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T. DO NOT REMOVE

Dockets Nos. 50-259, 260, 296

Posted
Amdt. 128
to DPR-52

Mr. S. A. White
Manager of Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. White:

The Commission has issued the enclosed Amendments Nos. 132, 128, and 103 to Facility Operating Licenses Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3. These amendments are in response to your application dated September 30, 1986 (TVA BFNP TS 221).

The amendments change the Technical Specifications to add requirements for Radiological Effluent Technical Specifications (RETS) which comply with Section V of Appendix I to 10 CFR Part 50.

Submitted along with the RETS was the Radiological Effluent Manual (REM) which the staff has also found acceptable. The REM is associated with the RETS and is cited therein; however, it is not included in the RETS and is not a part of the license. In addition the Offsite Dose Calculation Manual (ODCM) which was submitted January 4, 1983 has been found to be an acceptable reference to use with the RETS. It is also not included in the RETS and is not a part of the license.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

You should assure that any safety-related employee concerns currently under review by the Employee Concern Task Group and pertaining to this issue are appropriately addressed prior to start-up of the Browns Ferry Units.

Sincerely,

Original signed by

Marshall Grotenhuis, Project Manager
BWR Project Directorate #2
Division of BWR Licensing

Enclosures:
See next page

Enclosures:
1. Amendment No. 132 to License No. DPR-33
2. Amendment No.128 to License No. DPR-52
3. Amendment No.103 to License No. DPR-68
4. Safety Evaluation

cc w/enclosures:
See next page

TAC No. 63022/3/4

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Mr. S. A. White, Manager of Nuclear Power
Tennessee Valley Authority

Browns Ferry Nuclear Plant
Units 1, 2, and 3

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 128
License No. DPR-52

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The applications for amendment by Tennessee Valley Authority (the licensee) dated September 30, 1986, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 128, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Daniel R. Muller, Director
BWR Project Directorate #2
Division of BWR Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 5, 1987

ATTACHMENT TO LICENSE AMENDMENT NO.128

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

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vii	291
viii	291A
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1.0 DEFINITIONS (Cont'd)

10. Logic - A logic is an arrangement of relays, contacts, and other components that produces a decision output.

    (a) Initiating - A logic that receive signals from channels and produce decision outputs to the actuation logic.

    (b) Actuation - A logic that receives signals (either from initiation logic or channels) and produces decision outputs to accomplish a protective action.

11. Channel Calibration - Shall be the adjustment, as necessary, of the channel output such that it responds with necessary range and accuracy to known values of the parameters which the channel monitors. The channel calibration shall encompass the entire channel including alarm and/or trip functions and shall include the channel functional test. The channel calibration may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated. Non-calibratable components shall be excluded from this requirement, but will be included in channel functional test and source check.

12. Channel Functional Test - Shall be:

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

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

13. Source Check - Shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source or multiple of sources.

W. Functional Tests - A functional test is the manual operation or initiation of a system, subsystem, or components to verify that it functions within design tolerances (e.g., the manual start of a core spray pump to verify that it runs and that it pumps the required volume of water).

X. Shutdown - The reactor is in a shutdown condition when the reactor mode switch is in the shutdown mode position and no core alterations are being performed.

Y. Engineered Safeguard - An engineered safeguard is a safety system the actions of which are essential to a safety action required in response to accidents.

Z. Reportable Event - A reportable event shall be any of those conditions specified in section 50.73 to 10 CFR Part 50.

AA. Solidification - Shall be the conversion of radioactive wastes into a form that meets shipping and burial ground requirements.

BB. Offsite Dose Calculation Manual (ODCM) - Shall be a manual describing the environmental monitoring program and the methodology and parameters used in the calculation of release rate limits and offsite doses due to radioactive gaseous and and liquid effluents. The ODCM will also provide the plant with guidance for establishing alarm/trip setpoints to ensure technical specifications sections 3.8.A.1 and 3.8.B.1 are not exceeded.

CC. Purge or purging - The controlled process of discharging air or gas from the primary containment to maintain temperature, pressure, humidity, concentration, or other operating condition in such a manner that replacement air or gas is required to purify the containment.

DD. Process Control Program - Shall contain the sampling, analysis, and formulation determination by which SOLIDIFICATION of radioactive wastes from liquid systems is assured.

EE. Radiological Effluent Manual (REM) - Shall be a manual containing the site and environmental sampling and analysis programs for measurements of radiation and radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposure to individuals from station operation. It shall also specify operating guidelines for radioactive waste treatment systems and report content.

FF. Venting - The controlled process of discharging air or gas from the primary containment to maintain temperature, pressure, humidity, concentration, or other operating condition in such a manner that replacement air or gas is not provided or required. Vent, used in system names, does not imply a venting process.

GG. Site Boundary - Shall be that line beyond which the land is not owned, leased, or otherwise controlled by TVA.

HH. Unrestricted Area - Any area at or beyond the site boundary to which access is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials or any area within the site boundary used for industrial, commercial, institutional, or recreational purposes.

II. Dose Equivalent I-131 - The DOSE EQUIVALENT I-131 shall be the concentration of I-131 (in μCi/gm) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factor used for this calculation shall be those listed in Table III of TID-14844 "Calculation of Distance Factors for Power and Test Reactor Sites".

JJ. Gaseous Waste Treatment System - The charcoal adsorber vessels installed on the discharge of the steam jet air ejector to provide delay to a unit's offgas activity prior to release.

KK. Members of the Public - Shall include all individuals who by virtue of their occupational status have no formal association with the plant. This category shall include non-employees of the licensee who are permitted to use portions of the site for recreational, occupational, or other purposes not associated with plant functions. This category shall not include non-employees such as vending machine servicemen or postmen who, as part of their formal job function, occasionally enter restricted areas.

LL. Surveillance - Surveillance Requirements shall be met during the OPERATIONAL CONDITIONS or other conditions specified for individual limiting conditions for operation unless otherwise stated in an individual Surveillance Requirements. Each surveillance Requirement shall be performed within the specified time interval with,

(1) A maximum allowable extention not to exceed 25% of the surveillance interval, but

(2) The combined time entered for any 3 consecutive surveillance intervals shall not exceed 3.25 times the specified surveillance interval

Performance of a Surveillance Requirement within the specified time interval shall constitute compliance and OPERABILITY requirements for a limiting condition for operation and associated action statements unless otherwise required by these specifications. Surveillance requirements do not have to be performed on inoperable equipment.

Table 1.1

SURVEILLANCE FREQUENCY NOTATION

NOTATION		FREQUENCY
S	(Shift)	At least once per 12 hours.
D	(Daily)	At least once per normal calendar 24 hour day (midnight to midnight).
W	(Weekly)	At least once per 7 days.
M	(Monthly)	At least once per 31 days.
Q	(Quarterly)	At least once per 3 months or 92 days.
SA	(Semi-Annually	At least once per 6 months or 184 days.
Y	(Yearly)	At least once per year or 366 days.
R	(Refueling)	At least once per operating cycle.
S/U	(Start-Up)	Prior to each reactor startup.
N.A.		Not applicable.
P	(Prior)	Completed prior to each release.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.2.B Core and Containment Cooling Systems - Initiation & Control	4.2.B Core and Containment Cooling Systems - Initiation & Control
	are required to be operable shall be considered operable if they are within the required surveillance testing frequency and there is no reason to suspect that they are inoperable.
C. Control Rod Block Actuation	C. Control Rod Block Actuation
The limiting conditions of operation for the instrumentation that initiates control rod block are given in Table 3.2.C.	Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2.C. System logic shall be functionally tested as indicated in Table 4.2.C.
3.2.D Radioactive Liquid Effluent Monitoring Instrumentation	4.2.D Radioactive Liquid Effluent Monitoring Instrumentation
1. The radioactive liquid effluent monitoring instrumentation listed in Table 3.2.D shall be operable with the applicability as shown in Tables 3.2.D/4.2.D. Alarm/ trip setpoints will be set in accordance with guidance given in the ODCM to ensure that the limits of specification 3.8.A.1 are not exceeded.	1. Each of the radioactive liquid effluent monitoring instruments shall be demonstrated operable by performance of test in accordance with Table 4.2.D.
2. The action required when the number of operable channels is less than the minimum channels operable requirement is specified in the notes for Table 3.2.D. Exert best efforts to return the instrument(s) to OPERABLE status within 30 days and if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.2.D Radioactive Liquid Effluent (Con't)	4.2.D Radioactive Liquid Effluent (Con't)
3. With a radioactive liquid effluent monitoring channel alarm/trip setpoint less conservative than required by these specifications, suspend the release without delay, declare the channel inoperable, or adjust the alarm/trip setpoint to establish the conservatism required by these specifications.	
4. The provisions of specification 1.0.C and 6.7.2 are not applicable.	
E. Drywell Leak Detection	E. Drywell Leak Detection
The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Table 3.2.E.	Instrumentation shall be calibrated and checked as indicated in Table 4.2.E.
F. Surveillance Instrumentation	F. Surveillance Instrumentation
The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.	Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.
G. Control Room Isolation	G. Control Room Isolation
The limiting conditions for instrumentation that isolates the control room and initiates the control room emergency pressurization systems are given in Table 3.2.G.	Instrumentation shall be calibrated and checked as indicated in Table 4.2.G.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.2.J Seismic Monitoring Instrumentation	4.2.J Seismic Monitoring Instrumentation
1. The seismic monitoring instruments listed in Table 3.2.J shall be operable at all times.	1. Each of the seismic monitoring instruments shall be demonstrated operable by performance of tests at the frequencies listed in Table 4.2.J.
2. With the number of seismic monitoring instruments less than the number listed in Table 3.2.J, restore the inoperable instrument(s) to operable status within 30 days.	2. Data shall be retrieved from all seismic instruments actuated during a seismic event and analyzed to determine the magnitude of the vibratory ground motion. A Special Report shall be submitted to the Commission pursuant to specification 6.7.3.D within 10 days describing the magnitude, frequency spectrum, and resultant effect upon plant features important to safety.
3. With one or more of the instruments listed in Table 3.2.J inoperable for more than 30 days, submit a Special Report to the Commission pursuant to specification 6.7.3.C within the next 10 days describing the cause of the malfunction and plans for restoring the instruments to operable status.	
3.2.K Radioactive Gaseous Effluent Monitoring Instrumentation	4.2.K Radioactive Gaseous Effluent Monitoring Instrumentation
1. The radioactive gaseous effluent monitoring instruments listed in Table 3.2.K shall be operable with the applicability as shown in Tables 3.2.K/4.2.K. Alarm/ trip setpoints will be set in accordance with guidance given in the ODCM to ensure that the limits of specification 3.8.B.1 are not exceeded.	1. Each of the radioactive gaseous effluent monitoring instruments shall be demonstrated operable by performance of tests in accordance with Table 4.2.K.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.2.K Radioactive Gaseous Effluent Monitoring Instrumentation (Con't)	4.2.K Radioactive Gaseous Effluent Monitoring Instrumentation (Con't)
2. The action required when the number of operable channels is less than the Minimum Channels Operable requirement is specified in the notes for Table 3.2.K. Exert best efforts to return the instruments to operable status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Release Report why the inoperability was not corrected in a timely manner.	
3. With a radioactive gaseous effluent monitoring channel alarm/trip setpoint less conservative than required by these specifications, suspend the release without delay, declare the channel inoperable, or adjust the alarm/trip setpoint to establish the conservatism required by these specifications.	
4. Both off-gas treatment monitors may be taken out of service for less than one hour for purging of monitors during SI performance.	
5. The provisions of specifications 1.0.C and 6.7.2 are not applicable.	

Amendment No. 128

TABLE 3.2.D

Radioactive Liquid Effluent Monitoring Instrumentation

Instrument [F]	Minimum Channels Operable	Applicability	Action
1. LIQUID RADWASTE EFFLUENT MONITOR (RM-90-130)	1	**	A, B
2. RHR SERVICE WATER MONITOR (RM-90-133, -134)	1	***	C
3. RAW COOLING WATER MONITOR (RM-90-132)	1	**	D
4. LIQUID RADWASTE EFFLUENT FLOW RATE (77-60 loop excluding fixed in line rotometer)	1	**	E

NOTES FOR TABLE 3.2.D

*At all times
**During releases via this pathway
***During operation of an RHR loop and associated RHR service water system

ACTION A

During release of radioactive wastes from the radwaste processing system, the following shall be met (1) liquid waste activity and flowrate shall be continuously monitored and recorded during release and shall be set to alarm and automatically close the waste discharge valve before exceeding the limits specified in 3.8.A.1, (2) if this cannot be met, two independent samples of the tank being discharged shall be analyzed in accordance with the sampling and analysis program specified in the REM and two qualified station personnel shall independently verify the release rate calculations and check valving before the discharge. Otherwise, suspend release via this pathway.

ACTION B

With a radioactive liquid effluent monitoring channel/alarm trip setpoint less conservative than required by these specifications, suspend release via this pathway without delay, declare the channel inoperable, or adjust the alarm/trip setpoint to establish the conservatism referred by these specifications.

ACTION C

During operation of an RHR loop and associated RHR service water system, the effluent from that unit's service water shall be continuously monitored. If an installed monitoring system is not available, a temporary monitor or grab samples taken every 4 hours and an analysis of at least an LLD(1) of 1E-7 μCi/ml (gross) or < applicable MPC ratio (γ isotopic) shall be used to monitor the effluent.

ACTION D

With the number of channels OPERABLE less than required by the Minimum Channels Operable requirement, effluent releases via this pathway may continued provided that a temporary monitor is installed or, at least once per 8 hours, grab samples are collected and analyzed for radioactivity with an LLD(1) of 1E-7 μCi/ml (gross) or < applicable MPC ratio (γ isotopic).

ACTION E

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

ACTION F

Alarm/trip setpoints will be calculated in accordance with the guidance given in the Offsite Dose Calculation Manual (ODCM).

(1) See REM, TABLE NOTATIONS - TABLE C-1, for the definition of LLD.

Radioactive Gaseous Effluent Monitoring Instrumentation

Instrument	Minimum Channels/ Devices Operable	Applicability	Action
1. STACK (RM-90-147A & B)			
a. Noble Gas Monitor	(1)	*	A/C
b. Iodine Cartridge	(1)	*	B/C
c. Particulate Filter	(1)	*	B/C
d. Sampler Flow Abnormal	(1)	*	D
e. Stack Flow (FT, FM, FI-90-271)	(1)	*	D
2. REACTOR/TURBINE BLDG VENTILATION (RM-90-250)			
a. Noble Gas Monitor	(1)	*	A/C
b. Iodine Sampler	(1)	*	B/C
c. Particulate Sampler	(1)	*	B/C
d. Sampler Flowmeter	(1)	*	D
3. TURBINE BLDG EXHAUST (RM-90-249, 251)			
a. Noble Gas Monitor	(1)	**	A/C
b. Iodine Sampler	(1)	**	B/C
c. Particulate Sampler	(1)	**	B/C
d. Sampler Flowmeter	(1)	**	D
4. RADWASTE BLDG VENT (RM-90-252)			
a. Noble Gas Monitor	(1)	*	A/C
b. Iodine Sampler	(1)	*	B/C
c. Particulate Sampler	(1)	*	B/C
d. Sampler Flowmeter	(1)	*	D
5. OFF GAS HYDROGEN ANALYZER (H_2A, H_2B)	(1)	***	E
6. OFF GAS POST TREATMENT			
a. Noble Gas Activity Monitor (RM-90-265, 266)	(1)	*	F
b. Sample Flow Abnormal (PA-90-262)	(1)	*	D

NOTES FOR TABLE 3.2.K

*At all times
**During releases via this pathway
***During main condenser offgas treatment system operation

ACTION A

With the number of channels OPERABLE less than required by the Minimum Channels Operable requirement, effluent releases via the affected pathway may continue provided a temporary monitoring system is installed or grab samples are taken and analyzed at least once every 8 hours.

ACTION B

With a number of channels OPERABLE less than required by the Minimum Channels Operable requirement, effluent releases via this pathway may continued provided samples are continuously collected with auxiliary sampling equipment for periods on the order of seven (7) days and analyzed in accordance with the sampling and analysis program specified in the REM within 48 hours after the end of the sampling period.

ACTION C

A monitoring system may be out of service for 4 hours for functional testing, calibration, or repair without providing or initiating grab sampling.

ACTION D

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

ACTION E

With the number of channels OPERABLE less than required by the Minimum Channels Operable requirement, operation of main condenser offgas treatment system may continue provided that a temporary monitor is installed or grab samples are collected at least once per 4 hours and analyzed within the following 4 hours.

ACTION F

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 8 hours and these samples are analyzed for gross activity within 24 hours. Purging during SI performance is not considered a loss of monitoring capability

TABLE 4.2.D

Radioactive Liquid Effluent Monitoring Instrumentation Surveillance Requirements

Instrument	Instrument Check	Source Check	Channel Calibration	Functional Test
1. LIQUID RADWASTE EFFLUENT MONITOR (RM-90-130)	D(4)	M	R(5)	Q(1)
2. RHR SERVICE WATER MONITOR (RM-90-133, -134)	D(4)	M	R(5)	Q(2)
3. RAW COOLING WATER MONITOR (RM-90-132)	D(4)	M	R(5)	Q(2)
4. LIQUID RADWASTE EFFLUENT FLOW RATE (77-60 loop)	D(4)	NA	R	Q(3)

NOTES FOR TABLE 4.2.D

(1) The channel functional test shall also demonstrate that automatic isolation of this pathway and control room annunciation occurs if any of the following conditions exist:

a. Instrument indicates measured levels above the alarm/trip setpoint
b. Instrument indicates an inoperative/downscale failure
c. Instrument controls not set in operate mode

(2) The channel functional test shall also demonstrate that control room annunciation occurs if any of the following conditions exist:

a. Instrument indicates measured levels above the alarm/trip setpoint
b. Instrument indicates an inoperative/downscale failure
c. Instrument controls not set in operate mode

(3) This functional test shall consist of measuring rate of tank decrease over a period of time and comparing this value with flow rate instrument reading.

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

(5) The CHANNEL CALIBRATION shall include the use of a known (traceable to National Bureau of Standards Radiation Measurement System) radioactive source(s) positioned in a reproducible geometry with respect to the sensor or using standards that have been obtained from suppliers that participate in measurement assurance activities with the National Bureau of Standards (NBS).

TABLE 4.2.K

Radioactive Gaseous Effluent Instrumentation Surveillance

Instrument	Instrument Check	Source Check	Channel Calibration	Functional Test
1. STACK				
a. Noble Gas Monitor (5)	D	M	R(1)	Q(2)
b. Iodine Cartridge	W	NA	NA	NA
c. Particulate Filter	W	NA	NA	NA
d. Sampler Flow Abnormal	D	NA	R	Q
e. Stack Flowmeter	D	NA	R	Q
2. REACTOR/TURBINE BLDG VENT				
a. Noble Gas Monitor (6)	D	M	R(1)	Q(2)
b. Iodine Sampler	W	NA	NA	NA
c. Particulate Sampler	W	NA	NA	NA
d. Sampler Flowmeter	D	NA	R	Q
3. TURBINE BLDG EXHAUST				
a. Noble Gas Monitor (6)	D	M	R(1)	Q(2)
b. Iodine Sampler	W	NA	NA	NA
c. Particulate Sampler	W	NA	NA	NA
d. Sampler Flowmeter	D	NA	R	Q
4. RADWASTE BLDG VENT				
a. Noble Gas Monitor (6)	D	M	R(1)	Q(2)
b. Iodine Sampler	W	NA	NA	NA
c. Particulate Sampler	W	NA	NA	NA
d. Sampler Flowmeter	D	NA	R	Q
5. OFF GAS HYDROGEN ANALYZER (H_2A, H_2B)	D	NA	R(3)	Q(4)
6. OFF GAS POST TREATMENT (5)				
a. Noble Gas Activity Monitor	D	M	R(1)	Q(4)
b. Sample Flow Abnormal	D	NA	R	Q(2)

NOTES FOR TABLE 4.2.K

(1) The CHANNEL CALIBRATION shall include the use of a known (traceable to the National Bureau of Standards Radiation Measurement System) radioactive source(s) positioned in a reproducible geometry with respect to the sensor or using standards that have obtained from suppliers that participate in measurement assurance activities with the National Bureau of Standards.

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

a. Instrument indicates measured levels above the alarm/trip setpoint.

b. Instrument indicates an inoperative/downscale failure.

c. Instrument controls not set in operate mode (stack only).

(3) The channel calibration shall include the use of standard gas samples containing a nominal:

a. Zero volume percent hydrogen (compressed air) and,

b. One volume percent hydrogen, balance nitrogen.

(4) The channel functional test shall demonstrate that automatic isolation of this pathway and control room annunciation occurs if any of the following conditions exists:

a. Instrument indicates measured level above the alarm/trip setpoint.

b. Instrument indicates an inoperative/downscale failure

c. Instrument controls not set in operate mode.

The two channels are arranged in a coincidence logic such that 2 upscale, or 1 downscale and 1 upscale or 2 downscale will isolate the offgas line.

(5) The noble gas monitor shall have a LLD of 1E-5 (Xe 133 Equivalent).

(6) The noble gas monitor shall have a LLD of 1E-6 (Xe 133 Equivalent).

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments will be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentration of potentially explosive gas mixtures in the offgas holdup system. 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.

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 guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20 Appendix B, Table II, Column 2. 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.

there is no true minimum. The curve does have a definite knee and very little reduction in system unavailability is achieved by testing at a shorter interval than computed by the equation for a single channel.

The best test procedure of all those examined is to perfectly stagger the tests. That is, if the test interval is four months, test one or the other channel every two months. This is shown in Curve No. 5. The difference between Cases 4 and 5 is negligible. There may be other arguments, however, that more strongly support the perfectly staggered tests, including reductions in human error.

The conclusions to be drawn are these:

1. A 1 out of n system may be treated the same as a single channel in terms of choosing a test interval; and

2. more than one channel should not be bypassed for testing at any one time.

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in two 1 out of 2 logic systems. The bases given for the rod blocks apply here also and were used to arrive at the functional testing frequency. The off-gas post treatment monitors are connected in a 2 out of 2 logic arrangement. Based on experience with instruments of similar design, a testing interval of once every three months has been found adequate.

The automatic pressure relief instrumentation can be considered to be a 1 out of 2 logic system and the discussion above applies also.

The criteria for ensuring the reliability and accuracy of the radioactive gaseous effluent instrumentation is listed in Table 4.2.K.

The criteria for ensuring the reliability and accuracy of the radioactive liquid effluent instrumentation is listed in Table 4.2.D.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.6 Primary System Boundary	4.6 Primary System Boundary
6. Whenever the reactor is critical, the limits on activity concentrations in the reactor coolant shall not exceed the equilibrium value of 3.2 µc/gm of does equivalent I-131. This limit may be exceeded following power transients for a maximum of 48 hours. During this activity transient the iodine concentrations shall not exceed 26 µCi/gm whenever the reactor is critical. The reactor shall not be operated more than 5 percent of its yearly power operation under this exception for the equilibrium activity limits. If the iodine concentration in the coolant exceeds 26 µCi/gm, the reactor shall be shut down, and the steam line isolation valves shall be closed immediately.	6. Additional coolant samples shall be taken whenever the reactor activity exceeds one percent of the equilibrium concentration specified in 3.6.B.6 and one of the following conditions are met: a. During startup b. Following a significant power change** c. Following an increase in the equilibrium off-gas level exceeding 10,000 µCi/sec (at the steam jet air ejector) within a 48 hour period. d. Whenever the equilibrium iodine limit specified in 3.6.B.6 is exceeded. The additional coolant liquid samples shall be taken at 4 hour intervals for 48 hours, or until a stable iodine concentration below the limiting value (3.2 µCi/gm) is established. However, at least 3 consecutive samples shall be taken in all cases. An isotopic analysis shall be performed for each sample, and quantitative measurements made to determine the dose equivalent I-131 concentration. If the total iodine activity of the sample is below 0.32 µCi/gm, an isotopic analysis to determine equivalent I-131 is not required.

**For the purpose of this section on sampling frequency, a significant power exchange is defined as a change exceeding 15% of rated power in less than 1 hour.

3.8 Radioactive Materials

Applicability

Applies to the release of radioactive liquids and gases from the facility.

Objective

To define the limits and conditions for the release of radioactive effluents to the environs to assure that any radioactive releases are as low as reasonably achievable and within the limits of 10 CFR Part 20. The specifications except for 3.8.A.1 and 3.8.B.1 are exempt from the requirements of definition 1.0.C (Limiting Condition for Operation).

Specification

A. Liquid Effluents

1. The concentration of radioactive material released at any time from the site to unrestricted areas (see Figure 4.8-1b) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 μCi/ml total activity.

2. If the limits of 3.8.A.1 are exceeded, appropriate action shall be initiated without delay to bring the release within

4.8 Radioactive Materials

Applicability

Applies to the periodic test and record requirements and sampling and monitoring methods used for facility effluents.

Objective

To ensure that radioactive liquid and gaseous releases from the facility are maintained within the limits specified by Specifications 3.8.A and 3.8.B.

Specification

A. Liquid Effluents

1. Facility records shall be maintained of radioactive concentrations and volume before dilution of each batch of liquid effluent released, and of the average dilution flow and length of time over which each discharge occurred.

2. Radioactive liquid waste sampling and activity analysis of each liquid waste batch to be discharged shall be performed prior to release in accordance with the sampling and analysis program specified in the REM.

3. The operation of the automatic isolation valves and discharge tank selection valves shall be checked annually.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.8 Radioactive Materials	4.8 Radioactive Materials
limits. Provide prompt notification to the NRC pursuant to section 6.7.2.	4. The results of the analysis of samples collected from release points shall be used with the calculational methodology in the ODCM to assure that the concentrations at the point of release are maintained within the limits of specification 3.8.A.1.
3. The doses or dose commitment to a member of the public from radioactive materials in liquid effluents released from each unit to unrestricted areas (See Figure 4.8-1b) shall be limited:	5. Cummulative quarterly and yearly dose contributions from liquid effluents shall be determined as specified in the ODCM at least once every 31 days.
a. During any calendar quarter to <1.5 mrem to the total body and <5 mrem to any organ and,	6. The quantity of radioactive material contained in any outside liquid radwaste storage tanks shall be determined to be within the above limit by analyzing a representative sample of the tank's contents at least once per 7 days when radioactive materials are being added to the tank.
b. During any calendar year to <3 mrem to the total body and <10 mrem to any organ	
4. If the limits specified in 3.8.A.3 a & b above are exceeded, prepare and submit Special Report pursuant to Section 6.7.2.	
5. The maximum activity to be contained in one liquid radwaste tank or temporary storage tank that can be discharged directly to the environs shall not exceed 10 curies excluding tritium and dissolved/entrained noble gas.	
6. With radioactive liquid waste exceeding 3.8.A.5 limits, without delay suspend all additions of radioactive material to the tank and within 48 hours, reduce the tank contents to within the limit. Events leading to this condition must be reported in the next Semiannual Radioactive Effluent Release Report (section F.2 of the REM)	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.8 Radioactive Materials	4.8 Radioactive Materials
B. Airborne Effluents	B. Airborne Effluents
1. The dose rate at any time to areas at and beyond the site boundary (see Figure 4.8-1b) due to radioactivity released in gaseous effluents from the site shall be limited to the following values:	1. The gross ß/γ and particulate activity of gaseous wastes released to the environment shall be monitored and recorded.
a. The dose rate limit for noble gases shall be <500 mrem/yr to the total body and <3000 mrem/yr to the skin, and	a. For effluent streams having continuous monitoring capability, the activity shall be monitored and flow rate evaluated and recorded to enable release rates of gross radioactivity to be determined at least once per shift using instruments specified in table 3.2.K.
b. The dose rate limit for I-131, I-133, H-3, and particulates with greater than eight day half-lives shall be <1500 mrem/yr to any organ.	b. For effluent streams without continuous monitoring capability, the activity shall be monitored and recorded and the release through these streams controlled to within the limits specified in 3.8.B.
2. If the limits of 3.8.B.1 are exceeded, appropriate corrective action shall be immediately initiated to bring the release within limits. Provide prompt notification to the NRC pursuant to section 6.7.2.	2. Radioactive gaseous waste sampling and activity analysis shall be performed in accordance with the sampling and analysis program specified in the REM. Dose rates shall be determined to be within limits of 3.8.B using methods contained in the ODCM.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3. The air dose to areas at and beyond the site boundary (see Figure 4.8-1b) due to noble gases released in gaseous effluents per unit shall be limited to the following: a. During any calendar quarter, to ≤5 mrad for gamma radiation and ≤10 mrad for beta radiation; b. During any calendar year, to ≤10 mrad for gamma radiation and ≤20 mrad for beta radiation.	3. Cumulative quarterly and yearly dose contributions from gaseous releases shall be determined using methods contained in the ODCM at least once every 31 days.
4. If the calculated air dose exceeds the limits specified in 3.8.B.3 above, prepare and submit a special report pursuant to section 6.7.2.	
5. The dose to a member of the public from radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half lives greater than 8 days in gaseous effluent released per unit to areas at and beyond the site boundary (see Figure 4.8-1b) shall be limited to the following: a. To any organ during any calendar quarter to ≤7.5 mrem; b. To any organ during any calendar year to ≤15 mrem;	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
6. If the calculated doses exceed the limits of 3.8.B.5 above, prepare and submit a special report pursuant to section 6.7.2.	4. During operation above 25% power, the position of the charcoal bed bypass valve will be verified daily.
7. During operation above 25% power the discharge of the SJAE must be routed through the charcoal adsorbers.	5. The concentration of hydrogen downstream of the recombiners shall be determined to be within the limits of 3.8.B.9 by continuously monitoring the offgass whenever the SJAE is in service using instruments described in Table 3.2.K. Instrument surveillance requirements are specified in Table 4.2.K.
8. With gaseous waste being discharged for more than 7 days without treatment through the charcoal adsorbers, prepare and submit a special report pursuant to section 6.7.2.	
9. Whenever the SJAE is in service, the concentration of hydrogen in the offgas downstream of the recombiners shall be limited to $\leq$4% by volume.	
10. With the concentration of hydrogen exceeding the limit of 3.8.B.9 above, restore the concentration to within the limit within 48 hours.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.8.C Radioactive Effluents - Dose	4.8.C Radioactive Effluents - Dose
1. The dose or dose commitment to a real individual from all uranium fuel cycle sources is limited to ≤25 mrem to the total body or any organ (except the thyroid, which is limited to ≤75 mrem) over a period of one calendar year.	1. Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with specifications 3.8.A.3, 3.8.B.3, and 3.8.B.5 and the methods in the ODCM.
2. With the calculated dose from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of specification 3.8.A.3, 3.8.B.3, or 3.8.B.5, prepare and submit a Special Report to the Commission pursuant to specification 6.7.2 and limit the subsequent releases such that the limits of 3.8.C.1 are not exceeded.	
3.8.D Mechanical Vacuum Pump	4.8.D Mechanical Vacuum Pump
1. Each mechanical vacuum pump shall be capable of being automatically isolated and secured on a signal or high radioactivity in the steam lines whenever the main steam isolation valves are open.	At least once during each operating cycle verify automatic securing and isolation of the mechanical vacuum pump.
2. If the limits of 3.8.D are not met, the vacuum pump shall be isolated.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.8 Radioactive Materials	4.8.C Radioactive Materials
E. Miscellaneous Radioactive Materials Sources	E. Miscellaneous Radioactive Materials Sources
1. Source Leakage Test	1. Surveillance Requirement
Each sealed source containing radioactive material either in excess of 100 microcuries of beta and/or gamma emitting material or 5 microcuries of alpha emitting material shall be free of $\geq$ 0.005 microcurie of removable contamination. Each sealed souce with removable contamination in excess of the above limit shall be immediately withdrawn from use and (a) either decontaminated and repaired, or (b) disposed of in accordance with Commission regulations.	Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Commission or an agreement State, as follows:
	a. Sources in Use
	Each sealed source, excluding startup sources and flux detectors previously subjected to core flux, containing radioactive material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at least once per six months. The leakage test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample.

4.8.E Miscellaneous Radioactive Materials Sources

1. Surveillance Requirements

b. Stored Sources Not In Use

Each sealed source and fission detector not previously subjected to core flux shall be tested prior to use or transfer to another licensee unless tested within the previous six months. Sealed sources and fission detectors transferred without a certificate indicating the last test date shall be tested prior to use.

c. Startup Sources and Fission Detectors

Each sealed startup source and fission detector shall be tested prior to being subjected to core flux and following repair or maintenance to the source.

2. Reports

A report shall be prepared and submitted to the Commission on an annual basis if sealed sources or fission detector leakage tests reveal the presence of greater than or equal to 0.005 microcuries of removable contamination.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.8 Radioactive Materials	4.8 Radioactive Materials
F. Solid Radwaste	F. Solid Radwaste
1. The solid radwaste system shall be operated in accordance with a process control program, for the solidification and packaging of wet radioactive wastes to ensure meeting the requirements of 10 CFR 20 and 10 CFR 71 and burial ground requirements prior to shipment of radioactive wastes from the site.	1. The Process Control Program shall include surveillance checks necessary to demonstrate compliance with 3.8.F.1.
2. With the packaging requirements of 10 CFR 20 or burial ground requirements and/or 10 CFR 71 not satisfied, suspend shipments of defectively packaged solid radioactive wastes from the site.	

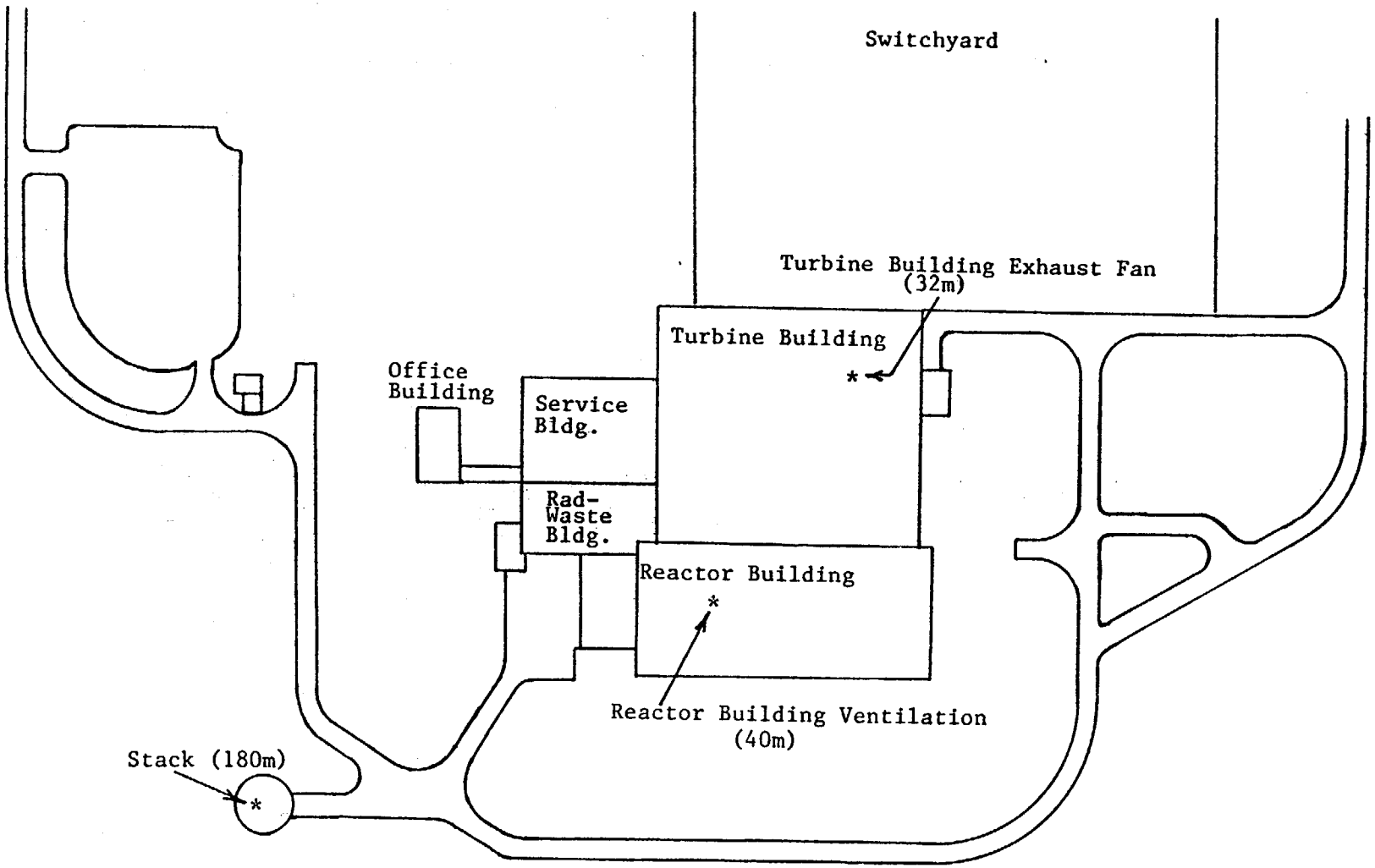
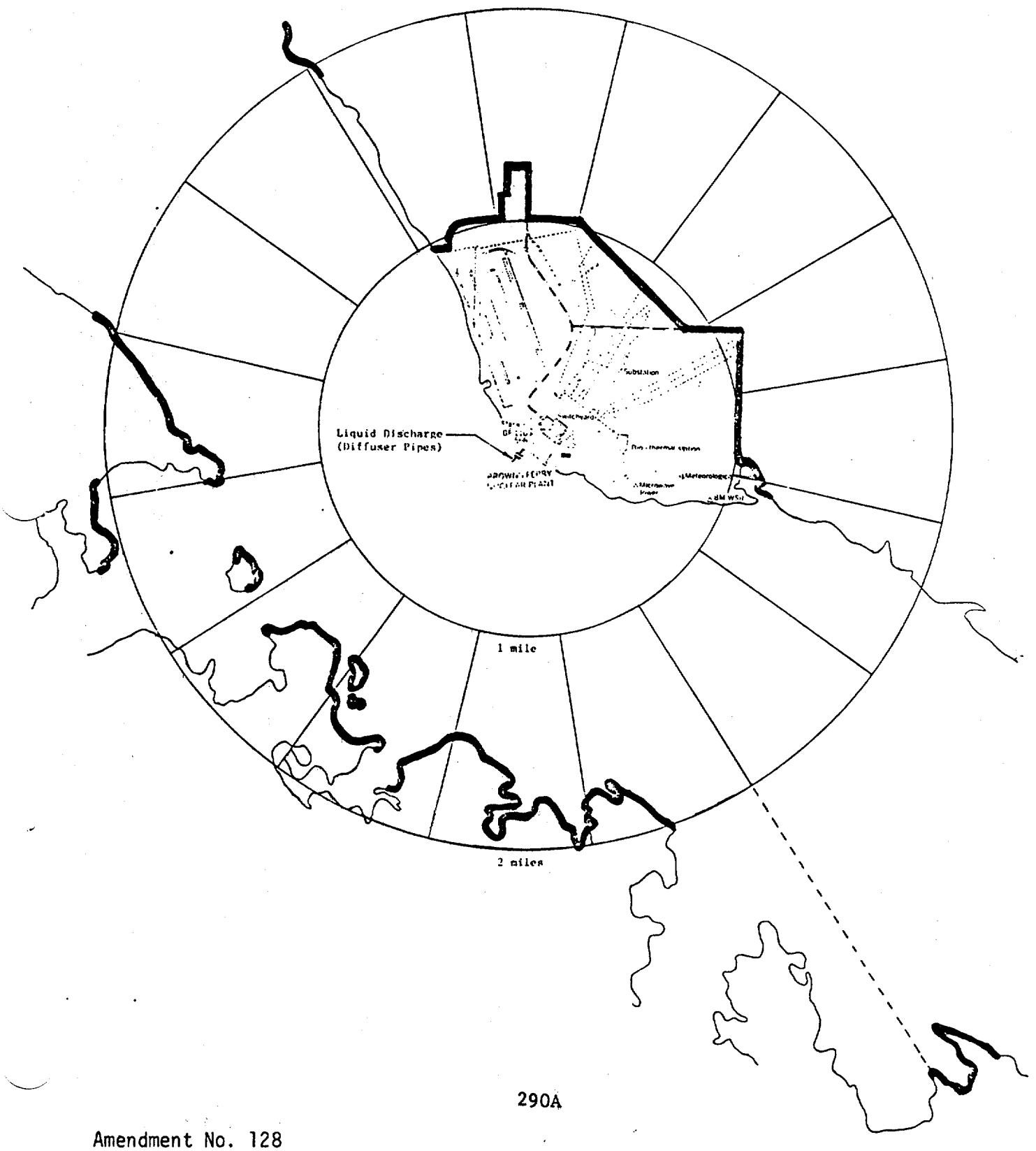


Figure 4.8-1a

GASEOUS RELEASE POINTS AND ELEVATIONS

Figure 4.8-1b

LAND SITE BOUNDARY



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3.8 BASES

Radioactive waste release levels to unrestricted areas should be kept "as low as reasonably achievable" and are not to exceed the concentration limits specified in 10 CFR Part 20. At the same time, these specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in releases higher than design objectives but still within the concentration limits specified in 10 CFR Part 20. It is expected that by using this operational flexibility and exerting every effort to keep levels or radioactive materials released as low as reasonably achievable in accordance with criteria established in 10 CFR 50 Appendix I, the annual releases will not exceed a small fraction of the annual average concentration limits specified in 10 CFR Part 20.

3.8.A. LIQUID EFFLUENTS

Specification 3.8.A.1 is provided to ensure that the concentration of radioactive materials released in liquid waste effluents from the site to unrestricted areas will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2. This limitation provides additional assurance that the levels of radioactive materials in bodies of water outside the site will result in exposures within (1) the Section 11.A design objectives of Appendix I, 10 CFR Part 50, to an individual and (2) the limits of 10 CFR Part 20.106(e) to the population. The concentration limit for 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.

Specification 3.8.A.3 is provided to implement the dose requirements of Sections II.A, III.A, and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth the Section 11.A of Appendix I.

Specification 3.8.A.4 action statements provides the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents 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

3.8.A LIQUID EFFLUENTS (cont'd)

calculational procedures based on models and data such that the actual exposure of an individual through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents will be 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 Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977. NUREG-0133 provides methods for dose calculations consistent with Regulatory Guides 1.109 and 1.113.

3.8.B AIRBORNE EFFLUENTS

Specification 3.8.B.1 is provided to ensure that the dose rate at anytime at the exclusion 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 limits are the doses associated with the concentrations of 10 CFR part 20, Appendix B, Table II, Column 1. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a member of the public in an unrestricted area, either within or outside the exclusion area 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 exclusion area 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 exclusion area boundary.

3.8.B AIRBORNE EFFLUENTS (cont'd)

The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to an individual at or beyond the exclusion area boundary to $\leq$ 500 mrem/year to the total body or to $\leq$ 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to an infant via the cow-milk-infant pathway to $\leq$ 1500 mrem/year for the nearest cow to the plant.

Specification 3.8.B.2 requires that appropriate correction action(s) be taken to reduce gaseous effluent releases if the limits of 3.8.B.1 are exceeded.

Specification 3.8.B.5 dose limits is provided to implement the requirements of Section II.C, III.A, and IV of Appendix I, 10 CFR Part 50. The limiting conditions for operation are the guides set forth in Section II.C of Appendix I.

Specification 3.8.B.6 action statement provides 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 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 an individual through appropriate pathways is unlikely to be substantially underestimated. The ODCM calculational methods used for calculating the doses due to the actual release rates of the subject materials are required to be consistent with the methodology provided in Regulatory Guide 1.109, "Calculating 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, NUREG/CR-1004, "A Statistical Analysis of Selected Parameters for Predicting Food Chain Transport and Internal Dose of Radionuclides", October 1979, and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for radioiodines, radioactive material in particulate form and radionuclides other than noble gases are dependent on the existing radionuclide pathways to man, in the unrestricted area. The pathways which are examined in the development of these calculations are: 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 animal 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.

Specification 3.8.B.6 action statement requires that a special report be prepared and submitted to explain violations of the limiting doses contained in Specification 3.8.B.5.

AIRBORNE EFFLUENTS

Specification 3.8.B.7 requires that the offgas charcoal adsorber beds be used when specified to treat gaseous effluents prior to their release to the environment. This provides reasonable assurance that the release of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable". This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and design objective 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 guide set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

Specification 3.8.B.8 requires that a special report be prepared and submitted to explain reasons for any failure to comply with Specification 3.8.B.7.

Specification 3.8.B.3 is provided to implement the requirements of Section II.B, III.A, and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guide set forth in Section II.C of Appendix I.

Specification 3.8.B.4 action statement provides 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 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 is to be shown by calculational procedures based on models and data such that the actual exposure of a member of the public through appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents will be consistent with the methodology provided in Regulatory Guide 1.109, "Calculating 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, NUREG/CR-1004, "A Statistical Analysis of Selected Parameters for Predicting Food Chain Transport and Internal Dose of Radionuclides", October 1979 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 the exclusion area boundary will be based upon the historical average atmospheric conditions. NUREG-0133 provides methods for dose calculations consistent with Regulatory Guides 1.109 and 1.111. Specifications 3.8.B.4 requires that a special report be prepared and submitted to explain violations of the limiting doses contained in Specification 3.8.B.3.

4.8.A and 4.8.B BASES

The surveillance requirements given under Specification 4.8.A and 4.8.B provide assurance that liquid and gaseous wastes are properly controlled and monitored during any release of radioactive materials in the liquid and

4.8.A and 4.8.B BASES (cont'd)

gaseous effluents. These surveillance requirements provide the data for the licensee and the Commission to evaluate the station's performance relative to radioactive wastes released to the environment. Reports on the quantities of radioactive materials released in effluents shall be furnished to the Commission on the basis of Section 6 of these technical specifications. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such actions as the Commission deems appropriate.

3.8.C and 4.8.C BASES

This specification is provided to meet the dose limitations of 40 CFR 190. The specification requires the preparation and submittal of a Special Report whenever the calculated doses from plant radioactive effluents exceed twice the design objective doses of Appendix I. 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 190 if the individual reactors remain within the reporting requirement level. The Special Report will describe a course of action which should result in the limitation of dose to a member of the public for the calendar year to be within 40 CFR 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 five miles must be considered.

3.8.D and 4.8.D MECHANICAL VACUUM PUMP

The purpose of isolating the mechanical vacuum pump line is to limit the release of activity from the main condenser. During an accident, fission products would be transported from the reactor through the main steam lines to the condenser. The fission product radioactivity would be sensed by the main steam line radioactivity monitors which initiate isolation.

3.8.E and 4.8.E BASES

The limitations on removable contamination for sources requiring leak testing, including alpha emitters, based on 10 CFR 70.39(c) limits for plutonium. This limitation will ensure that leakage from byproduct, source, and special nuclear material sources will not exceed allowable intake values. sealed sources are classified into three groups according to their use, with surveillance requirements commensurate with the probability of damage to a source in that group. Those sources which are frequently handled are required to be tested more often than those which are not. Sealed sources which are continuously enclosed within a shielded mechanism (i.e., sealed sources within radiation monitoring or boron measuring devices) are considered to be stored and need not be tested unless they are removed from the shielded mechanism.

k. The radiological environmental monitoring program and the results thereof at least once per 12 months.

l. The performance of activities required by the Quality Assurance Program to meet the criteria of Regulatory Guide 4.15, December 1977 or Regulatory Guide 1.21, Rev. 1, 1974 and Regulatory Guide 4.1, 1975 at least once per 12 months.

m. The performance of activities required by the Safeguards Contingency Plan to meet the criteria of 10 CFR 73.40(d) at least once per 12 months.

n. The Offsite Dose Calculation Manual and implementing procedures at least once per 24 months.

o. The Process Control Program and implementing procedures for solidification of wet radioactive wastes at least once per 24 months.

p. The Radiological Effluent Manual and implementing procedures at least once per 12 months.

9. AUTHORITY

The NSRB shall report to and advise the Manager of Power on those areas of responsibility specified in Sections 6.2.A.7 and 6.2.A.8.

10. RECORDS

Records of NSRB activities shall be prepared, approved and distributed as indicated below:

a. Minutes of each NSRB meeting shall be prepared, approved and forwarded to the Manager of Power within 14 days following each meeting.

b. Reports of reviews encompassed by Section 6.2.A.7 above, shall be prepared, approved and forwarded to the Manager of Power within 14 days following completion of the review.

c. Audit reports encompassed by Section 6.2.A.8 above, shall be forwarded to the Manager of Power and to the management positions responsible for the areas audited within 30 days after completion of the audit.

j. Review proposed changes to the Radiological Effluent Manual.

k. Review adequacy of the Process Control Program and Offsite Dose Calculation Manual at least once every 24 months.

l. Review changes to the radwaste treatment systems.

m. Review of every unplanned onsite release of radioactive material to the environs including the preparation and forwarding of reports covering evaluation, recommendation, and deposition of the corrective action to prevent recurrence to the Director, Nuclear Power and to the Nuclear Safety Review Board.

5. Authority

The PORC shall be advisory to the plant superintendent.

6. Records

Minutes shall be kept for all PORC meetings with copies sent to Director, Nuclear Power; Assistant Director of Nuclear Power (Operations); Chairman, NSRB.

7. Procedures

Written administrative procedures for committee operation shall be prepared and maintained describing the method for submission and content of presentations to the committee, review and approval by members of committee actions, dissemination of minutes, agenda and scheduling of meetings.

6.0 ADMINISTRATIVE CONTROLS

6.3 Procedures

A. Detailed written procedures, including applicable checkoff lists covering items listed below shall be prepared, approved and adhered to.

1. Normal startup, operation and shutdown of the reactor and of all systems and components involving nuclear safety of the facility.

2. Refueling operations.

3. Actions to be taken to correct specific and foreseen potential malfunctions of systems or components, including responses to alarms, suspected primary system leaks and abnormal reactivity changes.

4. Emergency conditions involving potential or actual release of radioactivity.

5. Preventive or corrective maintenance operations which could have an effect on the safety of the reactor.

6. Surveillance and testing requirements.

7. Radiation control procedures.

8. Radiological Emergency Plan implementing procedures.

9. Plant security program implementing procedures.

10. Fire protection and prevention procedures.

11. Limitations on the amount of overtime worked by individuals performing safety-related functions in accordance with the NRC policy statement on working hours (Generic Letter No. 82-12).

12. Radiological Effluent Manual implementing procedures.

13. Process Control Program (PCP).

14. Offsite Dose Calculation Manual.

B. Written procedures pertaining to those items listed above shall be reviewed by PORC and approved by the plant superintendent prior to implementation. Temporary changes to a procedures which do not change the intent of the approved procedure may be made by a member of the plant staff knowledgeable in the area affected by the procedure except that temporary changes to those items listed above except item 5 require the additional approval of a member of the plant staff who holds a Senior Reactor Operator license on the unit affected. Such changes shall be documented and subsequently reviewed by PORC and approved by the plant superintendent.

6.0 ADMINISTRATIVE CONTROLS

6.3 Procedures

E. Quality Assurance Procedures - Effluent and Environmental Monitoring

Quality Assurance procedures shall be established, implemented, and maintained for effluent and environmental monitoring, using the guidance in Regulatory Guide 1.21, rev. 1, June 1974 and Regulatory Guide 4.1, rev. 1, April 1975 or Regulatory Guide 4.15, Dec. 1977.

6.0 Administrative Controls

3. Unique Reporting Requirements

A. Radioactive Effluent Release Report

Deleted. (See REM section F.2)

6.9 Process Control Program (PCP)

1. The PCP shall be approved by the Commission prior to implementation.

2. Changes to the PCP shall be submitted to the Commission in the semi-annual Radioactive Effluent Release Report for the period in which the change(s) was made. This submittal shall contain:

   a. Sufficiently detailed information to totally support the change.

   b. A determination that the change did not change the overall conformance of the solidified product to existing criteria.

3. Changes to the PCP shall become effective upon review and acceptance by PORC.

6.10 Offsite Dose Calculational Manual (ODCM)

1. The ODCM shall be approved by the Commission prior to implementation.

2. Changes to the ODCM shall be submitted to the Commission in the semi-annual Radioactive Effluent Release Report for the period in which the change(s) was made. This submittal shall contain:

   a. Sufficiently detailed information to totally support the change.

3. Changes to the ODCM shall become effective upon review and acceptance by PORC.

6.11 RADIOLOGICAL EFFLUENT MANUAL (REM)

1. The REM shall be approved by the Commission prior to implementation.

2. Changes to the REM shall be reviewed by PORC prior to implementation.

3. Changes to the REM shall be approved by the Commission prior to implementation.

ENVIRONMENTAL TECHNICAL SPECIFICAITONS

FOR

BROWNS FERRY NUCLEAR PLANT

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3.2.2 Transmission Line Right-of-Way Maintenance

Objective

The sole purpose of this section is to provide reporting requirements (to USNRC) on herbicide usage, if any, for purposes of right-of-way maintenance regarding only those transmission lines under USNRC's jurisdiction for the Browns Ferry Nuclear Plant.

Specification

A statement as to whether or not herbicides have been used in maintaining rights-of-way for those transmission lines associated with the Browns Ferry Nuclear Plant shall be provided. If herbicides have been used, a description of the types, volumes, concentrations, manners and frequencies of application, and miles or rights-of-way that have been treated shall be included.

Reporting Requirements

Information as specified above shall be provided in the Annual Operating Report (Appendix A, Section 6.7.1(b)).

Bases

Vegetation growth on a transmission line right-of-way must be controlled in such a manner that it will neither interfere with safe and reliable operation of the line or impede restoration of service when outages occur.

Vegetation growth is controlled by mechanical cutting and the limited use of herbicides. Selected chemicals approved by EPA for use as herbicides are assigned (by EPA) label instructions which provide guidance on and procedures for their use.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 132 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 128 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 103 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3

DOCKETS NOS. 50-259, 50-260 AND 50-296

1.0 INTRODUCTION

By letter dated September 30, 1986 (TVA BFNP TS-221) the Tennessee Valley Authority (the licensee or TVA) requested amendments to Facility Operating Licenses Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3.

The proposed amendments would change the Technical Specifications (TS) to add requirements for Radiological Effluent Technical Specifications (RETS) which comply with Section V of Appendix I to 10 CFR Part 50.

Submitted with the RETS was the Radiological Effluent Manual (REM). The REM consists of certain commitments on the part of TVA which were part of the proposed RETS amendment submitted on October 27, 1983. The staff found it acceptable to include them as a document separate from RETS. This is consistent with the conclusions of the meeting with TVA on July 12, 1986 (see meeting summary dated August 12, 1986). The REM is associated with the RETS and is defined and cited therein although it is not a part of the license.

In addition, the Offsite Dose Calcuations Manual (ODCM) submitted January 3, 1983, is a document that must be used with the RETS. It too is associated with RETS and is defined and cited therein although it is not a part of the license.

To comply with Section V of Appendix I of 10 CFR Part 50, the Tennessee Valley Authority (TVA) has filed with the Commission plans and proposed Technical Specifications developed for the purpose of keeping releases of radioactive materials to unrestricted areas during normal operation, including expected operational occurrences, as low as is reasonably achievable. TVA originally filed this information with the Commission by letter dated October 27, 1983 and supplemented by a letter dated August 1, 1984, which requested changes to the Technical Specifications appended to Facility Operating Licenses Nos. DPR-33, DPR-52 and DPR-68 for Browns Ferry Nuclear Plant, Units 1, 2 and 3. The Technical Specifications

proposed at that time updated those portions of the Technical Specifications addressing radioactive waste management to make them consistent with the current staff positions as expressed in NUREG-0473.

Those revised Technical Specifications would provide reasonable assurance of compliance, in radioactive waste management, with the provisions of 10 CFR Part 50.36a, as supplemented by Appendix I to 10 CFR Part 50, with 10 CFR Parts 20.105(c), 106(g) and 405(c); with 10 CFR Part 50, Appendix A, General Design Criteria 60, 63 and 64; and with 10 CFR Part 50, Appendix B.

The proposed Technical Specifications were originally submitted October 27, 1983 and supplemented on August 1, 1984. TVA withdrew the Technical Specification change request by a letter dated April 4, 1986, from R. Gridley to D. R. Muller. On September 30, 1986, TVA resubmitted in a revised format the exact same Technical Specification commitments previously withdrawn.

2.0 BACKGROUND AND DISCUSSION

2.1 Regulations

10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," Section 50.36a, "Technical Specifications on Effluents from Nuclear Power Reactors," provides that each license authorizing operation of a nuclear power reactor will include Technical Specifications that (1) require compliance with applicable provisions of Part 20.106, "Radioactivity in Effluents to Unrestricted Areas;" (2) require that operating procedures developed for the control of effluents be established and followed; (3) require that equipment installed in the radioactive waste system be maintained and used; and (4) require the periodic submission of reports to the NRC specifying the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents, any quantities of radioactive materials released that are significantly above design objectives, and such other information as may be required by the Commission to estimate maximum potential radiation doses to the public resulting from the effluent releases.

10 CFR Part 20, "Standards for Protection Against Radiation," paragraphs 20.106(c), 20.106(g), and 20.405(c) require that nuclear power plant and other licensees comply with 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations" and submit reports to the NRC when the 40 CFR Part 190 limits have been or may be exceeded. 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," contains Criterion 60, "Control of Releases for Radioactive Materials to the Environment;" Criterion 63, "Monitoring Fuel and Waste Storage;" and Criterion 64, "Monitoring Radioactivity Releases." Criterion 60 requires that the nuclear power unit design include means to control suitably the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during

normal reactor operation, including anticipated operational occurrences. Criterion 63 requires that appropriate systems be provided in radioactive waste systems and associated handling areas to detect conditions that may result in excessive radiation levels and to initiate appropriate safety actions. Criterion 64 requires that means be provided for monitoring effluent discharge paths and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences and postulated accidents.

10 CFR Part 50, Appendix B, establishes quality assurance requirements for nuclear power plants.

10 CFR Part 50, Appendix I, Section IV, provides guides on Technical Specifications for limiting conditions for operation for light-water-cooled nuclear power reactors licensed under 10 CFR 50.

2.2 Standard Radiological Effluent Technical Specifications

NUREG-0473 provides Radiological Effluent Technical Specifications for boiling water reactors which the staff finds to be an acceptable standard for licensing actions. Further clarification of these acceptable methods is provided in NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants." NUREG-0133 describes methods found acceptable to the staff for the calculation of certain key values required in the preparation of proposed Radiological Effluent Technical Specifications for light-water-cooled nuclear power plants. NUREG-0133 also provides guidance to licensees in preparing requests for changes to existing Radiological Effluent Technical Specifications for operating reactors. It also describes current staff positions on the methodology for estimating radiation exposure due to the release of radioactive materials in effluents and on the administrative control of radioactive waste treatment systems.

The above NUREG documents address all of the Radiological Effluent Technical Specifications needed to assure compliance with the guidance and requirements provided by the regulations previously cited. However, alternative approaches to the preparation of Radiological Effluent Technical Specifications and alternative Radiological Effluent Technical Specifications may be acceptable if the staff determines that the alternatives are in compliance with the regulations and with the intent of the regulatory guidance.

The standard Radiological Effluent Technical Specifications can be grouped under the following categories:

(1) Instrumentation

(2) Radioactive effluents

(3) Radiological environmental monitoring

(4) Design features

(5) Administrative controls

Each of the specifications under the first three categories is comprised of two parts: the limiting condition for operation and the surveillance requirements. The limiting condition for operation provides a statement of the limiting condition, the times when it is applicable, and the actions to be taken in the event that the limiting condition is not met.

In general, the specifications established to assure compliance with 10 CFR Part 20 standards provide, in the event the limiting conditions of operation are exceeded, that without delay conditions are restored to within the limiting conditions. Otherwise, the facility is required to effect approved shutdown procedures. In general, the specifications established to assure compliance with 10 CFR Part 50 provide, in the event the limiting conditions of operation are exceeded, that within specified times, corrective actions are to be taken, alternative means of operation are to be employed, and certain reports are to be submitted to the NRC describing these conditions and actions.

The specifications concerning design features and administrative controls contain no limiting conditions of operation or surveillance requirements.

Table 1 indicates the standard radiological effluent technical specifications that are needed to assure compliance with the particular provisions of the regulations described in Section 1.0.

3.0 EVALUATION

The enclosed report (EGG-PBS-6691) was prepared for us by EG&G Idaho, Inc., as part of our technical assistance contract program. Their report provides their technical evaluation of the compliance of the licensee's October 27, 1983 and August 1, 1984 submittals with NRC criteria. The staff reviewed this TER and agreed with the evaluation.

The September 30, 1986 submittal, in revised format, has been compared by the staff, with the earlier submittal that had been given technical approval. It was found that all commitments made in the approved submittal had been transferred in their entirety to the new submittal. The only change was the location of the commitments within the submittal, that is, the relocation of some commitments into the Radiological Effluent Manual (REM). Therefore, the technical evaluation of the contractor in the enclosed EGG-PBS-6691 report is valid in every respect for the September 30, 1986 submittal in revised format.

The Radiological Effluent Manual (REM) has been reviewed in conjunction with the Radiological Effluent Technical Specifications (RETS) review and has been found acceptable for use in with the RETS. The REM is defined and cited in the RETS; however, the REM is not a part of the RETS nor a

part of the license. Changes in REM are subject to prior approval by the NRC, however, such changes do not represent a license amendment.

The licensee has provided, as a reference document dated January 4, 1983, an "Offsite Dose Calculation Manual" (ODCM). The ODCM has also been reviewed in conjunction with the RETS review. We find that this ODCM generally uses documented and approved methods that are consistent with the methodology and guidelines in NUREG-0133 and, therefore, is an acceptable reference for use with the proposed RETS. ODCM is also defined and cited in the RETS and is also not a part of RETS or the license. Changes to the ODCM do not need prior NRC approval but such changes must be periodically reported to the NRC.

3.1 Summary

The proposed changes to the Radiological Effluent Technical Specifications for Browns Ferry Nuclear Plant, Units 1, 2 and 3, have been reviewed, evaluated, and found to be in compliance with NRC regulations and with the intent of NUREG-0133 and NUREG-0473 (the Browns Ferry plant consists of three boiling water reactors). They, along with the REM and ODCM, thereby fulfill all the requirements of the regulations related to Radiological Effluent Technical Specifications.

4.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes in administrative procedures or requirements. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of these amendments.

5.0 CONCLUSION

The staff has concluded, on the basis of the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: W. Meinke

Dated: February 5, 1987

Table 1. Relation Between Provisions of the Regulations and the Standard Radiological Effluent Technical Specifications for Pressurized Water Reactors and Boiling Water Reactors

● Indicate the specifications that are needed to assure compliance with the identified provision of the regulations.

	Standard Radiological Effluent Technical Specifications																												
	Instrumentation		Radioactive Effluents																Rad. Envir. Monitoring			Design Features	Administrative Control						
			Liquid				Gaseous																						
							PWR/BWR				PWR		BWR																
Provisions of Title 10 Code of Federal Regulations	Rad. Liquid Effl. Monitoring	Rad. Gas. Effl. Monitoring	Effluent Concentration	Dose	Liquid Radwaste Treatment	Liquid Holdup Tanks	Dose Rate	Dose Noble Gases	Dose I-131, Trit. and Part.	Explosive Gas Mixture	Gaseous Radwaste Treatment	Gas Storage Tanks	Gaseous Radwaste Treatment	Ventilation Exhaust Treatment	Main Condenser	Mark I or II Containment	Solid Radioactive Waste	Total Dose	Rad. Env. Monitoring Program	Land Use Census	Interlab. Comparison Program	Site Boundaries*	Review and Audits	Procedures	Reports	Record Retention	Process Control Program	Offsite Dose Calc. Manual	Major Changes to Rad. Systems
§ 50.36a Technical specifications on effluents from nuclear power reactors																													
Remain within limits of § 20.106			●			●	●					●				●												●	
Establish and follow procedures to control effluents			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							●				●	
Maintain and use radioactive waste system equipment				●	●			●	●		●		●	●														●	
Submit reports, semi-annual and other	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●									●	●	●
§§ 20.105(c), 20.106(g), 20.405(c) Compliance with 40 CFR 190																		●	●	●	●							●	
Part 50 Appendix A - General Design Criteria																													
Criterion 60 - Control of releases of radioactive materials to the environment	●	●			●	●				●	●	●	●	●	●	●	●							●			●	●	
Criterion 61 - Fuel storage and handling and radioactivity control	●	●																											
Criterion 63 - Monitoring fuel and waste storage	●	●																											
Criterion 64 - Monitoring radioactivity releases	●	●													●				●									●	
Part 50 Appendix B - Quality Assurance Criteria	●	●																			●		●	●			●		
Part 50 Appendix I - Guides to Meet "As Low As Is Reasonably Achievable (ALARA)"																													
Maintain releases within design objectives				●	●			●	●		●			●														●	
Establish surveillance & monitoring program to provide data on:																												●	
(1) quantities of rad. matls. in effluents	●	●																											
(2) radiation & rad. matls. in the environment																			●						●	●			
(3) changes in use of unrestricted areas																				●									
Exert best efforts to keep releases "ALARA"				●	●			●	●		●		●	●															●
Submit report if calculated doses exceed the design objective				●				●	●		●			●											●				
Demonstrate conform. to des. obj. by calc. proced.				●				●	●		●			●														●	
Part 100															●														

*Note: Needed to fully implement other specifications.

EGG-PBS-6691

RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS (RETS) IMPLEMENTATION - BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3

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ABSTRACT

A review of the Radiological Effluent Technical Specifications (RETS) for the Browns Ferry Nuclear Plant Units 1, 2, and 3 was performed. The principal review guidelines used were NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," and Draft 7" of NUREG-0473, Revision 3, "Standard Radiological Effluent Technical Specifications for Boiling Water Reactors." Draft submittals were discussed with the Licensee by both EG&G and the NRC staff until all items requiring changes to the Technical Specifications were resolved. The Licensee then submitted final proposed RETS to the NRC which were evaluated and found to be in compliance with the requirements of the NRC review guidelines. The proposed Offsite Dose Calculation Manual was reviewed and generally found to be in compliance with the requirements of the NRC review guidelines.

FOREWORD

The Technical Evaluation Report was prepared by EG&G Idaho, Inc. under a contract with the U. S. Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation, Division of Systems Integration) for technical assistance in support of NRC operating reactor licensing actions. The technical evaluation was conducted in accordance with criteria established by the NRC.

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1. INTRODUCTION

1.1 Purpose of the Technical Evaluation

The purpose of this Technical Evaluation Report (TER) is to review and evaluate the proposed changes in the Technical Specifications of the Browns Ferry Nuclear Plant Units 1, 2, and 3 with regard to Radiological Effluent Technical Specifications (RETS) and the proposed Offsite Dose Calculation Manual (ODCM).

The evaluation used criteria proposed by the Nuclear Regulatory Commission (NRC) staff in the model Technical Specifications for boiling water reactors (BWRs), NUREG-0473,[1] and subsequent revisions. This effort is directed toward the NRC objective of implementing RETS which comply with the regulatory requirements, primarily those of 10 CFR Part 50, Appendix I.[2] Other regulations pertinent to the control of effluent releases are also included within the scope of compliance.

1.2 Generic Issue Background

Since 1970, 10 CFR Part 50, Section 50.36a,[3] "Technical Specifications on Effluents from Nuclear Power Reactors," has required licensees to provide Technical Specifications which ensure that radioactive releases will be kept as low as is reasonably achievable (ALARA). In 1975 numerical guidance for the ALARA requirements was issued in 10 CFR Part 50, Appendix I. The licensees of all operating reactors were required[4] to submit, no later than June 4, 1976, their proposed ALARA Technical Specifications and information for evaluation in accordance with 10 CFR Part 50, Appendix I. However, in February 1976 the NRC staff recommended that proposals to modify Technical Specifications be deferred until the NRC completed the model RETS.

The model RETS deal with radioactive waste management systems and environmental monitoring. Although the model RETS address 10 CFR Part 50, Appendix I requirements, subsequent revisions include provisions for addressing issues not covered in Appendix I. These provisions are stipulated in the following regulations:

- 10 CFR Part 20,[5] "Standards for Protection Against Radiation," Sections 20.105(c), 20.106(g), and 20.405(c) which require that nuclear power plants and other licensees comply with 40 CFR Part 190,[6] "Environmental Radiation Protection Standards for Nuclear Power Operations," and submit reports to the NRC when the 40 CFR Part 190 limits have been or may be exceeded.

- 10 CFR Part 50, Appendix A,[7] "General Design Criteria for Nuclear Power Plants," which contains Criterion 60--Control of releases of radioactive materials to the environment; Criterion 63--Monitoring fuel and waste storage; and Criterion 64--Monitoring radioactive releases.

- 10 CFR Part 50, Appendix B,[8] which establishes the quality assurance required for nuclear power plants.

The NRC position on the model RETS was established in May 1978 when the NRC's Regulatory Requirements Review Committee approved the model RETS: NUREG-0472 for PWRs and NUREG-0473 for BWRs. Copies of the model RETS were sent to licensees in July 1978 with a request to submit proposed site-specific RETS on a staggered schedule over a six-month period. Licensees responded with requests for clarifications and extensions.

The Atomic Industrial Forum (AIF) formed a task force to comment on the model RETS. NRC staff members first met with the AIF task force on June 17, 1978. The model RETS were subsequently revised (Revision 1) to reflect comments from the AIF and others. A principal change was the transfer of much of the material concerning dose calculations from the model RETS to a separate document, the ODCM.

Revision 1 of the model RETS was sent to licensees on November 15 and 16, 1978 with guidance (NUREG-0133)[9] for preparation of the RETS and the ODCM and a new schedule for responses, again staggered over a six-month period.

Four regional seminars on the RETS were conducted by the NRC staff during November and December 1978. Subsequently, a preliminary copy of Revision 2 of the model RETS and additional guidance on the ODCM and a PCP were issued on February 1979 to each utility at individual meetings. NUREG-0473, Revision 2,[1] and NUREG-0472, Revision 2,[10] were published in July 1979 and updated in January 1980 and February 1980. In response to the NRC's request, operating reactor licensees subsequently submitted initial proposals on plant RETS and the ODCM. Reviews leading to ultimate implementation of these documents were initiated by the NRC in September 1981 using subcontracted independent teams as reviewers.

As the RETS review progressed, feedback from the licensees led the NRC to modify some of the provisions in the February 1, 1980 versions of the model RETS to clarify specific concerns of the licensees and thus expedite the reviews. Starting in April 1982, the NRC distributed revised versions of the model RETS in draft form to the licensees during the site visits. The new guidance on these changes was presented in an AIF meeting on May 19, 1982.[11] Some interim changes regarding the Radiological Environmental Monitoring Section were issued in August 1982.[12] With the incorporation of these changes, the NRC issued Draft 7" of Revision 3 of NUREG-0473[13] in September 1982 to serve as new guidance for the review teams.

1.3 Plant-Specific Background

In conformance with the 1975 directive,[4] the Tennessee Valley Authority (TVA), the Licensee of the Browns Ferry Nuclear Plant Units 1, 2, and 3 filed with the Commission on February 13, 1976[14] and

December 21, 1976[15] the necessary information to permit an evaluation of the units with respect to the requirements of Sections II.A, II.B, and II.C of 10 CFR Part 50, Appendix I.

The Licensee submitted proposed RETS and an ODCM in letter dated June 29, 1979.[16] EG&G Idaho, Inc., (EG&G) selected as an independent task review team received a copy of the submittal on July 20, 1982 for review and evaluation. The submittal was compared with NUREG-0473 and assessed for compliance with the requirements of 10 CFR Part 50, Appendix I, and 10 CFR Part 50 , Appendix A.

Review comments and questions dated July 23, 1982[17] were mailed to the NRC prior to arranging a site visit with the Licensee. The site visit (August 18 and 19, 1982) was arranged for the purpose of resolving questions identified in the review of the draft submittal.

Following the site visit in August 1982, the Licensee submitted a preliminary proposal which was received by the NRC on June 3, 1983, and by the EG&G review team on June 6, 1983. The preliminary proposal was compared with NUREG-0473. Review comments and questions dated June 13, 1983[18] were prepared by EG&G and transmitted to the NRC. A docketed proposal dated October 27, 1983[19] was submitted by the Licensee to the NRC. The docketed proposal was identical in content to the preliminary proposal as reported in EG&G letter dated November 29, 1983.[20] The review comments were formally sent to the Licensee on December 20, 1983.[21]

The Licensee responded to the December 20, 1983, review comments via a telephone conference on March 22, 1984, with subsequent revisions to the October 27, 1983, docketed submittal. The revisions were reported in a supplement to letter dated August 1, 1984.[22] The revisions were reviewed and accepted by the NRC on August 15, 1984,[23] and a copy of the agreements transmitted to EG&G. This allowed preparation of a TER by EG&G for transmittal to the NRC.

The ODCM submitted with the June 29, 1979[16] letter was reviewed by EG&G and review questions were transmitted to the NRC.[17] An updated ODCM[18] was received by the EG&G review team June 6, 1983 and was reviewed against the NRC review criteria. Review questions and comments were transmitted to the NRC in EG&G letter dated June 13, 1983.[19] The ODCM contains documented and approved methods that are generally consistent with the guidelines of NUREG-0133 and is therefore acceptable to NRC as a reference.

2. REVIEW CRITERIA

Review criteria for the RETS were provided by the NRC in three documents:

1. NUREG-0472, RETS for PWRs
2. NUREG-0473, RETS for BWRs
3. NUREG-0133, Preparation of RETS for Nuclear Power Plants.

Twelve essential criteria are given for the RETS and ODCM:

1. All significant releases of radioactivity shall be controlled and monitored.

2. Offsite concentrations of radioactivity shall not exceed the 10 CFR Part 20, Appendix B, Table II limits.[24]

3. Offsite radiation doses shall be ALARA.

4. Equipment shall be maintained and used to keep offsite doses ALARA.

5. Radwaste tank inventories shall be limited so that failures would not cause offsite doses exceeding 10 CFR Part 20 limits.

6. Hydrogen and/or oxygen concentrations in the waste gas system shall be controlled to prevent explosive mixtures.

7. Wastes shall be processed to shipping and burial ground criteria under a documented program, subject to quality assurance verification.

8. An environmental monitoring program, including a land use census, shall be implemented.

9. The radwaste management program shall be subject to regular audits and reviews.

10. Procedures for control of liquid and gaseous effluents shall be maintained and followed.

11. Periodic and special reports on environmental monitoring and on releases shall be submitted.

12. Offsite dose calculations shall be performed using documented and approved methods consistent with NRC methodology.

In addition to NUREG-0472 and NUREG-0473, as revised, the NRC staff issued guidelines,[25,26] clarifications,[27,28] branch positions[29,30] and NUREG-0543,[31] establishing a policy that requires the licensees of operating reactors to meet the intent, if not the letter, of the model RETS requirements. The NRC branch positions issued since the RETS implementation review began have clarified the model RETS for operating reactors.

Review criteria for the ODCM is based on the following NRC guidelines: Branch Technical Position, "General Content of the Offsite Dose Calculation Manual";[32] NUREG-0133;[9] and Regulatory Guide 1.109.[33] The format for the ODCM is left to the Licensee and may be simplified by tables and grid printouts.

3. TECHNICAL EVALUATION

3.1 General Description of Radiological Effluent System

This section briefly describes the liquid and gaseous radwaste effluent release paths, radwaste treatment systems, and control systems installed at Browns Ferry Nuclear Plant Units 1, 2, and 3 (BWRs).

3.1.1 Radioactive Liquid Effluents

There are three radioactive liquid effluent sources for each unit at this three-unit site:

1. Liquid radwaste treatment system,
2. Raw cooling water for the reactor building closed cooling water system,
3. Residual heat removal (RHR) service water system during shutdown.

The three units share a common liquid radwaste treatment system as shown in Figure 1. The radwaste and raw cooling water effluents are discharged to the Tennessee River via the common diffuser system whereas the RHR effluents are discharged directly to the river from each unit. Therefore, there are four release points to the river at this three unit site. The typical release points are shown in Figure 2.

3.1.2 Radioactive Gaseous Effluents

There are eight separate radioactive gaseous effluent release points at this three-unit site.

1. Common stack (1)
2. Reactor Building Ventilation (3)
3. Turbine Building Exhaust (3)
4. Radwaste Building Vent (1)

The release points are shown in Figures 3 and 4. These figures were obtained from the ODCM.

The common main stack is the release point for effluents from each unit's main condenser off-gas treatment system, each unit's mechanical vacuum pump and gland seal condenser, and effluents from the common standby gas treatment system. Major components of the main condenser off-gas treatment system are illustrated in Figure 3.

Effluents from the containment purge are released through the reactor building ventilation system except during an emergency in which the reactor building effluents are routed through the SGTS before release via the main stack.

3.2 Radiological Effluent Technical Specifications

The following sub-sections describe the primary objectives of each section of the model RETS and a summary of the commitments of the Licensee's RETS. A cross reference between the model RETS and the Licensee's RETS is contained in Table 1. The chronological sequence of the RETS review was described in the Plant-Specific Background, Section 1.3 of this report.

3.2.1 Effluent Instrumentation

The objective of the model RETS with regard to effluent instrumentation is to ensure that all significant liquid and gaseous radioactive effluents are monitored. The model RETS specify that all effluent monitors be operable with periodic surveillance and that alarm/trip setpoints be determined in order to ensure that offsite radioactive effluent concentrations do not exceed maximum permissible concentrations (MPCs) listed in 10 CFR Part 20.

BROWNS FERRY NUCLEAR PLANT LIQUID

RADWASTE TREATMENT SYSTEM

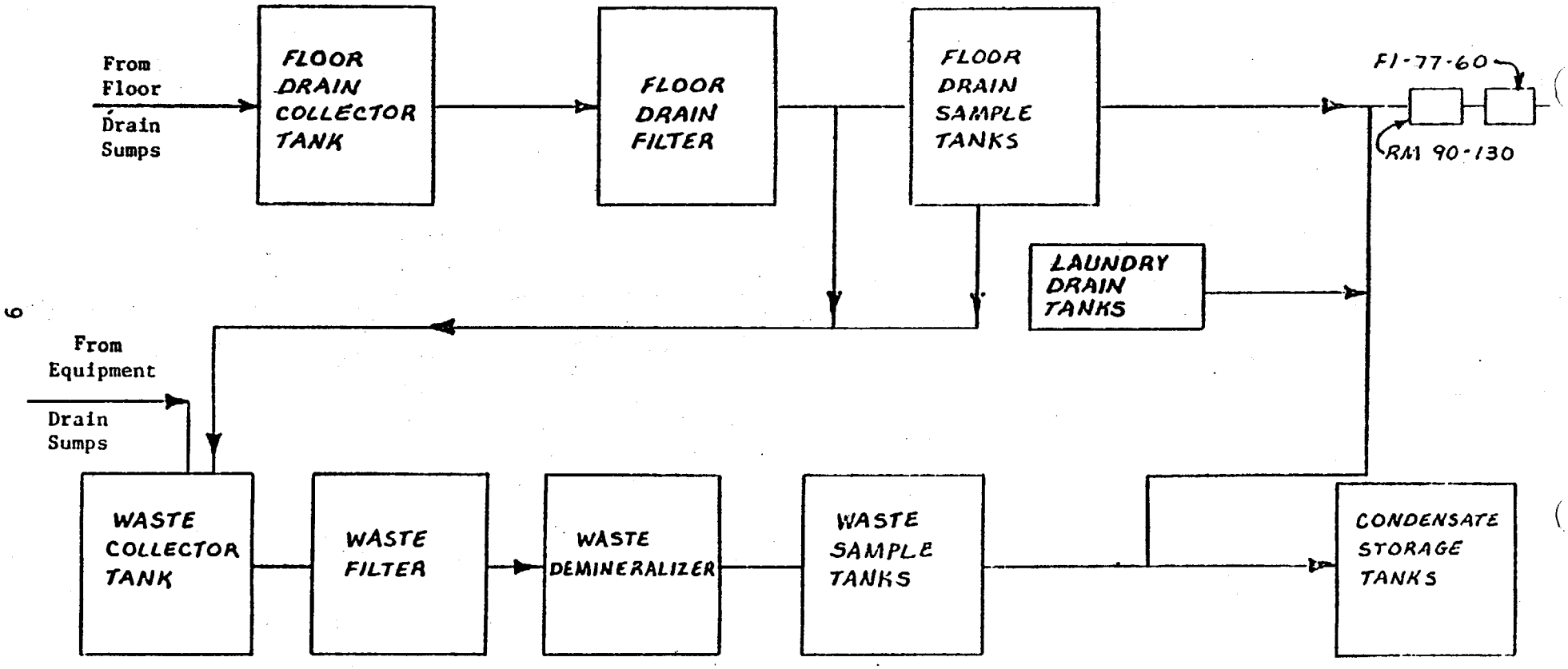

Figure 1. Browns Ferry liquid radwaste treatment system common to all three units.

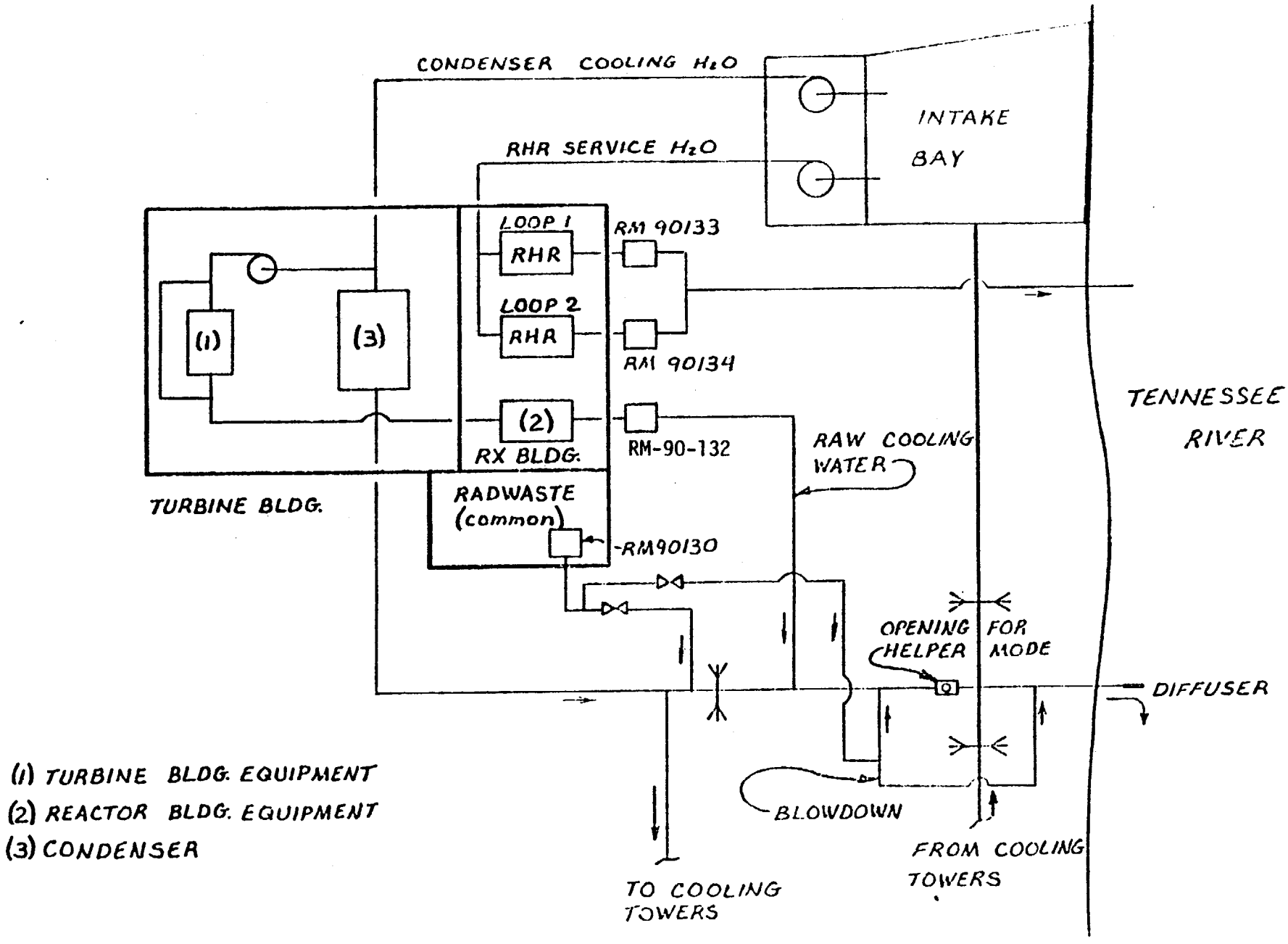

Figure 2. Browns Ferry liquid effluent release points for a typical unit with the common diffuser system.

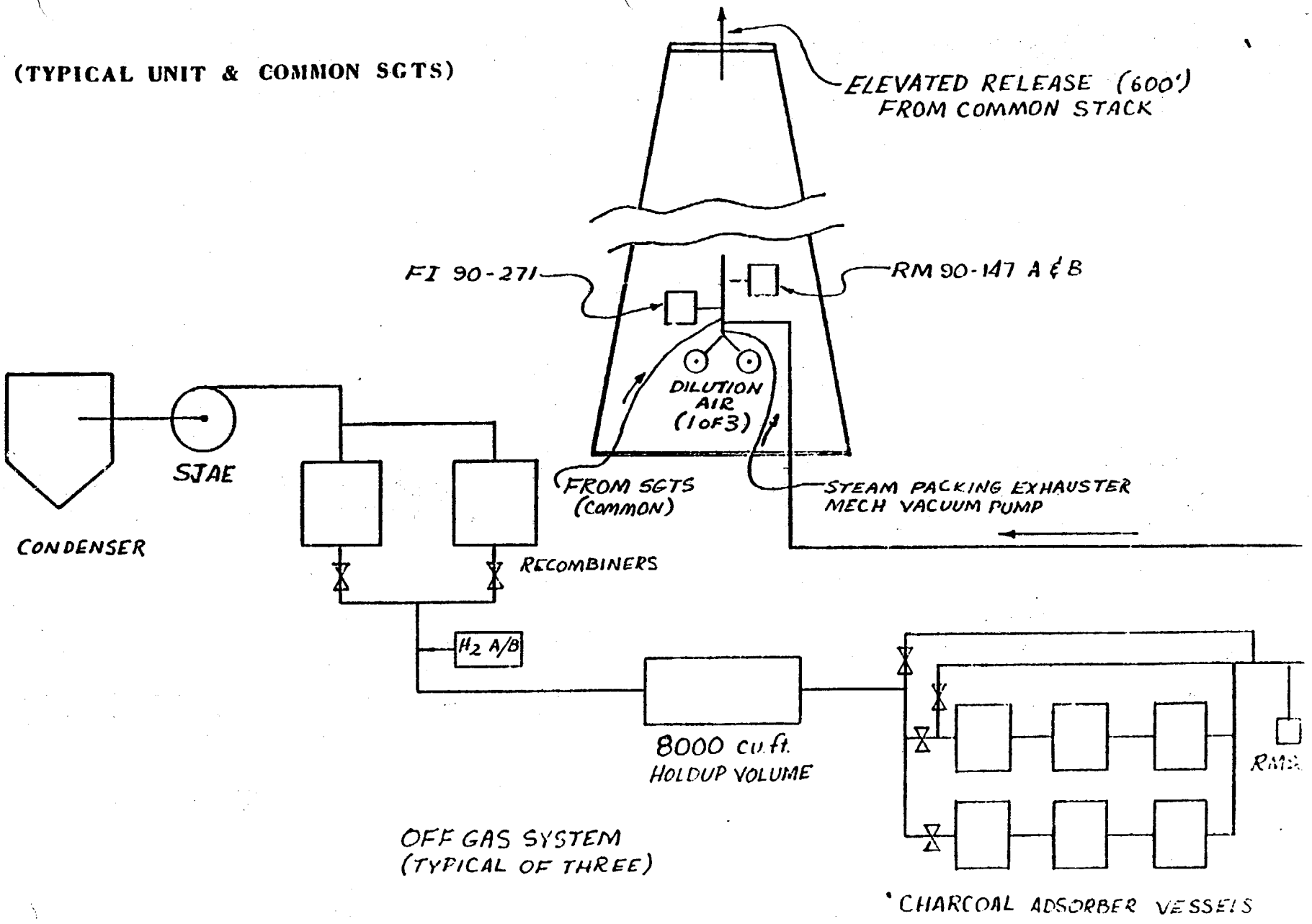

Figure 3. Browns Ferry off-gas system and SGTS effluent monitoring.

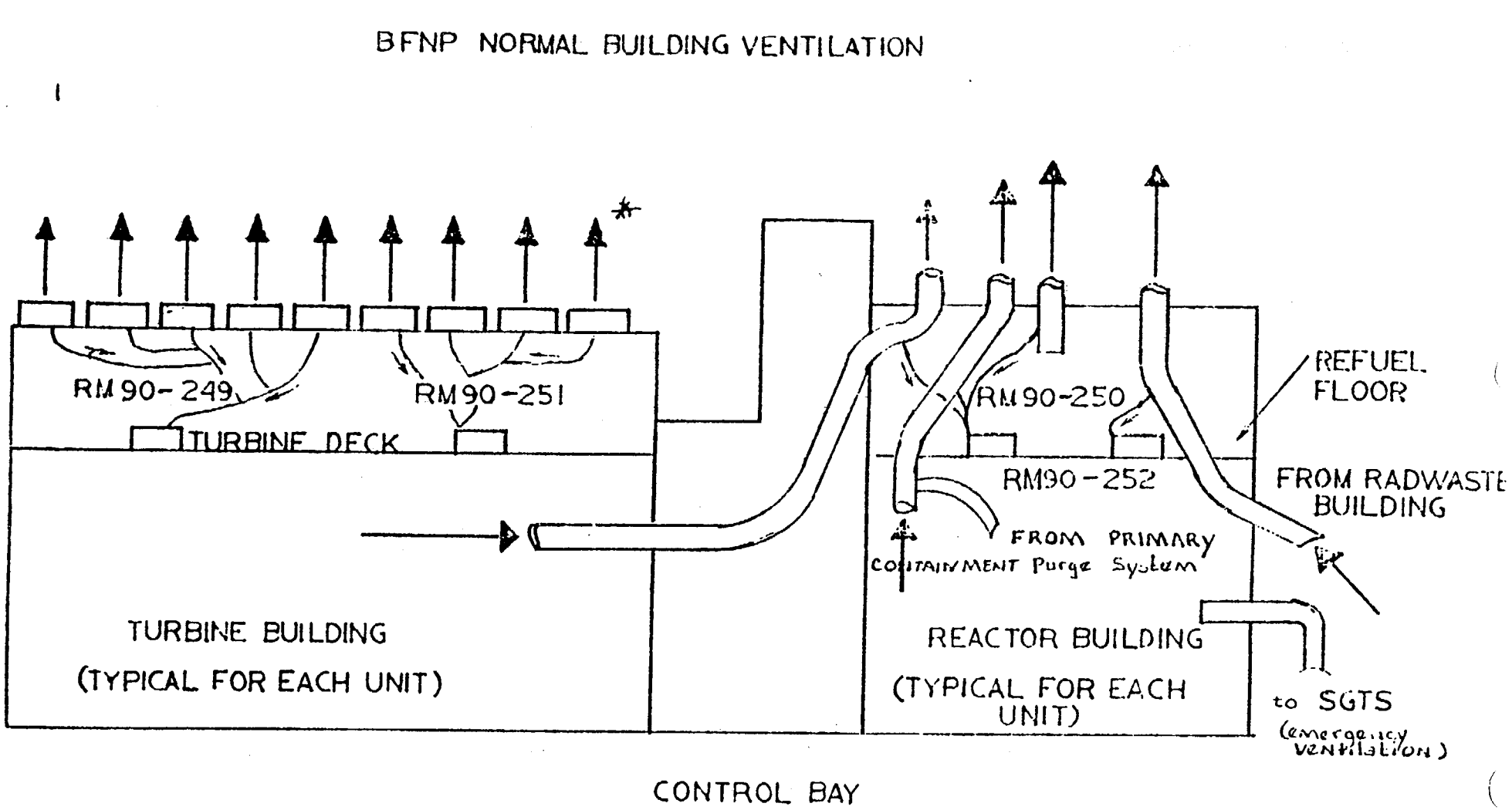

Figure 4. Browns Ferry normal building ventilation.

3.2.1.1 Radioactive Liquid Effluent Instrumentation

The four radioactive liquid effluent release points are monitored with adequate instrument surveillance being performed.

The common radwaste line and the raw cooling water lines are monitored when releases occur via these pathways. The RHR monitors are required to be operational during operation of an RHR loop and associated RHR service water system. Upon high radiation, the liquid radwaste monitor will provide alarm and automatic termination of the batch release. High radiation for the raw cooling water system and the RHR system will provide control room alarm to initiate operator action.

3.2.1.2 Radioactive Gaseous Effluent Instrumentation

The eight radioactive gaseous effluent release points are monitored with adequate instrument surveillance being performed.

The main stack monitor has a backup monitor and each will provide control room alarm upon a high radiation condition in the main stack. The turbine deck monitor also has a backup monitor and each will provide control room alarm upon a high radiation condition at the turbine deck. The radwaste building vent monitor and the reactor/turbine building vent monitor provides control room alarm annunciation upon a high radiation condition. Automatic isolation of the main condenser off-gas treatment system from the main stack is provided by the sample flow abnormal instrument in the off-gas post-treatment system. The hydrogen explosive gas monitor will automatically terminate discharges from the recombiners if hydrogen concentrations exceed the limits. Upon high radiation, the reactor building/turbine building monitor provides alarm and automatic routing through the SGTS before release at the main stack.

The Licensee has provided radiation monitors with alarm annunciation for potential radioactive liquid or gaseous release points. In addition, automatic isolation for discharges from the recombiners is provided by the explosive gas monitors and automatic isolation of the off-gas treatment system is provided by the sample flow abnormal. The Licensee's RETS state the concentration of radioactive liquid or gases will be monitored at all times during release.

3.2.1.3 Liquid and Gaseous Instrumentation Setpoints

The setpoints at each release point are established to prevent exceeding concentrations in liquid releases or corresponding dose rates for gaseous releases of 10 CFR Part 20 in unrestricted areas. A map showing the unrestricted area boundaries was included as Figure 4.8-1b of the proposal. The setpoints for the liquid and gaseous effluent instrumentation will be determined in accordance with the Offsite Dose Calculation Manual (ODCM).

The Licensee's RETS submittal on liquid and gaseous effluent monitoring instrumentation has satisfied the provisions and meets the intent of NUREG-0473.

3.2.2 Concentration and Dose Rates of Effluents

3.2.2.1 Liquid Effluent Concentration

The Licensee's RETS include a commitment to maintain the concentration of radioactive liquid effluents released from the site to the unrestricted areas to within 10 CFR Part 20 limits, and if the concentration of liquid effluents to the unrestricted area exceeds these limits, appropriate action will be initiated without delay to bring the release within limits. The batch releases are sampled and analyzed periodically in accordance with a sampling and analysis program.

Therefore, the Licensee's RETS submittal on liquid effluent concentrations meets the intent of NUREG-0473.

3.2.2.2 Gaseous Effluent Dose Rate

The Licensee's RETS include a commitment to maintain the offsite gaseous dose rate from the site to areas at and beyond the site boundary to within 10 CFR Part 20 limits, and if the concentration of gaseous effluents exceeds these limits or the equivalent dose rate values, appropriate corrective action will be initiated without delay to bring the values within limits.

The radioactive gaseous waste sampling and analysis program provides adequate sampling and analysis of the discharges.

Therefore, the Licensee's RETS submittal on gaseous effluent dose rates meets the intent of NUREG-0473.

3.2.3 Offsite Doses from Effluents

The objectives of the model RETS with regard to offsite doses from effluents are to ensure that offsite doses are kept ALARA, are in compliance with the dose specifications of NUREG-0473, and are in accordance with 10 CFR Part 50, Appendix I and 40 CFR Part 190.

The Licensee's RETS include commitments (a) to maintain doses due to liquids effluents to within the NUREG-0473 quarterly and annual dose criteria, (b) to maintain noble gas air doses to areas at and beyond the site boundary to within the NUREG-0473 quarterly and annual dose criteria, (c) to maintain the dose level to areas at and beyond the site boundary due to release of iodine-131, iodine-133, tritium and materials in particulate form with half lives greater than eight days to within the NUREG-0473 quarterly and annual dose criteria, and (d) to limit the annual dose to any member of the public due to release of radioactivity and radiation from uranium fuel cycle sources to within the requirements of 40 CFR Part 190.

Therefore, the Licensee's RETS submittal on offsite doses from radioactive effluents meets the intent of NUREG-0473.

3.2.4 Effluent Treatment

The objectives of the model RETS with regard to effluent treatment are to ensure that the radioactive waste treatment systems are used to keep releases ALARA and to satisfy the provisions for Technical Specifications governing the maintenance and use of radwaste treatment equipment.

The Licensee's RETS include a commitment to use the liquid radwaste treatment system when the projected monthly doses exceed 25 percent of the annual dose design objectives. The projections are to be made at least once per 31 days. The Licensee's RETS include a commitment to prepare a special report if liquid radwaste is being discharged for more than 31 days without treatment and the projected doses are in excess of the limits.

The Licensee's RETS include a commitment to use the gaseous radwaste treatment system during operation above 25 percent power. With gaseous wastes being discharged for more than seven days without treatment through the charcoal adsorbers a special report will be submitted to the NRC. The Licensee's submittal does not address the gaseous ventilation exhaust treatment systems as these systems do not exist at these plants. However, the radwaste building has built-in HEPA filters which cannot be bypassed.

Therefore, the Licensee's RETS submittal on effluent treatment meets the intent of NUREG-0473.

3.2.5 Tank Inventory Limits

The objective of the model RETS with regard to a curie limit on liquid-containing tanks is to ensure that in the event of a tank rupture, the concentrations in the nearest potable water supply and the nearest

surface water supply in an unrestricted area would not exceed the limits of 10 CFR Part 20, Appendix B, Table II.

The Licensee's RETS limits the maximum activity to 10 curies in a liquid radwaste tank or temporary radwaste storage tank than can be discharged directly to the environs. The submittal commits to adequate surveillance of the tank's contents in accordance with NUREG-0473.

Therefore, the Licensee's RETS submittal on tank inventory limits meets the intent of NUREG-0473.

3.2.6 Explosive Gas Mixtures

The objective of the model RETS with regard to explosive gas mixtures is to prevent hydrogen explosions in the waste gas system.

The Licensee's RETS limits the concentration of hydrogen in the off-gas downstream of the recombiners to $\leq$ 4% by volume whenever the SJAE is in service. The hydrogen concentration shall be determined to be within the limits by use of continuous hydrogen monitors which have adequate surveillance requirements. Therefore, the Licensee's RETS submittal on explosive gas mixtures meets the intent of NUREG-0473.

3.2.7 Solid Radwaste System

The objective of the model RETS with regard to the solid radwaste system is to ensure that radwaste will be properly processed and packaged before it is shipped from the plant to the burial site to satisfy the requirements of 10 CFR Part 20, Section 20.301 and 10 CFR Part 71.[34]

The Licensee has committed to use the methods prescribed in a Process Control Program (PCP) to ensure that the requirements of shipping and burial ground requirements are met prior to shipment of radwaste from the site.

Therefore, the Licensee's RETS submittal on solid radioactive waste meets the intent of NUREG-0473.

3.2.8 Radiological Environmental Monitoring Program

The objectives of the model RETS with regard to radiological environmental monitoring are to ensure that (a) an adequate full-area coverage environmental monitoring program exists, (b) there is an appropriate land use census, and (c) an acceptable Interlaboratory Comparison Program exists. The monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50, the land use census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50, and the requirement for participation in an approved Interlaboratory Comparison Program is provided to ensure that independent checks are performed as part of the quality assurance program for environmental monitoring to demonstrate that valid results are obtained for Section IV.B.2 of Appendix I to 10 CFR Part 50.

The Licensee's RETS for a radiological environmental monitoring program have followed in general the intent of the model RETS and the Branch Technical Position on the subject issued November 1979,[29] as applicable to the site, and have generally provided an adequate number of sample locations for pathways identified. The Licensee's method of sample analysis and maintenance of the monitoring program satisfies the requirements of Appendix I, 10 CFR Part 50. The Licensee's RETS contain a land use census specification which requires the appropriate annual information for a BWR. The RETS also state that the Licensee will participate in an NRC-approved Interlaboratory Comparison Program.

Thus, the Licensee's RETS submittal for a radiological environmental monitoring program meets the intent of NUREG-0473.

3.2.9 Audits and Reviews

The objective of the model RETS with regard to audits and reviews is to ensure that audits and reviews of the radwaste and environmental monitoring programs are properly conducted.

The Licensee's administrative structure identifies the Plant Operations Review Committee (PORC) and the Nuclear Safety Review Board (NSRB) as the two entities comparable to the Unit Review Group (URG) and the Company Nuclear Review and Audit Group (CNRAG), respectively.

The PORC is responsible for reviewing every unplanned release of radioactive material and the adequacy of the PCP and ODCM at least once every 24 months.

The NSRB is responsible for auditing the radiological environmental monitoring program and results thereof, the ODCM and implementing procedures, the PCP and implementing procedures, and the performance of activities required by the quality assurance (QA) program. These audits are performed at the frequency required by the model RETS.

The PORC and NSRB encompass the total responsibility for reviews and audits specified in NUREG-0473.

3.2.10 Procedures and Records

The objective of the model RETS with regard to procedures is to ensure that written procedures be established, implemented and maintained for the PCP, the ODCM, and the QA program for effluent and environmental monitoring. The objective of the model RETS with regard to records is to ensure that documented records pertaining to the radiological environmental monitoring program are retained.

The Licensee's RETS include a commitment to establish, implement, and maintain written procedures for the PCP, ODCM, and QA programs. The

Licensee's existing technical specifications state that the records of the off-site environmental monitoring program will be retained for the life of the plant which meets the intent of NUREG-0473.

Therefore, the Licensee's RETS submittal on procedures and records meets the intent of NUREG-0473.

3.2.11 Reports

The objective of the model RETS with regard to reporting requirements is to ensure that appropriate annual and semiannual periodic reports and special reports are submitted to the NRC.

The Licensee's RETS include commitments to submit the following reports:

1. Radiological Environmental Monitoring (Annual Report)

   This report includes summaries, interpretations and analysis of trends of the results of the radiological environmental surveillance program. The report also includes the results of the land use census and results of participation in the Interlaboratory Comparison Program. The report shall include a summary description of the environmental monitoring program and a map of all sampling locations keyed to a table giving directions and distances from one reactor. The report will be submitted prior to May 1 of each year.

2. Radioactive Effluent Release Report (Semiannual)

   This report contains a summary of the quantities of radioactive liquid and gaseous effluents and solid waste shipped from the plant and is submitted within 60 days after January 1 and July 1 of each year. The report shall include a summary of the

meteorological conditions concurrent with the release of gaseous effluents during each quarter. Calculated offsite doses to members of the public resulting from the release of liquid and gaseous effluents shall be reported. Changes to the PCP and ODCM shall be contained in the report. The Licensee's RETS include a commitment to the format and content of the reporting requirements of Regulatory Guide 1.21 (Revision 1) dated June 1974. This contains the requirements of reporting the solid wastes shipped offsite.

3. Special Reports

The Licensee's RETS include a commitment to file a special report within 30 days under the following conditions:

- Exceeding the liquid effluent dose limits according to Specification 3.8.A.4.

- Exceeding the gaseous effluent dose limits according to Specifications 3.8.B.4 and 3.8.B.6.

- Exceeding the total dose limits according to Specification 3.8.C.2.

- Exceeding the reporting levels for the radioactivity measured in the environmental sampling program according to Specification 3.13.A.3.

- When radioactive liquid or gaseous effluents are released without treatment before discharge according to Specifications 3.8.A.6 and 3.8.B.8.

Therefore, the Licensee's RETS submittal on reports meets the intent of NUREG-0473.

3.2.12 Other Administrative Controls

An objective of the model RETS in the administrative controls section is to ensure that any changes to the PCP and ODCM and major changes to the radioactive waste treatment systems are reported to the NRC. Such changes shall be reviewed and accepted by the URG before implementation.

The Licensee's RETS state that the aforementioned changes to the PCP and ODCM will be reported to the NRC after review and acceptance by the PORC. The Licensee states major changes to the radwaste treatment systems are addressed in accordance with 10 CFR 50.59.

Therefore, the Licensee's RETS submittal for these administrative controls meets the intent of NUREG-0473.

3.3 Offsite Dose Calculation Manual

As specified in NUREG-0473, the ODCM is to be developed by the Licensee to document the methodology and approaches used to calculate offsite doses and maintain the operability of the effluent system. As a minimum, the ODCM should provide equations and methodology for the following topics:

- alarm and trip setpoints for effluent instrumentation
- liquid effluent concentrations in unrestricted areas
- gaseous effluent dose rates or concentrations at or beyond the site boundary
- liquid and gaseous effluent dose contributions
- total dose compliance, including direct shine
- liquid and gaseous effluent dose projections.

In addition, the ODCM should contain flow diagrams, consistent with the systems being used at the station, defining the treatment paths and the components of the radioactive liquid, gaseous, and solid waste management systems. A description and the location of samples in support of the environmental monitoring program are also needed in the ODCM.

3.3.1 Evaluation

The Licensee's ODCM satisfies the equation in the addendum of NUREG-0133 to determine the alarm and trip setpoints for the liquid effluent monitors. This assures that the alarm and trip actions will occur prior to exceeding the 10 CFR Part 20, Appendix B, Table II values at the discharge point to the unrestricted area.

The alarm and trip setpoints for the gaseous effluent monitors are calculated to assure that alarm and trip actions will occur prior to exceeding the limits set in 10 CFR Part 20 for annual dose rates to unrestricted areas. The Licensee uses equations similiar to those contained in NUREG-0133 with the dose rate values identified in NUREG-0473.

The Licensee's ODCM contains the methods and calculational relationships that are used to compare the radioactivity concentrations in liquid releases at the point of release to the 10 CFR Part 20 limits prior to the release and after the release.

The Licensee's ODCM assures that noble gas discharges are within the NUREG-0473 dose rate limits by correctly determining the setpoints for the noble gas monitors. The dose rate due to the release of I-131, tritium, and particulates with half-lives greater than eight days is assured to be within the NUREG-0473 limit of 1500 mrem per year by calculating the dose to the thyroid for the infant via the milk ingestion, ground contamination and inhalation pathway due to the expected release using a calculated air concentration.

The Licensee's ODCM demonstrates compliance with 10 CFR Part 50, Appendix I by calculating the monthly dose commitments for liquid and gaseous effluents at least once per 31 days. The calculated cumulative values are compared to the quarterly and annual limits to demonstrate compliance.

The Licensee's RETS commits to projecting doses to determine if the liquid radwaste treatment system must be operated. The ODCM includes the dose projection methodology.

Specific parameters of distance and the direction sector from the centerline of a reactor and additional information have been provided for each and every sample location identified in RETS Environmental Monitoring Table 3.13.A in Tables 3.1-2 and 3.1-3, and in Figures 3.1-1, 3.1-2, 3.1-3, and 3.1-4 of the ODCM. The ODCM contains simplified diagrams of the liquid and gaseous release points and the liquid and gaseous radwaste treatment system.

The Licensee's ODCM for Browns Ferry Units 1, 2, and 3 is generally in compliance with the NRC requirements and uses methods consistent with the methodology and guidance prescribed in NUREG-0133.

4. CONCLUSIONS

The Licensee's proposed RETS and ODCM were reviewed and evaluated and the following conclusions were reached:

- The Licensee's proposed RETS for the Browns Ferry Nuclear Plant Units 1, 2, and 3, submitted October 27, 1983, and supplemented with revisions on August 1, 1984, meets the intent of the NRC staff's "Standard Radiological Effluent Technical Specifications for Boiling Water Reactors", NUREG-0473.

- The Licensee's ODCM, dated January 4, 1983, uses documented and approved methods that are applicable to Browns Ferry Units 1, 2, and 3 and are consistent with the methodology and guidelines of NUREG-0133. It is thus an acceptable reference.

A correspondence between (a) NUREG-0473, (b) the Licensee's current RETS, and (c) the Licensee's proposed RETS is shown in Table 1.

TABLE 1. CORRESPONDENCE OF PROVISIONS OF NUREG-0473, THE LICENSEE'S CURRENT TECHNICAL SPECIFICATIONS AND THE LICENSEE'S PROPOSAL FOR BROWNS FERRY UNITS 1, 2, AND 3

RETS Requirement	NUREG-0473	Current Technical Specification	Licensee Proposal (Section)
Effluent Instrumentation	3.3.3.10	---	3.2.D.1
	3.3.3.11	---	3.2.K.1
Concentrations	3.11.1.1	3.8.A.1	3.8.A.1
	3.11.2.1	3.8.B.1	3.8.B.1
Offsite Doses	3.11.1.2	---	3.8.A.3
	3.11.2.2	---	3.8.B.3
	3.11.2.3	---	3.8.B.5
	3.11.4	---	3.8.C.1
Effluent Treatment	3.11.1.3	3.8.A.4	3.8.A.5
	3.11.2.4	---	3.8.B.7
	3.11.2.5	---	---
Tank Inventory Limits	3.11.1.4	3.8.A.5	3.8.A.7
Explosive Gas Mixtures	3.11.2.6	---	3.8.B.9
Main Condenser Effluent	3.11.2.7	---	---
Mark I or Mark II Containment	3.11.2.7	---	3.2.A
Solid Radwaste (PCP)	3.11.3	---	3.8.F.1
Environmental Monitoring	3.12.1	---	3.13.A
Land Use Census	3.12.2	---	3.13.B.1
Interlaboratory Comparisons	3.12.3	---	3.13.C.1
Audits and Reviews	6.5.1	---	6.2.B.4
	6.5.2	6.2.8	6.2.A.8
Procedures and Records	6.8, 6.10	---, 6.6.A.10	6.3.A, 6.6.A.10
Reports: Annual	6.9.1.11	---	6.7.1.d
Semiannual	6.9.1.12	6.7.3.A	6.7.3.A
Other Administrative Controls	6.13	---	6.3.E
	6.14	---	6.3.G
	6.15	---	---

5. REFERENCES

1. United States Nuclear Regulatory Commission, Standard Radiological Effluent Technical Specifications for Boiling Water Reactors, NUREG-0473, Revision 2, July 1979.

2. United States Office of the Federal Register, Title 10, Code of Federal Regulations, Part 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents."

3. United States Office of the Federal Register, Title 10, Code of Federal Regulations, Part 50, Section 50.36a, "Technical Specifications on Effluents from Nuclear Power Reactors."

4. United States Office of the Federal Register, Title 10, Code of Federal Regulations, Part 50, Appendix I, Section V.B., "Effective Dates."

5. United States Office of the Federal Register, Title 10, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."

6. United States Office of the Federal Register, Title 40, Code of Federal Regulations, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

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8. United States Office of the Federal Register, Title 10, Code of Federal Regulations, Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."

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17. W. Serrano letter of transmittal, Transmittal of Questions for Browns Ferry RETS Review, Serr-10-82, July 23, 1982.

18. W. Serrano letter of transmittal, Browns Ferry RETS and ODCM Reviews, Serr-16-83, June 13, 1983.

19. L. M. Mills letter of transmittal, In the Matter of the Tennessee Valley Authority Docket Nos. 50-259, 50-260, 50-296, October 27, 1983.

20. W. Serrano letter of transmittal, Comparison of Browns Ferry RETS Submittals, Serr-32-83, November 29, 1983.

21. D. B. Vasallo (NRC) letter to H. G. Parris (TVA), Browns Ferry 1, 2, 3 RETS, December 20, 1983.

22. L. M. Mills, letter of transmittal, In the Matter of the Tennessee Valley Authority Docket Nos. 50-259, 50-260, 50-296, August 1, 1984.

23. C. L. Miller Personal Communication, Final Resolution of Browns Ferry RETS Submittal, August 15, 1984.

24. United States Office of the Federal Register, Title 10, Code of Federal Regulations, Part 20, Appendix B, "Concentrations in Air and Water Above Natural Background."

25. C. A. Willis, letter to F. B. Simpson (summarizing changes to RETS requirements following meeting with Atomic Industrial Forum), November 20, 1981.

26. W. E. Kreger (NRC), memo to R. J. Mattson (NRC), Plans for Dealing with The Explosive Gas Issue in Implementing The Radiological Effluent Technical Specifications (RETS), December 14, 1981.

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