



**NYE COUNTY NUCLEAR WASTE
REPOSITORY PROJECT OFFICE**

WORK PLAN

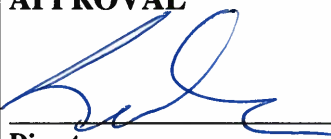


TITLE: Groundwater Chemistry Sampling and Analysis for the Nye County Tritium Sampling and Monitoring Program (TSAMP)		REVISION: 3 DATE: 10/03/2019 PAGE: 1 OF 8
WORK PLAN NUMBER: WP-11	SUPERSEDES: Rev. 2, 9-30-2016	
APPROVAL  _____ Director	CONCURRENCE  _____ Principal Investigator	
 11/14/19 Date	 _____ Quality Assurance Officer	
	10/10/19 Date	
	10-9-19 Date	

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1.0 INTRODUCTION

This Work Plan (WP) describes the strategy and procedures for the collection and testing of groundwater chemistry samples as part of the Nye County's Nuclear Waste Repository Project Office's Tritium Sampling and Monitoring Program (TSAMP), funded through a seven-year U.S. Department of Energy (DOE) Environmental Management (EM) Office grant. All water sample collection and testing will be conducted under the Nye County TSAMP. This Work Plan has been prepared in accordance with the provisions of the Nye County NWRPO quality administrative procedure *QAP-5.2, Preparation of Work Plans, Test Plans, and Technical Procedures*.

2.0 PURPOSE

The purpose of this WP is to outline actions to manage the collection and testing of TSAMP groundwater chemistry samples.

Groundwater chemistry sampling and analysis are being conducted as part of a working partnership between the Nye County NWRPO, DOE's Nevada Field Office, and Desert Research Institute's Community Environmental Monitoring Program (CEMP). The program includes monitoring groundwater for tritium at offsite locations downgradient of the Nevada National Security Site (NNSS), at both Distal wells and Community wells, and Distal wells on the NNSS, downgradient of corrective action unit source plumes.

3.0 BACKGROUND

The NNSS is located in Nye County and was historically used to test nuclear weapons. Nye County and public stakeholders are concerned about onsite groundwater contamination due to past testing, and the possibility of offsite migration of that contamination. The Nye County TSAMP program, funded by the grant through the DOE's EM Nevada Program, will monitor groundwater at locations downgradient of the NNSS at both Distal and Point of Use wells. Sampling locations for inclusion in the County's groundwater monitoring program will be based on proximity to groundwater flow paths, proximity to the boundaries of the NNSS and public water supply systems, and recommendations by stakeholders.

Tritium is the primary analyte of concern, because it is highly mobile in groundwater and can serve as an indicator of contaminant migration from nuclear testing and is the only radionuclide that exceeds the Safe Drinking Water Act maximum contaminant level (MCL) away from the nuclear test cavities.

Data from the TSAMP water sampling program will provide more information regarding:

- Quality of waters (tritium) adjacent to and downgradient from the NNSS and Nevada Test and Training Range (NTTR)
- Changes in water quality with time (tritium)

4.0 SCOPE OF WORK

The scope of work of this plan applies to groundwater chemistry sampling and analyses in wells that have been completed and developed. This scope of work presents specifics for the following, which are discussed in Sections 4.1 through 4.4:

- Applicable Nye County Nuclear Waste Project Office (NWRPO) quality assurance (QA), quality administrative procedures (QAPs), and technical procedures (TPs)
- Responsibilities and participants for groundwater chemistry sampling and analysis tasks
- A strategy for water sampling and analysis
- A communication plan identifying when and with whom information will be communicated if tritium is detected in groundwater samples collected and analyzed under TSAMP.

4.1 Applicable Quality Assurance Plans and Procedures

Groundwater chemistry sampling and analysis after well completion and development will involve well purging, as well as the measurement of field water chemistry indicator parameters during well purging, collection and labeling of samples, shipping of samples to testing laboratories, and laboratory chemical analysis. Procedures for these and related tasks are described in technical procedures TP-11.2, *Field Collection and Handling of Water Samples for the Nye County Tritium Sampling and Monitoring Program*. The calibration of equipment used to measure field indicator parameters will be documented in accordance with quality administrative procedure QAP-12.1, *Control of Measuring and Test Equipment*.

Detailed groundwater chemistry sampling and analysis instructions beyond the scope of the associated TP will be specified in a Test Plan (TPN) for each sampling program.

4.2 Responsibilities and Participants

The Principal Investigator (PI) or designee is responsible for the production of this WP and associated TPs, the training of NWRPO personnel and contractors in these QA documents, and the overall supervision of groundwater chemistry sampling and analysis tasks. The PI or designee will submit all original field and laboratory analysis data, together with associated metadata, to the NWRPO QA Records Center (QARC) following review and approval.

Nye County personnel and/or contractors, herein referred to as “NWRPO personnel,” are responsible for implementing these QA plans and procedures; the Director of NWRPO is responsible for organizing and implementing technical reviews; and the Project QA Officer is responsible for ensuring/verifying that they contain necessary QA directives, that technical reviews are conducted, that testing laboratories are qualified as vendors, and that the plans and procedures are implemented in the field.

Several agencies separate from the NWRPO will possibly collect groundwater chemistry samples at wellheads during each NWRPO sampling and analysis session. The NWRPO will have the authority to approve access to the well sites and sampling plans for these agencies. The NWRPO will be responsible for pumping water to the ground surface; the other agencies will be responsible for collecting samples at the wellhead. Some agencies that have previously collected groundwater chemistry samples from NWRPO sampling sessions include the Desert Research Institute, University of Nevada at Las Vegas Harry Reid Center for Environmental Studies, the State of Nevada, the U.S. Nuclear Regulatory Commission, Los Alamos National Laboratory, and the U.S. Geological Survey.

4.3 Groundwater Chemistry Sampling and Analysis Plan

Nye County has drilled and installed approximately 45 wells in Amargosa Desert, Amargosa Valley, and Oasis Valley. The location of these well sites can be seen in Figure 1. This map shows the general area of sampling under the TSAMP program downgradient of the NNSS and Nye County wells in the area.

A subset of the Nye County wells along with other community and private wells located in the Beatty, Amargosa, and Lathrop Wells areas will be selected to be sampled for tritium. Community Environmental Monitors, Desert Research Institute, DOE staff, and members of the public are all stakeholders in the groundwater monitoring effort, and these stakeholders will identify the wells to be sampled and develop a sampling schedule.

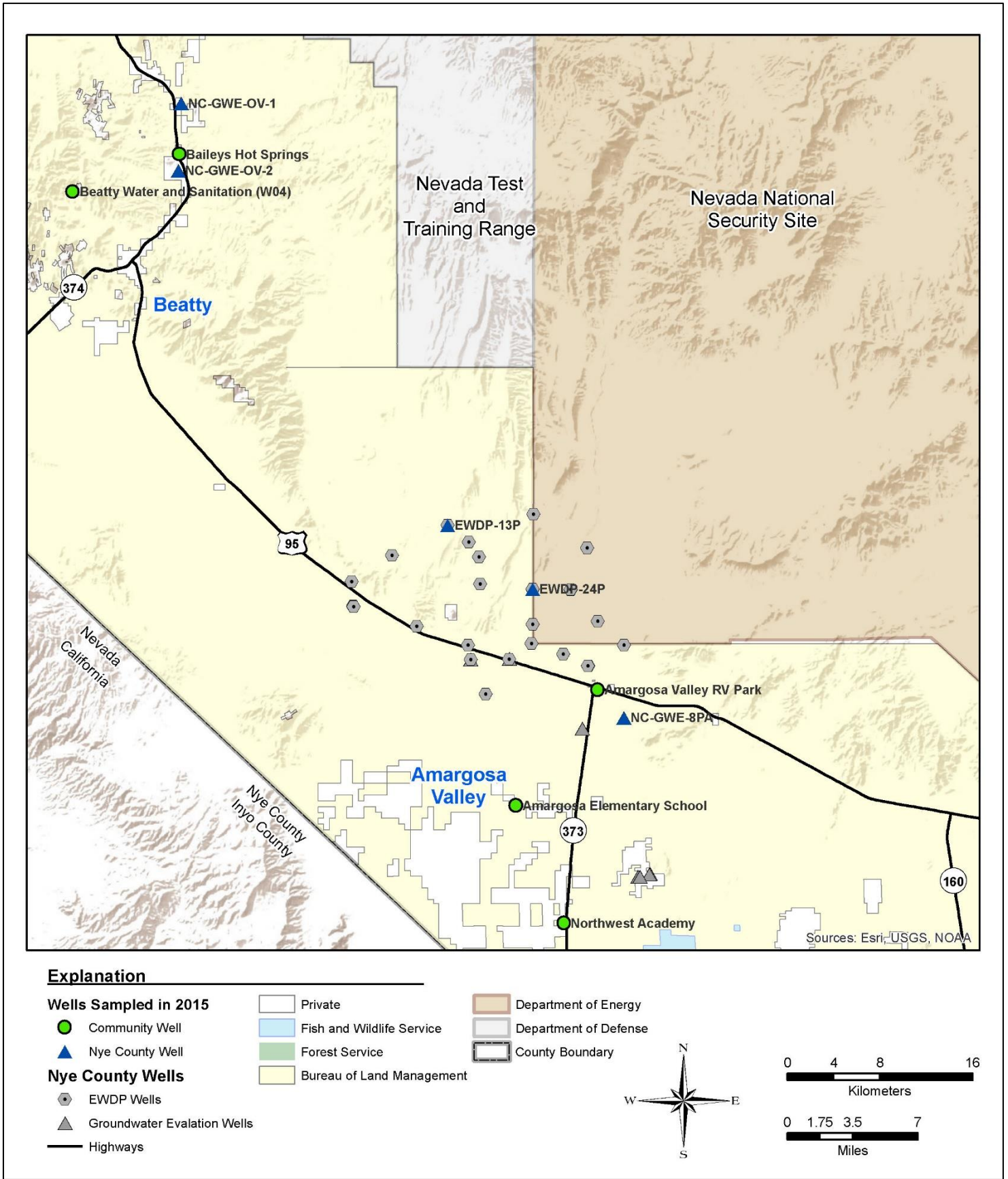


Figure 1

Initial screening of candidate sites was based on the following criteria:

- Proximity to population centers
- Groundwater gradient (flow directions)
- Geology and hydrology
- faults and rock/soil types

Documentation of well selections each year will be submitted to the QARC.

In the event that analysis of a groundwater sample from a well result in a preliminary detection of tritium (lab results are greater than the Minimum Detectable Concentration (MDC) plus the measurement error), and after verification by analysis of field duplicate results in a non-detect, the well will be resampled the following year. If a preliminary detection is validated as described in Section 5.0 with a detectable level of tritium, the well will be resampled in the current year. This sampling will be scheduled by the PI.

Where possible, the following groundwater chemistry indicator parameters will be measured in the field during and following the purging of each well:

- pH
- Electrical conductivity
- Temperature

Procedures for purging and measuring these parameters are described in TP-11.2. The testing laboratory will measure for tritium, unless the PI specifies different analyses for a particular sampling session. Laboratories, testing methods, and procedures for collecting and shipping samples for specific sampling sessions shall be specified by the PI. Any changes will be documented in the Scientific Notebook.

4.4 Quality Assurance Samples

TP-11.2 presents types of field and laboratory QA samples and types and sources of error measured for these samples, QA objectives for these samples, and a strategy for collecting field QA samples. The specific type and number of field QA samples required for future sampling sessions may be modified from this procedure by the PI. Modifications to QA sample requirements will be documented in the applicable TP.

The type and frequency of analysis of laboratory QA samples will be specified in the QA procedures of each testing laboratory and the results included in laboratory data reports. All QA lab reports will be submitted to the QARC with the data package.

5.0 COMMUNICATION PLAN

The purpose of the Nye County TSAMP Communication Plan is to identify when and with whom communication should be established after receipt of sampling analysis results, and also addresses communications in the event of detection of tritium contamination in water samples collected by Nye County under the TSAMP. It is a priority for this program to ensure that our stakeholders have access to accurate information in a timely matter.

5.1 Analytical Results

All water samples will be analyzed by an independent State of Nevada certified laboratory. Results that are identified as being above the Minimum Detection Concentration (MDC) plus the measurement error will be flagged as a preliminary detection. All samples noted with preliminary detection will be reviewed and a field duplicate sample will be sent to the lab for reanalysis and verification of initial preliminary results. Field duplicate samples are collected at the same sampling event as the original sample and stored in a sample dedicated refrigerator at the NWRPO.

5.2 External Communication

Nye County will communicate all TSAMP results in the annual Nevada National Security Site Environmental Report (NNSER). In addition, Nye County may report results to public media and at various public meetings. Nye County will coordinate external notifications with DOE prior to external communication.

Preliminary detections will be reported to DOE as follows:

Verbal communication to EM Nevada Program UGTA Activity Lead with email to:

EM Nevada Program Manager

EM Nevada Program Deputy Program Manager for Operations

EM Nevada Program UGTA Activity Lead

EM Nevada Program Director of Public Affairs

The email will describe the reported lab results including measurement error and MDC, laboratory records package, sampling location, and the planned path forward. The planned path forward will include sending a duplicate field sample to the same lab for analysis and verification of initial preliminary results. DOE will be notified verbally and by email, as described above, once the results for the duplicate sample are received from the laboratory.

The location will be resampled, also giving DOE the opportunity to sample, during or before the next annual sampling event.

In the event of a verified detection, Nye County will notify the land or permit owner and any detection above the Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) of 20,000 pCi/L, Nye County will notify NDEP.

6.0 MANAGEMENT

To ensure that the work described in this work plan will be quality controlled and accomplished in accordance with the scope and objectives of the TSAMP, certain responsibilities must be met, and tasks performed. Responsibilities of key personnel were described briefly in Section 4.2 and are described in more detail in the following.

Training is a critical management tool and detailed responsibilities in this area are specified as follows. The PI and QAO are responsible for ensuring that all NWRPO personnel performing the tasks described in the above sections will be trained in the plans and procedures specifically applicable to the equipment and methods used before conducting work. At a minimum, NWRPO personnel will document that they have read and understand the applicable QA plans and procedures which include but are not limited to this work plan and the following:

- TP-11.2, *Field Collection and Handling of Water Samples for the Nye County Tritium Sampling and Monitoring Program*
- QAP-12.1, *Control of Measuring and Test Equipment*

NWRPO personnel, under the supervision of the PI or designee, are responsible for collecting and processing groundwater chemistry samples according to these procedures. The QA officer is responsible for verifying, via surveillances and audits, that NWRPO personnel follow these procedures.

Quality control in water chemistry testing laboratories is equally important to field quality control. Laboratory analyses of groundwater chemistry samples will be performed by facilities certified to use analytical methods and procedures consistent with industry standards and/or U.S. Environmental Protection Agency approved methods and procedures. The QA officer is responsible for verifying that testing laboratories are appropriately certified, have the necessary QA program in place, and that this QA program is followed while laboratory analyses are conducted.

7.0 REFERENCES

QAP-5.2, *Preparation of Work Plans, Test Plans, and Technical Procedures*, Quality Administrative Procedure: Nye County NWRPO, Pahrump, Nevada.

QAP-12.1, *Control of Measuring and Test Equipment*.

TP-11.2, *Field Collection and Handling of Water Samples for the Nye County Tritium Sampling and Monitoring Program*, Technical Procedure: Nye County NWRPO, Pahrump, Nevada.