LIQUID RADWASTE SAMPLING AND ANALYSIS

1.0 OBJECTIVE

1.1 To establish sampling methods and analysis requirements for batch and/or continuous release of liquid effluent from radioactive and potentially radioactive waste systems as required by Station Technical Specifications, Reg. Guide 1-21 (1974), and Reg. Guide 4.15 (1979).

2.0 REFERENCES

2.1 SONGS-1 Technical Specification

2.2 SO123-C-3, Chemistry Section, Tech Specs Surveillance Requirements

2.3 SO1-III-5.0, Effluent Monitoring Program

2.4 SO1-III-5.2.0, Effluent Sampling & Analysis

2.5 Reg. Guide 1.21 (1974)

2.6 Reg. Guide 4.15 (1979)

3.0 PREREQUISITES

3.1 A request for liquid effluent release from the Watch Engineer has been received or a Station Technical Specification surveillance for a continuous release is due.

3.2 Sample containers and sampling accessories as required.

4.0 PRECAUTIONS

4.1 Check the applicable radiation and contamination survey information and REP requirements and use them to assist in maintaining your exposure ALARA. Handle radioactive materials with care to avoid spreading contamination.

4.2 Wear appropriate face and eye protection equipment when sampling pressurized systems.

5.0 CHECK-OFF LISTS

Not Applicable

6.0 PROCEDURE

6.1 Radwaste Holdup Tanks

There are three radwaste holdup tanks, each with a dedicated liquid level indicator (East: LI-7; Center: LI-8, and West: LI-9), and one common sampling location. Prior to sampling, the tank contents shall be recirculated for a minimum of four hours to insure a representative sampling. Proceed as follows for sampling and analysis.

6.1.1 Representative Sampling

.1 Check with the Control Operator or the Watch Engineer to verify that the contents of the holdup tank identified on the release request have been recirculating for four hours

.2 Proceed to the holdup tank pump area and visually verify recirculation pump operation and pump suction valve alignment.

.3 Open sample valve and purge the sample line at approximately one liter per minute flow for one minute.

.4 Obtain a clear 250 ml volume sample container with a screw on cap and label. Record holdup tank identification (Holdup Tank - East, Center or West).

.5 Collect 250 ml of the holup tank liquid in the sample container and secure the container cap. Close sample valve.

.6 Record date and time (to the nearest minute) of the sample collection on the sample container label.

.7 Record the holdup tank liquid level indicator (located at the South wall) reading on the sample container label.

.8 Notify the Control Room that the sampling has been accomplished and recirculation may be secured.

.9 Take the sample to the Radiochemistry Laboratory for analysis for gamma emitters, gross alpha and tritium.

.10 Save sample.

6.0 PROCEDURE (Continued)

6.2 Radwaste Monitor Tanks

There are two monitor tanks, identified as North and South, each with a dedicated liquid level indicator. Prior to sampling, the monitor tank contents must be mixed by recirculating for two hours to ensure representative sampling. Proceed as follows for sampling and analysis.

6.2.1 Representative Sampling

.1 Check with the Control Operator or the Watch Engineer to verify that the contents of the Monitor Tank identified in the release request have been recirculating for two hours.

.2 Proceed to the monitor tank pump area and visually verify recirculation pump operation and pump suction valve alignment.

.3 Obtain a clean, dry 250 ml volume labeled sample container with a screw-on cap. Record monitor tank identification (Monitor Tank - North or Monitor Tank - South) on the sample container label.

.4 Open the sample valve and purge the sample line at approximately one liter per minute flow for a minimum of one minute.

.5 Collect 250 ml of the monitor tank liquid sample in the sample container and secure the container cap. Close the sample valve.

.6 Record date and time (to the nearest minute) of sample collection on the sample container label.

.7 Record the monitor tank liquid level gauge reading from the sight glass of the tank sampled.

.8 Notify Control Room that the sampling is complete and recirculation may be secured.

.9 Take the sample to the Radiochemistry Laboratory for analysis for gamma emitters, gross alpha and tritium.

.10 Save sample for inclusion in composite should composite sampler not provide a composite sample.

6.0 PROCEDURE (Continued)

6.3 Liquid Radwaste Release Composite Sampler

The liquid radwaste release composite sampler should be in service on all Holdup Tank and Monitor Tank releases greater than 900 gallons. The composite sampler draws a small volume of sample for each 300 gallons of liquid released. Setting up the composite sampler for sampling a release is normally done by operations. Proceed as follows for the operation of the compositor.

6.3.1 Representative Sampling

.1 Open the flow integrator and set the selector valve for the 0-10 gpm or 0-100 gpm flow positions, depending on the orifice selected for use.

.2 Immediately after a release flow is established, fully open the metering valve. Depress (and hold) the "Purge" button on the Radwaste Control Board and flush the sample line to waste for one minute.

.3 Adjust the metering valve and agastat settings as specified on the radioacative liquid release permit.

.4 Obtain a two liter liquid sample container with a label. Record release number and source identification (e.g., E Holdup or N Monitor Tank) on the sample container label. Designate type of sample as "Composite".

.5 Place the sample container under the sampling location.

.6 After completion of sampling transfer "composite" sample to radiochemistry laboratory for analysis for gamma emitters, gross alpha and trituim.

.7 Notify the Chemical Foreman or the Watch Engineer that sampling has been completed.

.8 Save sample for inclusion in monthly composite sample as per Section 6.12.

6.4 Liquid Radwaste Effluent

This sample point represents the final effluent of a holdup tank or monitor tank release. It is downstream of the gas stripper and discharge filter. The liquid radwaste effluent sampling location is next to the gate to the gas stripper and flash tank. Sampling of liquid effluent is done after a release has been initiated. The sampling requirements of Ref. 2.4 dictate when it is necessary to obtain three samples, one each at the start, midpoint, and end of the release progress.

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6.0 PROCEDURE (Continued)

6.4.1 Representative Sampling

.1 Check the circular graph on the Radwaste Control Board (centrally located in lower radwaste) to verify liquid radwaste effluent flow.

.2 Open sample valve and purge sample line at ~1 liter/min flow for a minimum of five minutes.

.3 Collect a 250 ml sample in a 250 ml sample container. Close sample valve.

.4 Label the sample as appropriate (whether taken at "start", "mid", or near the "end" of the release in progress), and identify source, time and date.

.5 Send the sample to the radiochemistry laboratory for analysis for gamma emitters.

.6 Save sample for inclusion in release composite should the release composite sampler not be in service.

6.5 Steam Generator Blowdown

6.5.1 Steam generator blowdown samples are normally collected for activity analysis during operation under three conditions:

.1 Feedwater $^{3}H > 1.0 \times 10^{-4}$ µCi/cc.

.2 Unit Load Reduction.

Cesium hideout returns to solution from sludge deposits.

.3 Steam Generator Sludge Blowdown.

Cobalt isotopes present in the sludge are discharged during the periodic sludge blowdown procedure. ORMS Channel 1216 may alarm due to high activity during these periods.

.4 Sampling and analysis of steam generator blowdown should be carried out under the above conditions as indicated in Attachment 8.1.

.5 Record data concerning these releases on Attachment 8.2.

.6 Prepare a Radioactive Release Permit for each composite sample as required.

6.0 PROCEDURE (Continued)

6.6 Radwaste Ion Exchangers (A, B, C or D)

6.6.1 These samples are used to evaluate the performance of the ion exchanger(s) in service during holdup tank processing or liquid radwaste discharge. Normally, inlet and outlet samples of each ion exchanger in service are required.

.1 Check the circular chart recorder (R-10) on the radwaste control board centrally located in lower radwaste. This chart records all processing and release flow data. Verify that flow for the process to be sampled is stable and has been in progress for a minimum of 15 minutes.

.2 The inlet and outlet sample lines for the process ion exchangers A, B, C and D are located in the valving corridor east of the base of the stairway descending into lower radwaste.

.3 Trace the sample line from the root valve to verify that the correct sample is collected.

.4 Open the sample valve and purge the line at ~ 1 liter per minute for a minimum of five minutes.

NOTE: If sampling the outlet of an ion exchanger flowing to an empty holdup tank, the sample may be under negative pressure. Check the pressure indicator for the appropriate ion exchanger (PI 191, PI 192, PI 193, PI 194). If a negative pressure is indicated, contact the control operator to have the ion exchanger outlet valve throttled.

6.7 Oily Waste Sump Effluent

6.7.1 This sample point represents the composite of the reheater sump and various other turbine plant flow paths. It is normally sampled on a weekly basis unless activity is suspected or found to be present. In the latter case, periodic sampling may be initiated as necessary to evaluate the release. (See schedule in Attachment 8.1).

.1 The oily waste sump sample point is located just outside the vital area fence on the west side of the condensate storage tank.

.2 Open the sample valve and purge the line at ~ four liters per minute for at least one minute.

.3 Collect samples as required. A four liter Marinelli sample is normally required for counting on the (GeLi) detector system.

6.0 PROCEDURE (Continued)

6.7.1.4 Any activity (total Ci) found and reported (in an existing release permit) for the SGBD must be subtracted from the results reported for the oily waste sump.

.5 Prepare a Liquid Radioactive Waste Release Permit for any activity found in excess of that reported for the Steam Generator Blow Down.

.6 Save an appropriate amount of each release sample for the inclusion in the release composite. (See Attachment 8.1).

6.8 Yard Drain Sump

6.8.1 The yard drain sump is located west of the hypochlorite tank. Samples are collected from beneath the wooden grating by lowering a sampling device into the sump.

.1 A four liter Marinelli sample is normally counted on the (GeLi) detector system. (See Attachment 8.1).

.2 If activity is detected, the source of the activity shall be determined and a Liquid Radioactive Release Permit prepared. Do not include activity which is accounted for in any other Liquid Radioactive Release Permit.

.3 Save an appropriate amount of each sample for inclusion in the release composite. (See Attachment 8.1).

6.9 Reheater Pit Sump

6.9.1 The reheater pit sump is located in the north end of the reheater pit area. Samples are collected from this location only to evaluate the source of activity present in the oily waste sump. If activity present in the reheater sump is due to a spill in the reheater sump area, add flush water to the reheater sump to expedite removal of activity from this source. Release permits are normally not required since these are issued at the discharge from the oily waste sump.

.1 Collect sample by lowering sample device into sump.

6.10 Sewage Treatment Plant Effluent

6.10.1 The sewage treatment plant effluent sample is taken from beneath the grating directly east of the chlorinator in the north sewage treatment train in the northwest corner of the sewage treatment plant. Samples are collected to evaluate possible discharge of activity which could result from inadvertent contamination of this system.

6.0 PROCEDURE (Continued)

6.10.1.1 Collect sample with the bucket provided at the chlorinator.

.2 Take sample to radiochemical laboratory for analysis for gamma emitters and tritium.

.3 Prepare a Liquid Radioactive Release Permit for any activity found.

.4 Save sample for inclusion in release composite sample. (See Attachment 8.1).

6.11 Feedwater

6.11.1 Samples are collected from the feedwater sample point in the turbine plant laboratory whenever the concentration of tritium in the feedwater $\geq 1.0 \times 10^{-4}$ µCi/cc.

.1 Collect a 50 ml sample daily from each the east and west feedwater trains and store in a gallon polyethylene container. Save these daily samples and analyze the resulting composite weekly for gamma emitters and tritium.

.2 Determine the total volume released and prepare a Liquid Radioactive Release Permit.

.3 Save the weekly feedwater composite for inclusion in the monthly composite.

6.12 Monthly Composites

6.12.1 Batch Release Composite

Prepare a monthly liquid composite from aliquots from each batch release sample as collected in this procedure. The aliquot shall normally be in the ratio of 10 ml per 1,000 gallons of effluent. This composite shall contain >1<4 liters total volume.

6.12.2 Analyze the monthly composite for gamma emitters, gross alpha, gross beta, and tritium.

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6.0 PROCEDURE (Continued)

6.12.3 Transfer 500 ml to a 500 ml plastic bottle for shipment to EAL for analysis.

6.12.4 Save remainder of sample.

7.0 RECORDS

7.1 Each release permit shall be filed in CDM under Encode CN05-AY. The transfer of these records shall occur quarterly.

8.0 ATTACHMENTS

8.1 Continuous Effluent Sampling Schedule

8.2 Radioactive Effluent Composite Log

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CONTINUOUS RADIOACTIVE EFFLUENT SAMPLING SCHEDULE

Steam Generator Blowdown

Blowdown Valve Turns Open	Flowrate, GPM -Total for 3 SG	Sample* Interval	Analysis** Frequency, (min)
0	15 (900 GPH)	Daily	3 X Wk
1/4	69 (4140 GPH)	6 Hr	Daily
1/2	123 (7380 GPH)	3 Hr	12 Hrs
3/4	165 (9900 GPH)	2 Hr	8 Hrs
1	210 (12,600 GPH)	1 1/2 Hr	6 Hrs
1 1/2	270 (16,200 GPH)	1 1/2 Hr	6 Hrs
2	315 (18,900 GPH)	1 Hr	4 Hrs
2 1/2	375 (22,500 GPH)	1 Hr	4 Hrs

*Composite sample at ratio of 500 ml (167 ml/SG) per ~ 20,000 gal blowdown

**Analyze sample (1 or 4 liters) corresponding to ~ 80,000 gal increments of blowdown

OILY WASTE EFFLUENT

Flowrate 375 GPH (9000 GPD)

1. Composite sample

1.1 Composite sample at ratio of 250 ml per ~ 10,000 gal flow every 24 hours.

1.2 Analyze sample (1 or 4 liters) corresponding to ~ 10,000 gal every 24 hours.

YARD DRAIN SUMP EFFLUENT

Flowrate 3,625 GPH (87,000 GPD)

1. Composite sample

1.1 Composite at ratio of 500 ml per ~ 20,000 gal flow every 6 hours.

1.2 Analyze sample (1 or 4 liters) corresponding to ~ 80,000 gal every 24 hours.

SEWAGE TREATMENT PLANT EFFLUENT

Flowrate 730 GPH (17,500 GPD)

1. Composite sample

1.1 Composite at ratio of 250 ml per ~ 10,000 gal at peak flow periods (10:00 a.m. and 4:00 p.m.)

1.2 Analyze sample (1 or 4 liters) corresponding to ~ 20,000 gal flow every 24 hrs.

RADIOACTIVE EFFLUENT COMPOSITE LOG

Source: _____ Release Permit # _____

Activity Detected: Date: _____ Time: _____

Release Backdated to: Date: _____ Time: _____

Comments _____

Date	Time	Effluent Flowrate	Volume Released This Sample Period	Volume Released Total	Composite Volume This Sample Period	Composite Volume Total	Technician

Comments _____

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