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QA

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Semiannual Radioactive Effluent Release Report

Gentlemen:

Attached is the Semiannual Radioactive Effluent Release Report for the period July 1 through December 31, 1992. This report is submitted in accordance with Waterford 3 Technical Specification 6.9.1.8.

If you have any questions, please contact C.J. Thomas at (504) 739-6531.

Very truly yours,

R F Burski

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Director, Nuclear Safety

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Semiannual Radioactive Effluent Release

Report

July 1, 1992 - December 31, 1992

Waterford 3 SES

Entergy Operations, Inc.

W21419HP

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1.0 SCOPE

This Semiannual Radioactive Effluent Release Report is submitted as required by Waterford 3's Technical Specification 6.9.1.8. It covers the period from July 1, 1992 through December 31, 1992. Information in this report is presented in the format outlined in Appendix B of Regulatory Guide 1.21.

The information contained in this report includes:

(1) A summary of the quantities of radioactive liquid and gaseous effluents and solid wastes released from the plant during the reporting period;

(2) A summary of the meteorological data collected during 1992;

(3) Assessment of radiation doses due to liquid and gaseous radioactive effluents released during 1992;

(4) Explanation of why certain effluent instrumentation was not restored to operable status within the time specified in the ACTION Statement, as per UNT-005-014, Offsite Dose Calculation Manual (ODCM), Specification 5.6.1 and 5.6.2;

(5) A summary of the quantities of radioactive gaseous effluents released from identified miscellaneous secondary release pathways for 1992;

(6) A summary of changes to the Process Control Program during this reporting period.

2.0 SUPPLEMENTAL INFORMATION

2.1 Regulatory Limits

The Limits applicable to the release of radioactive material in liquid and gaseous effluents are described in the following sections. These limits are addressed in UNT-005-014, Offsite Dose Calculation Manual.

2.1.1 Fission and Activation Gases (Noble Gases)

The dose rate due to radioactive noble gases released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to less than or equal to 500 mrem/yr to the total body and less than or equal to 3000 mrem/yr to the skin.

The air dose due to noble gases released in gaseous effluents from the site to areas at or beyond the site boundary shall be limited to the following:

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

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

2.1.2 Iodines; Particulates, Half Lives > 8 Days; and Tritium

The dose rate due to Iodine-131 and 133, tritium, and all radionuclides in particulate form with half lives greater than eight (8) days, released in gaseous effluents from the site to areas at and beyond the site boundary, shall be limited to less than or equal to 1500 mrem/yr to any organ.

The dose to a member of the public from Iodine 131 and 133, tritium, and all radionuclides in particulate form with half lives greater than eight (8) days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

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

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

2.1.3 Liquid Effluents

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-4 μCi/ml total activity.

The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to the following:

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

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

2.1.4 Uranium Fuel Cycle Sources

The dose or dose commitment to any member of the public due to releases of radioactivity and radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the total body or any organ (except the thyroid, which shall be limited to less than or equal to 75 mrem) over 12 consecutive months.

2.2 Maximum Permissible Concentrations

2.2.1 Fission and Activation Gases; Iodines; and Particulates, Half Lives > 8 Days

For gaseous effluents, maximum permissible concentrations are not directly used in release rate calculations since the applicable limits are expressed in terms of dose rate at the site boundary.

2.2.2 Liquid Effluents

The maximum permissible concentration (MPC) values specified in 10 CFR Part 20, Appendix B, Table II, Column 2 are used as the permissible concentrations of liquid radioactive effluents at the unrestricted area boundary. A value of 2.0E-4 μCi/ml is used as the MPC for dissolved and entrained noble gases in liquid effluents.

2.3 Average Energy

This is not applicable to Waterford 3's Effluent Specifications. E-Bars are not required to be calculated from effluent release data.

2.4 Measurements and Approximations of Total Radioactivity

The quantification of radioactivity in liquid and gaseous effluents was accomplished by performing the sampling and radiological analysis of effluents in accordance with the requirements of Tables 5.3-1 and 5.4-1 of UNT-005-014, Offsite Dose Calculation Manual.

2.4.1 Fission and Activation Gases (Noble Gases)

For continuous releases, a gas grab sample was analyzed monthly for noble gases. Each week a Gas Ratio (GR) was calculated according to the following equation:

$$GR = \frac{\text{Average Weekly Noble Gas Monitor Reading}}{\text{Monitor Reading During Noble Gas Sampling}}$$

The monthly sample analysis and weekly Gas Ratio were then used to determine noble gases discharged continuously for the previous week. For gas decay tank and containment purge batch releases, a gas grab sample was analyzed prior to release to determine noble gas concentrations in the batch. In all cases the total radioactivity in gaseous effluents was determined from measured concentrations of each radionuclide present and the total volume discharged.

2.4.2 Iodines and Particulates

Iodines and particulates discharged were sampled using a continuous sampler which contained a charcoal cartridge and a particulate filter. Each week the charcoal cartridge and particulate filter were analyzed for gamma emitters using gamma spectroscopy. The determined radionuclide concentrations and effluent volume discharged were used to calculate the previous week's activity released.

The particulate samples were composited and analyzed quarterly for Sr-89 and Sr-90 by a contract laboratory (Teledyne Isotopes). Particulate gross alpha activity was measured weekly using alpha scintillation counting techniques. The determined activities were used to estimate effluent concentrations in subsequent releases until the next scheduled analysis was performed.

Grab samples of continuous and batch releases were analyzed monthly for tritium. The determined concentrations were used to estimate tritium activity in subsequent releases until the next scheduled analysis was performed.

2.4.3 Liquid Effluents

For continuous releases, samples were collected weekly and analyzed using gamma spectroscopy. The measured concentrations were used to determine radionuclide concentrations in the previous week's releases. For batch releases, gamma analysis was performed on the sample prior to release.

For both continuous and batch releases, composite samples were analyzed quarterly by a contract laboratory (Teledyne Isotopes) for Sr-89, Sr-90, and Fe-55. Samples were composited and analyzed monthly for tritium and gross alpha using liquid scintillation and gas flow proportional counting techniques, respectively. For radionuclides measured in the composite samples, the measured concentrations in the composite samples from the previous month or quarter were used to estimate released quantities of these isotopes in liquid effluents during the current month or quarter.

The total radioactivity in liquid effluent releases was determined from the measured and estimated concentrations of each radionuclide present and the total volume of the effluent discharged.

2.5 Batch Releases

A summary of information for gaseous and liquid batch releases is included in Table 1.

2.6 Unplanned/Abnormal Releases

During this reporting period, there was one abnormal release. A liquid radioactive release was performed with the radiation monitor setpoint incorrectly specified. Licensee Event Report (LER) Number 92-007 documents this event. A discussion is provided below.

On July 17, 1992, a liquid radioactive waste release was performed from Waste Condensate Tank 'A' to the Circulating Water System. The associated radiation monitor high alarm setpoint was incorrectly adjusted to a value that was ten times higher than the calculated setpoint. During the release, the radioactivity concentration monitored remained well below the calculated setpoint. At no time were any Offsite Dose Calculation Manual (ODCM) dose or concentration limits exceeded.

Description of Event:

On July 17, 1992, Health Physics department made preparations to release Waste Condensate Tank 'A' (WCT A) to the Mississippi River via the Circulating Water System. A computer hard disk failure on July 15, 1992, placed the computer used to perform release permits and effluent calculations out of commision. Release permits had to be calculated manually in accordance with HP-001-231, Liquid Radioactive Release Permit (Manual), and HP-001-235, Calculation and Adjustment of Radiation Monitoring Setpoints. The pre-release permit (LB92081) was generated manually at approximately 1300 on July 17, 1992. The radiation monitor setpoint was correctly calculated to be 3.34 E-3 µCi/ml. However, the HP technician who performed the calculation incorrectly transcribed the setpoint to the front page of the release permit as 3.43E-2 µCi/ml. This

Description of Event (cont'd):

discrepancy was identified by a separate reviewer, (HP Engineer) who signed the release permit and returned it to the HP technician for correction. The HP Technician corrected the mantissa, but failed to recognize that the exponent was ten times too high. The release permit was not returned to the reviewer, since the signature was complete, to ensure that the corrections were satisfactory. Consequently, the release permit specified an incorrect setpoint of 3.34 E-2 µCi/ml.

HP adjusted the high alarm setpoint for the effluent radiation monitor PRM-IRE-0647 to 3.34E-2 µCi/ml. The release was commenced at 1546 on July 17, 1992 by Operations personnel in the control room. Dilution flow for the release was maintained at 1.0E+6 gal/min for entire duration. Also 10 min Radiation Monitor System trends and Radiation Recorder, LWM-IFRR-0647, indicate that the liquid was uniformly mixed. Both of these instruments indicate that radioactivity levels remained somewhat steady at approximately 5.25 E-4 µCi/ml throughout the release. Also, these records indicate that the radioactivity levels never exceeded the alert alarm limit of 6.00 E-4 µCi/ml, nor the calculated (true) High Alarm Value of 3.34E-3 µCi/ml. Operations terminated the release at 2020 on July 17, 1992. The release permit was closed out manually on July 19 at approximately 1500.

At 0913 on July 20, 1992 the HP Engineer who reviewed the release permit (LB92081) noticed that the high alarm setpoint was incorrect. The engineer discovered the discrepancy while preparing to update the repaired effluents computer system with manually calculated permit data.

Cause of Event:

The root cause of this event is personnel error. Release permits are typically computer generated as per HP-001-233, Liquid Radioactive Releaser Permit (Computer). With failure of the HP Computer System, HP department was forced to use manual calculations or simple personal computer spreadsheets that perform the requirements of HP-001-231 and HP-001-235. The setpoint calculation is an attachment to the release permit. The number generated during the setpoint calculation must be copied to the release permit cover sheet. This was done incorrectly. A contributing cause of this event involves the reviewer. Although the reviewer identified the error he did not ensure that the error was corrected before signing the release permit. Had this been done, the event may have been prevented.

Corrective Action:

All manually calculated release permits were reviewed for errors and the release information was entered into the H.P. computer system. All manually calculated release permits now require supervisory oversight before the release. Individuals involved in the release permit errors were counseled on the importance of self-checks and permit reviews.

Actions Taken to Prevent Recurrence

HP standing instructions were updated to include new requiements for manually calculated release permits. These instructions required that an on-duty HP Supervisor review the release permit and that the permit not be delivered to operations until the HP Supervisor had arrived on-site and the final review had been completed. Procedure changes to HP-001-231 and HP-001-235 have been completed to incorporate human factors into the manual release permit calculation and review process.

3.0 GASEOUS EFFLUENTS

The quantities of radioactive material released in gaseous effluents are summarized in Tables 1A, 1B, and 1C. Note that there were no elevated releases, since all Waterford 3 releases are considered to be at ground level. The estimated total error in % is based upon several statistical uncertainties due to sample counting, efficiency, volume, etc.

4.0 LIQUID EFFLUENTS

The quantities of radioactive material released in liquid effluents are summarized in Tables 2A and 2B. The estimated total error in % is based upon several statistical uncertainties due to sample counting, efficiency, volume, etc.

5.0 SOLID WASTES

The summary of radioactive solid wastes shipped offsite for disposal is listed in Table 3. For certain waste forms Waterford 3 is now using volume reduction services provided by Scientific Ecology Group, Inc. and Alaron Corp. These waste forms are identified in Table 3 and volumes reported reflect the volume of waste shipped offsite, not final disposal volumes. Final disposal volumes are reported as they become available. The estimated total error in % is based upon several statistical uncertainties due to sample counting, efficiency, volume, etc.

6.0 METEOROLOGICAL DATA

In Table 4 the hourly meteorological data from January 1, 1992 through December 31, 1992, is presented in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability. The Waterford-3 data recovery results by parameter are as follows:

Parameter	Annual Data Recovery Rate
Delta T	100.0%
Wind Speed	100.0%
Wind Direction	100.0%
Overall*	100.0%

*Simultaneous occurrence of valid data for all three parameters.

7.0 ASSESSMENT OF DOSES

7.1 Dose Due to Gaseous Effluents

7.1.1 Air Doses at the Site Boundary

Air doses from gaseous effluents were evaluated at the closest offsite location that could be occupied continuously during the term of plant operation and that would result in the highest dose. This location was determined by examining the atmospheric dispersion parameters (χ/Q's) at the closest offsite locations that could be continuously occupied during plant operation in each of the meteorological sectors surrounding the plant. The location that would have the highest dose would be that location having the most restrictive (largest) χ/Q value. Based on actual meteorological data collected during 1992, this location was determined to be in the NNE sector at a distance of 966 meters from the plant. Doses were assessed at this location in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual considering only beta and gamma exposures in air due to noble gas. The results of these assessments for the year 1992 are summarized as follows:

Beta air dose: 0.83 mrad
Gamma air dose: 0.67 mrad

The beta and gamma air doses are 4.2% and 6.7% of the Annual Dose Limits, respectively. The results of the dose calculations by quarter are summarized in Table 5.

7.1.2 Maximum Organ Dose to the Critical Receptor

The maximum organ dose to a MEMBER OF THE PUBLIC from I-131, I-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released to areas at and beyond the site boundary was determined for 1992.

An assessment of the maximum organ dose was performed for the critical receptor. The critical receptor was assumed to be located at the nearest residence to the plant having the most restrictive atmospheric dispersion (χ/Q) and deposition (D/Q) parameters. Furthermore, it was assumed that the receptor living at this residence consumed food products that were either raised or produced at this residence. Using land use census and meteorological data for 1992, the residence with the highest χ/Q and D/Q values was determined to be in the N sector at a distance of 1448 meters. The dose calculation was performed in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual considering the inhalation, ground plane exposure, and ingestion pathways.

The maximum organ dose to the critical receptor was determined to be 0.28 mrem to the infant thyroid. This represents 1.9% of the Annual Dose Limit. Dose calculation results are summarized by quarters in Table 5.

7.2 Doses Due to Liquid Effluents

The annual doses to the maximum exposed individual resulting from exposure to liquid effluents released during 1992 from Waterford 3 were 0.16 mrem total body and 0.22 mrem to the maximum exposed organ (liver). These values are 5.3% and 2.2% respectively, of the Annual Dose Limits. Dose calculation results are summarized by quarters in Table 5. The doses were calculated in accordance with the methodology described in the Waterford 3 Offsite Dose Calculation Manual.

7.3 40 CFR Part 190 Dose Evaluation

In accordance with Waterford 3 Offsite Dose Calculation Manual, Section 5.5.2, dose evaluations to demonstrate compliance with Surveillance Requirements 5.5.1.a and 5.5.1.b of the ODCM, dealing with dose from the uranium fuel cycle, need to be performed only if quarterly doses exceed 3 mrem to the total body (liquid releases), 10 mrem to any organ (liquid releases), 10 mrad gamma air dose, 20 mrad beta air dose, or 15 mrem to any organ from radioiodines and particulates.

At no time during 1992 were any of these limits exceeded; therefore, no evaluations were required.

7.4 Doses to Public Inside the Site Boundary

The Member of the Public inside the site boundary expected to have the maximum exposure due to gaseous effluents would be an employee at Waterford 1 and 2 fossil fuel plants, located in the NW sector, approximately 670 meters from the plant. Based on an assumed occupancy of 25% (40 hour work week) and the fact that all employees are adults, the maximum organ dose would be less than 0.034 mrem to the thyroid. Total body and skin doses were calculated to be 0.07 and 0.15 mrem, respectively. These doses were calculated according to the methodology described in the Waterford 3 Offsite Dose Calculation Manual considering only the inhalation and ground plane exposure pathways.

8.0 RELATED INFORMATION

8.1 Changes to the Process Control Program

There were minor changes to the Process Control Program during the reporting period. Vendor information was changed in procedure RW-001-210, Process Control Program, to reflect the current contract service company. Copies of the changes to the Process Control Program are included in Attachment 10.1.

8.2 Changes to the Offsite Dose Calculation Manual

There were no changes to the Offsite Dose Calculation Manual during the reporting period.

8.3 Unavailability of REMP Milk Samples

Due to the unavailability of three milk sampling locations within five kilometers of the plant, Broad Leaf sampling is performed in accordance with ODCM Table 5.8-1. Milk is collected, when available, from the control location and two identified sampling locations as indicated in Waterford 3 Offsite Dose Calculation Manual, Attachment 6.14.

8.4 Report of Required Effluent Instrument Inoperability

ODCM Specifications, 5.6.1.b and 5.6.2.b requires reporting in the Semiannual Radioactive Effluent Release Report of why designated inoperable effluent monitoring instrumentation was not restored to operability within the time specified in the ACTION Statement. During the reporting period, there were no cases when instrumentation was not restored to operability within the time specified.

8.5 Activity Released Via Secondary Pathways

The following secondary release paths were continuously monitored for radioactivity: 1) the Hot Machine Shop Exhaust (AH-35), 2) Decontamination Shop Exhaust (AH-34), 3) the RAB H&V Equipment Room Ventilation system Exhaust (E-41A and E-41B); and 4) the Switchgear/Cable Vault Area Ventilation System (AH-25). Continuous sampling for these areas is maintained in order to demonstrate the operability of installed treatment systems and to verify integrity of barriers separating primary and secondary ventilation systems. Sampling for these areas was limited to continuous particulate and iodine sampling and monthly noble gas grab sampling. The activity released via these secondary pathways resulted from routine operations and remained below significant levels. Table 6 contains a summary of activity released during 1992.

8.6 Missed Effluent Samples:

8.6.1 No liquid or gaseous effluent samples were missed during this reporting period.

8.7 Additional Information

The most recent Reactor Coolant System E-Bar calculation was 0.416 MeV/Disintegration from a sample obtained on December 20, 1992. Reactor Coolant System E-Bar is supplied for information only and is not used for effluent dose calculations.

8.8 Corrections to Semiannual Radioactive Release Reports

Corrections to Table 3 of Semi Annual Radioactive Release Report covering the period from January 1, 1992 to June 30, 1992 are presented in attachment 10.2. These changes are due to submittal of actual burial volumes and activities from volume reduction and disposal facilities, which was not available when the last report was submitted to the Nuclear Regulatory Commission.

8.9 Gas Decay Tank Releases

Release of a Gas Decay Tank is sometimes complicated by leakage from another tank. Design Change #3091 proposed replacement of components made of carbon steel with stainless steel. This design change was cancelled. Administrative controls are currently in effect to implement precautions associated with releases of Gas Decay Tanks.

9.0 TABLES

1 Batch Release Summary

1A Semiannual Summation of all Releases by Quarter - All Airborne Effluents

1B Semiannual Airborne Continuous Elevated and Ground Level Releases

1C Semiannual Airborne Batch Elevated and Ground Level Releases

2A Semiannual Summation of All Releases by Quarter - All Liquid Effluents

2B Semiannual Liquid Continuous and Batch Releases

3 Solid Waste Shipped Offsite for Disposal

4 Joint Frequency Distribution of Meteorological Data

5 Dose Calculation Results for 1992

6. Activity Calculations for Secondary Release Pathways for 1992

10.0 ATTACHMENTS

10.1 Changes to Process Control Program; July 1, 1992 to December 31, 1992 (13 pages)

10.2 Corrections to Table 3 of Semiannual Radioactive Release Report of January 1, - June 30, 1992 Submittal of burial volumes and activities from volume reduction and disposal facilities. (3 pages)

TABLE 1

(1 of 1)

REPORT CATEGORY : BATCH RELEASE SUMMARY
RELEASE POINT : ALL
TYPE OF RELEASE : BATCH LIQUID AND GASEOUS
PERIOD START TIME : 4368:00 HRS = 12:00AM JULY 1, 1992
PERIOD END TIME : 8783:59 HRS = 11:59PM DECEMBER 31, 1992

LIQUID RELEASES

NUMBER OF RELEASES	:	111	
TOTAL TIME FOR ALL RELEASES	:	28876.0	MINUTES
MAXIMUM TIME FOR A RELEASE	:	319.0	MINUTES
AVERAGE TIME FOR A RELEASE	:	260.1	MINUTES
MINIMUM TIME FOR A RELEASE	:	104.0	MINUTES
AVERAGE STREAM FLOW	:	830857.8	GPM

GASEOUS RELEASES

NUMBER OF RELEASES	:	4	
TOTAL TIME FOR ALL RELEASES	:	1575.0	MINUTES
MAXIMUM TIME FOR A RELEASE	:	600.0	MINUTES
AVERAGE TIME FOR A RELEASE	:	393.8	MINUTES
MINIMUM TIME FOR A RELEASE	:	180.0	MINUTES

TABLE 1A

(1 of 1)

REPORT CATEGORY : SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
TYPE OF ACTIVITY : ALL AIRBORNE EFFLUENTS
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4

TYPE OF EFFLUENT	UNIT	QUARTER 3 HOURS 4345-6552	QUARTER 4 HOURS 6553-8760	EST. TOTAL ERROR %
A. FISSION AND ACTIVATION PRODUCTS				
1. TOTAL RELEASE	CURIES	6.83E 01	1.26E 01	1.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	8.60E 00	1.59E 00	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. RADIOIODINES				
1. TOTAL IODINE-131	CURIES	7.78E-07	1.26E-05	1.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	9.79E-08	1.59E-06	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. PARTICULATES				
1. PARTICULATES(HALF-LIVES>8 DAYS)	CURIES	9.53E-06	3.06E-06	1.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	1.20E-06	3.85E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
4. GROSS ALPHA RADIOACTIVITY	CURIES	3.99E-06	5.07E-06	
D. TRITIUM				
1. TOTAL RELEASE	CURIES	9.48E 01	7.91E 00	1.50E 01
2. AVERAGE RELEASE RATE FOR PERIOD	UCI/SEC	1.19E 01	9.95E-01	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	

TABLE 1B

(1 of 1)

REPORT CATEGORY : SEMIANNUAL AIRBORNE CONTINUOUS ELEVATED AND GROUND LEVEL RELEASES. TOTALS FOR EACH NUCLIDE RELEASED.
TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4

		ELEVATED RELEASES		GROUND RELEASES	
	UNIT	QUARTER 3	QUARTER 4	QUARTER 3	QUARTER 4
		HOURS	HOURS	HOURS	HOURS
NUCLIDE		4345-6552	6553-8760	4345-6552	6553-8760
FISSION GASES					
XE-133	CURIES	0.00E-01	0.00E-01	5.16E 01	6.05E 00
XE-135	CURIES	0.00E-01	0.00E-01	1.28E 01	6.39E 00
TOTAL FOR PERIOD	CURIES	0.00E-01	0.00E-01	6.45E 01	1.24E 01
IODINES					
I-131	CURIES	0.00E-01	0.00E-01	7.78E-07	1.26E-05
PARTICULATES					
H-3	CURIES	0.00E-01	0.00E-01	9.48E 01	7.91E 00
CO-58	CURIES	0.00E-01	0.00E-01	0.00E-01	1.26E-06
CO-60	CURIES	0.00E-01	0.00E-01	0.00E-01	5.31E-07
RU-103	CURIES	0.00E-01	0.00E-01	0.00E-01	9.41E-07
CS-134	CURIES	0.00E-01	0.00E-01	3.37E-07	2.96E-07
CS-137	CURIES	0.00E-01	0.00E-01	9.79E-07	0.00E-01
SR-90	CURIES	0.00E-01	0.00E-01	0.00E-01	3.48E-08
G ALPHA	CURIES	0.00E-01	0.00E-01	3.99E-06	5.07E-06
BR-82	CURIES	0.00E-01	0.00E-01	8.21E-06	0.00E-01
TOTAL FOR PERIOD	CURIES	0.00E-01	0.00E-01	9.48E 01	7.91E 00

TABLE 1C

(1 of 1)

REPORT CATEGORY : SEMIANNUAL AIRBORNE BATCH ELEVATED AND GROUND
: LEVEL RELEASES, TOTALS FOR EACH NUCLIDE RELEASED.
TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4

			ELEVATED RELEASES		GROUND RELEASES	
		UNIT	QUARTER 3 HOURS	QUARTER 4 HOURS	QUARTER 3 HOURS	QUARTER 4 HOURS
NUCLIDE			4345-6552	6553-8760	4345-6552	6553-8760
FISSION GASES						
KR-85		CURIES	0.00E-01	0.00E-01	0.00E-01	4.63E-02
XE-131M		CURIES	0.00E-01	0.00E-01	0.00E-01	5.73E-03
XE-133M		CURIES	0.00E-01	0.00E-01	0.00E-01	3.22E-05
XE-133		CURIES	0.00E-01	0.00E-01	3.16E 00	1.96E-01
XE-135		CURIES	0.00E-01	0.00E-01	1.34E-01	0.00E-01
AR-41		CURIES	0.00E-01	0.00E-01	5.37E-01	0.00E-01
TOTAL FOR PERIOD		CURIES	0.00E-01	0.00E-01	3.83E 00	2.08E-01
IODINES						
NONE						
PARTICULATES						
H-3		CURIES	0.00E-01	0.00E-01	1.26E-02	0.00E-01

TABLE 2A

(1 of 1)

REPORT CATEGORY : SEMIANNUAL SUMMATION OF ALL RELEASES BY QUARTER
TYPE OF ACTIVITY : ALL LIQUID EFFLUENTS
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4

TYPE OF EFFLUENT	UNIT	QUARTER 3 HOURS 4345-6552	QUARTER 4 HOURS 6553-8760	EST. TOTAL ERROR %
A. FISSION AND ACTIVATION PRODUCTS				
1. TOTAL RELEASE(NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	4.72E-01	5.29E-01	1.50E 01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	UCI/ML	7.38E-09	1.97E-08	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
B. TRITIUM				
1. TOTAL RELEASE	CURIES	1.75E 02	2.47E 01	1.50E 01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	UCI/ML	2.74E-06	9.17E-07	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CURIES	1.51E 00	1.54E-02	1.50E 01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	UCI/ML	2.36E-08	5.71E-10	
3. PERCENT OF APPLICABLE LIMIT	%	N/A	N/A	
D. GROSS ALPHA RADIOACTIVITY				
1. TOTAL RELEASE	CURIES	0.00E-01	0.00E-01	1.50E 01
E. WASTE VOL RELEASED(PRE-DILUTION)	GAL	7.90E 05	4.97E 05	1.50E 01
F. VOLUME OF DILUTION WATER USED	GAL	1.69E 10	7.11E 09	1.50E 01

TABLE 2B

(1 of 2)

REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
: TOTALS FOR EACH NUCLIDE RELEASED.
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4

		CONTINUOUS RELEASES		BATCH RELEASES	
	UNIT	QUARTER 3 HOURS 4345-6552	QUARTER 4 HOURS 6553-8760	QUARTER 3 HOURS 4345-6552	QUARTER 4 HOURS 6553-8760
NUCLIDE					
ALL NUCLIDES					
H-3	CURIES	0.00E-01	0.00E-01	1.75E 02	2.47E 01
NA-24	CURIES	0.00E-01	0.00E-01	2.59E-04	3.92E-04
CR-51	CURIES	0.00E-01	0.00E-01	1.33E-02	4.75E-02
MN-54	CURIES	0.00E-01	0.00E-01	2.56E-03	6.03E-03
FE-55	CURIES	0.00E-01	0.00E-01	1.10E-01	2.19E-02
FE-59	CURIES	0.00E-01	0.00E-01	4.83E-03	8.17E-03
CO-58	CURIES	0.00E-01	0.00E-01	9.35E-02	1.93E-01
CO-60	CURIES	0.00E-01	0.00E-01	1.68E-02	2.83E-02
ZN-65	CURIES	0.00E-01	0.00E-01	3.69E-06	0.00E-01
RB-88	CURIES	0.00E-01	0.00E-01	0.00E-01	2.52E-03
SR-89	CURIES	0.00E-01	0.00E-01	7.57E-05	3.18E-05
SR-92	CURIES	0.00E-01	0.00E-01	7.96E-05	2.70E-04
ZR-95	CURIES	0.00E-01	0.00E-01	4.23E-03	1.73E-02
ZR-97	CURIES	0.00E-01	0.00E-01	2.00E-04	0.00E-01
NB-95	CURIES	0.00E-01	0.00E-01	7.30E-03	2.97E-02
MO-99	CURIES	0.00E-01	0.00E-01	6.91E-03	0.00E-01
TC-99M	CURIES	0.00E-01	0.00E-01	5.77E-04	0.00E-01
RU-103	CURIES	0.00E-01	0.00E-01	9.68E-05	6.25E-04
RU-106	CURIES	0.00E-01	0.00E-01	5.56E-04	7.34E-04
AG-110M	CURIES	0.00E-01	0.00E-01	5.75E-04	2.39E-03
TE-132	CURIES	0.00E-01	0.00E-01	5.65E-04	7.74E-05
I-131	CURIES	0.00E-01	0.00E-01	9.44E-02	3.27E-03
I-132	CURIES	0.00E-01	0.00E-01	1.00E-03	4.46E-05
I-133	CURIES	0.00E-01	0.00E-01	4.61E-02	0.00E-01
I-135	CURIES	0.00E-01	0.00E-01	2.85E-03	0.00E-01
CS-134	CURIES	0.00E-01	0.00E-01	1.14E-04	1.84E-02
CS-136	CURIES	0.00E-01	0.00E-01	0.00E-01	6.92E-05
CS-137	CURIES	0.00E-01	0.00E-01	6.67E-04	2.13E-02

TABLE 2B

(2 of 2)

REPORT CATEGORY : SEMIANNUAL LIQUID CONTINUOUS AND BATCH RELEASES
: TOTALS FOR EACH NUCLIDE RELEASED.
TYPE OF ACTIVITY : ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER # 3 AND QUARTER # 4

		CONTINUOUS RELEASES		BATCH RELEASES	
	UNIT	QUARTER 3 HOURS	QUARTER 4 HOURS	QUARTER 3 HOURS	QUARTER 4 HOURS
NUCLIDE		4345-6552	6553-8760	4345-6552	6553-8760
ALL NUCLIDES CONTINUED					
BA-140	CURIES	0.00E-01	0.00E-01	7.41E-04	0.00E-01
LA-140	CURIES	0.00E-01	0.00E-01	4.33E-04	1.34E-04
LA-142	CURIES	0.00E-01	0.00E-01	3.35E-04	0.00E-01
CE-144	CURIES	0.00E-01	0.00E-01	1.78E-04	3.92E-04
W-187	CURIES	0.00E-01	0.00E-01	1.45E-03	0.00E-01
NP-239	CURIES	0.00E-01	0.00E-01	4.36E-04	0.00E-01
KR-85M	CURIES	0.00E-01	0.00E-01	1.72E-04	4.09E-05
KR-85	CURIES	0.00E-01	0.00E-01	2.04E-02	0.00E-01
KR-88	CURIES	0.00E-01	0.00E-01	7.31E-05	4.49E-05
XE-131M	CURIES	0.00E-01	0.00E-01	1.38E-02	0.00E-01
XE-133M	CURIES	0.00E-01	0.00E-01	1.55E-02	2.97E-04
XE-133	CURIES	0.00E-01	0.00E-01	1.44E 00	1.11E-02
XE-135	CURIES	0.00E-01	0.00E-01	1.90E-02	3.77E-03
AR-41	CURIES	0.00E-01	0.00E-01	1.06E-05	7.73E-05
CO-57	CURIES	0.00E-01	0.00E-01	1.82E-04	5.22E-04
SB-124	CURIES	0.00E-01	0.00E-01	8.64E-03	1.44E-02
SN-113	CURIES	0.00E-01	0.00E-01	1.60E-03	5.37E-03
NB-97	CURIES	0.00E-01	0.00E-01	1.02E-03	5.36E-03
SB-122	CURIES	0.00E-01	0.00E-01	1.17E-02	7.34E-04
SB-125	CURIES	0.00E-01	0.00E-01	3.58E-02	9.97E-02
SB-127	CURIES	0.00E-01	0.00E-01	4.56E-04	0.00E-01
BR-82	CURIES	0.00E-01	0.00E-01	3.76E-04	0.00E-01
SB-126	CURIES	0.00E-01	0.00E-01	1.07E-03	3.80E-04
TOTAL FOR PERIOD	CURIES	0.00E-01	0.00E-01	1.77E 02	2.52E 01

TABLE 3

(1 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL

DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	CONTAINER VOLUME (ft^3)	WASTE VOLUME (m^3)	TOTAL ACTIVITY (Ci)	ERROR
(B) Non Compacted Dry Activity Waste Shipped to Scientific Ecology Group for Volume Reduction *	1040	29.4	4.62E-2 *1	±25%
		23.33 Burial Volume	4.30E-2 Buried Activity	±25%
(B) Non Compacted Dry Activity Waste Shipped to Alaron Corp for Volume Reduction *	1040	714.43	3.21E+0 *1	±25%
		119.71 Burial Volume	3.16 Buried Activity	±25%
(A) Powder Resin Dewatered in a B-25 Box	95	5.38	1.04E-5 *2	±25%
		5.38 Burial Volume	8.80E-6 Buried Activity	±25%
(A) SGBD Bead Resin Dewatered in a Steel Liner	207.4	11.08	7.55E-5 *2	±25%

* Waste volumes shipped for volume reduction do not reflect final burial waste volumes unless otherwise stated.

*1 Activity determined by estimations.

*2 Activity determined by measurements.

TABLE 3

(2 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL

DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	CONTAINER VOLUME (ft^3)	WASTE VOLUME (m^3)	TOTAL ACTIVITY (Ci)		ERROR
(A) Resin Waste Management Resin Dewatered in a High Integrity Container (Bead Resin)	170.8	19.35	7.53E+02	*2	±25%
(A) Mechanical Filters Dewatered Shipped in a High Integrity Container	120.3	3.4	1.51E+02	*2	±25%
(A) Liquid Waste Management Resin Dewatered in a High Integrity Container (Bead Resin)	170.8	9.67	7.53E+00	*2	±25%
(D) Waste Oil Shipped to Scientific Ecology Group for Incineration *	7.5	11.16 Incinerated	9.05E-2 Incinerated	*1	±25%

* Waste volumes shipped for volume reduction do not reflect final burial waste volumes unless otherwise stated.

*1 Activity determined by estimations.

*2 Activity determined by measurements.

TABLE 3

(3 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL

DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(A) Mechanical Filters Dewatered Shipped in a High Integrity Container	Fe-55	37.585%	5.69E+01
	Co-58	36.528%	5.53E+01
	Co-604	7.200%	1.09E+01
	Ni-63	6.262%	9.48E+00
	Cr-51	2.741%	4.15E+00
	Be-7	2.569%	3.89E+00
	Mn-54	1.632%	2.47E+00
	Zr-95	1.493%	2.26E+00
	Sn-113	.931%	1.41E+00
	Nb-95	.912%	1.38E+00
	Ru-106	.506%	7.66E-01
	C-14	.388%	5.87E-01
	Sb-125	.373%	5.65E-01
	Fe-59	.320%	4.84E-01
	Ce-144	.235%	3.56E-01
	Pu-241	.111%	1.68E-01
	Cs-137	.091%	1.38E-01
	Sr-89	.072%	1.09E-01
	Sr-90	.028%	4.26E-02
	Cs-134	.010%	1.58E-02
	Cm-242	.009%	1.32E-02
	Cm-243/44	.002%	3.62E-03
	Pu-238	.001%	1.72E-03
	Pu239/40	.001%	1.33E-03
	Am-241	.000%	6.67E-04
	Pu-242	.000%	8.13E-06

TABLE 3
(4 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(A) Resin Waste Management Resin Dewatered in a High Integrity Container (Bead Resin)	Co-58	68.246%	5.11E+02
	Ni-63	11.282%	8.44E+01
	Cs-137	5.155%	3.86E+01
	Fe-55	4.465%	3.34E+01
	Co-60	3.287%	2.46E+01
	Cs-134	3.137%	2.35E+01
	Mn-54	2.555%	1.91E+01
	Sb-125	1.412%	1.06E+01
	Co-57	.182%	1.36E+00
	Fe-59	.096%	7.21E-01
	C-14	.079%	5.94E-01
	Ce-144	.050%	3.77E-01
	Sr-89	.026%	1.95E-01
	Sr-90	.025%	1.87E-01
	H-3	.002%	1.76E-02
	Pu-238	.000%	3.45E-04
	Cm243/44	.000%	2.06E-04
	Pu239/40	.000%	1.68E-04
	Am-241	.000%	6.52E-05
	Tc-99	.000%	5.19E-05

TABLE 3
(5 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(A) Liquid Waste Management Resin dewatered in a High Integrity Container (Bead Resin)	Co-58	50.709%	6.59E+00
	Cs-137	21.655%	2.81E+00
	Co-60	7.367%	9.57E-01
	Ni-63	6.039%	7.84E-01
	Fe-55	5.833%	7.58E-01
	Cs-134	4.751%	6.17E-01
	Mn-54	2.514%	3.27E-01
	Nb-95	.513%	6.67E-02
	Ce-144	.273%	3.55E-02
	Sb-125	.131%	1.70E-02
	Sr-90	.105%	1.37E-02
	C-14	.054%	7.08E-03
	H-3	.054%	6.99E-03
	Pu-238	.000%	9.64E-06
	Pu-239/40	.000%	6.43E-06
	Tc-99	.000%	5.30E-06
	Cm243/44	.000%	4.03E-06
	Am-241	.000%	1.87E-06

TABLE 3
(6 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(A) Powdex Resin Dewatered Shipped in a B-25 Box	Cs-137	63.7%	6.60E-06
	Cs-134	27.8%	2.88E-06
	Ce-144	4.5%	4.63E-07
	H-3	2.7%	2.83E-07
(A) Steam Generator Blow Down Resin Dewatered in a steel liner	Cs-137	47.7%	3.60E-05
	Cs-134	24.0%	1.81E-05
	Co-60	12.1%	9.16E-06
	Co-58	9.9%	7.50E-06
	Mn-54	4.5%	3.40E-06
	Ni-63	1.6%	1.23E-06
(B) Non Compacted Dry Activcity Waste Shipped to Scientific Ecology Group and Alaron Corp. (Sea Land Container)	Co-58	41.1%	6.49E-01
	Co-60	28.5%	4.50E-01
	Cs-137	12.2%	1.92E-01
	Cs-134	6.0%	9.48E-02
	Mn-54	5.5%	8.69E-02
	Ni-63	3.8%	6.00E-02
	Fe-55	1.7%	2.68E-02
	Co-57	1.0%	1.58E-02

TABLE 3
(7 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
DURING PERIOD 7/1/92 THRU 12/31/92

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(B) Non Compacted Dry Activity Waste Shipped to Alaron Corp. (Strong-Tight Package)	Mn-54	5.51%	9.25E-02
	Fe-55	1.73%	2.90E-02
	Co-57	1.02%	1.72E-02
	Co-58	41.23%	6.92E-01
	Co-60	28.42%	4.77E-01
	Ni-63	3.81%	6.39E-02
	H-3	.03%	4.48E-04
	C-14	.02%	3.35E-04
	Cs-134	6.02%	1.01E-01
	Cs-137	12.21%	2.05E-01
(D) Oil Shipped to Scientific Ecology Group for Incineration	Cs-137	40.5%	3.67E-02
	Co-60	31.9%	2.89E-02
	Co-58	9.4%	8.55E-03
	Cs-134	7.8%	7.02E-03
	Ni-63	4.3%	3.88E-03
	Fe-55	1.9%	1.75E-03
	Sb-125	1.9%	1.69E-03

TABLE 3

(8 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL

DURING PERIOD 7/1/92 THRU 12/31/92

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
7	Sole Use Cask	Barnwell, SC
3	Sole Use Flatbed	Oakridge, TN
13	Sole Use Flatbed	Wampum, PA

WASTE CLASS	# OF SHIPMENTS	TYPE	TYPE OF CONTAINER	MODE	DESTINATION
B	3	7A LSA	Poly - HIC	Truck	Barnwell, SC
AU	3	Type-A	Poly - HIC	Truck	Barnwell, SC
C	1	Type-B	Poly - HIC	Truck	Barnwell, SC
AU	13	LSA	Strong-Tight	Truck	Wampum, PA
AU	3	LSA	Strong-Tight	Truck	OakRidge, TN

TABLE 3

(9 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL

DURING PERIOD 7/1/92 THRU 12/31/92

SUMMARY BY MAJOR WASTE TYPES

(A) Spent Resins, Filter Sludges, Evaporator Bottoms, etc.

(B) Dry Compressible Waste, Contaminated Equipment, etc.

(C) Irriaded Components, Control Rods, etc.

(D) Other (Waste Oil)

WASTE TYPE	WASTE VOLUME (M^3)	TOTAL ACTIVITY (Ci)	ERROR
(A)	48.88	9.13E+02	±25%
(B)	143.04* Burial Volume	3.25E+00	±25%
(C)	NONE	N/A	N/A
(D)	0.0 Incinerated	8.85E-02 Incinerated	±25%

* Includes all Type (B) waste volume.

TABLE 3
(10 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
DURING PERIOD 7/1/92 THRU 12/31/92

SUMMARY BY MAJOR WASTE TYPE (Cont'd)

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(A)	Co-57	0.15	1.36E+00
	Co-58	62.75	5.73E+02
	Co-60	3.99	3.65E+01
	Cs-134	2.64	2.41E+01
	Cs-137	4.55	4.15E+01
	Fe-55	9.97	9.11E+01
	Mn-54	2.40	2.19E+01
	Ni-63	10.37	9.47E+01
	Fe-59	0.13	1.21E+00
	Sb-125	1.22	1.12E+01
	Nb-95	0.16	1.45E+00
	Zr-95	0.25	2.26E+00
	Sr-89	0.03	3.04E-01
	Sr-90	0.03	2.43E-01
	Ru-106	0.08	7.66E-01
	Sn-113	0.15	1.41E+00
	Ce-144	0.08	7.69E-01
	Cr-51	0.45	4.15E+00
	H-3	0.00	2.46E-02
	Be-7	0.43	3.89E+00
	C-14	0.13	1.19E+00
	Tc-99	0.00	5.72E-05
	Pu-238	0.00	2.07E-03
	Pu-239/240	0.00	1.50E-03
	Pu-241	0.02	1.68E-01
	Pu-242	0.00	8.13E-06
	Am-241	0.00	7.34E-04
	Cm-242	0.00	1.32E-02
	Cm-243/244	0.00	3.83E-03
(B)	Co-57	1.01	3.30E-02
	Co-58	41.21	1.34E+00
	Co-60	28.49	9.27E-01
	Cs-134	6.02	1.96E-01
	Cs-137	12.20	3.97E-01
	Fe-55	1.71	5.58E-02
	Mn-54	5.51	1.79E-01
	Ni-63	3.81	1.24E-01
	H-3	0.01	4.48E-04
	C-14	0.01	3.35E-04

TABLE 3
(11 of 11)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
DURING PERIOD 7/1/92 THRU 12/31/92

SUMMARY BY MAJOR WASTE TYPE (Cont'd)

WASTE TYPE	NUCLIDE NAME	% ABUNDANCE	CURIES
(D)	Co-58	9.66	8.55E-03
	Co-60	32.66	2.89E-02
	Cs-134	7.93	7.02E-03
	Cs-137	41.47	3.67E-02
	Fe-55	1.98	1.75E-03
	Ni-63	4.38	3.88E-03
	Sb-125	1.91	1.69E-03

TABLE 4

(1 of 4)

JOINT FREQUENCY DISTRIBUTION OF METEOROLOGICAL DATA

Joint frequency distribution of wind speed and direction in hours 01-01-92 00:00to 12-31-92 23:59 Pasquill Class A

Wind Speed (M/S) at 10-m Level

Wind Direction	.35-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10	10.1-13	13.1-18.0	>18.0	Total
N	0	0	0	2	6	17	15	10	0	0	0	0	50
NNE	0	0	0	1	4	22	31	6	0	0	0	0	64
NE	0	0	0	2	3	39	61	10	0	0	0	0	115
ENE	0	0	0	0	0	3	14	1	2	0	0	0	20
E	0	0	0	0	0	0	1	0	0	1	0	0	2
ESE	0	0	0	0	1	0	1	0	0	0	0	0	2
SE	0	0	0	0	0	0	2	3	0	0	0	0	5
SSE	0	0	0	0	2	4	12	3	0	0	0	0	21
S	0	0	0	0	0	5	18	2	0	0	0	0	25
SSW	0	0	0	1	3	4	6	1	0	0	0	0	15
SW	0	0	0	1	4	13	8	0	0	0	0	0	26
WSW	0	0	0	2	7	15	7	0	0	0	0	0	31
W	0	0	0	2	3	17	5	0	0	0	0	0	27
WNW	0	0	0	0	4	8	3	0	0	0	0	0	15
NW	0	0	1	1	5	3	1	0	0	0	0	0	11
NNW	0	0	0	0	4	14	21	10	4	0	0	0	53
Total	0	0	1	12	46	164	206	46	6	1	0	0	482

Number of calms for A Stability: 0

Joint frequency distribution of wind speed and direction in hours 01-01-92 00:00to 12-31-92 23:59 Pasquill Class B

Wind Speed (M/S) at 10-m Level

Wind Direction	.35-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10	10.1-13	13.1-18.0	>18.0	Total
N	0	0	0	2	6	13	11	4	2	0	0	0	38
NNE	0	0	0	0	6	11	13	4	0	0	0	0	34
NE	0	0	0	2	3	29	24	6	0	0	0	0	64
ENE	0	0	0	1	1	2	1	1	0	0	0	0	6
E	0	0	0	0	2	2	0	1	0	0	0	0	5
ESE	0	0	0	0	1	3	9	2	0	0	0	0	15
SE	0	0	0	1	1	4	14	6	0	0	0	0	26
SSE	0	0	0	0	1	4	7	3	0	0	0	0	15
S	0	0	0	0	0	4	12	0	0	0	0	0	16
SSW	0	0	0	5	2	5	9	2	0	0	0	0	23
SW	0	0	0	0	3	21	12	0	0	0	0	0	36
WSW	0	0	0	3	7	5	16	0	0	0	0	0	31
W	0	0	0	2	7	12	9	0	0	0	0	0	30
WNW	0	0	0	2	4	4	4	1	0	0	0	0	15
NW	0	0	0	1	2	2	1	1	0	0	0	0	7
NNW	0	0	0	1	5	10	12	2	1	0	0	0	31
Total	0	0	0	20	51	131	154	33	3	0	0	0	392

Number of calms for B Stability: 0

TABLE 4

(2 of 4)

JOINT FREQUENCY DISTRIBUTION OF METEOROLOGICAL DATA

Joint frequency distribution of wind speed and direction in hours 01-01-92 00:00to 12-31-92 23:59 Pasquill Class C

Wind Speed (M/S) at 10-m Level

Wind Direction	.35-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10	10.1-13	13.1-18.0	>18.0	Total
N	0	0	0	1	3	7	16	1	1	0	0	0	29
NNE	0	0	0	3	7	16	13	3	0	0	0	0	42
NE	0	0	0	2	4	28	24	1	0	0	0	0	59
ENE	0	0	0	1	1	2	7	0	1	0	0	0	12
E	0	0	0	2	0	2	3	0	0	0	0	0	7
ESE	0	0	0	0	0	0	11	3	0	0	0	0	14
SE	0	0	0	2	1	1	14	3	2	1	0	0	24
SSE	0	0	0	1	0	4	7	1	0	0	0	0	13
S	0	0	1	1	1	6	12	6	0	0	0	0	27
SSW	0	0	0	0	0	5	11	2	0	0	0	0	18
SW	0	0	0	2	2	12	13	2	0	0	0	0	31
WSW	0	0	0	0	2	11	16	0	0	0	0	0	29
W	0	0	0	1	1	7	8	0	0	0	0	0	17
WNW	0	0	1	2	1	5	2	0	0	0	0	0	11
NW	0	0	0	0	1	4	5	0	0	0	0	0	10
NNW	0	0	0	0	1	5	11	9	2	0	0	0	28
Total	0	0	2	18	25	115	173	31	6	1	0	0	371

Number of calms for C Stability: 1

Joint frequency distribution of wind speed and direction in hours 01-01-92 00:00to 12-31-92 23:59 Pasquill Class D

Wind Speed (M/S) at 10-m Level

Wind Direction	.35-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10	10.1-13	13.1-18.0	>18.0	Total
N	1	2	6	15	18	60	104	57	6	0	0	0	269
NNE	0	0	5	20	25	51	111	36	12	0	0	0	260
NE	0	0	7	12	23	100	151	36	13	1	0	0	343
ENE	0	1	1	9	6	25	84	15	4	0	0	0	145
E	0	1	3	1	5	10	35	6	0	0	0	0	61
ESE	0	0	0	6	1	9	63	24	0	1	0	0	104
SE	1	1	4	8	8	27	92	28	4	3	1	0	177
SSE	0	0	2	6	17	53	79	24	9	0	0	0	190
S	1	0	0	13	13	51	53	26	11	0	0	0	168
SSW	1	1	2	12	22	24	27	5	3	0	0	0	97
SW	1	1	4	8	17	40	48	5	0	0	0	0	124
WSW	0	0	1	13	12	30	33	5	2	0	0	0	96
W	0	3	3	20	17	30	16	7	0	0	0	0	96
WNW	0	0	3	11	6	25	27	5	0	0	0	0	77
NW	0	1	3	4	15	26	49	18	2	0	0	0	118
NNW	0	0	3	5	11	43	75	44	11	0	0	0	192
Total	5	11	47	163	216	604	1047	341	77	5	1	0	2517

Number of calms for D Stability: 2

TABLE 4

(4 of 4)

JOINT FREQUENCY DISTRIBUTION OF METEOROLOGICAL DATA

Joint frequency distribution of wind speed and direction in hours 01-01-92 00:00to 12-31-92 23:59 Pasquill Class G

Wind Speed (M/S) at 10-m Level

Wind Direction	.35-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10	10.1-13	13.1-18.0	>18.0	Total
N	0	5	7	4	1	1	0	0	0	0	0	0	18
NNE	0	1	2	3	1	1	0	0	0	0	0	0	8
NE	0	1	3	4	3	1	0	0	0	0	0	0	12
ENE	0	0	2	1	0	1	0	0	0	0	0	0	4
E	0	1	1	0	0	0	0	0	0	0	0	0	2
ESE	0	0	0	1	0	0	0	0	0	0	0	0	1
SE	0	1	2	0	2	1	0	0	0	0	0	0	6
SSE	1	4	6	12	9	2	0	0	0	0	0	0	34
S	4	13	23	24	4	0	0	0	0	0	0	0	68
SSW	11	16	28	24	5	1	0	0	0	0	0	0	85
SW	5	21	23	11	0	0	0	0	0	0	0	0	60
WSW	14	22	19	6	1	0	0	0	0	0	0	0	62
W	19	31	25	5	3	0	0	0	0	0	0	0	83
WNW	10	11	11	2	1	0	0	0	0	0	0	0	35
NW	6	6	7	5	1	0	0	0	0	0	0	0	25
NNW	8	6	6	7	4	1	0	0	0	0	0	0	32
Total	78	139	165	109	35	9	0	0	0	0	0	0	535

Number of calms for G Stability: 50

Total vaild hours for all stabilities = 8784
Total invaild hours for all stabilities = 0

TABLE 5

(1 of 2)

DOSE CALCULATION RESULTS FOR 1992

(DOSES DUE TO GASEOUS RADIOACTIVE EFFLUENTS)

** UNIT 1 ** QUARTER 1 OF 1992 **
DOSE FROM RADIOIODINES, PARTICULATES, AND TRITIUM
AT CONTROLLING LOCATION:

TOTAL DOSE (MREM) FOR BONE	:	1.7175E-05
TOTAL DOSE (MREM) FOR LIVER	:	8.1395E-02
TOTAL DOSE (MREM) FOR TOTAL BODY	:	8.1383E-02
TOTAL DOSE (MREM) FOR THYROID	:	8.4204E-02
TOTAL DOSE (MREM) FOR KIDNEY	:	8.1391E-02
TOTAL DOSE (MREM) FOR LUNG	:	8.1380E-02
TOTAL DOSE (MREM) FOR GI-LLI	:	8.1379E-02
NOBLE GAS DOSE AT SITE BOUNDARY:		
TOTAL BODY DOSE TOTAL (MREM)	:	5.6634E-01
SKIN DOSE TOTAL (MREM)	:	1.1019E 00
NOBLE GAS AIRDOSE AT SITE BOUNDARY:		
TOTAL GAMMA AIRDOSE (MRAD)	:	6.0902E-01
TOTAL BETA AIRDOSE (MRAD)	:	7.1754E-01

** UNIT 1 ** QUARTER 2 OF 1992 **
DOSE FROM RADIOIODINES, PARTICULATES, AND TRITIUM
AT CONTROLLING LOCATION:

TOTAL DOSE (MREM) FOR BONE	:	2.0503E-05
TOTAL DOSE (MREM) FOR LIVER	:	9.8197E-02
TOTAL DOSE (MREM) FOR TOTAL BODY	:	9.8179E-02
TOTAL DOSE (MREM) FOR THYROID	:	9.8178E-02
TOTAL DOSE (MREM) FOR KIDNEY	:	9.8183E-02
TOTAL DOSE (MREM) FOR LUNG	:	9.8180E-02
TOTAL DOSE (MREM) FOR GI-LLI	:	9.8178E-02
NOBLE GAS DOSE AT SITE BOUNDARY:		
TOTAL BODY DOSE TOTAL (MREM)	:	1.3866E-02
SKIN DOSE TOTAL (MREM)	:	3.0943E-02
NOBLE GAS AIRDOSE AT SITE BOUNDARY:		
TOTAL GAMMA AIRDOSE (MRAD)	:	1.5366E-02
TOTAL BETA AIRDOSE (MRAD)	:	2.8736E-02

** UNIT 1 ** QUARTER 3 OF 1992 **
DOSE FROM RADIOIODINES, PARTICULATES, AND TRITIUM
AT CONTROLLING LOCATION:

TOTAL DOSE (MREM) FOR BONE	:	5.2477E-05
TOTAL DOSE (MREM) FOR LIVER	:	8.1651E-02
TOTAL DOSE (MREM) FOR TOTAL BODY	:	8.1602E-02
TOTAL DOSE (MREM) FOR THYROID	:	8.2120E-02
TOTAL DOSE (MREM) FOR KIDNEY	:	8.1613E-02
TOTAL DOSE (MREM) FOR LUNG	:	8.1603E-02
TOTAL DOSE (MREM) FOR GI-LLI	:	8.1598E-02
NOBLE GAS DOSE AT SITE BOUNDARY:		
TOTAL BODY DOSE TOTAL (MREM)	:	3.2309E-02
SKIN DOSE TOTAL (MREM)	:	7.0685E-02
NOBLE GAS AIRDOSE AT SITE BOUNDARY:		
TOTAL GAMMA AIRDOSE (MRAD)	:	3.5886E-02
TOTAL BETA AIRDOSE (MRAD)	:	6.6484E-02

** UNIT 1 ** QUARTER 4 OF 1992 **
DOSE FROM RADIOIODINES, PARTICULATES, AND TRITIUM
AT CONTROLLING LOCATION:

TOTAL DOSE (MREM) FOR BONE	:	4.4711E-05
TOTAL DOSE (MREM) FOR LIVER	:	6.8556E-03
TOTAL DOSE (MREM) FOR TOTAL BODY	:	6.8304E-03
TOTAL DOSE (MREM) FOR THYROID	:	1.5275E-02
TOTAL DOSE (MREM) FOR KIDNEY	:	6.8503E-03
TOTAL DOSE (MREM) FOR LUNG	:	6.8196E-03
TOTAL DOSE (MREM) FOR GI-LLI	:	6.8181E-03
NOBLE GAS DOSE AT SITE BOUNDARY:		
TOTAL BODY DOSE TOTAL (MREM)	:	9.7621E-03
SKIN DOSE TOTAL (MREM)	:	2.1797E-02
NOBLE GAS AIRDOSE AT SITE BOUNDARY:		
TOTAL GAMMA AIRDOSE (MRAD)	:	1.0542E-02
TOTAL BETA AIRDOSE (MRAD)	:	1.6282E-02

** UNIT 1 ** TOTALS FOR 1992 **
DOSE FROM RADIOIODINES, PARTICULATES, AND TRITIUM
AT CONTROLLING LOCATION:

TOTAL DOSE (MREM) FOR BONE	:	1.3487E-04
TOTAL DOSE (MREM) FOR LIVER	:	2.6810E-01
TOTAL DOSE (MREM) FOR TOTAL BODY	:	2.6800E-01
TOTAL DOSE (MREM) FOR THYROID	:	2.7978E-01
TOTAL DOSE (MREM) FOR KIDNEY	:	2.6804E-01
TOTAL DOSE (MREM) FOR LUNG	:	2.6798E-01
TOTAL DOSE (MREM) FOR GI-LLI	:	2.6797E-01
NOBLE GAS DOSE AT SITE BOUNDARY:		
TOTAL BODY DOSE TOTAL (MREM)	:	6.2228E-01
SKIN DOSE TOTAL (MREM)	:	1.2254E 00
NOBLE GAS AIRDOSE AT SITE BOUNDARY:		
TOTAL GAMMA AIRDOSE (MRAD)	:	6.7082E-01
TOTAL BETA AIRDOSE (MRAD)	:	8.2904E-01

TABLE 5

(2 of 2)

DOSE CALCULATION RESULTS FOR 1992

(DOSES DUE TO LIQUID RADIOACTIVE EFFLUENTS)

** UNIT 1 ** QUARTER 1 OF 1992 **		
TOTAL DOSE (MREM) FOR BONE	:	3.1378E-03
TOTAL DOSE (MREM) FOR LIVER	:	4.8672E-03
TOTAL DOSE (MREM) FOR TOTAL BODY	:	3.3533E-03
TOTAL DOSE (MREM) FOR THYROID	:	8.6443E-04
TOTAL DOSE (MREM) FOR KIDNEY	:	1.7804E-03
TOTAL DOSE (MREM) FOR LUNG	:	8.0782E-04
TOTAL DOSE (MREM) FOR GI-LLI	:	2.9813E-03
** UNIT 1 ** QUARTER 2 OF 1992 **		
TOTAL DOSE (MREM) FOR BONE	:	2.7636E-03
TOTAL DOSE (MREM) FOR LIVER	:	4.4185E-03
TOTAL DOSE (MREM) FOR TOTAL BODY	:	3.1248E-03
TOTAL DOSE (MREM) FOR THYROID	:	1.5458E-03
TOTAL DOSE (MREM) FOR KIDNEY	:	1.5768E-03
TOTAL DOSE (MREM) FOR LUNG	:	6.3550E-04
TOTAL DOSE (MREM) FOR GI-LLI	:	1.2510E-03
** UNIT 1 ** QUARTER 3 OF 1992 **		
TOTAL DOSE (MREM) FOR BONE	:	1.7935E-03
TOTAL DOSE (MREM) FOR LIVER	:	2.7480E-03
TOTAL DOSE (MREM) FOR TOTAL BODY	:	1.8924E-03
TOTAL DOSE (MREM) FOR THYROID	:	3.4513E-02
TOTAL DOSE (MREM) FOR KIDNEY	:	1.1607E-03
TOTAL DOSE (MREM) FOR LUNG	:	5.7581E-04
TOTAL DOSE (MREM) FOR GI-LLI	:	3.6429E-03
** UNIT 1 ** QUARTER 4 OF 1992 **		
TOTAL DOSE (MREM) FOR BONE	:	1.1567E-01
TOTAL DOSE (MREM) FOR LIVER	:	2.0592E-01
TOTAL DOSE (MREM) FOR TOTAL BODY	:	1.5311E-01
TOTAL DOSE (MREM) FOR THYROID	:	2.0522E-03
TOTAL DOSE (MREM) FOR KIDNEY	:	6.8061E-02
TOTAL DOSE (MREM) FOR LUNG	:	2.2689E-02
TOTAL DOSE (MREM) FOR GI-LLI	:	1.2224E-02
** UNIT 1 ** TOTALS FOR 1992 **		
TOTAL DOSE (MREM) FOR BONE	:	1.2336E-01
TOTAL DOSE (MREM) FOR LIVER	:	2.1796E-01
TOTAL DOSE (MREM) FOR TOTAL BODY	:	1.6148E-01
TOTAL DOSE (MREM) FOR THYROID	:	3.8976E-02
TOTAL DOSE (MREM) FOR KIDNEY	:	7.2579E-02
TOTAL DOSE (MREM) FOR LUNG	:	2.4708E-02
TOTAL DOSE (MREM) FOR GI-LLI	:	2.0099E-02

TABLE 6

(1 of 1)

ACTIVITY CALCULATIONS FOR SECONDARY

RELEASE PATHWAYS FOR 1992

VENTILATION SYSTEM	TOTAL ACTIVITY RELEASED DURING 1992 (Curies)			
	I-131	I-133	Co-58	Xe-133
SWITCHGEAR AREA VENT (AH-25)	<LLD	<LLD	<LLD	<LLD
+46 H&V EQUIPMENT ROOM (E-41A&B)	<LLD	<LLD	<LLD	<LLD
HOT MACHINE SHOP (AH-35)	3.09E-6	<LLD	<LLD	<LLD
DECONTAMINATION SHOP (AH-34)	6.09E-6	<LLD	6.05E-8	<LLD
TOTALS	9.18E-6	<LLD	6.05E-8	<LLD

ATTACHMENT 10.1

(13 PAGES)

CHANGES TO RW-001-210,

PROCESS CONTROL PROGRAM (PCP)

July 1, 1992 To December 31, 1992

PORC ~~ANB-PORC---S/C~~
REVIEW AND APPROVAL SHEET

REVIEW OF: RW-001-210 - (Change 1) Process Control Program (Rev. 4)	PORC ☒ PORC - S/C ☐

The PORC or PORC S/C has reviewed this item and determined that a Safety/ Commitment Review was performed (if applicable), that a Safety Evaluation was performed (if applicable), that an unreviewed safety question does not exist, and that nuclear safety is/was not adversely affected.

PORC MEMBER	MEMBER SIGNATURE	RECOMMENDED FOR APPROVAL YES	RECOMMENDED FOR APPROVAL NO
Maintenance Superintendent	Robert L Peter	✓	
Operations Superintendent	[signature]	✓	
Radiation Protection Superintendent	[signature]	✓	
Quality Assurance Member	[signature]	✓	
Plant Engineering Superintendent	P J Schlesinger	✓	
Manager Operations & Maintenance	Robert S Starkey	✓	
PORC-S/C Member			
PORC-S/C Member			
PORC-S/C Member			

Meeting No. 92-070 Item No. VIII-A Date: 7/23/92

This item is recommended for approval? ☒ YES ☐ NO
This item requires SRC/NRC review prior to implementation? ☐ YES ☒ NO
If yes, ensure documentation supporting review is attached.

	SIGNATURE	RECOMMENDED FOR APPROVAL YES	RECOMMENDED FOR APPROVAL NO	DATE
PORC-S/C Chairman				
PORC Chairman	T R Hearn	✓		7-23-92

Comments:

Approved by [signature] Date 7/28/92
General Manager Plant Operations

Check Block:
☒ PORC
☐ PORC-S/C

WATERFORD 3 SES
PLANT OPERATING MANUAL
CHANGE/REVISION/DELETION REQUEST

Procedure No.: RW-001-215 Title: Process Control Program

Effective Date: _____ (If different from approval date)

COMPLETE A, B, and C:

A. Change No.: 1 ☒ Permanent ☐ Deviation Expiration Date: _____

B. Revision No.: 4

C. Deletion: ☐ YES ☒ NO

DESCRIPTION OF CHANGE, REVISION OR DELETION: Update procedure to incorporate the current vendor.

REASON FOR CHANGE, REVISION OR DELETION: Same as above

ORIGINATOR: Kenneth A. Hill DATE: 6/22/92

TECHNICAL REVIEW: Steve Landry DATE: 6-23-92

GROUP HEAD REVIEW: [signature] DATE: 6/24/92

*TEMPORARY APPROVAL (SRO): _____ DATE: _____

*TEMPORARY APPROVAL: _____ DATE: _____

*Refer to paragraphs 3.2.15 and 5.3.2.8c for Temporary Approval Requirements.

TABLE OF CONTENTS

LIST OF EFFECTIVE PAGES

Title	Revision 4
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Chng #1 6-22-82

1.0 PURPOSE

1.1 The purpose of Waterford Steam Electric Station - Unit Number 3 (Waterford 3) Process Control Program (PCP) is to describe the program which provides reasonable assurance of the complete stabilization and/or solidification, as applicable of various radioactive "wet wastes" which may include resin slurries and evaporator bottoms are in accordance with applicable Department of Transportation (DOT), Nuclear Regulatory Commission (NRC), State and licensed burial facilities acceptance criteria for packaging and shipment to an approved burial site. Compliance with these criteria will be achieved through implementation of the PCP and related Waterford 3 and vendor supplied procedures. Containers engineered and built to comply with the stability requirement may be used. Waterford 3 SES typically relies on Vendor supplied systems and/or services for stabilization and solidification services.

2.0 REFERENCES

2.1 Waterford 3 Documents

2.1.1 FSAR Chapter 11.4, Solid Waste Management System

2.1.2 FSAR Chapter 13.4, Review and Audit

2.1.3 FSAR Chapter 13.2, Training

2.1.4 FSAR Chapter 13.5, Plant Procedures

2.1.5 Nuclear Operations Management Manual, Section VI, Chapter 5

2.2 Vendor Controlled Documents

2.2.1 ~~LN Technologies Corporation, TR002, Topical Report on 10CFR61 Qualified Radioactive Waste Forms, May 1984~~ Chem-Nuclear Systems Inc., DM-OP-22, Process Control Program for CNSI Liquid Waste Processing Systems.

2.2.2 ~~LN Technologies Corporation FI-013, Process Control Program for Dewatering Liner with LN Technologies Corporation Internals, LN Technologies Corporation~~ Chem-Nuclear Systems Inc., SD-OP-003, Process Control Program for CNSI Cement Solidification Units.

Chg #1 6-22-92

2.2.3 Scientific Ecology Group, Inc., OP-4.34, Process Control Program for Dewatering Bead or Powdered Resin with Quick Dry Dewatering System No 8814.

2.2.4 Scientific Ecology Group, Inc., OP-4.31, Operating Procedure for SEG Rad Waste Solidification System.

2.2.5 Scientific Ecology Group, Inc., OP-4.30, Process Control Program for Rad Waste Solidification Service

2.2.6 RW-2-401, Use of Radman Operating Program

2.2.7 RW-2-411, Use of Radman Data Base Manager and Recover

2.2.8 RW-2-110, Waste Sample Collection and Isotope Evaluation

2.3 Other Documents

2.3.1 10CFR61, Licensing Requirements for Land Disposal of Radioactive Waste

2.3.2 10CFR20.311, Transfer for disposal and manifests

2.3.3 10CFR71.91, Records

3.0 DEFINITIONS

3.1 Stability means structural stability as per 10CFR61.2

3.2 Solidification means the immobilization of wet radioactive wastes such as evaporator bottoms, spent resins, sludges, and reverse osmosis concentrates as a result of a process of mixing the waste type with a solidification agent(s) to meet the requirements of the licensed disposal site and 10CFR61.

4.0 RESPONSIBILITIES

4.1 Radiation Protection Superintendent

4.1.1 The Radiation Protection Superintendent is responsible for the overall effective management of the plant Process Control Program. The Radiation Protection Superintendent ensures that changes are initiated to the Process Control Program procedures when necessary and that appropriate Health Physics support is provided.

4.2 Lead Supervisor-Radwaste

4.2.1 The Lead Supervisor-Radwaste who reports to the Radiation Protection Superintendent holds key responsibilities for implementation of the Process Control Program such as:

4.2.1.1 The preparation, review and approval of the Process Control Program procedures pertaining to the processing and packaging, of radioactive materials;

4.2.1.2 Data collection, trend analysis, long-term planning, and problem solving for the plant Process Control Program;

4.2.1.3 Managing radwaste stabilization, dewatering and packaging;

4.2.1.4 Preparing procedures for stabilization, dewatering and packaging;

4.2.1.5 Interfacing with other groups as necessary to analyze and resolve problems relating to the Process Control program such as the design of Radwaste Systems and Equipment;

4.2.1.6 Preparing periodic reports summarizing the Process Control Program;

4.2.1.7 Procurement of materials and supplies required for implementation and maintenance of the Process Control Program;

4.2.1.8 That personnel receive appropriate training and are qualified for their respective duties;

4.2.1.9 Adequate staffing and sufficient resources for efficient and economic operation of the Process Control Program.

4.3 Operations Superintendent

4.3.1 The Operations Superintendent is responsible for the effective operations of permanent plant radwaste systems and will coordinate radwaste activities with the radwaste department.

4.4 Plant Chemist

4.4.1 The Plant Chemist is responsible for interfacing with the Radwaste Engineer on items or problems relating to radwaste processes and chemistry controls or chemical reactions and performing chemical and radiochemical analyses of samples of radioactive waste or materials.

4.5 Quality Assurance

4.5.1 Quality Assurance is responsible for:

4.5.1.1 Assessing the implementation and effectiveness of the quality assurance aspects of the Process Control Program through regular audits and selective monitoring of activities.

4.6 Director Operations Support & Assessment

4.6.1 The Director of Operation Support & Assessment is responsible for providing the following services:

4.6.1.1 State-of-the-art technical advise, support, and assistance as required;

4.6.1.2 Licensing and regulatory compliance support; and

4.6.1.3 Appraising the Waterford-3 Process Control Program and recommending improvements.

4.6.2 The Operations Support and Assessment staff interfaces directly with the plant staff in providing these services.

5.0 PROCEDURE

5.1 Program Description

5.1.1 Solidification System Description:
Waterford 3 utilizes vendor supplied portable solidification equipment for radioactive waste solidification. References 2.2.1, 2.2.4 and 2.2.5 provide a general description of respective vendor solidification processes and process control features; Reference 2.2.6 describes the method which will be utilized to classify wastes in accordance with 10CFR61; and Reference 2.1.1 through 2.1.5 are Waterford 3 documents which either implement or describe activities which provide reasonable assurance that wastes are solidified or dewatered in accordance with all applicable regulations and criteria.

5.1.2 Sources of Waterford 3 Stabilization/Solidification Feeds:
The Cement solidification will be used to stabilize resins, evaporator bottoms and boric acid concentrates. During resin stabilization, vendor equipment will be connected to the Resin Waste Management System outlet to allow for the transfer of resin. Vendor equipment will be connected to the Solid waste Management System outlet when evaporator bottoms from the radwaste evaporator and boric acid concentrates from the Boron Management System evaporator are to be stabilized. Solidifcation using Aquaset/Petroset media will be used to process resins, oil, water/acid, evaporator bottoms and boric acid concentrates. This process will not be connected to any plant waste systems and will be processed on a batch basis.

5.2 Solidification Process Parameters:

5.2.1 Solidification formulas and solidification process parameters are incorporated into the applicable vendor process control program. No exceptions or deviations from vendor supplied procedures or topical reports are anticipated for stabilized waste. The formulas are used to calculate the ratio of waste, cement, water and other reagents required to achieve an acceptable solidified product. Compatibility requirements of the waste stream with respect to the solidification media are described in the vendor process controls program. Waste stream parameters are adjusted as necessary to meet these requirements.

5.2.2 Test solidifications are performed on waste stream samples to verify vendor calculated solidification formulas.

5.2.3 Radioactive wastes shall be solidified or dewatered in accordance with the process control program to meet shipping and transportation requirements during transit, and disposal site requirements when received at the disposal site.

5.2.4 With solidification or dewatering not meeting disposal site and shipping and transportation requirements, suspend shipment of the inadequately processed wastes and correct the process control program, the procedures, and/or the solid waste system as necessary to prevent recurrence.

5.2.5 With solidification or dewatering not performed in accordance with the process control program, test the improperly processed waste in each container to ensure that it meets burial ground and shipping requirements and perform appropriate corrective action if required.

5.2.6 Solidification of at least one representative test specimen from at least every tenth batch of each type of wet radioactive wastes (e.g., filter sludges, spent resins, evaporator bottoms, boric acid solutions and sodium sulfate solutions) shall be verified in accordance with the vendor's process control program.

5.2.7 If the initial test specimen from a batch of waste fails to verify solidification, the process control program shall provide for the collection and testing of representative test specimens from each consecutive batch of the same type of wet waste until at least three consecutive initial test specimens demonstrate solidification. The process control program may be modified if practical to assure solidification of subsequent batches of waste.

5.2.8 If any test specimen fails to verify solidification, the solidification of the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative solidification parameters can be determined in accordance with the vendors process control program, and a subsequent test verifies solidification. Solidification of the batch may then be resumed using the alternative solidification parameters determined by the process control program.

5.3 Administrative Controls

5.3.1 Administrative controls utilized to insure compliance with applicable state and federal regulations and burial site criteria are detailed in the radioactive waste solidification surveillance procedure(s). These implementing document(s) for radioactive waste solidification and dewatering describes the requirements which must be met prior to processing radioactive waste, as well as the condition of the solidified or dewatered waste. Test solidifications, full scale calculations and operation of the solidification equipment are performed by vendor personnel. Dewatering operations will be performed by vendor personnel or by qualified Plant staff. Plant staff provides Health Physics and Quality Assurance coverage, operates plant radioactive waste systems, collects waste stream samples and performs isotopic analyses. Copies of all referenced documents are available on site for use by personnel engaged in solidification activities.

5.3.2 Changes to this Process Control Program shall be described in the semi-annual Radioactive Effluent Release Report for the period in which the change is made.

5.4 Waste Characterization and Classification

5.4.1 Waste Classification

5.4.1.1 Solidified wastes are classified in accordance with the requirements of 10CFR61.55, as implemented by reference 2.2.6 and plant waste classification and characterization procedure(s).

5.4.1.2 Annual analysis will be performed on the waste streams to determine the isotopic abundance of gamma emitting isotopes in the streams as described in Reference 2.2.8. Scaling factors for the non-gamma emitting and transuranic constituents will be developed from this annual analysis using References 2.2.6 and 2.2.7. The activity of each radionuclide in the solidified waste will be determined by a core sample or a calculational method employing the percent abundance and scaling factors with a dose to curie conversion factor as described in Reference 2.2.6.

5.4.2 Waste Characteristics

5.4.2.1 Solidified wastes will meet the characteristics of 10CFR61.56(a). Stabilized wastes will meet the characteristics of 10CFR61.56(b). Waste containers will be labelled to identify the waste class.

5.4.2.2 The manifesting requirements of 10CFR20.311 are implemented and records are maintained in accordance with 10CFR71.91.

5.5 Quality Assurance

5.5.1 Quality Assurance related activities for the Radioactive Waste Program are implemented as described in the Nuclear Operations Management Manual (Reference 2.1.5). These activities provide verification that the solidified wastes meet applicable state and federal regulations and burial site criteria.

6.0 ATTACHMENTS

NONE

ATTACHMENT 10.2

(1 PAGE)

CORRECTIONS TO TABLE 3
OF
SEMIANNUAL RADIOACTIVE RELEASE REPORT

January 1, 1992 to June 30, 1992

Submittal of Burial Volumes and Activities from
Volume reduction and disposal facilities.

TABLE 3

(1 of 12)

SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL

DURING PERIOD 1/1/92 THRU 6/30/92

WASTE TYPE	CONTAINER VOLUME (ft^3)	WASTE VOLUME (m^3)	TOTAL ACTIVITY (Ci)	ERROR
(B) Non Compacted Dry Activity Waste Shipped to Scientific Ecology Group for volume reduction (Sea Land Container)*	1040	29.44	1.65E-2 *2	±25%
		10.94 Burial Volume	5.61E-2 Burial Activity	
(B) Non Compacted Dry Activity Waste Shipped to Scientific Ecology Group for Volume Reduction (B-25 Box)*	95	10.7	2.00E-4 *2	±25%
		10.7 Burial Volume	2.00E-4 Burial Activity	

* Waste volumes shipped for volume reduction do not reflect final burial waste volumes unless otherwise stated.

*1 Activity determined by estimations.

*2 Activity determined by measurements.