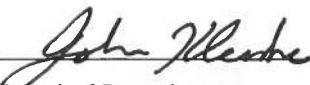




NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

TEST PLAN

TITLE: Groundwater Sampling and Analysis for The Nye County Tritium Sampling and Monitoring Program		Revision: 1 Date: 10/03/2019 Page: 1 of 5
TEST PLAN NUMBER: TPN-11.8	SUPERSEDES: Rev. 0, 05/19/2016	
APPROVAL  11/14/19 Director	CONCURRENCE  10/10/19 Principal Investigator	
	 10-9-19 Quality Assurance Officer	

1.0 INTRODUCTION

This test plan (TPN) provides detailed groundwater sampling and analysis instructions specific to Nye County Nuclear Waste Repository Project Office (NWRPO) groundwater sample collection planned for the Nye County Tritium Sampling and Monitoring Program (TSAMP). This TPN supplements work plan (WP) WP-11, *Groundwater Chemistry Sampling and Analysis for the Nye County Tritium Sampling and Monitoring Program* and technical procedure (TP) TP-11.2, *Field Collection and Handling of Water Samples for the Nye County Tritium Sampling and Monitoring Program*, identifies the testing laboratory, and provides detailed guidance for the maintenance and preparation of field measurement equipment and sample collection, preservation, storage, and shipping.

2.0 ANALYTICAL LABORATORY

2.1 Radiation Safety Engineering, Inc.

Radiation Safety Engineering, Inc. (RSE), in Chandler, Arizona, will analyze water samples for tritium. The RSE points of contact, mailing address, telephone number, and email address are listed in the following.

Pierre Pouquette: ppouquette@radsafe.com
Scarlet Carter: admin@radsafe.com
Radiation Safety Engineering, Inc.
3245 North Washington St.
Chandler, AZ 85225
480-897-9459

2.2 Approval of Laboratory

All labs used for this program shall be certified by the Nevada Department of Environmental Protection (NDEP). RSE is an NDEP certified lab and certification can be verified on the NDEP website (<https://ndep.nv.gov/water/lab-certification>).

3.0 PORTABLE FIELD MEASUREMENT EQUIPMENT MAINTENANCE AND PREPARATION

The instrument for measuring field indicator parameters includes the Oakton PC 450 Waterproof Portable Meter and or equivalent meter approved by the PI and QAO. Manuals or manufacturers' instructions should be available at all times when using this equipment.

Before the start of sampling, the Oakton meter will be prepared for use according to the following steps:

- Check all probes for signs of wear and corrosion.
- Perform a calibration check to verify pH, conductivity, and temperature accuracy.

Before the start of sampling calibrate pH range on the Oakton meter using 7.00, 4.00 and 10.00 pH standards then read the standards as samples and record the readings in the scientific notebook. **Note: be sure to also place the conductivity probe in the PH calibration solution so that automatic temperature compensation will occur.** Immediately prior to sampling calibrate the conductivity range on the Oakton meter using a 1413 $\mu\text{S}/\text{cm}$ standard then read the standard as a sample and record the reading in the scientific notebook. If calibration is successful, proceed with measurement of water sample parameters as water samples are taken. If calibration is unsuccessful, repeat the maintenance and calibration steps as directed. If calibration is still unsuccessful, notify the PI and QAO, and contact Oakton Technical Support by phone at 949-757-0353, by fax at 949-757-0363.

4.0 LABORATORY AND FIELD ANALYSES

4.1 Laboratory Analyses

Water samples will be analyzed for tritium by an approved lab, with an approximate detection limit of 365 picocuries/liter.

4.2 Water Chemistry Monitoring and Data Collection

Calibrate all portable field equipment before data collection as indicated above.

Monitor field water chemistry parameters and fill out Attachment A: NWRPO Groundwater Sample Collection Form and assess the stability of the measurements relative to the amount of water purged from the well. Electrical conductivity (EC), and pH should stabilize as the well is purged. Temperature of the purged water may not stabilize, due to changes in air temperature, atmospheric pressure, or the heating of sampling equipment on the ground surface by radiant energy from the sun.

After purging a minimum of three well volumes is complete at each well, or until stable conditions exist if unable to determine 3 well volumes, collect a sample for field measurement of pH, conductivity, and temperature. If purging 3 well volumes is not possible or undeterminable (i.e. in the case of some wells with dedicated pumps), field measurements should be taken before the start of sampling and notes added to scientific notebook to describe why well was not purged and field parameters observed.

5.0 SAMPLE COLLECTION

Samples will be collected from each of the wells and analyzed for tritium. In addition, quality assurance (QA) samples will be collected as follows: field blanks and blind field duplicate samples for every ten sets of water samples collected or approximately once per week of a sampling session, whichever results in more blind samples, unless otherwise specified by the PI. Field blanks will be collected in the field from reagent grade water supplied from selected laboratories or approved laboratory supply vendor. The reagent grade water shall be shipped to and from the field with other samples. These samples provide a test of contamination from atmospheric contaminants (e.g. dust) as well as from bottle preparation, storage, shipping and analyses. The PI or designee will determine the specific wells to be sampled for QA samples. Detailed QA sample collection instructions will be given in the field by the PI or designee and recorded in the scientific notebook. Blind field duplicates will be analyzed for tritium.

In addition to the blind field duplicate samples, a duplicate sample will be collected from each well and stored at the NWRPO. These additional samples may be sent to the lab for analysis if validation of lab results are required, as described in WP-11. Duplicates will be disposed of only after the original samples have been analyzed by a certified laboratory, and the results have been verified by the PI.

Collect a complete set of duplicate (blind) samples (for all analytes specified by the PI) for every ten sets of water samples collected or for each week of a sampling session, whichever results in more blind samples, unless otherwise specified by PI. The sampling work area (i.e., table or bench tops) should be thoroughly cleaned before sampling and kept as clean as possible during sample collection to minimize sample contamination. Use new, clean tubing to fill sample bottles for each well. Ensure that at least two volumes of the sample fluid pass through each new tubing before collecting samples.

Rinse bottles and caps with sample water three times.

Samples should be collected in an 8 oz. (500 ml) borosilicate glass bottle to the neck. Samples do not need filtration or preservation and shall be labeled as described in TP-11.2.

6.0 SAMPLE STORAGE

In the field, minimize the exposure of samples to heat and direct sunlight, and transport samples to the NWRPO at the end of each sampling day. When possible, store samples in the field in coolers with ice packs and do not use free ice in the coolers.

When the samples have been transported to the NWRPO, store them in the refrigerator reserved for water samples. The holding time for tritium samples is 6 months.

7.0 SAMPLE SHIPPING

Ship all samples as soon as possible to the appropriate testing laboratory in coolers with NWRPO chain-of-custody forms, as found in TP-11.2 and any forms required by the lab. Place all samples in the coolers with the caps up; do not place them on their sides. Pack all bottles in packing material. Pad the sides of the cooler with packing material and pack samples so that they are held snugly in place. Use additional packing material to prevent the samples from moving during shipping; pack the top of the cooler with packing material so that samples cannot move vertically.

Pack all refrigerated samples with blue ice or some form of cold pack. Do not use free ice in the coolers; the water from melted ice can wash labels off, contaminate samples, and remove labeling tape. Include the signed and dated Chain of Custody form in a waterproof Ziploc bag and place in cooler. Ensure that coolers are securely closed and will not open during shipping.

Ship all samples by overnight carrier (i.e., Federal Express) to the addresses as indicated in section 2.0. Do not ship samples on Friday.

Attachment A
Groundwater Sample Collection Form