

Bulk NTS Well Water Samples

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Bulk NTS Well Water Samples

1. PROCEDURE IDENTIFIER: TWS-INC-DP-62

INTRODUCTION

2. PURPOSE

The purpose of this procedure is to obtain, ship, and preserve bulk NTS water samples for the LANL Yucca Mountain Project (YMP) experiments.

3. SCOPE

This procedure applies to all NTS water samples collected for LANL YMP experiments.

4. APPLICABLE DOCUMENTS

- a. TWS-QAS-QP-05.2 "Preparation of a Detailed Technical Procedure"
- b. TWS-QAS-QP-07 "Procedure for Technical Review of Publications"
- c. TWS-QAS-QP-13.1 "Handling, Storage, and Shipping Procedure"
- d. TWS-MSTQA-QP-14 "Research and Development (Experimental) Procedure"

5. RESPONSIBILITIES

The PI has the responsibility of organizing and overseeing all operations. He may assign appropriate tasks to personnel trained to this DP. It is the responsibility of the users of this DP to adhere to the procedure. Investigators may direct deviations from the procedure upon approval of the responsible PI. It is the responsibility of the user to document such deviations in accordance with TWS-MSTQA-QP-14. If change requests are in process it is the responsibility of the user to document the procedure change in a water sample collection logbook. Each organization using this DP is responsible for maintaining a water collection logbook. It is the responsibility of the users of this DP to

report unplanned deviations from this procedure to the responsible PI.

6. PRINCIPLE

The water samples collected using this procedure can be used in any experiment in the LANL YMP.

7. DEFINITIONS

- a. production well = a well producing water for NTS purposes (e.g., drinking water, fire protection or road maintenance)
- b. flowing well = a well drilled for short term use (e.g., water chemistry analysis, site characterization measurements, etc.)
- c. experimental well = a well drilled on NTS to be used for scientific experiments (e.g., geological holes, hydrological holes, unsaturated zone drill holes, etc.)
- d. spring = a naturally occurring water source on NTS (e.g., Cane Springs, White Rock Springs, etc.)

PROCEDURE

8. ADEQUATE AND APPROPRIATE EQUIPMENT, INSTRUMENTATION, AND SOFTWARE

Poly-lined drums, poly bottles, glass containers, and stainless steel containers may be used to ship/store NTS water samples. A different transfer hose (tygon tubing or plastic garden hose) is used for each well to prevent cross-contamination. Household bleach (sodium hypochlorite) or acid (HNO_3) may be used to clean a container or acidify the samples.

9. PREPARATORY STEPS AND VERIFICATION

Coordinate the collection date with the responsible organization (e.g., REECo and USGS). The containers to be used for collection must be shipped to NTS or be available at the NTS warehouse prior to sample collection. The transfer hose is also shipped to NTS prior to sample collection. The hose may be stored at NTS and used again for the same

well. When in storage the hose is placed in a plastic bag, labelled with the well name and previous user's name.

Prior to collection, determine whether the containers are suitable for sample collection. If the container is to be cleaned, record in the logbook the cleaning agent utilized. If the sample must have long-term storage capability, household bleach (1 part to 10 parts water) may be used to clean the container. Before sample collection, purge the collection system (well stem, transfer hose, and collection vessel) for a minimum of 30 minutes using water from the source being sampled.

If any chemical needs to be added to the water collected, it should be added prior to water collection. Acid (1 part to 50 parts water) may be added to the sample to stabilize the water and prevent precipitation. Record in the logbook, the chemical added and the amount.

Logbook Entries

Verify that the following entries have been made in the logbook prior to sample collection:

- a. unique identifier for sample(s) to be collected (location, date, collector's initials, and 24-hour time upon initiation of sample collection).
- b. type of container used for collection.
- c. cleaning agent used (if any).
- d. chemical added and amount (if any).

10. SUITABLE AND CONTROLLED ENVIRONMENTAL CONDITIONS

The conditions required for water collection vary with the investigator's needs. Record special conditions such as collection under inert atmosphere in the logbook.

11. COLLECTION STEPS AND ACCEPTANCE OR REJECTION CRITERIA

Water samples may be collected from any NTS source, such as, flowing, production, or experimental wells and springs. The sampling technique differs depending on the type

of the NTS water source. In the case of a production well, ensure that the water comes directly from the well and does not come in contact with other components of the well system, such as chlorinator or storage tank. Samples collected from a flowing well are easily obtained by connecting the transfer hose directly to the outlet of the well. Different types of samples can be collected from an experimental well. The sampling technique determines the type of sample collected. For instance, downhole samples are collected at depth in the absence of a pump. Alternatively, if a pump is installed in the experimental well, the well can be sampled as a flowing well. Spring water samples are collected at the head of the spring.

Collect water samples using the appropriate technique. After the containers are filled and shipped to their final destination, cation and anion chemical analysis should be performed on a sample of the water collected. Periodically, samples of the stored water should be sent for re-analysis. For example, they could be included as blanks or standards each time other experimental samples are analyzed.

Logbook Entry

Record the type of water source sampled and the sampling technique used. Attach the results of the chemical analyses to the logbook. The investigator should inspect the most recent analysis prior to using the collected water for his experiment(s). If the collected water is representative of the type of water needed for the experiment, the investigator may proceed.

12. POTENTIAL SOURCES OF UNCERTAINTY AND ERROR

Malfunctioning of the equipment used can lead to the collection of contaminated water samples. Sample contamination can be detected by inspection of the water chemical analysis described in section 11.

13. METHOD OF DATA REDUCTION

No methods of data reduction are employed in this DP.

14. METHODS OF RECORDING AND STORING DATA AND RESULTS

Logbook Entries

Each organization using this DP should maintain a water collection logbook. The information required for preparatory verification (outlined in section 9) must be recorded in the logbook. Record special conditions used for water collection in the logbook at collection time (see section 10). Record the type of water source and sampling technique used. Keep the chemical analysis of the water collected in the logbook (see section 11).

Notebook Entry:

Record the unique identifier of the water sample, specified in section 9, in the laboratory notebook.

15. SAMPLE/SITE TRACEABILITY

A unique identifier will be assigned to the water sample collected. The identifier consists of the location, date, collector's initials, and 24-hour time upon initiation of sample collection.

QUALITY ASSURANCE REQUIREMENTS

16. QUANTITATIVE OR QUALITATIVE ACCEPTANCE CRITERIA FOR DETERMINING THAT ACTIVITIES HAVE BEEN SATISFACTORILY ACCOMPLISHED

Logbook Entries

Verify that all necessary information for the collected sample(s) is recorded in the logbook. The following information is required:

- a. unique identifier for sample(s) to be collected (location, date, collector's initials, and 24-hour time upon initiation of sample collection).
- b. type of container used for collection.
- c. cleaning agent used (if any).
- d. chemical added and amount (if any).
- e. special conditions used for collection (if any).

f. type of water source and sampling technique used.

g. chemical analysis of collected sample(s).

If the water sample collected is discarded on the basis of contamination as determined by the chemical analysis (see section 12), record this action in the logbook.

17. HANDLING, SHIPPING, AND STORAGE REQUIREMENT

The collected samples will be handled, shipped, and stored according to section 7.2 of TWS-QAS-QP-13.1. The collector must ensure that the collected sample is not exposed to extreme temperatures ($\leq 0^{\circ} \text{C}$ or $\geq 100^{\circ} \text{C}$) during handling, shipping, or storage. The collected sample should never be contacted with any unclean surfaces. The collector must ensure that the containers to be shipped are properly sealed to prevent contamination. Commercial and/or federal carriers can be used for shipping samples collected using this DP. The collected water must be stored in closed containers in a controlled area.

18. IDENTIFICATION OF QA RECORDS TO BE GENERATED AND THEIR CONTROL

The records produced by this procedure are the water collection logbooks. The data obtained using the collected water samples will be published in accordance with LANL Policy and TWS-QAS-QP-07. Investigators may direct deviations and modifications of the procedure for specific applications. Such actions are documented in the logbook.

19. TRAINING REQUIREMENTS AND METHODS

Staff members and technicians assigned to this work will be qualified by "hands-on" training under the supervision of an already qualified collector.

20. CALIBRATED INSTRUMENTATION INFORMATION

No calibration documentation is required in this procedure.

21. PROVISION FOR DOCUMENTATION, REPORTING, AND EVALUATION OF PROCEDURAL DEVIATION

Unplanned deviations from this procedure will be documented in the logbook. The

responsible PI or his designee will make a determination as to whether to use the collected water affected by the deviation. If a decision to use the water is made, the justification for this decision must be entered in the investigator's laboratory notebook.

22. SUBJECTS REQUIRING VERIFICATION

The recording of the information specified in section 9 needs to be verified before collection of the water sample(s) is initiated.

23. APPENDIX AND/OR ATTACHMENTS

None