

Approved By B. D. Carter	Vogtle Electric Generating Plant 	Procedure Number 35420-C	Rev 18
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MONITORING OF THE RADIOACTIVE LIQUID WASTE MANAGEMENT SYSTEM

PROCEDURE USAGE REQUIREMENTS-	SECTIONS
Continuous Use: Procedure must be open and readily available at the work location. Follow procedure step by step unless otherwise directed.	NONE
Reference Use: Procedure or applicable section(s) available at the work location for ready reference by person performing steps.	NONE
Information Use: Available on plant site for reference as needed.	ALL

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INFORMATION USE

1.0 PURPOSE

This procedure provides instructions for monitoring the chemical and radiochemical environment of the Liquid Waste Processing System (LWPS) to ensure compliance with limits set forth in 10CFR20, the ODCM, and the Technical Requirements Manual.

2.0 DEFINITIONS

2.1 Decontamination Factor; D.F. - the ratio of influent activity to effluent activity and/or the ratio of influent chemical concentration to effluent chemical concentration across a demineralizer bed or waste evaporator.

3.0 PRECAUTION AND LIMITATIONS

The following requirements apply to the Liquid Waste Processing System. (Refer to Procedure 30090-C, "Chemistry Technical Specification Surveillance Performance Coordination" for additional information).

3.1 LIQUIDS EFFLUENTS (ODCM 2.1.2)

The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited at all times to ten times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 1.0 E-4 µCi/ml total activity.

Action:

If the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeding the above limits, immediately restore the concentration to within the above limits. These limits do not affect mode changes.

Surveillance Requirements

(2.1.2.3) Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Procedure 30025-C, "Periodic Analysis Scheduling Program".

(2.1.2) The results of the radioactivity analysis shall be used in accordance with the methodology and parameters in the ODCM to assure that the concentrations at the point of release are maintained within the limits of ODCM.

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3.2 LIQUID HOLDUP TANKS

Technical Requirement Manual section 13.12.4 requires that the quantity of radioactive material contained in each outside temporary tank shall be limited to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases.

Applicability: at all times.

Action:

- a. With the quantity of radioactive material in any of the outside temporary tanks exceeding the above limit, immediately suspend all additions of radioactive material to the tank, within 48 hours reduce the tank contents to within the limit, and describe the events leading to this condition in the next Annual Radioactive Effluent Release Report, pursuant to Technical Specification 5.6.3.
- b. The provisions of Requirement 13.0.3 are not applicable.

Surveillance Requirements

(13.12.4.1) The quantity of radioactive material contained in each of the above listed tanks shall be determined to be within the above limits by analyzing a representative sample of either the tank's contents at least once per 7 days when radioactive materials are being added to the tank or each batch of radioactive materials prior to its addition to the tank.

- 3.3 When determining decontamination factors on demineralizer beds, ensure beds are in service.
- 3.4 Ensure sufficient sample volumes are collected to allow for analysis and compositing requirements. Refer to Procedure 33040-C, "Compositing Samples Weekly, Monthly, Quarterly" and 36015-C, "Radioactive Liquid Effluent Release Permit Generation And Data Control -Computer Method", for compositing requirements.

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4.0 **PROCEDURE**

4.1 **CHEMISTRY OBJECTIVES**

- 4.1.1 Monitor and account for water inventories during processing and disposal of liquid radioactive materials.
- 4.1.2 Determine proper processing in accordance with chemical and radiochemical specifications.
- 4.1.3 Ensure processing and release of liquid radioactive waste occurs in an efficient and timely manner.
- 4.1.4 Ensure that all releases of liquid radioactive materials to the environs are as low as reasonably achievable in accordance with 10 CFR20. Refer to Procedure 36010-C, "Offsite Dose Calculation Manual Implementation And Control" for additional information on control of radioactive effluents.

4.2 **GENERAL SYSTEM DESCRIPTION**

The Liquid Waste Processing System (LWPS) collects and processes potentially radioactive wastes for recycling, solidification, or release to the environment. The LWPS can be divided into two subsystems, Drain Channel A and Drain Channel B.

Drain Channel A collects aerated, tritiated liquid from accumulator drainage, sample room sink drains, demineralizers, filters, pumps, and other equipment drains. This liquid is pumped or flows to the waste holdup tank, the initial collecting point for liquids to be processed. A separate Drain Channel A subsystem is provided for each unit.

Drain Channel B processes all effluent that is normally to be discharged to the environment and is comprised of three drain sub channels, each associated with one of the following tanks:

- A. Chemical Drain Tank (CDT)
- B. Floor Drain Tank (FDT)
- C. Laundry & Hot Shower Tank (L & HST)

Laboratory samples which contain reagent chemicals (and possibly tritiated liquid) are discarded through a sample room sink which drains to the CDT. The CDT is sampled prior to processing or release. The CDT can be processed through the solid waste management system.

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Any liquids released to the environment by the LWPS are first directed to a waste monitor tank. Before releasing the contents of a waste monitor tank, a sample is taken for analysis. If the activity level is within acceptable limits, and the discharge does not cause the limits of 10CFR 50, Appendix I, to be exceeded, then the tank contents may be released. The discharge valve is interlocked with an effluent radiation monitor and closes automatically when the radioactivity concentration in the liquid discharge exceeds a preset limit. The radiation element is located upstream of the discharge valve at a distance sufficient to close the valve before passing the fluid that activated the detector trip signal. The stop valve is also interlocked with the circulating water pump to block flow if sufficient dilution water is not available. A permanent record of the radioactive releases is provided by sample analysis of the known volumes of waste effluent released. Liquid waste discharge flow and volume are also recorded. Refer to Procedure 36015-C, "Radioactive Liquid Effluent Permit Generation and Data Control - Computer Method" for additional information on processing liquid effluents.

If the monitor tank contents are not acceptable for discharge, the fluid can be held for a time to allow activity to decay to acceptable levels, or it can be further processed by the demineralizer.

The batch effluent release (i.e. Liquid Radwaste Effluent) is sampled for each batch prior to release. The Steam Generator blowdown liquid is normally routed to the condenser, but if it's desired to route the steam generator blowdown to the environment and if radioactivity is suspected, a sample will be taken and analyzed prior to release. Releases from the turbine building drain system and the control building sump are terminated if the radiation levels exceed predetermined limits, the effluent is then routed to their respective waste processing systems.

The processing of the low level radioactive water in the turbine building dirty drain tank is manually initiated by the operator based on the predetermined water level in the tank. This processing system, located in the auxiliary building consists of an oily water separator, an activated charcoal filter, two demineralizers in series, and a discharge filter. The treated water is returned to the clean drain tank in the turbine building. After monitoring it is combined with other waste streams for disposal.

NOTE

When radwaste is to be recycled to the RMWST or BAST, sampling for organics (TOC or O&G or equivalent) will be done. Results will be evaluated by Lab Supervision and the contamination potential will be considered. Notify Lab Supervision if Operations desires to recycle radwaste and organic measuring systems are unavailable.

4.2.1 Notify laboratory supervision of any out-of-specification condition

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4.2.2 Outside Temporary Storage Tank

4.2.2.1 Operations is responsible for notifying the Chemistry Department of the proposed use and all subsequent transfers of liquids to and from outside temporary storage tanks. Refer to Procedure 30170-C, "Chemistry Department Interface Agreements".

4.2.2.2 The Technical Requirements Manual gives two options for sampling and analyzing these tanks:

a. At least once per 7 days when radioactive materials are being added to the tanks

- or -

b. each batch of radioactive material prior to its addition to the tank.

Upon notification of proposed outside temporary storage tank use, laboratory supervision must determine which sampling and analysis option is to be used.

4.2.2.3 Analysis consists of determining total curie content excluding tritium and dissolved or entrained noble gases. Gamma spectroscopy analysis may be performed.

4.2.2.4 Curie content can be calculated by multiplying the gamma activity ($\mu\text{Ci/ml}$) of the sample and volume of the tank (cc or ml). Then the μCi should be converted to curies (Ci).

4.2.2.5 Results are to be entered into the Chemistry Database. If the Database is unavailable, data may be logged on Worksheet 1 and entered into the Database when it becomes available. Total curie content excluding tritium and dissolved or entrained noble gases is required to be less than 10 curies in each tank. Notify Laboratory Supervision if exceeded.

4.2.3 Fire Protection Program

4.2.3.1 Fire protection water discharged in areas having the potential for radioactive contamination is collected, sampled, and analyzed prior to release. Submit analysis results to Chemistry Department Management for evaluation. If analysis indicates that processing is required, the water should be routed to the liquid radwaste system for treatment prior to release. If results are within specification, water may be released subject to provisions of Procedure 36015-C, "Radioactive Liquid Effluent Release Permit Generation And Data Control - Computer Method".

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4.2.4 Tank Moats or Trenches

4.2.4.1 Chemical Considerations

- a. Normal rainfall (in moat or trench associated with RWST, RMWST, or CST) or pump seal leak off from the RMWST degasifier or CST degasifier does not require sampling for chemical contamination. This water is normally discharged to the storm drain system. Radiological considerations are addressed below.
- b. NPDES regulations do not permit tank overflow water to be discharged to the storm drain system.

4.2.4.2 Radiological Considerations

- a. If potentially contaminated, moats or trenches will be sampled and counted for radiological contamination. Health Physics is responsible for the unconditional release of this water.
- b. Moat or trench water is analyzed for tritium if requested by Health Physics. The criterion for unconditional release is 6E-6 microcuries per milliliter tritium, as this is the long-term average value for rainfall in the vicinity.
- c. Sampling of the CST trench is not required if it is lined up to pump to the turbine building drain system.

4.2.5 Mobile Demineralizers

4.2.5.1 Samples are taken at sufficiently frequent intervals by Operations, to ensure proper operation of the mobile demineralizers. Sample results are used to detect depletion of ion exchange capability.

4.2.5.2 Samples will normally be required at the lead demineralizer effluent only since the influent is sampled at the tank being processed. Additional sample locations may be used to monitor overall system performance by Operations or by laboratory supervision.

4.2.5.3 Notify Operations if analysis indicates a low decontamination factor.

4.3 OPERATIONAL CHEMISTRY CRITERIA

4.3.1 Demineralizer performance may be evaluated by obtaining inlet and outlet samples and calculating decontamination factors. Refer to Subsection 4.5.1 for further instructions for calculating demineralizer D.F. Report results to laboratory supervision. If analysis indicates depleted resin, inform Operations.

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4.4 SYSTEM MONITORS

4.4.1 In-line radiation monitor, RE-0018, Waste Liquid Effluent Monitor, is located upstream of the discharge valve. For more information, refer to Procedure 34311-C, "Operation Of DRMS Liquid Release Monitors 1(2)RE-018".

4.5 USEFUL FORMULAS

4.5.1 Decontamination Factors (D.F.)

4.5.1.1 Radioactivity D.F.- to calculate the D.F.'s, divide the influent activity (for a particular isotope) by the effluent activity (for the same isotope).

4.5.1.2 Chemical D.F. - divide the monitored parameter's influent concentration by the parameter's effluent concentration.

4.6 CHEMICAL ADDITIONS

Chemicals, such as anti-foaming agent, may be added to the waste evaporators via the waste evaporator reagent tank. Chemical addition will be determined by laboratory supervision and coordinated with the Operations.

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5.0 REFERENCES

5.1 FSAR

5.1.1 Chapter 11 Sections 11.2 & 11.5

5.2 PROCEDURES

5.2.1 13214-1&2 "Liquid Waste Processing System"

5.2.2 13216-1&2 "Liquid Waste Release"

5.2.3 13290-C, "Mobile Demineralizer System"

5.2.4 30006-C, "Laboratory Safety Manual"

5.2.5 33040-C, "Compositing Samples Weekly, Monthly, Quarterly"

5.2.6 34311-C, "Operation Of DRMS Liquid Release Monitors 1(2)RE018"

5.2.7 35140-C, "Chemistry Control Of The Reactor Makeup Water Storage Tank"

5.2.8 35150-C, "Chemistry Control Of The Boric Acid Storage Tank"

5.2.9 36015-C, "Radioactive Liquid Effluent Release Permit Generation And Data Control
- Computer Method"

5.2.10 37000-C, "General Grab Sampling Technique"

5.2.11 37420-1, "Sampling of Unit One Radioactive Liquid Waste System"

5.2.12 37420-2, "Sampling of Unit Two Radioactive Liquid Waste System"

5.2.13 37420-C, "Sampling the Common Radioactive Liquid Waste System"

5.3 P&ID'S

5.3.1 1x4DB124-126 "Waste Processing System-Liquid"

5.4 Offsite Dose Calculation Manual

5.5 Technical Requirements Manual

END OF PROCEDURE TEXT

