. MODE 3 within 13 hours; and
- c. MODE 4 within 37 hours.

Exceptions to this Control are stated in the individual Controls.

Where corrective measures are completed that permit operation in accordance with the Control or ACTIONS, completion of the actions required by Control 3.0.3 is not required.

Control 3.0.3 is only applicable in MODES 1, 2, and 3.

3.0.4 When a Control is not met, entry into a MODE or other specified condition in the Applicability shall not be made except when the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time. This Control shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS, or that are part of a shutdown of the unit.

Exceptions to this Control are stated in the individual Controls. These exceptions allow entry into MODES or other specified conditions in the Applicability when the associated ACTIONS to be entered allow unit operation in the MODE or other specified condition in the Applicability only for a limited period of time.

Control 3.0.4 is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, and 3.

3.0.5 Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to Control 3.0.2 for the system returned to service under administrative control to perform the testing required to demonstrate OPERABILITY.

APPLICABILITY

SURVEILLANCE REQUIREMENT (SR)

4.0.1 SRs shall be met during the MODES or other specified conditions in the Applicability for individual Controls, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the surveillance or between performances of the Surveillance, shall be failure to meet the Control. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the Control except as provided in SR 4.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits.

4.0.2 The specified frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the frequency, as measured from the previous performance or as measured from the time a specified condition of the frequency is met.

If a time interval requires periodic performance on a "once per ..." basis, the above frequency extension applies to each performance after the initial performance.

Exceptions to this S.R. are stated in the individual S.R.'s.

4.0.3 If it is discovered that a Surveillance was not performed within its specified frequency, then compliance with the requirement to declare the Control not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified frequency, whichever is less. This delay period is permitted to allow performance of the Surveillance.

If the Surveillance is not performed within the delay period, the Control must immediately be declared not met, and the applicable ACTION(s) must be entered. When the Surveillance is performed within the delay period and the Surveillance is not met, the Control must immediately be declared not met, and the applicable ACTION(s) must be entered.

4.0.4 Entry into a MODE or other specified condition in the Applicability of a Control shall not be made unless the Control's Surveillances have been met within their specified frequency. This provision shall not prevent entry into MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

SR 4.0.4 is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, and 3.

INSTRUMENTATION

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

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3.3.7.9 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.a, the radioactive liquid effluent monitoring instrumentation channels shown in Table 3.3.7.9-1 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 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 3.3.7.9-1. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain why this inoperability was not corrected in a timely manner in the next Annual Radioactive Effluent Release Report.
- c. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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4.3.7.9 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 operations at the frequencies shown in Table 4.3.7.9-1.

TABLE 3.3.7.9-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>ACTION</u>
1. GROSS RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC TERMINATION OF RELEASE		
a. Liquid Radwaste Discharge Radiation Monitor - ESW Discharge	1	110
2. GROSS BETA OR GAMMA RADIOACTIVITY MONITORS PROVIDING ALARM BUT NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE		
a. Emergency Service Water Loop A Radiation Monitor	1	111
b. Emergency Service Water Loop B Radiation Monitor	1	111
3. FLOW RATE MEASUREMENT DEVICES		
a. Radwaste Discharge Header		
1. Radwaste High Flow Discharge Header Flow	1	112
b. Service Water Discharge Header Flow	1	113
c. Unit 1 Emergency Service Water Flow Monitor	1	113

TABLE 3.3.7.9-1 (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

ACTION STATEMENTS

- ACTION 110 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases from 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 111 - 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 gross radioactivity (beta or gamma) at a limit of detection of at least 10<sup>-7</sup> microcuries/ml.
- ACTION 112 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the discharge valve position is verified to be consistent with the flow rate provisions of the release permit at least once per 4 hours during actual releases. Prior to initiating another release, at least two technically qualified members of the Facility Staff shall independently verify the discharge line valving and that the discharge valve position corresponds to the desired flow rate. Otherwise, suspend release of radioactive effluents via this pathway.
- ACTION 113 - 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 as well as other curves generated using pump performance may be used to estimate flow. The total of the individual flows through the RHR, ECC and diesel generator heat exchangers may also be used. <L02211>

TABLE 4.3.7.9-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

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<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>
1. GROSS RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC TERMINATION OF RELEASE				
a. Liquid Radwaste Discharge Radiation Monitor - ESW Discharge	D	P	R(3)	Q(1)
2. GROSS BETA OR GAMMA RADIOACTIVITY MONITORS PROVIDING ALARM BUT NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE				
a. Emergency Service Water Loop A Radiation Monitor	D	M	R(3)	Q(2)
b. Emergency Service Water Loop B Radiation Monitor	D	M	R(3)	Q(2)
3. FLOW RATE MEASUREMENT DEVICES				
a. Radwaste Discharge Header				
1. Radwaste High Flow Discharge Header Flow	D(4)	N.A.	R	Q
b. Service Water Discharge Header Flow	D(4)	N.A.	R	Q
c. Unit 1 Emergency Service Water Flow Monitor	D(4)	N.A.	R	Q

TABLE 4.3.7.9-1 (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING  
INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

- (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:
  1. Instrument indicates measured levels above the alarm/trip setpoint.
  2. Instrument indicates a downscale failure.
  3. Instrument controls not set in operate mode except in high voltage position.
- (2) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:
  1. Instrument indicates measured levels above the alarm setpoint.
  2. Instrument indicates a downscale failure.
  3. Instrument controls not set in operate mode, except in high voltage position.
- (3) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards or using standards that have been obtained from suppliers that participate in measurement assurance activities with NBS. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.
- (4) CHANNEL CHECK shall consist of verifying indication of flow. CHANNEL CHECK shall be made at least once per 24 hours on days which continuous, periodic or batch releases are made.

INSTRUMENTATION

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.3.7.10 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.a, the radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.3.7.10-1 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 applicable channels shall be determined and adjusted in accordance with the methodology and parameters in the ODCM.

APPLICABILITY: As shown in Table 3.3.7.10-1

ACTION:

- a. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above specification, 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 3.3.7.10-1. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, explain why this inoperability was not corrected in a timely manner in the next Annual Radioactive Effluent Release Report.
- c. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.10 Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3.7.10-1.



TABLE 3.3.7.10-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>ACTION</u>
1. OFFGAS VENT RADIATION MONITOR			
a. Noble Gas Activity Monitor	1	*	121
b. Iodine Sampler (1)	1	*	122
c. Particulate Sampler (1)	1	*	122
d. Effluent System Flow Rate Monitor	1	*	123
e. Sampler Flow Rate Monitor (Victoreen Flow Monitor)	1	*	123
2. UNIT 1 VENT RADIATION MONITOR			
a. Noble Gas Activity Monitor <L02211>	1	1, 2, 3 4, 5	121, 125 121
b. Iodine Sampler (1)	1	*	122
c. Particulate Sampler (1)	1	*	122
d. Effluent System Flow Rate Monitor	1	*	123
e. Sampler Flow Rate Monitor (Victoreen Flow Monitor)	1	*	123

(1) This encompasses the isokinetic and victoreen photohelics.

TABLE 3.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>ACTION</u>
3. UNIT 2 VENT RADIATION MONITOR			
a. Noble Gas Activity Monitor	1	*	121
b. Iodine Sampler (1)	1	*	122
c. Particulate Sampler (1)	1	*	122
d. Effluent System Flow Rate Monitor	1	*	123
e. Sampler Flow Rate Monitor (Victoreen Flow Monitor)	1	*	123
4. HEATER BAY/TURBINE BUILDING VENT RADIATION MONITOR			
a. Noble Gas Activity Monitor	1	*	121
b. Iodine Sampler (1)	1	*	122
c. Particulate Sampler (1)	1	*	122
d. Effluent System Flow Rate Monitor	1	*	123
e. Sampler Flow Rate Monitor (Victoreen Flow Monitor)	1	*	123

(1) This encompasses the isokinetic and victoreen photohelics.

TABLE 3.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

TABLE NOTATION

\* At all times.

\*\* During main condenser offgas treatment system operation.

ACTION 121 - 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 principal gamma emitters as required by Table 4.11.2.1.2-1.

ACTION 122 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided samples are continuously collected within 4 hours with auxiliary sampling equipment as required by Table 4.11.2.1.2-1. If the inoperability is due to failure of the AMC skid, the Victoreen skid alone can be used as the auxiliary sampling equipment for a maximum of 30 consecutive days. <L02211> Loss of the isokinetic flow monitor constitutes inoperability of particulate and iodine channels (b, c).

ACTION 123 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent release via this pathway may continue provided the flow rate is estimated at least once per 4 hours. This action applies to both the effluent system flow and victoreen sample flow (d, e).

ACTION 124 - NOT USED

ACTION 125 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, except as a result of a non-conservative setpoint, immediately suspend operation of the Containment Vessel and Drywell Purge (M14) system. Prior to resuming M14 System operation, ensure compliance with Control 3.11.2.1 requirements. If Control 3.11.2.1 compliance is met, operation of the M14 System may continue provided grab samples are taken at least once per 12 hours and analyzed for principal gamma emitters, as required by Table 4.11.2.1.2-1.

TABLE 4.3.7.10-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
1. OFFGAS VENT RADIATION MONITOR					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler	W(4)	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W(4)	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*
2. UNIT 1 VENT RADIATION MONITOR					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler	W(4)	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W(4)	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*

TABLE 4.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
3. UNIT 2 VENT RADIATION MONITOR					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler	W(4)	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W(4)	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*
4. HEATER BAY/TURBINE BUILDING VENT RADIATION MONITOR					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler	W(4)	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W(4)	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*

TABLE 4.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING  
INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

- \* At all times.
- \*\* During main condenser offgas treatment system operation.
- (1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:
  - 1. Instrument indicates measured levels above the alarm setpoint.
  - 2. Instrument indicates a downscale failure.
  - 3. Instrument controls not set in operate mode.
- (2) 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 energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.
- (3) NOT USED
- (4) The iodine cartridges and particulate filters will be changed at least once per 7 days. Performance of this CHANNEL CHECK does not render the system inoperable, and the applicable ACTION statements need not be entered.

### 3/4.11 RADIOACTIVE EFFLUENTS

#### 3/4.11.1 LIQUID EFFLUENTS

##### CONCENTRATION

##### CONTROLS

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3.11.1.1 In accordance with Perry Nuclear Power Plant TS 5.5.4.b and c, the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (see Figure 3.2-1) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to  $2 \times 10^{-4}$  microcuries/ml total activity. | 0  
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APPLICABILITY: At all times.

##### ACTION:

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.

##### SURVEILLANCE REQUIREMENTS

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4.11.1.1.1 The radioactivity content of each batch of radioactive liquid waste shall be determined prior to release by sampling and analysis in accordance with Table 4.11.1.1.1-1. The results of pre-release analyses shall be used with the calculational methods in the ODCM to assure that the concentration at the point of release is maintained within the limits of Control 3.11.1.1.

4.11.1.1.2 Post-release analyses of samples composited from batch releases shall be performed in accordance with Table 4.11.1.1.1-1. The results of the radioactivity analysis 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.

4.11.1.1.3 Continuous releases of radioactive liquid effluents shall be sampled and analyzed in accordance with Table 4.11.1.1.1-1. 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 4.11.1.1.1-1  
RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (µCi/ml) <sup>a</sup>
A. Batch Waste Release Tanks <sup>c</sup>	P Each batch	P Each batch	Principal Gamma Emitters <sup>d</sup>	5x10 <sup>-7</sup>
			I-131	1x10 <sup>-6</sup>
	P One Batch/M	M	Dissolved and Entrained Gases (Gamma emitters)	1x10 <sup>-5</sup>
	P Each Batch	M Composite <sup>b</sup>	H-3	1x10 <sup>-5</sup>
			Gross Alpha	1x10 <sup>-7</sup>
	P Each Batch	Q Composite <sup>b</sup>	Sr-89, Sr-90	5x10 <sup>-8</sup>
		Fe-55	1x10 <sup>-6</sup>	
B. Continuous Releases <sup>e</sup> RHR Heat Exchanger ESW Outlet	D Grab Sample <sup>f</sup>	W Composite <sup>b, f</sup>	Principal Gamma Emitters <sup>d</sup>	5x10 <sup>-7</sup>
			I-131	1x10 <sup>-6</sup>
	M Grab Sample	M	Dissolved and Entrained Gases (Gamma Emitters)	1x10 <sup>-5</sup>
	D Grab Sample	M Composite <sup>b</sup>	H-3	1x10 <sup>-5</sup>
			Gross Alpha	1x10 <sup>-7</sup>
	D Grab Sample	Q Composite <sup>b</sup> <R00449>	Sr-89, Sr-90	5x10 <sup>-8</sup>
		Fe-55	1x10 <sup>-6</sup>	

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TABLE 4.11.1.1.1-1 (Continued)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION

- a. The LLD is 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):

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

where

LLD is the "a priori" lower limit of detection as defined above (as  $\mu\text{Ci}$  per unit mass or volume).

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

E is the counting efficiency (as counts per disintegration)

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

$2.22 \times 10^6$  is the number of disintegrations per minute per microcurie

Y is the fractional radiochemical yield (when applicable)

$\lambda$  is the radioactive decay constant for the particular radionuclide ( $\text{sec}^{-1}$ )

$\Delta t$  is the elapsed time between sample 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.

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 4.11.1.1.1-1 (Continued)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION (Continued)

- b. 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 which is representative of the liquids released.
- c. 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 to assure representative sampling.
- d. The principal gamma emitters for which the LLD specification applies exclusively are 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 detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported in the Annual Radioactive Effluent Release Report pursuant to Control 6.9.1.7 in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974. | c  
2
- e. 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. Sampling/Analysis of RHR Heat Exchanger is only applicable when there is ESW flow thru the RHR Heat Exchanger.
- f. Sampling and analysis is required of the RHR heat exchanger ESW outlet every 12 hours when the samples indicate levels greater than LLD. | c  
2

RADIOACTIVE EFFLUENTS

DOSE

CONTROLS

---

3.11.1.2 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.d and e, the dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each reactor unit, to UNRESTRICTED AREAS (see Figure 3.2-1) shall be limited:

- a. During the current quarter to less than or equal to 1.5 mrem to the total body and to less than or equal to 5 mrem to any organ, and
- b. During the current year to less than or equal to 3 mrem to the total body and to less than or equal to 10 mrem 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 which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the corrective actions to be taken to ensure that future releases will be in compliance with the above limits.
- b. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

---

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

RADIOACTIVE EFFLUENTS

LIQUID RADWASTE TREATMENT SYSTEM

CONTROLS

---

3.11.1.3 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.f, the LIQUID RADWASTE TREATMENT SYSTEM shall be OPERABLE and appropriate portions of the system shall be used to reduce the release of radioactivity when the projected doses due to the liquid effluent from each reactor unit to UNRESTRICTED AREAS (see Figure 3.2-1) would exceed 0.06 mrem to the total body or 0.2 mrem to any organ, in a 31-day period. |<sup>c</sup>/<sub>2</sub>

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 which 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, and
  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 Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

---

4.11.1.3.1 Doses due to liquid releases from each reactor unit to UNRESTRICTED AREAS shall be projected at least once per 31 days, in accordance with methodology and parameters in the ODCM.

4.11.1.3.2 The installed LIQUID RADWASTE TREATMENT SYSTEM shall be demonstrated OPERABLE by meeting Controls 3.11.1.1 and 3.11.1.2.

RADIOACTIVE EFFLUENTS

3/4.11.2 GASEOUS EFFLUENTS

DOSE RATE

CONTROLS

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3.11.2.1 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.c and g, the dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figure 3.2-1) shall be limited to the following:

- a. For noble gases: Less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin, and
- b. For all iodine-131, iodine-133, tritium and 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:

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

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 of the ODCM.

4.11.2.1.2 The dose rate due to iodine-131, iodine-133, tritium and to 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 of the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table 4.11.2.1.2-1.

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TABLE 4.11.2.1.2-1  
RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

GASEOUS RELEASE PATH	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) <sup>(a)</sup> ( $\mu\text{Ci/mL}$ )
A. Containment Vessel and Drywell Purge (M14) and Combustible Gas Control (M15) Systems	Each PURGE <sup>(b)</sup> and VENT Grab Sample	Each PURGE <sup>(b)</sup> and VENT	Principal Gamma Emitters <sup>(e)</sup>	$1 \times 10^{-4}$
	M Grab Sample	M	H-3	$1 \times 10^{-6}$
B. Offgas Vent, Unit 1 Vent, Unit 2 Vent and Turbine Building/Heater Bay Vent	M <sup>(b)</sup> Grab Sample	M <sup>(b)</sup>	Principal Gamma Emitters <sup>(b), (e)</sup>	$1 \times 10^{-4}$
			H-3	$1 \times 10^{-6}$
C. All Release Paths as listed in B above	Continuous <sup>(d)</sup>	W <sup>(c)</sup>	I-131	$1 \times 10^{-12}$
		Charcoal Sample	I-133	$1 \times 10^{-10}$
	Continuous <sup>(d)</sup>	W <sup>(c)</sup> Particulate Sample	Principal Gamma Emitters <sup>(e)</sup>	$1 \times 10^{-11}$
	Continuous <sup>(d)</sup>	M Composite Particulate Sample	Gross Alpha	$1 \times 10^{-11}$
	Continuous <sup>(d)</sup>	Q Composite Particulate Sample	Sr-89, Sr-90	$1 \times 10^{-11}$
	Continuous <sup>(d)</sup>	Noble Gas Monitor <sup>(f)</sup>	Noble Gases Gross Beta or Gamma	$1 \times 10^{-6}$ (Xe-133 equivalent)

TABLE 4.11.2.1.2-1 (Continued)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION

- a. The LLD is 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):

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

where

- LLD is the "a priori" lower limit of detection as defined above (as  $\mu\text{Ci}$  per unit mass or volume).
- $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)
- E is the counting efficiency (as counts per disintegration)
- V is the sample size (in units of mass or volume)
- $2.22 \times 10^6$  is the number of disintegrations per minute per microcurie
- Y is the fractional radiochemical yield (when applicable)
- $\lambda$  is the radioactive decay constant for the particular radionuclide ( $\text{sec}^{-1}$ )
- $\Delta t$  is the elapsed time between sample 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.

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 4.11.2.1.2-1 (Continued)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION (Continued)

- b. Analyses shall also be performed following startup, shutdown, or a THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period. This requirement does not apply if (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary 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.
- c. 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 and analyses 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 percent of RATED THERMAL POWER in one hour. When samples collected for 24 hours are analyzed, the corresponding LLD's 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 primary 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. If the noble gas monitor is not operable, then a grab sample may be used to demonstrate that activity has not increased by a factor of 3 for item (2).
- d. 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 Control 3.11.2.1, 3.11.2.2 and 3.11.2.3.
- e. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported in the Annual Radiological Effluent Release Report pursuant to Control 6.9.1.7 in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.
- f. Sampling and analysis of gaseous release points shall be performed initially whenever a high alarm setpoint is exceeded or whenever two or more of the alert setpoints are exceeded. If the high alarm setpoint or two or more of the alert setpoints continue to be exceeded, verify at least once per 4 hours via the radiation monitors that plant releases are below the Control 3.11.2.1 dose rate limits and sampling and analysis shall be performed at least once per 12 hours.



RADIOACTIVE EFFLUENTS

DOSE - NOBLE GASES

CONTROLS

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3.11.2.2 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.e and h, the air dose due to noble gases released in gaseous effluents, from each reactor unit, from the site to areas at and beyond the SITE BOUNDARY (see Figure 3.2-1) shall be limited to the following:

- a. During the current quarter: Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation, and
- b. During the current year: Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

APPLICABILITY: At all times.

ACTION:

- a. With the calculated air dose from the 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 which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to ensure that future releases will be in compliance with Control 3.11.2.2.
- b. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

---

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

RADIOACTIVE EFFLUENTS

DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM

CONTROLS

3.11.2.3 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.e and i, the dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium and radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each reactor unit, from the site to areas at and beyond the SITE BOUNDARY (see Figure 3.2-1) shall be limited to the following:

- a. During the current quarter: Less than or equal to 7.5 mrems to any organ, and
- b. During the current 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 which identifies the cause(s) for exceeding the limit and defines the corrective actions that have been taken to reduce releases and the proposed corrective actions to be taken to ensure that future releases will be in compliance with Control 3.11.2.3.
- b. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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

RADIOACTIVE EFFLUENTS

GASEOUS RADWASTE (OFFGAS) TREATMENT

CONTROLS

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3.11.2.4 The GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM shall be in operation\*. <L02211> The Charcoal bypass mode shall not be used unless the offgas post-treatment radiation monitor is OPERABLE.

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 consecutive days, prepare and submit to the Commission within 30 days, pursuant to Control 6.9.2, a Special Report which includes the following information:
  1. Explanation of why gaseous radwaste was being discharged without treatment, identification of the inoperable equipment or subsystems which resulted in gaseous radwaste being discharged without treatment, 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 Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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

\* - Flow directed through the adsorber beds. <L02211>

RADIOACTIVE EFFLUENTS

VENTILATION EXHAUST TREATMENT SYSTEMS

CONTROLS

---

3.11.2.5 The VENTILATION EXHAUST TREATMENT SYSTEMS shall be OPERABLE and appropriate portions of the system shall be used to reduce releases of radioactivity when the projected dose due to gaseous effluent releases from each reactor unit to areas at and beyond the SITE BOUNDARY (see Figure 3.2-1) in a 31 day period would exceed 0.3 mrem to any organ of a MEMBER OF THE PUBLIC. 10

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 which includes the following information:
  1. Explanation of why gaseous radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems which resulted in gaseous radwaste being discharged without treatment, 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 Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

---

4.11.2.5.1 Doses due to gaseous releases from each reactor 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.

4.11.2.5.2 The installed VENTILATION EXHAUST TREATMENT SYSTEMS shall be demonstrated OPERABLE by meeting Controls 3.11.2.1 and 3.11.2.3.

RADIOACTIVE EFFLUENTS

3/4.11.4 TOTAL DOSE

CONTROLS

---

3.11.4 In accordance with Perry Nuclear Power Plant Unit 1 TS 5.5.4.j, the current year dose or dose commitment to any MEMBER of THE PUBLIC, due to releases of radioactivity and radiation, from uranium fuel cycle sources shall be limited to less than or equal to 25 mremS to the total 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 reactor units and from outside storage tanks 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 20.405c, shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the current 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 Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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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 If the cumulative dose contributions exceed the limits defined in 3.11.4, ACTION a, cumulative dose contributions from direct radiation from unit operation including outside storage tanks shall be determined in accordance with the methodology and parameters in the ODCM.

3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.1 MONITORING PROGRAM

CONTROLS

3.12.1 The radiological environmental monitoring program shall be conducted as specified in Table 3.12.1-1.

APPLICABILITY: At all times.

ACTION:

- a. With the radiological environmental monitoring program not being conducted as specified in Table 3.12.1-1, prepare and submit to the Commission, in the annual Radiological Environmental Operating Report per Control 6.9.1.6, 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 3.12.1-2 when averaged over the current 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 current year limits of Control 3.11.1.2, 3.11.2.2 and 3.11.2.3. When more than one of the radionuclides in Table 3.12.1-2 are detected in the sampling medium, this report shall be submitted if:

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

When radionuclides other than those in Table 3.12.1-2 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 is equal to or greater than the current year limits of Control 3.11.1.2, 3.11.2.2 and 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 6.9.1.6.

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

RADIOLOGICAL ENVIRONMENTAL MONITORING

CONTROLS

- c. With milk or broad leaf vegetation samples unavailable from one or more of the sample locations required by Table 3.12.1-1, 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 6.9.1.7, submit in the next Annual 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. | c  
2
- d. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.1 The radiological environmental monitoring samples shall be collected pursuant to Table 3.12.1-1 from the specific locations given in the table and figures in the ODCM and shall be analyzed pursuant to the requirements of Table 3.12.1-1 and the detection capabilities required by Table 4.12.1-1. | c  
2

TABLE 3.12.1-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM\*

<u>Exposure Pathway and/or Sample</u>	<u>Number of Samples and Sample Locations (1)</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
1. Direction Radiation (2)	<p>Twenty-eight routine monitoring stations either with two or more dosimeters or with one instrument for measuring and recording dose rate continuously, placed as follows:</p> <p>An inner ring of stations, one in each meteorological sector, other than those sectors entirely over water (N, NNE, NNW, NW, W, WNW), in the general area of the SITE BOUNDARY;</p> <p>An outer ring of stations, one in each meteorological sector, other than those sectors entirely over water (N, NE, NNE, NNW, NW, W, WNW), in the 6- to 8-km range from the site; and</p> <p>The balance of the stations 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.</p>	Quarterly.	Gamma dose quarterly.



TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathway and/or Sample</u>	<u>Number of Samples and Sample Locations (1)</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
2. Airborne			
Radioiodine and Particulates	<p>Samples from five locations:</p> <p>Three samples from close to the three SITE BOUNDARY locations, in different sectors, of the highest calculated annual average ground-level D/Q;</p> <p>One sample from the vicinity of a community having the highest calculated annual average ground-level D/Q; and</p> <p>One sample from a control location, as for example 15 to 30 km distant and in the least prevalent wind direction.</p>	Continuous sampler operation with sample collection weekly, or more frequently if required by dust loading.	<p><u>Radioiodine Canister:</u> I-131 analysis weekly.</p> <p><u>Particulate Sampler:</u> Gross beta radioactivity analysis following filter change, (3) and gamma isotopic analysis (4) of composite (by location) quarterly.</p>
3. Waterborne			
a. Surface	Two samples	Composite sample over 1-month period. (5)	Gamma isotopic analysis (4) monthly. Composite for tritium analysis quarterly.

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathway and/or Sample</u>	<u>Number of Samples and Sample Locations (1)</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
3. Waterborne (Continued)			
b. Drinking	One sample of each of one to three of the nearest water supplies that could be affected by its discharge.  One sample from a control location.	Composite sample over 2-week period <sup>(5)</sup> when I-131 analysis is performed; monthly composite otherwise.	I-131 analysis on each composite when the dose calculated from the consumption of the water is greater than 1 mrem per year. <sup>(6)</sup> Composite for gross beta and gamma isotopic analyses <sup>(4)</sup> monthly. Composite for tritium analysis quarterly.
c. Sediment from shoreline	One sample from area with existing or potential recreational value.	Semiannually.	Gamma isotopic analysis <sup>(4)</sup> semiannually.
4. Ingestion			
a. Milk	Samples from milking animals in three locations within 5km distance having the highest dose potential. If there are none, then one sample from milking animals in each of three areas between 5 to 8 km distant where doses are calculated to be greater than 1 mrem per yr. <sup>(6)</sup> One sample from milking animals at a control location 15 to 30 km distant and in the least prevalent wind direction.	Semimonthly when animals are on pasture; monthly at other times.	Gamma isotopic <sup>(4)</sup> and I-131 analysis semimonthly when animals are on pasture; monthly at other times.

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathway and/or Sample</u>	<u>Number of Samples and Sample Locations (1)</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
4. Ingestion (Continued)			
b. Fish and Invertebrates	<p>One sample of each commercially and recreationally important species in vicinity of plant discharge area.</p> <p>One sample of same species in areas not influenced by plant discharge.</p>	Sample in season, or semiannually if they are not seasonal.	Gamma isotopic analysis <sup>(4)</sup> on edible portions.
c. Food Products	<p>Sample 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.</p> <p>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.</p>	<p>Monthly during growing season.</p> <p>Monthly during growing season.</p>	<p>Gamma isotopic<sup>(4)</sup> and I-131 analysis.</p> <p>Gamma isotopic<sup>(4)</sup> and I-131 analysis.</p>

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

TABLE NOTATIONS

- \* Sample locations are given on the figure and the table in the ODCM.
- (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 specimen's 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 6.9.1.6. 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 specific alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made with 30 days in the Radiological Environmental Monitoring Program given in the ODCM. Pursuant to Control 6.9.1.7, submit in the next Annual 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 that 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 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 3.12.1-1 (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) 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.
- (6) The dose shall be calculated for the maximum organ and age group, using the methodology and parameters in the ODCM.

TABLE 3.12.1-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Reporting Levels

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m <sup>3</sup> )	Fish (pCi/Kg, wet)	Milk (pCi/l)	Food Products (pCi/kg, wet)
H-3	2 x 10 <sup>4</sup> <sup>a</sup>	NA	NA	NA	NA
Mn-54	1 x 10 <sup>3</sup>	NA	3 x 10 <sup>4</sup>	NA	NA
Fe-59	4 x 10 <sup>2</sup>	NA	1 x 10 <sup>4</sup>	NA	NA
Co-58	1 x 10 <sup>3</sup>	NA	3 x 10 <sup>4</sup>	NA	NA
Co-60	3 x 10 <sup>2</sup>	NA	1 x 10 <sup>4</sup>	NA	NA
Zn-65	3 x 10 <sup>2</sup>	NA	2 x 10 <sup>4</sup>	NA	NA
Zr-Nb-95	4 x 10 <sup>2</sup>	NA	NA	NA	NA
I-131	2	0.9	NA	3	1 x 10 <sup>2</sup>
Cs-134	30	10	1 x 10 <sup>3</sup>	60	1 x 10 <sup>3</sup>
Cs-137	50	20	2 x 10 <sup>3</sup>	70	2 x 10 <sup>3</sup>
Ba-La-140	2 x 10 <sup>2</sup>	NA	NA	3 x 10 <sup>2</sup>	NA

<sup>a</sup>For drinking water samples. This is a 40 CFR Part 141 value.

TABLE 4.12.1-1  
 (a), (b), (c)  
MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD)  
IN ENVIRONMENTAL SAMPLES

Analysis	Airborne Particulate		Fish (pCi/kg, wet)	Milk (pCi/l)	Broad Leaf Vegetation (pCi/kg, wet)	Sediment (pCi/kg, dry)
	Water (pCi/l)	or Gas (pCi/m <sup>3</sup> )				
Gross beta	4	1 x 10 <sup>-2</sup>	NA	NA	NA	NA
H-3	2000*	NA	NA	NA	NA	NA
Mn-54	15	NA	130	NA	NA	NA
Fe-59	30	NA	260	NA	NA	NA
Co-58, 60	15	NA	130	NA	NA	NA
Zn-65	30	NA	260	NA	NA	NA
Zr-95	30	NA	NA	NA	NA	NA
Nb-95	15	NA	NA	NA	NA	NA
I-131	1**	7 x 10 <sup>-2</sup>	NA	1	60	NA
Cs-134	15	5 x 10 <sup>-2</sup>	130	15	60	150
Cs-137	18	6 x 10 <sup>-2</sup>	150	18	80	180
Ba-140	60	NA	NA	60	NA	NA
La-140	15	NA	NA	15	NA	NA

\*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 4.12.1-1 (Continued)

MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD)

TABLE NOTATION

<sup>a</sup>Acceptable detection capabilities for thermoluminescent dosimeters used for environmental measurements are given in Regulatory Guide 4.13.

<sup>b</sup>Table 4.12-1 indicates acceptable detection capabilities for radioactive materials in environmental samples. These detection capabilities are tabulated in terms of the lower limits of detection (LLDs). The LLD is defined, for purposes of this guide, 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 is the "a priori" lower limit of detection as defined above (as pCi per unit mass or volume).
- $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)
- E is the counting efficiency (as counts per disintegration)
- V is the sample size (in units of mass or volume)
- 2.22 is the number of disintegrations per minute per picocurie
- Y is the fractional radiochemical yield (when applicable)
- $\lambda$  is the radioactive decay constant for the particular radionuclide
- $\Delta t$  is the elapsed time between sample collection (or end of the sample collection period) and time of counting

The value of  $s_b$  used in the calculation of the LLD for a particular measurement system should be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicated variance.



TABLE 4.12.1-1 (Continued)

MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD)

TABLE NOTATION (continued)

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. Occasionally background fluctuations, unavoidable small sample size, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors should be identified and described in the Annual Radiological Environmental Operating Report pursuant to Control 6.9.1.6.

<sup>c</sup>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 6.9.16.

RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.2 LAND USE CENSUS

CONTROLS

3.12.2 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<sup>2</sup> (500 ft<sup>2</sup>) producing broad leaf vegetation. |c/2

APPLICABILITY: At all times.

ACTION:

- a. With a land use census identifying a location(s) which yields a calculated dose or dose commitment greater than the values currently being calculated in Control 4.11.2.3, identify the new location(s)\* in the next Annual Radioactive Effluent Release Report, pursuant to Control 6.9.1.7.
- b. With a land use census identifying a location(s) which yields a calculated dose or dose commitment (via the same exposure pathway) 20 percent greater than at a location from which milk and/or broad leaf vegetation samples are currently being obtained in accordance with Control 3.12.1, add the new location(s) to the radiological environmental monitoring program within 30 days. If no milk and/or broad leaf vegetation samples are identified in the new sector with the highest D/Q value, then the next sector with the highest D/Q value will be considered and so on until a sampling location can be established. 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.\* Identify the new location(s) in the next Annual Radioactive Effluent Release Report and also include in the report a revised figure(s) and table(s) for the ODCM reflecting the new location(s).
- c. The provisions of Control 3.0.3 are not applicable.

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 6.9.1.6.

\*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 3.12.1-1 shall be followed, including analysis of control samples.

RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.3 INTERLABORATORY COMPARISON PROGRAM

CONTROLS

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3.12.3 Analyses shall be performed on radioactive materials that correspond to samples required by Table 3.12.1-1. These materials are supplied as part of an Interlaboratory Comparison Program which has been approved by the Commission. |e  
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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 6.9.1.6.
- b. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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4.12.3 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 6.9.1.6.

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 Section 3.0 and 4.0, but are not part of these Controls.

3/4 CONTROLS AND SURVEILLANCE REQUIREMENTS

3/4.0 APPLICABILITY

BASES

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Controls 3.0.1 through 3.0.5 establish the general requirements applicable to Appendix C Controls and apply at all times, unless otherwise stated.

Control 3.0.1 establishes the Applicability statement within each individual control as the requirement for when the Control is required to be met (i.e., when the unit is in the MODES or other specified conditions of the Applicability statement of each Control).

Control 3.0.2 establishes that upon discovery of a failure to meet a Control, the associated ACTIONS shall be met. The Completion Time of each ACTION condition is applicable from the point in time that an ACTIONS condition is entered. The ACTIONS establish those remedial measures that must be taken within specified times when the requirements of a Control are not met. This Control establishes that:

- a. Completion of the ACTIONS within the specified times constitutes compliance with a Control; and
- b. Completion of the ACTIONS is not required when a Control is met within the specified time, unless otherwise specified.

There are two basic types of ACTION requirements. The first type of ACTIONS specifies a time limit in which the Control must be met. This time limit is the time to restore an inoperable system or component to OPERABLE status or to restore variables to within specified limits. If this type of ACTION is not completed within the specified completion time, a shutdown may be required to place the unit in a MODE or condition in which the Control is not applicable. (Whether stated as an ACTION or not, correction of the entered condition is an action that may always be considered upon entering ACTIONS.) The second type of ACTION specifies the remedial measures that permit continued operation of the unit that is not further restricted by the completion time. In this case, compliance with the ACTIONS provides an acceptable level of safety for continued operation.

Completing the ACTIONS is not required when a Control is met or is no longer applicable, unless otherwise stated in the individual Control.

The nature of some ACTIONS of some conditions necessitates that, once the condition is entered, the ACTIONS must be completed even though the associated condition no longer exists. The individual Control's ACTIONS specify where this is the case.

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3/4.0      APPLICABILITY

BASES (Continued)

The completion times of the ACTIONS are also applicable when a system or component is removed from service intentionally. The reasons for intentionally relying on the ACTIONS include, but are not limited to, performance of Surveillances, preventive maintenance, corrective maintenance, or investigation of operational problems. Entering ACTIONS for these reasons must be done in a manner that does not compromise safety. Intentional entry into ACTIONS should not be made for operational convenience. Alternatives that would not result in redundant equipment being inoperable should be used instead. Doing so limits the time both subsystems/divisions of a safety function are inoperable and limits the time other conditions exist which result in Control 3.0.3 being entered. Individual Controls may specify a time limit for performing an SR when equipment is removed from service or bypassed for testing. In this case, the completion times of ACTIONS are applicable when this time limit expires, if the equipment remains removed from service or bypassed.

When a change in MODE or other specified condition is required to comply with an ACTION, the unit may enter a MODE or other specified condition in which another Control becomes applicable. In this case, the completion times of the associated ACTIONS would apply from the point in time that the new Control becomes applicable and the ACTIONS condition(s) are entered.

Control 3.0.3 establishes the actions that must be implemented when a Control is not met and:

- a. An associated ACTION and completion time is not met and no other condition applies; or
- b. The condition of the unit is not specifically addressed by the associated ACTIONS. This means that no combination of conditions stated in the ACTIONS can be made that exactly corresponds to the actual condition of the unit. Sometimes, possible combinations of conditions are such that entering Control 3.0.3 is warranted; in such cases, the ACTIONS specifically state a condition corresponding to such combinations and also that Control 3.0.3 be entered immediately.

This Control delineates the time limits for placing the unit in a safe MODE or other specified condition when operation cannot be maintained within the limits for safe operation as defined by the Control and its ACTIONS. It is not intended to be used as an operational convenience that permits routine voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable.

### 3/4.0 APPLICABILITY

#### BASES (Continued)

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Upon entering Control 3.0.3, 1 hour is allowed to prepare for an orderly shutdown before initiating a change in unit operation. This includes time to permit the operator to coordinate the reduction in electrical generation with the load dispatcher to ensure the stability and availability of the electrical grid. The time limits specified to reach lower MODES of operation permit the shutdown to proceed in a controlled and orderly manner that is well within the specified maximum cooldown rate and within the capabilities of the unit, assuming that only the minimum required equipment is OPERABLE. This reduces thermal stresses on components of the Reactor Coolant System and the potential for a plant upset that could challenge safety systems under conditions to which this Control applies.

A unit shutdown required in accordance with Control 3.0.3 may be terminated and Control 3.0.3 exited if any of the following occurs:

- a. The Control is met.
- b. A condition exists for which the ACTIONS have now been performed.
- c. ACTIONS exist that do not have expired completion times. These completion times are applicable from the point in time that the condition is initially entered and not from the time Control 3.0.3 is exited.

The time limits of Control 3.0.3 allow 37 hours for the unit to be in MODE 4 when a shutdown is required during MODE 1 operation. If the unit is in a lower MODE of operation when a shutdown is required, the time limit for reaching the next lower MODE applies. If a lower MODE of operation is reached in less time than allowed, however, the total allowable time to reach MODE 4, or other applicable MODE, is not reduced. For example, if MODE 2 is reached in 2 hours, then the time allowed for reaching MODE 3 is the next 11 hours, because the total time for reaching MODE 3 is not reduced from the allowable limit of 13 hours. Therefore, if remedial measures are completed that would permit a return to MODE 1, a penalty is not incurred by having to reach a lower MODE of operation in less than the total time allowed.

In MODES 1, 2, and 3, Control 3.0.3 provides actions for conditions not covered in other Controls. The requirements of Control 3.0.3 do not apply in MODES 4 and 5 because the unit is already in the most restrictive condition required by Control 3.0.3. The requirements of Control 3.0.3 do not apply in other specified conditions of the Applicability (unless in MODE 1, 2, or 3) because the ACTIONS of individual Controls sufficiently define the remedial measures to be taken.

Exceptions to Control 3.0.3 are provided in instances where requiring a unit shutdown, in accordance with Control 3.0.3, would not provide appropriate remedial measures for the associated condition of the unit. These exceptions are addressed in the individual Controls.

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### 3/4.0 APPLICABILITY

#### BASES (Continued)

Control 3.0.4 establishes limitations on changes in MODES or other specified conditions in the Applicability when a Control is not met. It precludes placing the Unit in a MODE or other specified condition stated in that Applicability (e.g., Applicability desired to be entered) when the following exist:

- a. Unit conditions are such that the requirements of the Control would not be met in the Applicability desired to be entered; and
- b. Continued noncompliance with the Control requirements, if the Applicability were entered, would result in the unit being required to exit the Applicability desired to be entered to comply with the ACTIONS.

Compliance with ACTION requirements that permit continued operation of the facility for an unlimited period of time in a MODE or other specified condition provides an acceptable level of safety for continued operation. This is without regard to the status of the plant before or after the MODE change. Therefore, in such cases, entry into a MODE or other specified condition in the Applicability may be made in accordance with the provisions of the ACTION requirements. The provisions of this control should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before Unit startup.

The provisions of Control 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of Control 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from any unit shutdown.

Exceptions to Control 3.0.4 are stated in the individual Controls. Exceptions may apply to all the ACTIONS or to a specific ACTION of a Control.

Surveillances do not have to be performed on the associated inoperable equipment (or on variables outside the specified limits), as permitted by SR 3.0.1. Therefore, changing MODES or other specified conditions while in an ACTIONS condition, either compliance with Control 3.0.4, or where an exception to Control 3.0.4 is stated, is not a violation of SR 4.0.1 or SR 4.0.4 for those Surveillances that do not have to be performed due to the associated inoperable equipment. However, SRs must be met to ensure OPERABILITY prior to declaring the associated equipment OPERABLE (or variable within limits) and restoring compliance with the affected Control.

Control 3.0.4 is only applicable when entering MODE 3 from MODE 4, MODE 2 from MODE 3 or 4, or MODE 1 from MODE 2. Furthermore, Control 3.0.4 is applicable when entering any other specified condition in the Applicability only while operating in MODE 1, 2, or 3. The requirements of Control 3.0.4 do not apply in MODES 4 and 5, or in the other specified conditions of the Applicability (unless in MODE 1, 2, or 3) because the ACTIONS of individual Controls sufficiently define the remedial measures to be taken.

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### 3/4.0 APPLICABILITY

#### BASES (Continued)

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Control 3.0.5 establishes the allowance for restoring equipment to service under administrative controls when it has been removed from service or declared inoperable to comply with ACTIONS. The sole purpose of this Control is to provide an exception to Control 3.0.2 (e.g., to not comply with the applicable ACTION(s)) to allow the performance of SRs to demonstrate:

- a. The OPERABILITY of the equipment being returned to service; or
- b. The OPERABILITY of other equipment.

The administrative controls ensure the time the equipment is returned to service in conflict with the requirements of the ACTIONS is limited to the time absolutely necessary to perform the allows SRs. This Control does not provide time to perform any other preventative or corrective maintenance.

SR 4.0.1 through 4.0.5 establish the general requirements applicable to all Controls and apply at all times, unless otherwise stated.

SR 4.0.1 establishes the requirement that SRs must be met during the MODES or other specified conditions in the Applicability for which the requirements of the Control apply, unless otherwise specified in the individual SRs. This Control is to ensure that Surveillances are performed to verify the OPERABILITY of systems and components, and that variables are within specified limits. Failure to meet a Surveillance within the specified frequency, in accordance with SR 4.0.2, constitutes a failure to meet a Control.

Systems and components are assumed to be OPERABLE when the associated SRs have been met. Nothing in this Control, however, is to be construed as implying that systems or components are OPERABLE when:

- a. The systems or components are known to be inoperable, although still meeting the SRs; or
- b. The requirements of the Surveillance(s) are known to be not met between required Surveillance performances.

Surveillances do not have to be performed when the unit is in a MODE or other specified condition for which the requirements of the associated Control are not applicable, unless otherwise specified. The SRs associated with a Special Operations Control are only applicable when the Special Operations Control is used as an allowable exception to the requirements of a Control.

Surveillances, including Surveillances invoked by ACTIONS, do not have to be performed on inoperable equipment because the ACTIONS define the remedial measures that apply. Surveillances have to be met and performed in accordance with SR 4.0.2, prior to returning equipment to OPERABLE status.

### 3/4.0 APPLICABILITY

#### BASES (Continued)

Upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable Surveillances are not failed and their most recent performance is in accordance with SR 4.0.2. Post maintenance testing may not be possible in the current MODE or other specified conditions in the Applicability due to the necessary unit parameters not having been established. In these situations, the equipment may be considered OPERABLE provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to proceed to a MODE or other specified condition where other necessary post maintenance tests can be completed.

SR 4.0.2 establishes the requirements for meeting the specified frequency for Surveillances and any ACTIONS with a completion time that requires the periodic performance of the ACTION on a "once per ..." interval.

SR 4.0.2 permits a 25% extension of the interval specified in the frequency. This extension facilitates Surveillance scheduling and considers plant operating conditions that may not be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities).

The 25% extension does not significantly degrade the reliability that results from performing the Surveillance at its specified frequency. This is based on the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the SRs. The exceptions to SR 4.0.2 are those Surveillances for which the 25% extension of the interval specified in the frequency does not apply. These exceptions are stated in the individual Controls.

As stated in SR 4.0.2, the 25% extension also does not apply to the initial portion of a periodic completion time that requires performance on a "once per ..." basis. The 25% extension applies to each performance after the initial performance. The initial performance of the ACTION, whether it is a particular Surveillance or some other remedial action, is considered a single action with a single completion time. One reason for not allowing the 25% extension to this completion time is that such an action usually verifies that no loss of function has occurred by checking the status of redundant or diverse components or accomplishes the function of the inoperable equipment in an alternative manner.

The provisions of SR 4.0.2 are not intended to be used repeatedly merely as an operational convenience to extend Surveillance intervals (other than those consistent with refueling intervals) or periodic completion time intervals beyond those specified.

### 3/4.0 APPLICABILITY

#### BASES (Continued)

SR 4.0.3 establishes the flexibility to defer declaring affected equipment inoperable or an affected variable outside the specified limits when a Surveillance has not been completed within the specified frequency. A delay period of up to 24 hours or up to the limit of the specified frequency, whichever is less, applies from the point in time that it is discovered that the Surveillance has not been performed in accordance with SR 4.0.2, and not at the time that the specified frequency was not met. This delay period provides adequate time to complete Surveillances that have been missed. This delay period permits the completion of a Surveillance before complying with ACTIONS or other remedial measures that might preclude completion of the Surveillance.

The basis for this delay period includes consideration of unit conditions, adequate planning, availability of personnel, the time required to perform the Surveillance, the safety significance of the delay in completing the required Surveillance, and the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the requirements.

When a Surveillance with a frequency based not on time intervals, but upon specified unit conditions or operational situations, is discovered not to have been performed when specified, SR 4.0.3 allows the full delay period of 24 hours to perform the Surveillance.

SR 4.0.3 also provides a time limit for completion of Surveillances that become applicable as a consequence of MODE changes imposed by ACTIONS.

Failure to comply with specified frequencies for SRs is expected to be an infrequent occurrence. Use of the delay period established by SR 4.0.3 is a flexibility which is not intended to be used as an operational convenience to extend Surveillance intervals.

If a Surveillance is not completed within the allowed delay period, then the equipment is considered inoperable or the variable then is considered outside the specified limits and the completion times of the ACTIONS for the applicable Control conditions begin immediately upon expiration of the delay period. If a Surveillance is failed within the delay period, then the equipment is inoperable, or the variable is outside the specified limits and the completion times of the required ACTIONS for the applicable Control conditions begin immediately upon failure of the Surveillance.

Completion of the Surveillance within the delay period allowed by this Control, or within the completion time of the ACTIONS, restores compliance with SR 4.0.1.

SR 4.0.4 establishes the requirement that all applicable SRs must be met before entry into a MODE or other specified condition in the Applicability.

This Control ensures that system and component OPERABILITY requirements and variable limits are met before entry into MODES or other specified conditions in the Applicability for which these systems and components ensure safe operation of the unit.

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### 3/4.0 APPLICABILITY

#### BASES (Continued)

However, in certain circumstances failing to meet an SR will not result in SR 4.0.4 restricting a MODE change or other specified condition change. When a system, subsystem, division, component, device, or variable is inoperable or outside its specified limits, the associated SR(s) are not required to be performed per SR 4.0.1 which states that surveillances do not have to be performed on inoperable equipment or variables outside specified limits. When equipment is inoperable, or variables are outside their specified limits, SR 4.0.4 does not apply to the associated SR(s) since the requirement for the SR(s) to be performed is removed. Therefore, failing to perform the Surveillance(s) within the specified frequency, on equipment that is inoperable, or on variables that are outside specified limits, does not result in an SR 4.0.4 restriction to changing MODES or other specified conditions in the Applicability. However, since the Control is not met in this instance, Control 3.0.4 will govern any restrictions that may (or may not) apply to MODE or other specified condition changes. The provisions of this Control should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before entering an associated MODE or other specified condition in the Applicability.

The provisions of SR 4.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of SR 4.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from any unit shutdown.

The precise requirements for performance of SRs are specified such that exceptions to SR 4.0.4 are not necessary. The specific time frames and conditions necessary for meeting the SRs are specified in the frequency, in the Surveillance, or both. This allows performance of Surveillances when the prerequisite condition(s) specified in a Surveillance procedure require entry into the MODE or other specified condition in the Applicability of the associated Control prior to the performance or completion of a Surveillance. A Surveillance that could not be performed until after entering the Control Applicability would have its frequency specified such that it is not "due" until the specific conditions needed are met. Alternately, the Surveillance may be stated in the form of a note as not required (to be met or performed) until a particular event, condition, or time has been reached.

SR 4.0.4 is only applicable when entering MODE 3 from MODE 4, MODE 2 from MODE 3 or 4, or MODE 1 from MODE 2. Furthermore, SR 4.0.4 is applicable when entering any other specified condition in the Applicability only while operating in MODE 1, 2, or 3. The requirements of SR 4.0.4 do not apply in MODES 4 and 5, or in the other specified conditions of the Applicability (unless in MODE 1, 2, or 3) because the ACTIONS of individual Controls sufficiently define the remedial measures to be taken.

INSTRUMENTATION

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3/4.3.7 MONITORING INSTRUMENTATION

3/4.3.7.9 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 in accordance with the procedures 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.

3/4.3.7.10 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 setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm 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

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#### 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 2, 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 50, to a MEMBER OF THE PUBLIC, and (2) the limits of 10 CFR 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. 1/2

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:

- (1) 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).
- (2) HASL Procedures Manual, HASL-300 (revised annually).

##### 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 which 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 which 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 141. The dose calculations 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

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3/4.11.1.2 DOSE (Continued)

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

This Control applies to the release of liquid effluents from each reactor at the site. For units with shared radwaste treatment systems, the liquid effluents from the shared system are 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 Part 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 limit 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 liquid effluents from each reactor at the site. For units with shared radwaste treatment systems, the liquid effluents from the shared system are proportioned among the units sharing the system.

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#### 3/4.11.2 GASEOUS EFFLUENTS

##### 3/4.11.2.1 DOSE RATE

This Control is provided to ensure that the dose 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 for UNRESTRICTED AREAS. The annual dose rate limits are those associated with the concentrations of those MPCs as described in Regulatory Guide 1.109. 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 the MEMBER OF THE PUBLIC will 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 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 mrem/year to the total body or to less than or equal to 3000 mrem/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 mrem/year.

This Control applies to the release of radioactive materials in gaseous effluents from all reactors at the site. The required detection capabilities for radioactive material in gaseous waste samples are tabulated in terms of the lower limit of detection (LLDs). Detailed discussion of the LLD and other detection limits can be found in:

- (1) 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).
- (2) HASL Procedures Manual, HASL-300 (revised annually).

##### 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 II.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



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3/4.11.2.2 DOSE - NOBLE GASES (Continued)

is unlikely to be substantially underestimated. The dose calculations 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 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. The ODCM equations provided for determining the air doses at and beyond the SITE BOUNDARY are made using meteorological conditions concurrent with the time of release of radioactive materials in gaseous effluents or are based upon the historical average atmospheric conditions.

This Control applies to the release of radioactive materials in gaseous effluents from each reactor 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 RADIONUCLIDES 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 methods 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 using meteorological conditions concurrent with the time of release of radioactive materials in gaseous effluents or are based upon the historical average atmospheric conditions. The release rate specifications for iodine-131, iodine-133, tritium and radionuclides in particulate form are dependent on the existing radionuclide pathway to man in the areas at and beyond the SITE BOUNDARY. The pathways which were examined in the development of these

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3/4.11.2.3 DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM (Continued)

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 reactor 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 (OFFGAS) SYSTEM AND VENTILATION EXHAUST TREATMENT SYSTEMS

The OPERABILITY of the GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM and the VENTILATION EXHAUST TREATMENT SYSTEMS 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 the 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 Part 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 reactor at the site. For units with shared radwaste treatment systems, the gaseous effluents from the shared system are proportional among the units sharing that system.

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RADIOACTIVE EFFLUENTS

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3/4.11.4 TOTAL DOSE

This Control is provided to meet the dose limitations of 40 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 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 RADIOLOGICAL ENVIRONMENTAL MONITORING

#### BASES

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#### 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 exposures 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:

- (1) 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).
- (2) HASL Procedure Manual, HASL-300 (revised annually).

#### 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 the census. The best information from door-to-door survey, visual or 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<sup>2</sup> 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<sup>2</sup>.

RADIOLOGICAL ENVIRONMENTAL MONITORING

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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 material 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.

6.0

ADMINISTRATIVE CONTROLS

ADMINISTRATIVE CONTROLS

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ANNUAL REPORTS

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

6.9.1.6 Routine radiological environmental operating reports covering the operation of the unit during the previous year shall be submitted prior to May 1 of each year.

The Annual Radiological Environmental Operating Reports shall include summaries, interpretations, and an analysis of trends of the results of the radiological environmental surveillance activities for the report period, including a comparison with preoperational studies, operational controls (as appropriate), and previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. The reports shall also include the results of land use censuses required by Control 3.12.2.

The Annual Radiological Environmental Operating Reports shall include the results of analysis of all radiological environmental samples and of all locations specified in the table and figures in the Offsite Dose Calculation Manual, as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

The reports shall also include the following: a summary description of the Radiological Environmental Monitoring Program; at least two legible maps\* covering all sampling locations keyed to a table giving distances and directions from the centerline of one reactor; the results of licensee participation in the Interlaboratory Comparison Program and the corrective action taken if the specified program is not being performed as required by Control 3.12.3; reasons for not conducting the Radiological Environmental Monitoring Program as required by Control 3.12.1, and discussion of all deviations from the sampling schedule of Table 3.12.1-1; discussion of environmental sample measurements that exceed the reporting levels of Table 3.12.1-2 but are not the result of plant effluents, pursuant to ACTION b of Control 3.12.1; and discussion of all analyses in which the the LLD required by Table 4.12.1-1 was not achievable.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

6.9.1.7 Routine radioactive release reports covering the operation of the unit during the previous year shall be submitted annually. The report must be submitted as specified in 10CFR50.4 and the time between submission of reports must be no longer than 12 months.

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\*One map shall cover stations near the SITE BOUNDARY; a second shall include the more distant stations.

ADMINISTRATIVE CONTROLS

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (Continued)

The Annual Radioactive Effluent Release Report shall include a summary of the quantities of radioactive liquid and gaseous effluents released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof.

The Annual Radioactive Effluent Release Report submitted each year shall include a summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing on magnetic tape of wind speed, wind direction, atmospheric stability, and precipitation (if measured), or in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability.\* This report shall include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit or station during the previous year. This report shall also include an assessment of the radiation doses from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY (see Figure 3.2-1) during the report period. All assumptions used in making these assessments, i.e., specific activity, exposure time, and location, shall be included in these reports. The assessment of radiation doses shall be performed in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

The Annual Radioactive Effluent Release Report submitted each year shall also include an assessment of radiation doses to the likely most exposed MEMBER OF THE PUBLIC from reactor releases and other nearby uranium fuel cycle sources, including doses from primary effluent pathways and direct radiation, for the previous calendar year to show conformance with 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operation." Acceptable methods for calculating the dose contribution from liquid and gaseous effluents are given in Regulatory Guide 1.109, Rev. 1, October 1977.

The Annual Radioactive Effluent Release Report shall include a list and description of unplanned releases from the site to UNRESTRICTED AREAS (see Figure 3.2-1) of radioactive materials in gaseous and liquid effluents made during the reporting period.

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\*In lieu of submission with the Annual Radioactive Effluent Release Report, the licensee has the option of retaining this summary of required meteorological data on site in a file that shall be provided to the NRC upon request.



ADMINISTRATIVE CONTROLS

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (Continued)

The Annual Radioactive Effluent Release Report shall include any changes made during the reporting period to the OFFSITE DOSE CALCULATION MANUAL (ODCM), pursuant to PNPP Technical Specification 5.5.1 as well as any major change to Liquid or Gaseous Treatment Systems pursuant to Control 6.15. It shall also include a listing of new locations for dose calculations and/or environmental monitoring identified by the Land Use Census pursuant to Control 3.12.2.

The Annual Radioactive Effluent Release Report shall also include the following: an explanation as to why the inoperability of liquid or gaseous effluent monitoring instrumentation was not corrected within the time specified in Control 3.3.7.9 or 3.3.7.10, respectively; and description of the events leading to liquid holdup tanks exceeding total curie limits.

SPECIAL REPORTS

6.9.2 Special reports shall be submitted in accordance with 10 CFR50.4 within the time period specified for each report.

6.10 RECORD RETENTION

6.10.1 In addition to the applicable record retention requirements of Title 10 Code of Federal Regulations, the following records shall be retained for at least the minimum period indicated.

6.10.2 The following records shall be retained for at least 5 years:

- a. Records of surveillance activities, inspections, and calibrations required by these Controls.

6.15 MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS\*

6.15.1 Licensee initiated major changes to the radioactive waste systems, liquid, gaseous and solid:

\*Licensee may choose to submit the information called for in this Control as part of the annual USAR update.

ADMINISTRATIVE CONTROLS

MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS (Continued)

1. Shall be reported to the Commission in the Annual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the PORC. The discussion of each change shall contain:
  - a. A summary of the evaluation that led to the determination that the change could be made in accordance with 10CFR50.59;
  - b. Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information;
  - c. A detailed description of the equipment, components and processes involved and the interfaces with other plant systems
  - d. An evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;
  - e. An evaluation of the change which shows the expected maximum exposures to MEMBERS OF THE PUBLIC in the UNRESTRICTED AREA and to the general population that differ from those previously estimated in the license application and amendments thereto;
  - f. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the changes are to be made;
  - g. An estimate of the exposure to plant operating personnel as a result of the change; and
  - h. Documentation of the fact that the change was reviewed and found acceptable by the PORC.
  
2. Shall become effective upon review and acceptance by the PORC.

Records

The following records are generated by this document:

Quality Assurance Records

Annual Radioactive Effluent Release Report

Non-Quality Records

None

REFERENCES

1. Title 10, "Energy," Chapter 1, Code of Federal Regulations; Part 20, U.S. Government Printing Office, Washington, D.C. 20402, May 21, 1991. |c  
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2. Title 10, "Energy," Chapter 1, Code of Federal Regulations; Part 50; U.S. Government Printing Office, Washington, D.C. 20402, January 1, 1984.
3. Title 40, "Protection of Environment," Chapter 1, Code of Federal Regulations, Part 190, Federal Register, Vol. 42, Washington, D.C. 20402, January 13, 1977.
4. U.S. Nuclear Regulatory Commission, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," USNRC NUREG-0133, Washington, D.C. 20555, October, 1981.
5. U.S. Nuclear Regulatory Commission, "Draft Radiological Effluent Technical Specifications for PWR's," USNRC NUREG-0473, Revision 2, Washington, D.C. 20555, February, 1980.
6. Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Revision 1, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, June 1974.
7. Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I," Revision 0, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, March 1976.
8. Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I," Revision 1, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, October 1977.
9. Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, July 1977.
10. Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," Revision 1, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, April 1977.

REFERENCES (Cont.)

11. Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment," U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, February 1979.
12. U.S. Nuclear Regulatory Commission, "Branch Technical Position," Revision 1, Washington, D.C. 20555, November 1979.
13. Perry Nuclear Power Plant, Unit 1 and 2, "Final Safety Analysis Report," Amendment 14, The Cleveland Electric Illuminating Company, Perry, Ohio 44081, August 1984.
14. Perry Nuclear Power Plant, Units 1 and 2, "Environmental Report, Operating License Stage," Supplement 3, The Cleveland Electric Illuminating Company, Perry, Ohio 44081, November 1981.
15. Perry Nuclear Power Plant, Units 1 and 2, "Radiological Environmental Monitoring Program Manual," The Cleveland Electric Illuminating Company, Perry, Ohio 44081, February 1985.
16. "Midas User's Manual, for the Cleveland Electric Illuminating Company, Perry Nuclear Power Plant," Pickard, Lowe and Garrick, Washington, D.C. 20036, July 1983.
17. Kocher, D.C., "Radioactive Decay Data Tables," Technical Information Center, U.S. Department of Energy, Springfield, Virginia 22161, September 1985.
18. 1989 Engineering Report "Lake Erie Potable Water Facilities and Intakes within 50 Miles of PNPP, (Ref. SO-11552 "E").
19. Perry Environmental Report Operating License Stage, Table 5.1-10 "Annual Average Dilution Factors for Lake Water Intakes within 50 Miles of PNPP and Q&R Page 2.1-2.
20. PNPP Ohio Power Siting Commission application of August 1974, Appendix 1304-C-2, Table IV-A-2.
21. Total Angler Catch (1987 annual) for Each Grid Location; per letter from Michael R. Rawson, Fairport Fisheries Research Station, Ohio Department of Natural Resources (6-20-88).

The Cleveland Electric Illuminating Company

**INFORMATION ONLY**

PERRY OPERATIONS MANUAL

Process Control Program

TITLE: PROCESS CONTROL PROGRAM (PCP)

REVISION: 6 EFFECTIVE DATE: 11-27-95

PREPARED: Michael Doty 12-6-94  
/ Date

EFFECTIVE PIC'S

PIC No.	Type of Change	Effective Date
1	Intent	2-1-99
2	Non-Intent	3-6-00
3	Intent	10-11-00
5	Non-Intent	1-18-01
4	Admin	5-10-01

PROCESS CONTROL PROGRAM (PCP)

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SCOPE OF REVISION:

- Rev. 6 - 1. Revised in its entirety, no rev bars needed.
2. The revision incorporates the procedural details of the RETS, with respect to the PCP, in accordance with the guidelines of G.L. 89-01, and as described in License Amendment Request Letter PY-CEI/NRR-1655L.

Change History

PIC Number: 1                      Affected Pages: i, ii, iv, 1, 2, 3, 4, 5, 7, 8, 9,  
10, 11, 13, 14, 31, 39

Summary of Change:

1. Update table 1 to reflect vendor changes due to mergers and acquisitions (Pacific Nuclear is now MMT, and SEG is now GTS but they no longer process wet solid radwaste at the nuclear power plants).
  2. Updated references to procedures, instructions and computer codes.
  3. Revised list of waste streams to reflect current processing practices. Added irradiated Hardware as a waste stream.
  4. Added 'Waste Acceptance Criteria' as a means of identifying waste from compliance requirements. New 'Topical Reports' are no longer accepted by the NRC.
  5. Minor editorial clarifications.
  6. Incorporated requirements under which off-site waste processors can be utilized.
  7. Made processed dates and dose rates optional information for the waste storage display diagram. This information may not always be complete or immediately available while the container is in storage.
  8. Fixed typo in reference 31.
  9. Changed 3.3.2.5 to camera system.
- 

PIC Number: 2                      Affected Pages: i, iv, 1, 35

Summary of Change:

1. Changed reference to Tech Spec 6.13 to ORM Section 7.9.
- 

PIC Number: 3                      Affected Pages: i, iv, 21, 31

Summary of Change:

1. Revised frequency based on the change in fuel cycle to 24 months.
- 

PIC Number: 5                      Affected Pages: i, ii, iv, 5, 7, 8, 10, 25, 37, 38,  
39

Summary of Change:

1. Updated names of vendors.
  2. Made corrections to index, errors in references and corrected typos identified by Audit PA 00-08.
  3. As a result of Improved Tech Specs, reference to T.S. 1.34 have been replaced by PCP Sect. 1.34.
- 

PIC Number: 4                      Affected Pages: i, iv, 14, 39

Summary of Change:

1. Update reference from PNPP Quality Assurance Plan to FENOC Quality Assurance Program Manual.
-



PROCESS CONTROL PROGRAM (PCP)

1.0 INTRODUCTION

The Process Control Program (PCP) is designed to provide administrative control and guidance for the solidification, dewatering and other processing of applicable forms of radwaste for ultimate disposal. The PCP contains information pertaining to the current formula (mixing ratio), sampling, analyses, tests, and determinations to be made to ensure that the processing and packaging of radioactive wastes, based on demonstrated processing of actual or simulated wet solid wastes, will be accomplished in such a way as to ensure compliance with 10CFR20, 10CFR61, 10CFR71, Federal and State regulations, burial ground requirements and other requirements governing the disposal of radioactive waste.

The PCP is applicable to the plant installed and Pacific Nuclear Co., Chem-Nuclear and Scientific Ecology Group (SEG) supplied mobile radwaste systems for solidification and dewatering of applicable waste forms. Waste packaged for intermediary processing at offsite vendors shall be prepared for shipment in accordance with the specific vendor's instructions and waste acceptance criteria, or approved operations manual instructions. All solidifications at Perry will be performed by a vendor with a Topical Report that is accepted by the NRC and destination burial site(s) as meeting all necessary requirements. <B00797>

Features have been incorporated into the design of the solid radioactive waste system and the building housing this system to insure that exposures of operating personnel to radiation will be kept within ALARA guidelines.

Appendix A of the PCP was prepared based on guidance of NUREG-1302 "Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors," Generic Letter 89-01, Supplement No. 1. This appendix along with plant procedures will be used by plant personnel to demonstrate compliance with Operational Requirements Manual (ORM) Section 7.9. (Process Control Program).

1.1 Definitions

The following definitions are applicable to the sections that follow:

ACCEPTABLE ENVELOPE: (of solidification\dewatering): specific properties of wastes that fall within the limits of the parameters required for solidification/dewatering. These parameters are established within the test solidification instruction and/or vendor waste acceptance criteria or Topical Report for each applicable waste type. <B00797>

BATCH: the volume of isolated waste contained in a tank that will be processed for solidification or dewatering.

CONTAINER: the physical container in which the final waste product is deposited.

HIGH INTEGRITY CONTAINER (HIC): a burial site licensing department approved container for burial having an expected life of 300 years and provides the stability to meet burial requirements. All HIC's must have an approved Certificate of Compliance.

SOLIDIFICATION: the conversion of radioactive materials from liquid and solid systems to a monolithic, immobilized solid with a definite volume and shape, bounded by a stable surface of distinct outline on all sides (free standing), with a free water content of less than 0.5% by volume.

## 2.0 WASTE TYPES

There are numerous types of radioactive waste expected to be generated at the Perry Plant that will require processing, including solidification, or dewatering, or burial site approved intermediary offsite vendor process prior to their disposal. These radwaste types can be categorized based on their chemical and physical properties. The waste types expected at PNPP are evaporator concentrates (bottoms), bead resins, filter demineralizer media sludge, traveling belt filter cake, filter cartridges, oily waste, and dry active waste (DAW).

The following waste types (other than DAW) may be solidified/dewatered individually or in combination, with the provision that the chemistry of the waste falls within the acceptable envelope for solidification/dewatering.

### 2.1 Evaporator Concentrates (Bottoms)

Evaporator concentrates (bottoms) result from the processing of the chemical waste tanks which contain condensate demineralizer regeneration solutions and/or low concentrations of the following: trisodium phosphate, minute amounts of other chemicals used for chemistry analyses, or decontamination solutions. They will normally be in the range of 5% to 25% sodium sulfate by weight. This waste stream is not currently used.

### 2.2 Bead Resins (SRT)

Bead resins are collected from the condensate, liquid radwaste, and suppression pool demineralizers and stored in the spent resin tank. Bead resins are also collected from chemical decontamination processes. Bead resin from the liquid radwaste and suppression pool demineralizers may contain activated carbon.

### 2.3 Filter Demineralizer Media Sludge Powdered Resin Waste Stream

Sludge is the waste product generated by the backwash of the condensate filters, the radwaste traveling belt filters, the reactor water cleanup filter/demineralizers, and the fuel pool filter/demineralizers. Sludge may consist of powdered ion exchange resin at varying degrees of exhaustion, fibrous filter media, and small concentrations of various solids and corrosion products. The media are normally decanted in the appropriate settling tank prior to solidification/dewatering or preparation for offsite processing.

The waste in this category is normally separated into two waste streams. The Condensate, Fuel Pool and Radwaste Filter media is collected into and processed from one of four Settling Tanks as a single waste stream.

The Reactor Water Cleanup filter/demineralizer waste is processed separately from the other powdered resin waste due to its higher activity levels. This waste stream is collected into and processed from one of two smaller settling tanks.

### 2.4 Irradiated Hardware

- a. Irradiated hardware removed from the internal area of the reactor pressure vessel is processed and packaged in the spent fuel pool(s)/cask storage pit. This waste stream is considered Irradiated Hardware.
- b. The constituents of this waste stream may include control rod blades, LRPMSs, IRMs, TIPs and components expended during hardware processing and packaging activities. Startup sources may also be processed as part of this waste stream.
- c. Irradiated hardware is packaged in steel liners or other suitable disposal containers for disposal.
- d. Liquid shall be drained to ensure the burial site free liquid Acceptance Criteria is met.
- e. Irradiated hardware should not be mixed with any other waste type in final processing due to differences in stability requirements. Mixing of this waste stream with other wastes can only occur with approval from the disposal site or the waste processor.

### 2.5 Filter Cartridges

Filter cartridges from the CRD pump suction and discharge filters, non-precoat condensate filter septa and any other disposable-type filter cartridge, or non metallic filter septa, that may be used in permanent or temporary, plant or vendor systems are included in this category.

### 2.6 Deleted

## 2.7 Dry Active Waste (DAW)

Contaminated air filters, paper, rags, clothing, tools, trash, equipment and parts, that cannot be effectively decontaminated are contained in this category. Also included are laboratory wastes.

Oily waste is that oil collected in liquid radwaste systems as a result of leakage and maintenance on various lubrication and hydraulic systems. Oily waste is considered part of the DAW waste stream because it is contaminated with the same types of corrosion products. However, oily waste does require special processing prior to disposal.

## 2.8 Other Materials

Various other materials not specifically identified above, will be evaluated for solidification, dewatering, or other process on a case-by-case basis.

## 3.0 PROCESS DESCRIPTION

The following process descriptions apply to both plant and vendor supplied systems. Any differences between the two have been noted.

### 3.1 Batch Tank Processing

#### 3.1.1 Filling of Tanks

Once it is determined that a liquid radwaste system batch tank is to be processed, it will be recirculated to ensure a homogeneous mixture. Eductors inside the tanks enhance the mixing capabilities. The tank will be isolated using the plant's tagout program to ensure that no additional waste is added.

#### 3.1.2 Sampling/Analysis

Samples will be obtained and analyzed for each batch of waste in accordance with appropriate site chemistry instructions for the plant system, or vendor procedures and PCP for vendor supplied sampling systems. Prior to sampling, tanks will undergo sufficient mixing and/or recirculation to ensure representative sampling. At a minimum, for solidification, analyses will be performed for radionuclide content, pH, oil content, and settled solids (oil and concentrates only). At a minimum, for dewatering, analyses will be performed for radionuclide and oil content. These analyses are necessary to ensure that the waste falls within the acceptable envelopes for solidification/dewatering. Samples of waste destined for off site processing shall be analyzed as required to ensure the waste processor's 'Waste Acceptance Criteria' or topical report requirements are satisfied.

### 3.1.3 Preconditioning

Waste preconditioning is the chemical or physical adjustment of the waste to bring it within an established acceptability envelope to ensure solidification. The need for and type of preconditioning shall be determined using sample analysis results and will be performed in accordance with the applicable site chemistry instruction or vendor procedures and PCP. Upon completion of waste preconditioning, additional samples shall be obtained, as required, to determine solidification mixing ratios.

Oily wastes may require special preconditioning. Handling of oily wastes will be conducted in accordance with burial site requirements.

Preconditioning may also be performed on waste streams which are or will be dewatered or processed offsite to eliminate or reduce bacterial activity in the waste. Preconditioning of waste streams for this purpose will be conducted in accordance with approved site and/or vendor procedures.

### 3.1.4 Mixing Ratios

Mixing ratios give the respective amounts of waste and solidification agents required for acceptable solidification. The determination of mixing ratios shall be performed for each batch of waste to be solidified. Solidification mixing ratios are dependent upon percent settled solids and sodium sulfate concentration. The waste type and ratios of cement, waste, sodium sulfate (for Class A waste), and water are determined in the applicable site chemistry instruction or vendor procedures and PCP.

### 3.1.5 Dewatering

Dewatering is the removal of water from solid material to a concentration of less than 0.5% or 1.0% by volume, as applicable to containers used and burial site limits. Dewatering of radioactive spent resins and filter sludges shall be performed in accordance with approved operating procedures which are based upon documented test data demonstrating the ability to achieve drainable water limits as specified in applicable regulations.

## 3.2 Solidification Processing

### 3.2.1 Description of Plant Processing System

Solidification and/or dewatering of wet solid radioactive waste will be processed by Chem-Nuclear's Rapid Dewatering System or ATG's Services Division's Resin Drying System. These systems are discussed in Section 3.2.2. The following description applies to the plant installed solid radwaste system that will interface with the vendor equipment (See Figure 1).

Solid Radioactive Waste Processing System

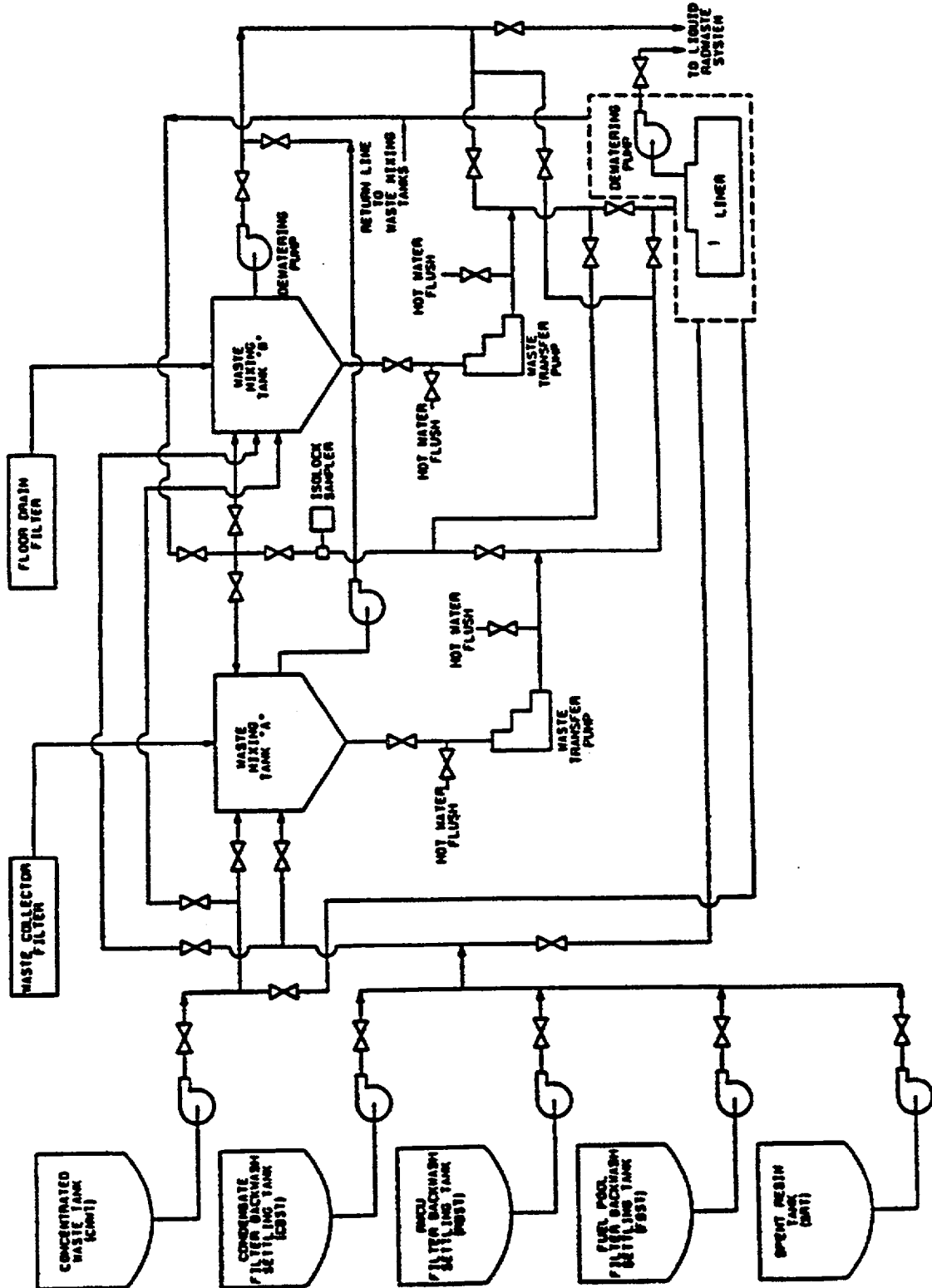


Figure 1

After the proper amount of waste has been accumulated in a settling or waste tanks or has been transferred to the waste mixing tank, the tank is decanted to remove excess free water (except when the waste being handled is traveling belt filter cake, in which case a predetermined amount of water or other approved aqueous solution is added to the tank for slurry transfer of the contents). The waste slurry is transferred at a preset rate to the vendor's equipment, in accordance with OM13A: RWI-G51-(SRW), where it is either dewatered or solidified with cement. The waste mixing tanks and settling tanks have recirculation capabilities where a representative sample can be drawn. If needed, a dewatering connection is available which is routed to the liquid radwaste system. An additional connection has been provided back to the waste mixing tank for use in the event of a liner overflow condition. Hot water flush connections are provided to thoroughly flush the plant and the vendor equipment into the liner used for processing. The waste transfer line and dewatering return lines are located behind a two foot thick shield wall to reduce exposure to the operator during processing.

### 3.2.2 Description of the Vendor's Waste Processing System

The wet solid radioactive waste will be transferred to the vendor's equipment to be dewatered or solidified in accordance with site approved procedures. Table 1 lists the Topical Reports, procedures and any comments for each vendor.

The vendor's equipment is located in the Radwaste Building in the fill aisle, storage area, and truck bay (see Figure 2). Normal processing of radioactive waste will be performed in the fill aisle with the dewatering equipment located in the truck bay. Periodically, when determined prudent, waste will be processed in the truck bay. When this is performed several restrictions will be imposed to minimize the potential for radioactive spill and ensure the principles of ALARA are maintained. These include; all processing to be performed in a High Integrity Container (HIC) placed inside a shipping package, all hosing and associated connections to be placed in hose bags, truck bay access doors to have temporary curbing placed in front of them, and locking all access areas to the truck bay. The areas where the processing takes place are specifically designed to handle the movement, storage, and processing of radioactive waste. Concrete walls and floors in these areas have protective coatings and shield/ cask walls are provided between the vendors equipment and potential radioactive sources to keep personnel exposures ALARA. The storage area is large enough to contain approximately 15 liners. This provides adequate storage before it is shipped to a burial site, or transferred to the On Site Storage Area.

Vendor Procedures for Radwaste Processing

<u>Vendor</u>	<u>Topical Report</u>	<u>Operating Procedures</u>	<u>Comments</u>
Chemi-Nuclear Systems Incorporated	Radioactive Waste Dewatering System, RDS-25506-01-P-A	Setup and Operating Procedure for the RDS-1000 Unit, FO-OP-032	1. Test solidifications will be run on each batch of the same waste type.
	Mobile Cement Solidification System, CNSI-2	Operating Procedure for the Mobile Cement Solidification Unit No. 221, SD-OP-050	
Allied Technologies Group	Vectra Dewatering System, TP-02-P-A	Resin Drying (Dewatering) System, OM-42-WS	
	Pacific Nuclear Systems Radwaste Solidification System, TP-05	Operation and Maintenance Manual for the ATG Radwaste Solidification System, OM-114	1. Test solidifications will be run on each batch of the same waste type.
		System Description of Pacific Nuclear System's Radioactive Waste Volume Reduction System RVR-800	
		Operation Procedure for RVR-800 Liquid Volume Reduction System, OM-0022-NS	

Table 1



Vendor Mobile Solidification Equipment Layout

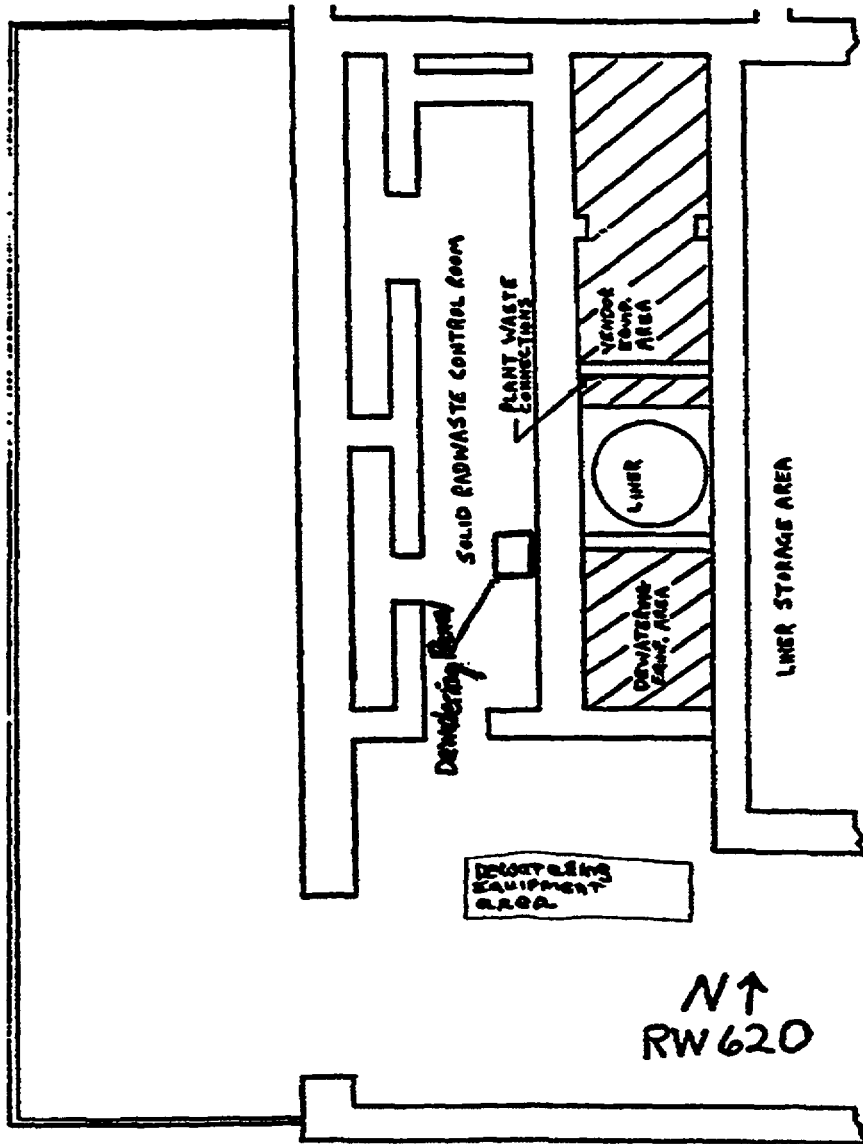


Figure 2

### 3.2.3 Radiological Effluent Controls and Monitoring

All processing with the vendor's equipment will be performed in a room with a volume sufficient to contain any postulated spill. A floor drain, routed to the liquid radwaste system, provides drainage in this area. All liquid radwaste discharges are sampled and monitored prior to their release to the environment.

Gaseous discharges from liners are processed through the vendor's off-gas blower system as described in the vendor's Topical Report. Ventilation from the areas housing the radwaste treatment and processing equipment, including the vendor's off-gas blower system, is routed through HEPA filters and charcoal beds prior to release to the environment via the Unit 1 Vent. Radiological monitoring is provided for Regulatory Guide 1.21 compliance to meet applicable Federal Code requirements.

### 3.2.4 Health Physics Support

Health Physics personnel will provide radiological control during the solidification and dewatering process. All work will be conducted under a Radiation Work Permit to keep personnel exposures ALARA.

### 3.2.5 Plant Utility Support

#### 1. Fire Protection

Fire suppression is provided above the processing and storage area to protect against fires. A fire hose is available in the truck bay for miscellaneous uses.

#### 2. Two-Way Communication

A two-way communication system will be used for communication between the plant operator and the vendor equipment operator. This will facilitate smooth coordination between the different segments of the waste processing system.

#### 3. Heating and Ventilation

The Radwaste Building Ventilation System will maintain a negative pressure in the processing and storage area. Heating is provided by the building heating system.

#### 4. Overhead Crane

An overhead crane will be used to transfer equipment between the storage and processing area and the truck bay. The crane has a 15 ton capacity which is fully capable of handling dewatered and solidified liners.

## 5. Closed Circuit Television

Closed Circuit Television will be used, where applicable, for remote viewing of the processing and storage areas. The overhead crane has an independent camera system for viewing all lifting and placing operations.

### 3.7 Cartridge Filters

Cartridge filters may be disposed of by encapsulation in a cement matrix in steel drums or liners. The encapsulation of cartridge filters shall be performed using approved procedures that provide reasonable assurance that the final waste form will meet the stability criteria of the Branch Technical Position on Waste Form. Cartridge filters may also be disposed of by placement in HIC's that are certified by the land disposal facility's State Agency. Additionally, cartridge filters may be sent to an offsite processor for processing if the filters meet the requirements of the processors waste acceptance criteria.

### 3.8 Dry Active Waste

Potentially contaminated dry wastes will be collected in containers located throughout the radiologically controlled areas within the plant. The waste will be periodically collected and transported to a temporary storage area prior to waste segregation onsite or offsite. Waste segregation will be performed to reduce waste volume and to recover reusable materials.

In order to reduce the waste volume, compressible waste will be compacted into shipping containers in accordance with applicable PNPP instructions, or sent to an offsite processor for volume reduction and/or final waste form packaging prior to disposal. Caution will be taken to avoid items that would cause free water formation as well as other compressibility hazards. Noncompressible waste will be loaded manually into suitable shipping containers.

### 3.9 Other Waste Forms and Processes

Waste forms and/or processes not previously discussed shall have an approved PNPP or vendor procedure to govern the process. The final waste product at PNPP must meet either: the disposal site waste acceptance criteria, the offsite waste processor's waste acceptance criteria, or be specifically waived in writing from the waste acceptance criteria by the disposal site or offsite waste processor prior to shipment of the material from PNPP.

### 4.0 PRODUCT CONTROL

Dewatering/Solidification processes will be conducted by qualified PNPP or vendor personnel in accordance with approved plant and/or vendor operating instructions and procedures.

PAP-0525, Solid Radwaste Administration will ensure appropriate documentation and compliance with this program.

#### 4.1 Test Solidification

Test solidifications are performed on waste stream samples to verify plant and/or vendor calculated solidification formulae. Test shall be performed to support solidification mixing formulae as follows:

(1) every batch of the same waste type; (2) when sampling analysis falls outside the normal established envelope and preconditioning is ineffective, (3) following any liner of the same waste type where solidification has been determined to be unacceptable; (4) when it is believed that some unexpected or abnormal containment may be present; or (5) when requested by Chemistry Supervision. A batch that requires test solidification shall not be processed until such time as the test solidification proves acceptable. <L00415>

Upon failure of a test solidification, additional samples shall be obtained and testing will continue until a successful solidification has been performed with revised mixing ratios as determined by Chemistry Supervision. Solidification of the batch may then be continued using the alternate solidification parameters defined by testing. All solidifications at Perry will be performed by a vendor with a Topical Report that is accepted by the NRC and destination burial site(s) as meeting all necessary requirements. <B00797>

#### 4.2 Product Quality

Solidification process product quality shall be ensured by the use of predetermined mixing ratios of waste and solidification agents. Mixing ratios are based upon laboratory testing of non-radioactive waste materials and are supported by (1) the test solidifications performed periodically, as mentioned above; (2) periodic checks, visual and physical, of actual processed containers filled with solidified waste; and (3) once every two years requalification of the waste form. Requalification includes testing for compressibility in accordance with ASTM C-39-84, following an appropriate immersion period.

#### 4.3 Acceptability

The acceptability of the solidified product shall be verified by ensuring that less than 0.5% free standing water exists and that the solidified product appears to be able to hold its shape if it were to be removed from the container.

Unacceptable solidified waste shall be handled as follows: (1) if the reason for unacceptability is free standing water, the free standing water will be removed or extra cement/sodium silicate will be added to solidify the free water; (2) if all or portions of the product did not solidify, the waste container will be capped and placed in a storage location in the Radwaste facility and periodically checked until such time that the product is acceptable or it is determined that additional solidification agents can be added to achieve satisfactory solidification. This will be determined by Chemistry Supervision. The handling of unacceptable solidified waste will be on a case-by-case basis.

Adherence to approved dewatering operating procedures ensure the final product will meet or exceed the standing water requirements of 10CFR61.

Dewatering of radioactive bead resin, filter demineralizer media sludge, and traveling belt filter cake shall be performed in accordance with approved operating procedures which are based upon documented test data demonstrating the ability to remove free water volumes below the applicable regulatory limits.

## 5.0 WASTE CLASSIFICATION, CHARACTERIZATION AND MANIFEST REQUIREMENTS

### 5.1 Waste Classification

All wastes shall be classified in accordance with the requirements of 10CFR61 as implemented by applicable plant instructions and procedures. Waste classifications may be performed by radwaste shipping computer codes. Analyses shall be performed on the waste streams at least annually (biannually for Class A waste), to determine the isotopic abundance of non-gamma emitting isotopes in the streams. Scaling factors, for the non-gamma emitting and transuranic constituents, will be developed from these analyses. Prior to the establishment of an acceptable data, estimated isotopic concentrations will be those obtained from the "Data Base Analysis Report, August 1985" prepared by Waste Management Group, Inc. (WVG, Inc.).

The activity of each radionuclide in the radioactive waste shall be determined by a calculational method employing the isotopic analysis of the waste and scaling factors or a dose-to-curie conversion. For DAW, a dose-to-curie conversion factor, percent fraction of the radionuclides, and scaling factors will be used to determine activity.

### 5.2 Waste Characteristics and Manifest Requirements

All wastes shall meet the characteristic requirements of 10CFR61.56 (a) and (b), as applicable, and waste packages shall be marked to identify the waste class. The manifesting requirements of 10CFR20.2006 shall be implemented by PNPP shipping instructions, and radwaste shipping computer codes may be utilized. Records are maintained in accordance with 10CFR71.91.

## 6.0 ADMINISTRATIVE CONTROLS

Compliance with applicable state and federal regulations, and with burial site criteria is ensured by compliance with the solid radioactive waste surveillance instructions, OM7A: SVI-G51-T5284.

The implementing instructions and procedures for radioactive waste solidification, dewatering, and segregation describe the requirements which must be met prior to processing radioactive waste, as well as the expected condition of the resultant waste form. Test solidifications, full scale calculations and operation of solidification, dewatering and segregation equipment shall be performed by qualified plant staff and vendor personnel. Plant staff personnel shall provide Health Physics and Quality Assurance coverage, operate plant radioactive waste systems, collect waste stream samples, and perform isotopic analyses. Copies of all referenced documents are available onsite for use by personnel engaged in waste processing activities.

Any changes to the Process Control Program shall be reviewed by the Plant Operations Review Committee (PORC) and shall be detailed in the Annual Radioactive Effluent Release Report covering that period.

## 7.0 QUALITY ASSURANCE

Quality Assurance related activities for the solid radwaste program are implemented as described in the FENOC Quality Assurance Program Manual. These activities shall provide verification that all solid radioactive waste meets applicable State and Federal regulations and burial site criteria. A flow chart illustrating the sequence of events for a waste solidification process is provided in Figure 3.

The FENOC Quality Assurance Program Manual also includes a management review of vendor's Topical Report. This will ensure that the vendor's operations and requirements are compatible with the responsibilities and operations of the plant.

Training and qualification of operators will be performed per Regulatory Guide 1.8 and ANSI N18.1 - 1971.

For accountability of filled waste containers, a clearly legible storage diagram will be permanently displayed near the radwaste control panel. It will show the position of containers holding wastes, and may contain additional information (i.e., the date the wastes were processed, and their dose rate(s)). The storage diagram will be updated to reflect any changes, additions, or deletions to storage.

Radwaste Process Flow Chart

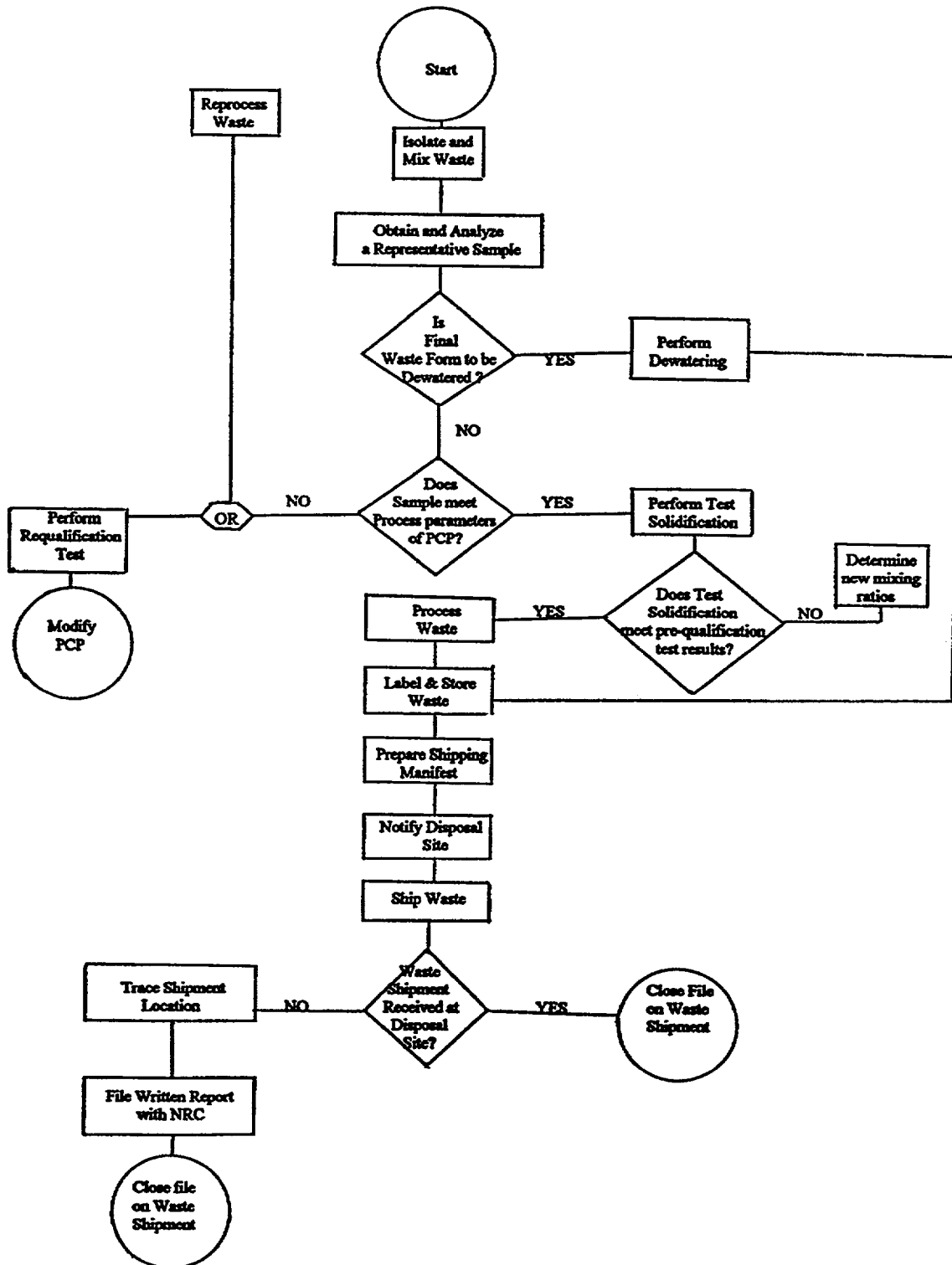


Figure 3

8.0 RECORDS

The following records are generated by this program:

Quality Assurance Records

None

Non Quality Records

None

9.0 ATTACHMENTS

None

10.0 REFERENCES

10.1 Commitments

The following commitments are wholly or in part met by this document:

B00301      F01412      F01464      L00415      S00245      B00797



APPENDIX A

Controls

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DEFINITIONS

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## DEFINITIONS

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The following terms are defined so that uniform interpretation of these Control may be achieved. The defined terms appear in capitalized type and be applicable throughout these Controls.

### ACTION

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

### MEMBER(S) OF THE PUBLIC

1.26 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 utility, 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 (ODCM)

1.28 The OFFSITE DOSE CALCULATION MANUAL shall contain the methodology and parameters used in the calculation of offsite doses due to radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring alarm/trip setpoints, and in the conduct of the radiological environmental monitoring program.

The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Specification 6.8.4 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Annual Radioactive Effluent Release Reports required by Specifications 6.9.1.6 and 6.9.1.7.

### OPERABLE - OPERABILITY

1.29 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

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

PROCESS CONTROL PROGRAM (PCP)

1.34 The PROCESS CONTROL PROGRAM shall contain the current formulas, sampling, analyses, tests, and determinations to be made to ensure that the 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 Part 20, 10 CFR Part 61, 10 CFR Part 71 and Federal and State regulations, burial ground requirements and other requirements governing the disposal of the radioactive waste.

SITE BOUNDARY

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

SOLIDIFICATION

1.43 SOLIDIFICATION shall be the conversion of wet wastes into a form that meets shipping and burial ground requirements.

UNRESTRICTED AREA

1.49 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 MEMBERS OF THE PUBLIC 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.

TABLE 1.1

SURVEILLANCE FREQUENCY NOTATION

<u>NOTATION</u>	<u>FREQUENCY</u>
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.
A	At least once per 366 days.
R	At least once per 24 months (731 days).
S/U	Prior to each reactor startup.
P	Completed prior to each release.
N.A.	Not applicable.

TABLE 1.2

OPERATIONAL CONDITIONS

<u>CONDITION</u>	<u>MODE SWITCH POSITION</u>	<u>AVERAGE REACTOR COOLANT TEMPERATURE</u>
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, Startup/Hot Standby, or Refuel position to test the switch interlock functions and related instrumentation 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 PNPP Unit 1 Technical 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 Test Exceptions 3.10.1 and 3.10.3 in PNPP Unit 1 Technical Specifications.

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

### 3/4.0 APPLICABILITY

#### CONTROLS

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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 one 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 when the conditions for the Control are not met and the associated ACTION requires a shutdown if they are not met within a specified time interval. Entry into an OPERATIONAL CONDITION or other specified condition may be made in accordance with the ACTION requirements when conformance to them permits continued operation of the facility for an unlimited period of time. 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.

APPLICABILITY

SURVEILLANCE REQUIREMENTS

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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 surveillance interval with a maximum allowable extension not to exceed 25 percent of the specified surveillance interval.

4.0.3 Failure to perform a Surveillance Requirement within the allowed surveillance interval, defined by control 4.0.2, shall constitute noncompliance with the OPERABILITY requirements for a Control. The time limits of the ACTION requirements are applicable at the time it is identified that a Surveillance Requirement has not been performed. The ACTION requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the ACTION requirements are less than 24 hours. 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 have been performed within the applicable surveillance interval or as otherwise specified. This provision shall not prevent passage through or to OPERATIONAL CONDITIONS as required to comply with ACTION requirements.



RADIOACTIVE EFFLUENTS

3/4.11.3 SOLID RADWASTE TREATMENT

CONTROLS

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3.11.3 In accordance with PCP Sect.1.34, radioactive wastes shall be SOLIDIFIED or dewatered in accordance with the PROCESS CONTROL PROGRAM to meet shipping and transportation requirements during transit, and disposal site requirements when received at the disposal site.

APPLICABILITY: At all times.

ACTION:

- a. With SOLIDIFICATION or dewatering not meeting disposal site and shipping and transportation requirements, suspend shipment of the inadequately processed wastes and correct the PROCESS CONTROL PROGRAM, the procedures and/or the solid waste system as necessary to prevent recurrence.
- b. With the SOLIDIFICATION or dewatering not performed in accordance with the PROCESS CONTROL PROGRAM, (1) test the improperly processed waste in each container to ensure that it meets burial ground and shipping requirements and (2) take appropriate administrative action to prevent recurrence.
- c. The provisions of Control 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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4.11.3.1 If the SOLIDIFICATION method is used, the PROCESS CONTROL PROGRAM shall be used to verify the SOLIDIFICATION of at least one representative test specimen from at least every tenth batch of each type of wet radioactive waste (e.g., filter sludges, spent resins, evaporator bottoms, and sodium sulfate solutions).

- a. If any test specimen fails to verify SOLIDIFICATION, the SOLIDIFICATION of the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative SOLIDIFICATION parameters can be determined in accordance with the PROCESS CONTROL PROGRAM, and a subsequent test verifies SOLIDIFICATION. SOLIDIFICATION of the batch may then be resumed using the alternative SOLIDIFICATION parameters determined by the PROCESS CONTROL PROGRAM.

RADIOACTIVE EFFLUENTS

SURVEILLANCE REQUIREMENTS (Continued)

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- b. If the initial test specimen from a batch of waste fails to verify SOLIDIFICATION, the PROCESS CONTROL PROGRAM shall provide for the collection and testing of representative test specimens from each consecutive batch of the same type of wet waste until at least three consecutive initial test specimens demonstrate SOLIDIFICATION. The PROCESS CONTROL PROGRAM shall be modified as required, as provided in Perry Nuclear Power Plant Unit 1 TS 6.13, to assure SOLIDIFICATION of subsequent batches of waste.
  
- c. With the installed equipment incapable of meeting Control 3.11.3 or declared inoperable, restore the equipment to OPERABLE status or provide the contract capability to process wastes as necessary to satisfy all applicable transportation and disposal requirements.

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 Section 3.0 and 4.0, but are not part of these Controls.

3/4 CONTROLS AND SURVEILLANCE REQUIREMENTS

3/4.0 APPLICABILITY

BASES

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Controls 3.0.1 through 3.0.4 establish the general requirements applicable to the Appendix C Controls. These requirements are derived from the requirements for Limiting Conditions for Operation stated in the Code of Federal Regulations, 10 CFR 50.36(c)(2) for plant Technical Specifications.

Control 3.0.1 establishes the Applicability statement within each individual control as the requirement for when (i.e., in which OPERATIONAL CONDITIONS or other specified conditions) conformance to the Control is required for safe operation of the facility. The ACTION requirements establish those remedial measures that must be taken within specified time limits when the requirements of a Control are not met. It is not intended that the shutdown ACTION requirements be used as an operational convenience which permits (routine) voluntary removal of a system(s) or component(s) from service in lieu of other alternatives that would not result in redundant systems or components being inoperable.

There are two basic types of ACTION requirements. The first specifies the remedial measures that permit continued operation of the facility which is not further restricted by the time limits of the ACTION requirements. In this case, conformance to the ACTION requirements provides an acceptable level of safety for unlimited continued operation as long as the ACTION requirements continue to be met. The second type of ACTION requirement specifies a time limit in which conformance to the conditions of the Control must be met. This time limit is the allowable outage time to restore an inoperable system or component to OPERABLE status or for restoring parameters within specified limits. If these actions are not completed within the allowable outage time limits, a shutdown is required to place the facility in an OPERATIONAL CONDITION or other specified condition in which the control no longer applies.

The specified time limits of the ACTION requirements are applicable from the point in time it is identified that a Control is not met. The time limits of the ACTION requirements are also applicable when a system or component is removed from service for surveillance testing or investigation of operational problems. Individual controls may include a specified time limit for the completion of a Surveillance Requirement when equipment is removed from service. In this case, the allowable outage time limits of the ACTION requirements are applicable when this limit expires if the surveillance has not been completed. When a shutdown is required to comply with ACTION requirements, the plant may have entered an OPERATIONAL CONDITION in which a new control becomes applicable. In this case, the time limits of the ACTION requirements would apply from the point in time that the new control becomes applicable if the requirements of the Control are not met.

3/4.0 APPLICABILITY

BASES (Continued)

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Control 3.0.2 establishes that noncompliance with a control exists when the requirements of the Control are not met and the associated ACTION requirements have not been implemented within the specified time interval. The purpose of this control is to clarify that (1) implementation of the ACTION requirement within the specified time interval constitutes compliance with a control, and (2) completion of the remedial measures of the ACTION requirements is not required when compliance with a Control is restored within the time interval specified in the associated ACTION requirements.

Control 3.0.3 establishes the shutdown ACTION requirements that must be implemented when a Control is not met and the condition is not specifically addressed by the associated ACTION requirements. The purpose of this control is to delineate the time limits for placing the unit in a safe shutdown CONDITION when plant operation cannot be maintained within the limits for safe operation defined by the Control and its ACTION requirements. It is not intended to be used as an operational convenience which permits (routine) voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable. One hour is allowed to prepare for an orderly shutdown before initiating a change in plant operation. This time permits the operator to coordinate the reduction in electrical generation with the load dispatcher to ensure the stability and availability of the electrical grid. The time limits specified to reach lower CONDITIONS of operation permit the shutdown to proceed in a controlled and orderly manner that is well within the specified maximum cooldown rate and within the cooldown capabilities of the facility assuming only the minimum required equipment is OPERABLE. This reduces thermal stresses on components of the primary coolant system and the potential for a plant upset that could challenge safety systems under conditions for which this control applies.

If remedial measures permitting limited continued operation of the facility under the provisions of the ACTION requirement are completed, the shutdown may be terminated. The time limits of the ACTION requirements are applicable from the point in time there was a failure to meet a Control. Therefore, the shutdown may be terminated if the ACTION requirements have been met or the time limits of the ACTION requirements have not expired, thus providing an allowance for the completion of the required actions.

### 3/4.0 APPLICABILITY

#### BASES (Continued)

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The time limits of Control 3.0.3 allow 37 hours for the plant to be in COLD SHUTDOWN when a shutdown is required during POWER operation. If the plant is in a lower CONDITION of operation when a shutdown is required, the time limit for reaching the next lower CONDITION of operation applies. However, if a lower CONDITION of operation is reached in less time than allowed, the total allowable time to reach COLD SHUTDOWN, or other OPERATIONAL CONDITION, is not reduced. For example, if STARTUP is reached in 2 hours, the time allowed to reach HOT SHUTDOWN is the next 11 hours because the total time to reach HOT SHUTDOWN is not reduced from the allowable limit of 13 hours. Therefore, if remedial measures are completed that would permit a return to POWER operation, a penalty is not incurred by having to reach a lower CONDITION of operation in less than the total time allowed.

The same principle applies with regard to the allowable outage time limits of the ACTION requirements, if compliance with the ACTION requirements for one control results in entry into an OPERATIONAL CONDITION or condition of operation for another control in which the requirements of the Control are not met. If the new control becomes applicable in less time than specified, the difference may be added to the allowable outage time limits of the second control. However, the allowable outage time limits of ACTION requirements for a higher CONDITION of operation may not be used to extend the allowable outage time that is applicable when a Control is not met in a lower CONDITION of operation.

The shutdown requirements of Control 3.0.3 do not apply in CONDITIONS 4 and 5, because the ACTION requirements of individual controls define the remedial measures to be taken.

Control 3.0.4 establishes limitations on a change in OPERATIONAL CONDITIONS when a Control is not met. It precludes placing the facility in a higher CONDITION of operation when the requirements for a Control are not met and continued noncompliance to these conditions would result in a shutdown to comply with the ACTION requirements if a change in CONDITIONS were permitted. The purpose of this control is to ensure that facility operation is not initiated or that higher CONDITIONS of operation are not entered when corrective action is being taken to obtain compliance with a control by restoring equipment to OPERABLE status or parameters to specified limits. Compliance with ACTION requirements that permit continued operation of the facility for an unlimited period of time provides an acceptable level of safety for continued operation without regard to the status of the plant before or after a change in OPERATIONAL CONDITION or other specified condition may be made in accordance with the provisions of the ACTION requirements. The provisions of this control should not, however, be interpreted as endorsing the failure to exercise good practice in restoring systems or components to OPERABLE status before plant startup.

### 3/4.0 APPLICABILITY

#### BASES (Continued)

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When a shutdown is required to comply with ACTION requirements, the provisions of Control 3.0.4 do not apply because they would delay placing the facility in a lower CONDITION of operation.

Controls 4.0.1 through 4.0.5 establish the general requirements applicable to Surveillance Requirements. These requirements are derived from those for Surveillance Requirements stated in the Code of Federal Regulations, 10 CFR 50.36(c)(3) for plant Technical Specifications.

Control 4.0.1 establishes the requirement that surveillances must be performed during the OPERATIONAL CONDITIONS or other conditions for which the requirements of the Controls apply unless otherwise stated in an individual Surveillance Requirement. The purpose of this control is to ensure that surveillances are performed to verify the operational status of systems and components and that parameters are within specified limits to ensure safe operation of the facility when the plant is in an OPERATIONAL CONDITION or other specified condition for which the individual Controls are applicable.

Surveillance Requirements do not have to be performed when the facility is in an OPERATIONAL CONDITION for which the requirements of the associated Control do not apply unless otherwise specified. The Surveillance Requirements associated with a Special Test Exception are only applicable when the Special Test Exception is used as an allowable exception to the requirements of a control.

Control 4.0.2 establishes the limit for which the specified time interval for Surveillance Requirements may be extended. It permits an allowable extension of the specified surveillance interval to facilitate surveillance scheduling and consideration of plant operating conditions that may not be suitable for conducting the surveillance; e.g., transient conditions or other ongoing surveillance or maintenance activities. It also provides flexibility to accommodate the length of a fuel cycle for surveillances that are performed at each refueling outage and are specified with a 24 month surveillance interval.

It is not intended that this provision be used repeatedly as a convenience to extend surveillance intervals beyond that specified for surveillances that are not performed during refueling outages. The limitation of Control 4.0.2 is based on engineering judgment and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the Surveillance Requirements. This provision is sufficient to ensure that the reliability ensured through surveillance activities is not significantly degraded beyond that obtained from the specified surveillance interval.

### 3/4.0 APPLICABILITY

#### BASES (Continued)

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Control 4.0.3 establishes that the failure to perform a Surveillance Requirement within the allowed surveillance interval, defined by the provisions of Control 4.0.2, is a condition that constitutes a failure to meet the OPERABILITY requirements for a Control. Under the provisions of this control, systems and components are assumed to be OPERABLE when Surveillance Requirements have been satisfactorily performed within the specified time interval. However, nothing in this provision is to be construed as implying that systems or components are OPERABLE when they are found or known to be inoperable although still meeting the Surveillance Requirements. This control also clarifies that the ACTION requirements are applicable when Surveillance Requirements have not been completed within the allowed surveillance interval and that the time limits of the ACTION requirements apply from the point in time it is identified that a surveillance has not been performed and not at the time that the allowed surveillance interval was exceeded. Completion of the Surveillance Requirement within the allowable outage time limits of the ACTION requirements restores compliance with the requirements of Control 4.0.3. However, this does not negate the fact that the failure to have performed the surveillance within the allowed surveillance interval, defined by the provisions of Control 4.0.2., constitutes a failure to meet the OPERABILITY requirements for a Control and any reports required by 10 CFR 50.73 shall be determined based on the length of time the surveillance interval has been exceeded, and the corresponding Control ACTION time requirements, similar to those discussed in NUREG-1022, Supplement 1.

If the allowable outage time limits of the ACTION requirements are less than 24 hours or a shutdown is required to comply with ACTION requirements, e.g., Control 3.0.3, a 24-hour allowance is provided to permit a delay in implementing the ACTION requirements. This provides an adequate time limit to complete Surveillance Requirements that have not been performed. The purpose of this allowance is to permit the completion of a surveillance before a shutdown would be required to comply with ACTION requirements or before other remedial measures would be required that may preclude the completion of a surveillance. The basis for this allowance includes consideration for plant conditions, adequate planning, availability of personnel, the time required to perform the surveillance, and the safety significance of the delay in completing the required surveillance. This provision also provides a time limit for the completion of Surveillance Requirements that become applicable as a consequence of CONDITION changes imposed by ACTION requirements and for completing Surveillance Requirements that are applicable when an exception to the requirements of Control 4.0.4 is allowed. If a surveillance is not completed within the 24-hour allowance, the time limits of the ACTION requirements are applicable at that time. When a surveillance is performed within the 24-hour allowance and the Surveillance requirements are not met, the time limits of the ACTION requirements are applicable at the time that the surveillance is terminated.



INSTRUMENTATION

3/4.0 APPLICABILITY

BASES (Continued)

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Surveillance Requirements do not have to be performed on inoperable equipment because the ACTION requirements define the remedial measures that apply. However, the Surveillance Requirements have to be met to demonstrate that inoperable equipment has been restored to OPERABLE status.

Control 4.0.4 establishes the requirement that all applicable surveillances must be met before entry into an OPERATIONAL CONDITION or other condition of operation specified in the Applicability statement. The purpose of this control is to ensure that system and component OPERABILITY requirements or parameter limits are met before entry into an OPERATIONAL CONDITION or other specified condition for which these systems and components ensure safe operation of the facility. This provision applies to changes in OPERATIONAL CONDITIONS or other specified conditions associated with plant shutdown as well as startup.

Under the provisions of this control, the applicable Surveillance Requirements must be performed within the specified surveillance interval to assume that the Controls are met during initial plant startup or following a plant outage.

When a shutdown is required to comply with ACTION requirements, the provisions of Control 4.0.4 do not apply because this would delay placing the facility in a lower CONDITION of operation.

RADIOACTIVE EFFLUENTS

BASES

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3/4.11.3 SOLID RADIOACTIVE WASTE

This Control implements the requirements of 10 CFR Part 50.36a and General Design Criterion 60 of Appendix A to 10 CFR Part 50. The process parameters included in establishing the PROCESS CONTROL PROGRAM may include, but are not limited to waste type, waste pH, waste/liquid/solidification agent/catalyst ratios, waste oil content, waste principal chemical constituents, mixing and curing times.

ADMINISTRATIVE CONTROLS

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ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

6.9.1.7 The Annual Radioactive Effluent Release Report shall include a summary of the quantities of radioactive solid waste released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants, : Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof. For solid wastes, the format for Table 3 in Appendix B shall be supplemented with three additional categories: class of solid wastes (as defined by 10 CFR Part 61), type of container (e.g., LSA, Type A, Type B Large Quantity) and SOLIDIFICATION agent or absorbent (e.g., cement, urea formaldehyde). This report shall also include any changes made during the reporting period to the PROCESS CONTROL PROGRAM (PCP) pursuant to PNPP ORM Section 7.9, as well as any major changes to Solid Radwaste Treatment Systems pursuant to Control 6.15.

ADMINISTRATIVE CONTROLS

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6.15 MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS\*

6.15.1 Licensee initiated major changes to the radioactive waste systems, liquid, gaseous and solid:

1. Shall be reported to the Commission in the Annual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the PORC. The discussion of each change shall contain:
  - a. A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59;
  - b. Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information;
  - c. A detailed description of the equipment, components and processes involved and the interfaces with other plant systems;
  - d. An evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;
  - e. An evaluation of the change which shows the expected maximum exposures to MEMBERS OF THE PUBLIC in the UNRESTRICTED AREA and to the general population that differ from those previously estimated in the license application and amendments thereto;
  - f. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the changes are to be made;
  - g. An estimate of the exposure to plant operating personnel as a result of the change; and
  - h. Documentation of the fact that the change was reviewed and found acceptable by the PORC.
2. Shall become effective upon review and acceptance by the PORC.

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\*Licensee may choose to submit the information called for in this CONTROL as part of the annual USAR update.

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3. U.S. Nuclear Regulatory Commission, "Standard Radiological Effluent Technical Specifications for Boiling Water Reactors", USNRC NUREG-0473, Revision 3, Washington, D.C. 20555, September 1982.
4. U.S. Nuclear Regulatory Commission, "Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification," Revision 0, May 1983.
5. U.S. Nuclear Regulatory Commission, "Branch Technical Position on Waste Form", Revision 0, May 1983.
6. "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens" ASTM C39-84, American Society for Testing and Materials, Philadelphia, Pennsylvania 19103, 1984.
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9. "Radman - A Computer Code to Classify and Document Packaged LLW in Accordance with 10CFR Part 61 Regulations", WMG-NP-A, Waste Management Group, Inc. Croton-on-the-Hudson, New York 10521, May 1983.
10. "Data Base Analysis Report - Perry Nuclear Power Station", Waste Management Group, Inc., Croton-on-the-Hudson, New York, New York 10521, May 1983.
11. SEG Process Control Program for Dewatering Bead or Powdered Resin with Quick Dry Dewatering System No. 2893, DW-004.
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16. "Perry Nuclear Power Plant Units 1 and 2, Updated Safety Analysis Report", The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
17. Perry Nuclear Power Plant Operations Manual, "Radioactive Shipment Criteria", PAP-1304, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
18. Perry Nuclear Power Plant Operations Manual, "Characterization of Radioactive Material/Waste", REC-0203, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
19. Perry Nuclear Power Plant Operations Manual, "Dry Radioactive Waste Volume Reduction Program", PAP-1901, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
20. Perry Nuclear Power Plant Operations Manual, "Plant Chemistry Control Program", PAP-1102, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
21. Perry Nuclear Power Plant Operations Manual, "10CFR61 Compliance Sampling", RPI-1102, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
22. Perry Nuclear Power Plant Operations Manual, "Miscellaneous Sampling Systems", CHI-5, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
23. Deleted
24. Perry Nuclear Power Plant Operations Manual, "Solid Radwaste Solidification System", RWI-G51-SRW, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
25. Perry Nuclear Power Plant Operations Manual, "Solid Radwaste Compaction System", RWI-G51-SRWC, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
26. Perry Nuclear Power Plant Operations Manual, "Process Control Program Solidification", SVI-G51-T5284, The Cleveland Electric Illuminating Company, Perry, Ohio 44081.
27. "Barnwell Waste Management Facility Site Disposal Criteria", Document S20-AD-010, Barnwell, South Carolina 29812.

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29. FENOC Quality Assurance Program Manual
30. Deleted
31. Operating Procedure for the Pacific Nuclear Resin Drying (Dewatering) Systems, OM-43-WS.
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36. Operating Procedure for the Mobile Cement Solidification Unit No. 221, SD-OP-050.
37. Topical Report covering Pacific Nuclear Systems Radwaste Solidification System, TP-05.
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39. System Description of Pacific Nuclear Systems' Radioactive Waste Volume Reduction System, RVR-800.
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