

Attachment 8

NYE COUNTY NUCLEAR WASTE
REPOSITORY PROJECT OFFICE

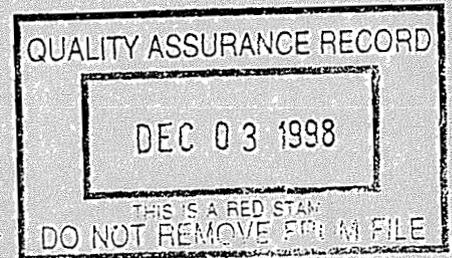


TECHNICAL PROCEDURE

TITLE: Gas Sampling Procedure of DNC#1 and other Westbay Instrumented Wells		Revision: 1 Date: 10-20-97 Page: 7 of 9
PROCEDURE No.: 9.40	SUPERSEDES:	
APPROVAL <i>Les W Bruchman</i> 11.30.98 Project Manager Date	CONCURRENCE <i>Br P. Montazer</i> <i>Kari S. Marshall</i> 11-13-98 Principal Investigator Date <i>[Signature]</i> 19-NOV 1998 Project Quality Assurance Officer Date	

CHANGE NOTICE NO. 2

EFFECTIVE DATE: 11-13-98



PURPOSE: To modify Section 5.2.4

HOW TO FILE: Remove and replace existing page 7 with new page 7.

APPROVAL: *Les W Bruchman* 11.30.98
Project Manager Date

CONCURRENCE: *[Signature]* 19 NOV 1998
Quality Assurance Officer Date

846



**NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT
OFFICE
TECHNICAL PROCEDURE**

TITLE: Gas Sampling Procedure of ONC#1 and other Westbay Instrumented Wells		Revision: 1 Date: 10-20-97 Page: 1 of 8
PROCEDURE No.: -9.40	SUPERSEDES:	
APPROVAL Les W Bradshaw 02.19.98 ----- Project Manager Date	CONCURRENCE M. Stettin 2-17-98 ----- On-Site Geotechnical Representative Date W. H. Haly 2-20-98 ----- Principal Investigator Date J. O. [Signature] 2/20/98 ----- Project Quality Assurance Officer Date	

1. PURPOSE

The purpose of this procedure is to provide instructions for gas sampling in ONC#1 and other Westbay instrumented wells. Gas sampling apparatus have been installed and are currently being monitored by the Nye County Nuclear Waste Repository Office (NWRPO) as part of the Yucca Mountain Independent Scientific Investigation Program. The implementation of this procedure ensures that gas samples collected and processed from these instrument assemblies as part of the

Nye County independent scientific investigation program meet NWRPO quality assurance (QA) requirements for scientific data.

2. SCOPE

This procedure describes activities required to conduct onsite gas sampling from well ONC#1 and other Westbay instrumented NWRPO wells. In addition, it describes activities necessary to vacuum test the downhole tubing string for any leaks, prior to sampling.

2.1 APPLICABILITY

This procedure applies to the NWRPO principal investigator (PI) or designated personnel and contractors performing the scientific investigation tasks listed in the above section. These individuals shall be referred to herein as NWRPO personnel.

2.2 TRAINING

NWRPO personnel shall be trained before conducting work and shall document that they have read and understand this procedure. Personnel performing the tasks described in this technical procedure shall be professional geoscientists or engineers with applicable previous experience. Personnel performing gas sampling as well as vacuum testing tasks shall be trained in procedures specifically applicable to the instrumentation used.

3. DEFINITIONS

MOSDAX: The instrument packages that are lowered to and connected with monitoring ports in the access tube of the Westbay downhole instrument assembly to measure pressure and temperature.

TBVPS: The Tedlar bag vacuum purging and sampling chamber.

V1, V2, V3a, V3b, V4, V5, V6: Valves in the sampling system (see Section 10).

4. RESPONSIBILITIES

The project QA Officer shall be responsible for the coordination of the internal review of this technical procedure. The PI shall be responsible for the preparation and modification of this procedure, as well as oversight of the performance of this procedure. NWRPO personnel shall be responsible for the implementation of this procedure.

5. PROCESS

This procedure controls the activities performed by NWRPO personnel related to gas sampling as well as vacuum testing for any leaks in the downhole tubing string. Any deviation from this procedure shall be documented in the field and/or office logbooks (i.e., scientific notebooks).

The performance of the tasks specified in this procedure shall be documented in scientific notebooks or computer text files, as appropriate. All documentation shall meet the requirements of YMP QAP-3.2, "Procedures for Documentation of Scientific Investigations." This procedure covers sampling of gas for Tritium, ^{14}C and CFCs. This list of chemicals may be modified at the discretion of the PI.

5.1 VACUUM TESTING OF THE DOWNHOLE TUBING STRING PROCEDURE

The following procedure should be used prior to any gas sampling:

1. Attach the well head assembly to the access tube as shown in the diagram in Figure 1.
2. Open V1, V2, V4, V5 and shut V3a, V3b, and V6.
3. Start the vacuum pump and observe the vacuum gage at V1. Allow 15 minutes for the pressure to stabilize. Shut V1 and shut the vacuum pump. Observe the pressure for 15 minutes. If the pressure has remained unchanged, there is no detectable leak in the system.

5.2 FIELD GAS SAMPLING PROCEDURES

NWRPO personnel shall carry the following items to the field:

1. This technical procedure
2. The completion report prepared by Westbay for each applicable borehole
3. The manufacturer's manual for operation of the MOSDAX assembly
4. The open and close tool operation manual
5. Flow meters and thermometer calibration sheets

5.2.1 WELL BORE SAMPLING ZONE PURGING

1. Open the specified port (refer to the open and close tool operation manual for instructions).
2. Reattach the gas sampling assembly as section 5.1 above.
3. Verify port is open by purging system and then closing V1. If pressure falls in wellbore, the port is open.
4. Pump until at least two borehole volumes have been evacuated. This ensures that the annulus is evacuated and several pore volumes are removed from the first few feet of the formation. Depending on the porosity of the formation, the volume that needs to be pumped may be larger. Generally, about 30 minutes of pumping should be allowed for every 20 feet of the open borehole. For example, a 100-ft long section would require 2.5 hours of evacuation at 2 cubic feet per minute.

5.2.2 TRITIUM SAMPLE

1. Attach the tritium cylinder to the tubes near V2. V3a and V3b are opened and V2 is shut, diverting flow through the Tritium cylinder. The cylinder should be upside down to avoid condensation entering the cylinder. About 35 grams per hour of water is adsorbed by the sieve trap. Therefore, a minimum of one hour of flow should be maintained to complete the tritium sampling.

2. Clamp the rubber tubes and detach the cylinder from the tubes. Shut V3a and b and open V2.
3. Allow flow for about 15 minutes to remove condensate that may have formed along the pipes. It may be necessary to allow some air to leak from the tube near V2 to remove condensate. After closing the clamp, 15 minutes of flow should be maintained to remove any atmospheric air that has entered the system.

5.2.3 C14 SAMPLING

1. Purge the system of atmospheric air (as described in Section 5.2.1), then slowly open V6. The Tedlar sample bags should be attached to the tie and inlet tubes between V2 and V4 and should be observed through the window in the TBVPS chamber to avoid overinflation.
2. Once both bags are inflated, V6 should be closed to allow the bags to deflate.
3. Repeat steps 1 and 2 at least 3 times to purge the bags and the tubing line of any air from sources other than the downhole air.
4. Adjust V5 as needed to reduce the vacuum in the line and increase vacuum in the TBVPS chamber. While deflating the bags into the line, V6 should be closed to ensure that no flow into the hole can occur.
5. Use care when removing the bags from the chamber. After disconnecting the bags from the tubes, and prior to sealing the entry valves to the bags, a small amount of the bag air should be allowed to escape. This would minimize contamination from atmospheric air during removal of the bags.
6. New bags can be attached and the sampling process repeated for the next interval of interest.
7. All samples should be labeled and the attached chain-of-custody form (Attachment I) be filled before shipping to the laboratory. Each sample should have a label attached to the bag near

the sample port by a string. No markings can be put on the bag itself. All samples will be marked with the following convention:

Borehole ID - Gas Type - Zone # in Borehole, Date of Sample

ex: ONC#1 - CFC - 3, 11-21-96

5.2.4 CFC SAMPLING

CFC samples can be collected either before or after ^{14}C sampling. Once the lines are purged, air shall be allowed to flow through the stainless steel while the valve to the cylinder is shut. This can be accomplished by slightly closing V2. V2 should not be shut all the way since flow in the main line needs to be maintained while sampling for CFC. After about 10 minutes, open the cylinder valve and allow for it to fill. The cylinder is under vacuum and fills by itself in about five minutes. Shut the valve and remove the cylinder. The cylinder and the stainless steel tube should be upside down to prevent condensation from entering the tube.

All samples should be shipped to the laboratory within 48 hours from sampling. Laboratory analyses will be performed by analytical facilities that are certified to use analytical methods and procedures that are consistent with industry standards and U.S. EPA-approved methods and procedures. Analytical laboratories will also be evaluated by the NWRPO QA Officer according to the controls of QAP-7.1, "Procedures for Control of Purchased Equipment and Services".

6. DATA ACQUISITION METHODOLOGY AND LIMITATIONS

This procedure does not include the handling of the samples beyond delivery to the laboratory. Contamination of the samples from atmospheric air can be reduced and proper treatment of the gas samples can be ensured if the above procedure is followed.

Flow rates, vacuum pressure readings, and temperature will be recorded every 15 minutes during the test. During purging, readings should be made at least every five minutes during the first 15 minute of the test.

7. REFERENCES

All manuals related to the installation and operation of NWRPO instruments in boreholes and the tunnels are maintained at the Nye County Geotechnical Representative's office, including, but not limited to:

- The Westbay field manual for operation of the MOSDAX instrument assembly in boreholes
- The Westbay completion report for each applicable borehole

8. RECORDS

Chain of Custody Record can be seen in Attachment I

9. ATTACHMENTS

- Figure 1 - Schematic of Gas Sampling Apparatus - "Surface Attachments"
- Attachment I - Chain of Custody Record
- Attachment II - Flow Test Sheet

10. TEST EQUIPMENT

Figure 1 is a schematic drawing of the gas sampling apparatus. The assembly connects to the downhole ports through the Westbay well-head plug which is modified to allow flow through the plug. Electrical connection to the MOSDAX probes can also be made through this modified plug during sampling or testing. A vacuum gage monitors the pressure in the tubing. The assembly has six valves. All valves except valve no. 5 (or V5) are shutoff valves. V5 is a fine flow adjusting valve.

Valves 2 and 3 (V2 and V3) control the flow into the Tritium microsieve sampling cylinder. By closing V2 and opening V3, flow will occur through the sieve trap. A majority of the moisture in

in the flow stream is adsorbed by the sieve. No other sampling should be done when this sieve is in the flow stream.

Valve 4 (V4) controls the flow-meter bypass. This valve is useful during purging when larger flow is needed and no accurate flow measurement is needed. The PI may choose not to install flow meters and thermometers as part of the gas sampling apparatus during a particular sampling event.

V5 and V6 control the Tedlar bag vacuum purging and sampling chamber (TBVPS). There is no interaction between the air that is passed through V4 and the sampling bags. The purpose of the TBVPS is only to inflate the Tedlar bags because the vacuum in the line does not allow flow into the bags unless pressure outside the bags is reduced in the chamber by opening V6 and adjusting V5 so that a pressure differential is created between the inlet to the bags and the chamber.

The vacuum pump can be any suitable vacuum pump that can create a vacuum of more than 20 kpa (0.2 bars).

11. TEST CONDITIONS

The appropriateness of the test conditions shall be determined by field personnel.

12. PERSONNEL REQUIREMENTS

There are no specific personnel requirements other than those described in Section 2.2.

13. SPECIAL ENVIRONMENTAL TEST/STORAGE CONDITIONS

There are no special requirements for environmental test or storage conditions.

14. INSPECTION HOLD POINTS

There are no applicable inspection hold points.

Figure 1 - SURFACE ATTACHMENTS

