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SAMPLING OF WASTE GAS DECAY TANKS AND REACTOR BUILDING

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THREE MILE ISLAND NUCLEAR STATION STATION HEALTH PHYSICS PROCEDURE 1631.2 SAMPLING OF WASTE GAS DECAY TANKS AND REACTOR BUILDING (Unit #2 Only) •

1.0 PURPOSE

The purpose of this procedure is to explain the operations required to sample a Waste Gas Decay Tank (WGDT) or the Reactor Building.

2.0 DISCUSSIONS

The Radioactive Gases released (at a controlled rate) from TMI are primarily from Waste Gas Decay Tanks and Reactor Building Purges. Prior to the releasing radioactive gases from these sources, a representative sample must be taken to assure adherence to the Technical Specifications.

3.0 REFERENCES

3.1 Victoreen Radiation Monitoring System Instruction Manual.

3.2 H.P.P.1605 - Portable Air Sampling for Radioactive Particulates.

3.3 H.P.P 1607 - Air Sampling for Radioactive Gas.

3.4 H.P.P. 1608 - Air Sampling for Tritium.

3.5 H.P.P 1622 - Releasing Radioactive Gaseous Wastes.

3.6 P.C.P 1958 - Gamma Spectrometry.

4.0 EQUIPMENT

4.1 Marinelli Beaker or appropriate sample container.

4.2 Geli Detection System.

4.3 Tritium Sampling Jars.

4.4 Demineralized Water.

4.5 Stop Watch.

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- 4.6 Liquid Scintillation Detection System.
- 5.0 OPERATING INSTRUCTIONS
- NOTE: Prior to and upon completion of sampling a Waste Gas Decay Tank or the Reactor Building notify the Shift Supervisor. 5.1 Waste Gas Decay Tanks (WGDT).
- 5.1.1 Upon request from the Shift Supervisor for analysis of a gaseous sample of a WGDT, a Rad. Chem. Tech./Jr. will proceed to the Hays Gas Analyzer Room, Auxiliary Building 305' Elev. with a Marinelli Beaker, or appropriate sample container, and a Tritium Sample Jar with 100 ml. of demineralized water in the jar.
- 5.1.2 Sampling Waste Gas Decay Tank A or Tank B.
 - <u>NOTE</u>: When sampling requires use of a syringe and a 5 cc glass vial method, refer to H.P.P 1607 for instrucitons.
- 5.1.2.1 Insure valves RSR-FV1 through RSR-FV11 are closed.
- 5.1.2.2 Using quick disconnect fittings, insert the sample container between valve RSR-FV2 and flow indicator "A" on the sample panel.
- 5.1.2.3 Onpen the stop cocks on the sample container.
- 5.1.2.4 Inside the sample panel there is a pressure regualtor valve RSR-FV12. Back this valve out the entire way by turning the valve handle counter clockwise unit1 it stops.
- 5.1.2.5 Select the desired sample by placing the toggle switch Number 1 for Waste Gas decay Tank A on toggle switch number 2 for Waste Gas Decay Tank B on the front panel of the Hays Gas Analyzer in the "Active" (up) position. Place all other toggle switches in the "skip" (down) position.

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5.1.2.6 Open valve SNV-217 and RSR-FV1. Close SNV-216.

- 5.1.2.7 Turn the pressure regulator valve RSR-FV12 clockwise until the pressure gauge (larger one with range 0-5 PSIG) reads one and one half (1-1/2) pounds.
 - NOTE: At four (4) pounds pressure the solonoid valve automatically closes.
- 5.1.2.8 Put on face shield.
- 5.1.2.9 Open valves RSR-FV2, RSR-FV10, RSR-FV11 and SNV-218.
- 5.1.2.10 Adjust the flow on flow meter "A" to 1000 cc/min.
- 5.1.2.11 Purge the container for a minimum of three (3) minutes.
- 5.1.2.12 After the sample container has purged for the allotted time close the stop cocks.
- 5.1.2.13 Close valves SNV-217, RSR-FV1, RSR-FV2, RSR-FV10, RSR-FV11 and SNV-218. Open SNV-216.
- 5.1.2.14 Return all toggle switches at the Hays Gas Analyzer Auto Scanner to the same position as found prior to sampling.
- 5.1.2.15 Remove the sample container from the sample panel.
- 5.1.2.16 Take the sample to the Radio Chem. Lab vent hood and open a stop cock just enough to relieve any excess pressure in the sample containers. Close the stop cock.
- 5.1.2.17 Take samples to laboratory and analyze in accordance with applicable H.P. and Chem. Procedures.
- 5.1.3 Sampling Waste Gas Decay Tank A or Tank B for Tritium.
- 5.1.3.1 Insure valves RSR-FV1 through RSR-FV11 are closed.
- 5.1.3.2 Insert the Tritium sample jar, containing 100 ml of demineralized water, between valve RSR-FV4 and flow indicator "C".

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- 5.1.3.3 Inside the sample panel there is a pressure regulator valve RSR-FV12. Back this valve out the entire way by turning the valve handle counter clockwise until it stops.
- 5.1.3.4 Select the desired sample by placing the toggle switch number 1 for waste Gas Decay tank A or toggle switch number 2 for Waste Gas Decay Tank B on the front panel of the Hays Gas Analyzer in the "Active" (up) position. Place all other switches in the "Skip" (down) position.
- 5.1.3.5 Open valve SNV-217 and RSR-FV1. Close SNV-216.
- 5.1.3.6 Turn the Pressure Regulator Valve RSR-FV12 slowly clockwise until the pressure (larger gauge with range 0-5 PSIG) reads three (3) pounds.
 - <u>NOTE</u>: At four (4) pounds pressure the solonoid valve automatically closes.
- 5.1.3.7 Put on a face shield.
- 5.1.3.8 Open valves RSR-FV4, RSR-FV8, RSR-FV11 and SNV-21E.
- 5.1.3.9 Set flow on flow indicator "C" at 500 cc/min and pruge for eight (8) minutes to obtain a 4.0 X 10³ cc volume of air purged through the demineralized water.
- 5.1.3.10 At the end of the allotted time close valves SNV-217, RSR-FV1, RSR-FV4, RSR-FV8, RSR-FV11 and SNV-218. Open SNV-216.
- 5.1.3.11 Return all toggle switches on the Hays Gas Analyzer Auto Scanner to the same position as found prior to sampling.
- 5.1.3.12 Remove the Tritium sample jar from the sample panel and take to the Radio Chemistry Laboratory.
- 5.1.3.13 Prepare and analyze tritium samples as per H.P.P. 1608.

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- 5.1.4 Sampling Waste Gas Decay Tank A or Tank B for Particulate and Iodine.
- 5.1.4.1 Insure valves RSR-FV1 through RSR-FV11 are closed.
- 5.1.4.2 Diassemble the particualte and iodine sample collection chamber and place a particulate filter paper or equivalent and charcoal filter cartridge into the chamber.
 - <u>NOTE</u>: The particulate filter is to preceed the charcoal filter in the air stream so that it will not allow particulates to lodge on the charcoal filter.
- 5.1.4.3 Reassemble the correction chamber and hand tighten the collar so that no leakage takes place.
- 5.1.4.4 Inside the sample panel there is a pressure regulator valve RSR-FV12. Back this valve out the entire way by turning the valve handle counter clockwise unit1 it stops.
- 5.1.4.5 Select the desired sample by placing the toggle switch number 1 for waste Gas Decay tank A or toggle switch number 2 for Waste Gas Decay Tank B on the front panel fo the Hays Gas Analyzer in the "Active" (up) position. Place all other switches in the "Skip" (down) position.
- 5.1.4.6 Open valve SNV-217 and RSR-FV1. Close SNV-216.
- 5.1.4.7 Turn the Pressure Regulator Valve RSR-FV12 slowly clockwise until the pressure (larger guage with range 0-5 PSIG) reads three (3) pounds.
 - NOTE: At four (4) pounds pressure the solonoid valve automatically closes.
- 5.1.4.8 Open valves RSR-FV3; RSR-FV5; RSR-FV7; RSR-FV8 and RSR-F11.

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- 5.1.4.9 Adjust flow meter "C" to 5000 cc/min.
- 5.1.4.10 Record the time flow is established through the filters.
- 5.1.4.11 Allow the sample to flow and to collect for 15 minutes.
- 5.1.4.12 After 15 minutes close RSR-FV1; RSR-FV3; RSR-FV5; RSR-FV7; RSR-FV8 and RSR-FV11.
- 5.1.4.13 Remove the particulates filter and charcoal to a small plastic bag. Reassemble the collection chamber.
- 5.1.4.14 If this is the only sample to be taken close valves SNV-217 and SNV-218. Open SNV-216.
- 5.1.4.15 Return all toggle switches at the Hays Gas Analyzer Auto

Scanner to the same position as found prior to the sampling.

5.1.4.16 Remove the samples to the Laboratory and analyze for activity using appropriate procedures. Return all completed analysis to department supervision for approval.

5.2 Reactor Building Gas Sampling.

- 5.2.1 Insert the marinelli beaker between valve RSR-FV2 and flow meter "A", and open the stop cock valves.
- 5.2.2 Open valves AH-V196, AH-V197, RSR-FV1, RSR-FV2, RSR-FV3 and RSR-FV12. Throttle valve AH-V198 as necessary to obtain required flow.
- 5.2.3 Purge the marinelli beaker a minimum of eight (8) minutes at a flow rate of 500 cc/min.
- 5.2.4 Close valves RSR-FV2, RSR-FV3, RSR-FV1, RSR-FV12, AH-V196 and AH-V197. Open valve AH-V198.
- 5.2.5 Close the stop cock valves on the marinelli beaker.

5.2.6 Remove the marinelli beaker, take to the nearest gas vent, and open one of the stop cock valves to release built up pressure.

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.5.2.7 Take the sample to the laboratory for analysis as per applicable Health Physics and Chemistry Procedures.

5.3 Sampling Reactor Building for Tritium.

- 5.3.1 Install the tritium container with 100 ml of DW in holder "C" between valves RSR-FV8 and RSR-FV6.
- 5.3.2 Open valves AH-V196, AH-V197, RSR-FV1, RSR-FV8, RSR-FV6, RSR-FV5 and RSR-FV12. Throttle valve AH-V198 as necessary to obtain required flow.
- 5.3.3 Adjust the flow on flow meter "C" to 500 cc/min.
- 5.3.4 Purge the tritium bubbler for twenty (20) minutes.
- 5.3.5 Close valves RSR-FV8, RSR-FV6, RSR-FV1, RSR-FV5, RSR-FV12, AH-V196 and AH-V197. Open valve AH-198.
- 5.3.6 Remove the tritium container and take sample to the laboratory for analysis and preparation as per applicable Health Physics and Chemistry Procedures.

5.4 Sampling for Tritium Efficiency Determination.

- 5.4.1 Install three tritium jars each containing 100 ml of demineralized water on tritium bubbler holder A, B and C.
- 5.4.2 Open valves AH-V196, AH-V197, RSR-FV1, RSR-FV7, RSR-FV6, RSR-FV5 and RSR-FV12. Throttle valve AH-V198 as necessary to obtain required flow.
- 5.4.3 Adjust flow on flow meter "C" to 500 cc/min and purge for eight (8) minutes.
- 5.4.4 At the end of the purge time close valves RSR-FV1, RSR-FV7, RSR-FV6, RSR-FV5, RSR-FV12, AH-V196 and AH-V197. Open valve AH-V198.

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5.4.5 Remove the writium collection jars A, B and C. Perform a tritium analysis on A, B and C samples respectively as per applicable Health Physics and Chemistry Procedures.

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5.5 Sampling the Reactor Building for Particulates and Iodine.

5.5.1 Stop both sample pumps. Shut valve HP-IV549.

- 5.5.2 At the side of the HP-R-227 monitor loosen and separate the particulate sample holder.
- 5.5.3 Remove the filter disc and backing screen and discard filter disc as radioactive waste.
- 5.5.4 Re-install backing screen and a clean filter disc into system.
- 5.5.5 Reassemble particulate sample holder and hand tighten.
- 5.5.6 At the front of the HP-R-227 Iodine sampler loosen two wing nuts and remove charcoal filter.
- 5.5.7 Replace the charcoal cartridge with a new cartridge. The cartridge which has been removed is a radioactive charcoal sample and should be handled in accordance with applicable Health Physics Procedures.
- 5.5.8 Open valve HP-IV549. Start the Iodine/Particulate sample pump in local control. Flow should indicate 1-1.5 ccm. Throttle valve HP-IV554 as necessary to obtain proper flow rate.
- 5.5.9 Allow the sample to flow and to collect for 15 minutes.
- 5.5.10 After 15 minutes stop the Iodine/Particulate sample pump. Shut valve HP-IV549.
- 5.5.11 Remove the particulate filter and charcoal cartridge to a small plastic bag.
- 5.5.12 Reassemble as per steps 5.5.4 through 5.5.7
- 5.5.13 Open valve HP-IV549. Start both sample pumps in automatic control.
- 5.5.14 Take samples to laboratory and analyze as per applicable Health Physics and Chemistry Procedures.

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5.6 Sampling the Reactor Building for Iodine only.

- 5.6.1 Open valve HP-IV551. Close valves HP-IV550 and HP-IV552.
- 5.6.2 At the front of the HP-R-227 Iodine sampler loosen two wing nuts and remove charcoal filter.
- 5.6.3 Replace the charcoal cartridge with a new cartridge. The cartridge which has been removed is a radioactive charcoal sample and should be handled in accordance with applicable Health Physics Procedures.
- 5.6.4 Open valves HP-IV550 and HP-IV552. Close valve HP-IV551.
- 5.6.5 Allow the sample to flow and to collect for 15 minutes. <u>NOTE</u>: The flow rate should be 1 cfm.
- 5.6.6 After 15 minutes open valve HP-IV551 and close valves HP-IV550 and HP-IV552.
- 5.6.7 Remove the-charcoal filter to a small plastic bag and reinstall a new charcoal cartridge.
- 5.6.8 Record the date and time the charcoal cartridge was changed on the HP-R-227 monitor.
- 5.6.9 Open valves HP-IV550 and HP-IV552. Close valve HP-IV551.
- 5.6.10 Take sample to laboratory and analyze as per applicable Health Physics and Chemistry Procedures.

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WASTE GAS SAMPLING PANEL



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Wilda R. Mullinix, NRC

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