

THREE MILE ISLAND NUCLEAR STATION
STATION HEALTH PHYSICS PROCEDURE 162912
LIQUID WASTE DISPOSAL SYSTEM SAMPLING (PERTINENT TO 2101.4-11-2)

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Cognizant Dept. Head

Unit 2 Staff Recommends Approval

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PORC comments of included
(date)

By Date

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THREE MILE ISLAND NUCLEAR STATION
STATION HEALTH PHYSICS PROCEDURE 1629.2
LIQUID WASTE DISPOSAL SYSTEM SAMPLING (PERTINENT TO 2104-4.1)
(UNIT 2 ONLY) •

1.0 PURPOSE

This procedure describes the samples that must be taken of various radioactive liquids prior to utilizing the liquid in another operation or prior to transferring the liquid to other components of the liquid waste disposal system.

2.0 DISCUSSION

The liquid waste disposal system has been engineered to maintain radioactivity levels in liquids at or below designated values. The major components of the system are tanks, pumps, pre-coat filters, demineralizers, evaporators, coolers, and floor and equipment drains with associated sumps. The liquid waste disposal system provides operating service functions to the primary system and spent fuel pools in addition to the collection, containment and processing of miscellaneous wastes for re-use or disposal. The functions are as follows:

- 2.1 Operating service functions to primary system and spent fuel pools.
 - 2.1.1 Chemical shim and volume control for primary system.
 - 2.1.2 Pressurizer relief suppression, containment and collection.
 - 2.1.3 Drain and fill primary system.
 - 2.1.4 Clean-up spent fuel pool water.
 - 2.1.5 Process primary coolant and refueling water for re-use or disposal.

- 2.1.6 Process spent fuel pool water for re-use or disposal.
- 2.2 Miscellaneous Functions of the LWDS:
 - 2.2.1 Process miscellaneous wastes from:
 - 2.2.1.1 Radioactive laboratory drains,
 - 2.2.1.2 Building and equipment drains,
 - 2.2.1.3 Regeneration of deborating resins,
 - 2.2.1.4 Discharge of spent resins from demineralizers.
 - 2.2.2 Process radioactive laundry and shower drain waste for disposal.
 - 2.2.3 Safely dispose waste liquids from both functions to the river.
- 2.3 The amount of radioactivity in the liquid is dependent on the use of that liquid at the nuclear station. Primary coolant is expected to have higher radioactivity levels than water used in the laundry of contaminated clothes. It follows that specifications as to the acceptable level of radioactivity in liquids to be used for one purpose will differ considerably from those used for another purpose. In order to verify the radioactivity level in a liquid, samples are taken and analyzed for gross beta-gamma activity. The liquids are then treated by filtration, demineralization and/or evaporation, as required.
- 2.4 Liquid waste disposal system piping is so arranged that all liquids collected in equipment of either the primary coolant or miscellaneous waste chains must be routed through the reactor coolant evaporators and the Evaporator Condensate demineralizers and be collected in the evaporator condensate test tanks before they can be discharged to the mechanical draft cooling towers.
- 3.0 REFERENCES
- 3.1 FSAR Volume 8.

3.2 2104-4.1, Liquid Waste Disposal System.

3.3 10CFR20.

3.4 10CFR50.

3.5 2104-1.11, Nuclear Plant Sampling.

3.6 1950, Determination of Tritium, 1929, Determination of Solids,
Suspended and Dissolved, 1912, Determination of Boron, 1900, Determination
of pH, 1901, Determination of Conductivity.

4.0 EQUIPMENT

4.1 End-window G-M detector.

4.2 GeLi detection system.

4.3 Sampling container.

5.0 OPERATING INSTRUCTIONS

5.1 Liquid radioactive samples will be collected either in the Nuclear
Sampling Room (elevation 305') or locally. Procedures for collecting
samples from the Nuclear Sampling Room are found in 2104-1.11,
Nuclear Plant Sampling. Those samples collected in the Nuclear
Sampling room are:

5.1.1 Discharge Waste Transfer Pumps.

5.1.2 Evap. Cond. Test Tank WDL-T-9A/B.

5.1.3 Neutralizer Tank WDL-T-8A/B.

5.1.4 Evap. Cond. Demin 3A/B.

5.1.5 Clean Up Demin.

5.1.6 R.C. Evap. Outlet.

5.2 The local samples to be taken are as follows:

Spent Resin Storage Tank WDS-T-1A and B.

Reclaimed Boric Acid Tank WDS-T-3.

Conc. Waste Tank WDS-T-2.

Contaminated Drain Tank WDL-T-11A/B.

5.2.1 Neutralizer Waste Storage and Feed Tanks

5.2.1.1 The two tanks involved in neutralization of lithium hydroxide and flush solutions used to regenerate the resins of the Deborating Demineralizers is used for this purpose 2 or 3 times within an approximate two months span at the end of a core lifetime. However, the functions of the neutralizer system have been expanded to include storage capacity for emergency transfers from the miscellaneous Waste Hold-up Tank (WDL-T2) and the Contaminated Drain Tank (WDL-11A/B) and the capability to neutralize, or add anti-foam agent to, miscellaneous and laundry wastes prior to their evaporation in the miscellaneous waste evaporator. There is also provision for recirculation and sampling prior to releasing via the MDCT.

5.2.1.2 If the Neutralizer Tank is essentially empty when a new batch of waste is transferred into it and if an adequate sample and analysis for the new batch does not have to be resampled before processing. However, if the neutralizer tank is not empty when the new batch is transferred into it or if the sample analysis for the new batch does not have the necessary information, the new batch shall be resampled and analyzed before processing.

5.2.1.3 The analysis on the pre-neutralization samples shall include a gross beta-gamma activity determination. This determination shall be made in accordance with 1950.

5.2.1.3.1 Neutralizer Tank WDL-T-8A/B

5.2.1.3.2 To sample the tanks notify operations to put the tank to be sampled on recirculation for at least (6 hours).

- 5.2.1.3.3 Collect a sample from Tank A by opening WDL-V246A and SN-V184.
- 5.2.1.3.4 Allow the sample line to purge for approximately (15 gal).
- 5.2.1.3.5 Close SN-V184; open SN-V133 and SN-V76.
- 5.2.1.3.6 Allow a minimum of two sample volumes to flow.
- 5.2.1.3.7 Collect sample.
- 5.2.1.3.8 At the completion of sampling notify the control room and close all associated sample valves.
- 5.2.1.3.9 For Sampling Tank B open WDL-V246B and SN-V68.
- 5.2.1.3.10 Allow the sample line to purge for approximately (15 gal).
- 5.2.1.3.11 Close SN-V68; open SN-V67 and SN-V92.
- 5.2.1.3.12 Allow a minimum of two sample volumes to flow.
- 5.2.1.3.13 Collect sample.
- 5.2.1.3.14 When the sampling is complete notify the control room and close all associated sample valves.
- 5.2.1.4 The sampling from the Evaporator Condensate Demineralizers is performed at the Unit 2 Sample Sink.
 - 5.2.1.4.1 Demineralizer A (WDL-K-3A) is samples by opening valves WDL-V-82A; SN-V194 and SN-V56.
 - 5.2.1.4.2 Allow the sample line to purge for approximately (15 gal).
 - 5.2.1.4.3 Close SN-V56; open SN-V55 and SN-V84.
 - 5.2.1.4.4 Purge at least two sample volumes.
 - 5.2.1.4.5 Collect Sample.
 - 5.2.1.4.6 Close WDL-V82A; SN-V55; SN-V84; SN-V194.
 - 5.2.1.4.7 Demineralizer B (WDL-K-3B) is sampled by opening valves WDL-V82B; SN-V195 and SN-V46.

- 5.2.1.4.8 Allow the sample line to purge for approximately 15 gal.
- 5.2.1.4.9 Close SN-V47; open SN-V47 and SN-V76.
- 5.2.1.4.10 Purge at least two sample volumes then collect the sample.
Return all related sample valves to the closed position
after sampling is complete.
- 5.2.1.5 Concentrated Waste Tank
 - 5.2.1.5.1 Prior to transferring concentrated Waste from the Concentrated
Waste Storage Tanks to the Unit 1 C.W.T's a sample must
be taken and analyzed for dissolved solids concentration,
gross beta-gamma activity level and boron content. (See
1929; 1950 and 1912).
 - 5.2.1.5.2 The sample will be collected locally.
 - 5.2.1.5.3 Notify operations to place the tank on recirculation for
at least (9 hours).
 - 5.2.1.5.4 Collect the sample by opening valves WDS-V69 and WDS-V70.
 - 5.2.1.5.5 Close WDS-V69 and WDS-V70 after sampling is complete and
notify the control room.
- 5.2.1.6 Evaporator Condensate Test Tank
 - 5.2.1.6.1 Notify the control room to put the tank to be sampled on
recirculation for at least (7 hours).
 - 5.2.1.6.2 At the end of the recirculation time open valve WDL-V95A
and SN-V49.
 - 5.2.1.6.3 Allow the sample line to purge for approximately (15
gal).
 - 5.2.1.6.4 Close SN-V49; open SN-V50 and SN-V141.
 - 5.2.1.6.5 Allow a minimum of two sample volumes to flow.

- 5.2.1.6.6 Collect sample.
- 5.2.1.6.7 For Sampling Tank B (WDL-T-9B).
- 5.2.1.6.8 Perform step 5.2.1.6.1.
- 5.2.1.6.9 At the end of the recirculation time open valve WDL-V95B and SN-V52.
- 5.2.1.6.10 Allow the sample line to purge for approximately (15 gal).
- 5.2.1.6.11 Close SN-V52; open SN-V53 and SN-V142.
- 5.2.1.6.12 Allow a minimum of two sample volumes to flow.
- 5.2.1.6.13 Collect Sample.
- 5.2.1.6.14 When Sampling is complete, notify the control room.
- 5.2.1.6.15 Return all associated sampling valves to the closed position.
- 5.2.1.7 Sampling Reclaimed Boric Acid Tank WDS-T-3.
 - 5.2.1.7.1 Each batch of reclaimed boric acid from the Reclaimed Boric Acid Tanks shall be sampled and analyzed prior to transfer to the Concentrated Waste Storage Tanks, to the Reactor Coolant Evaporator Feed Tank to the Unit 1 Concentrated Waste Tank or to the Reactor Coolant System by way of the Boric Acid Pumps. The analysis shall include a gross beta-gamma activity determination according to PCP 1950.
 - 5.2.1.7.1 Notify control room to put the Reclaimed Boric Acid Tank on recirculation.
 - 5.2.1.7.2 Allow the tank to recirculate for at least (5 hours).
 - 5.2.1.7.3 The sample is collected locally by opening WDS-V113A and WDS-V113B.

- 5.2.1.7.4 At the completion of sampling close all sample valves and notify the control room.
- 5.2.1.8 Resin Storage Tanks.
 - 5.2.1.8.1 Caution is to be exercised when sampling resin because of the possibility of excessive radiation levels. The best methods possible shall be employed to determine what the radiation levels are of the material being sampled before sampling takes place.
 - 5.2.1.8.2 Spent Resin is sampled locally by carefully opening WDS-V24 then Slowly opening WDS-V81. Place a High Range B-y instrument near the sample point and if levels reach 500 MR/hr discontinue sampling by closing WDS-V81 and WDS-V24.
 - 5.2.1.8.3 Place sample on a shielded container if necessary to minimize exposure.
 - 5.2.1.8.4 Notify operations when sampling is completed.
- 5.2.1.9 Clean up Demineralizers
 - 5.2.1.9.1 Notify operations to line up Demin A or B to the common sample point through valve WDL-V66.
 - 5.2.1.9.2 Open valve WDL-V66; SN-V43 and allow the sample line to purge for approximately (15 gal).
 - 5.2.1.9.3 Close SN-V43; open SN-V44 and SN-V78.
 - 5.2.1.9.4 Allow a minimum of two sample volumes to flow.
 - 5.2.1.9.5 Collect sample.
 - 5.2.1.9.6 Notify control room when sampling is completed and return all associated sampling valves to the closed position.

5.2.1.10 Reactor Coolant Evaporator Outlet

- 5.2.1.10.1 Notify control room that a sample is to be taken from the R.C. Evap. outlet.
- 5.2.1.10.2 Open WDL-V520 and SN-V137. .
- 5.2.1.10.3 Allow the sample line to purge for approximately (15 gal).
- 5.2.1.10.4 Close SN-V137; open SN-V136 and SN-V75.
- 5.2.1.10.5 Allow at least two sample volumes to flow.
- 5.2.1.10.6 Collect sample.
- 5.2.1.10.7 At the completion of the sampling notify the control room and return all sample valves to the closed position.

5.2.1.11 Contaminated Drain Tank

- 5.2.1.11.1 Notify the control room that a sample is to be taken of Drain Tank WDL-T-11A and request that it be put on recirculation.
- 5.2.1.11.2 Allow the tank to recirculate for at least (2 hours).
- 5.2.1.11.3 Collect a local sample by opening WDL-V341A and WDL-V1068A.
- 5.2.1.11.4 At the completion of sampling close all associated sample valves and notify the control room.
- 5.2.1.11.5 For sampling Contaminated Drain Tank WDL-T-11B.
- 5.2.1.11.6 Notify the control room that a sample is to be taken of Drain Tank WDL-T11B and request that it be put on recirculation.
- 5.2.1.11.7 Allow the tank to recirculate for at least (2 hours).
- 5.2.1.11.8 Collect a local sample by opening WDL-V341B and WDL-V1068B.
- 5.2.1.11.9 At the completion of sampling close all associated sample valves and notify the control room.

TMI DOCUMENTS

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