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RPP-PLAN-44354, Rev. 0

Field Sampling and Analysis Plan for Soil Samples at Well C7570 – Waste Management Area C

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U.S. Department of Energy Contract DE-AC27-08RV14800

RECEIVED
AUG 22 2018
EDMC

EDT/ECN:	DRF	UC:	N/A
Cost Center:	2FF00	Charge Code:	200152
B&R Code:		Total Pages:	33

Key Words: field sampling and analysis plan, FSAP, waste management area, WMA C, single-shell tanks, vadose zone soil sampling, groundwater monitoring, well C7570, 299-E27-24, RCRA

Abstract: This field sampling and analysis plan provides direction for field sampling, laboratory analysis, and data reporting of the new groundwater monitoring well C7570 (299-E27-24) outside of Waste Management Area C.

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FEB 04 2010
DATE:
STA: 15
HANFORD RELEASE
ID: 65

Nancy A Fouad 2-4-10
Release Approval Date

Release Stamp

Approved For Public Release

RPP-PLAN-44354
Revision 0

FIELD SAMPLING AND ANALYSIS PLAN FOR SOIL SAMPLES AT WELL C7570 – WASTE MANAGEMENT AREA C

C. L. Tabor
Washington River Protection Solutions LLC

Date Published
January 2010

washington river protection solutions

Prepared for the U.S. Department of Energy
Office of River Protection

Contract No. DE-AC27-08RV14800

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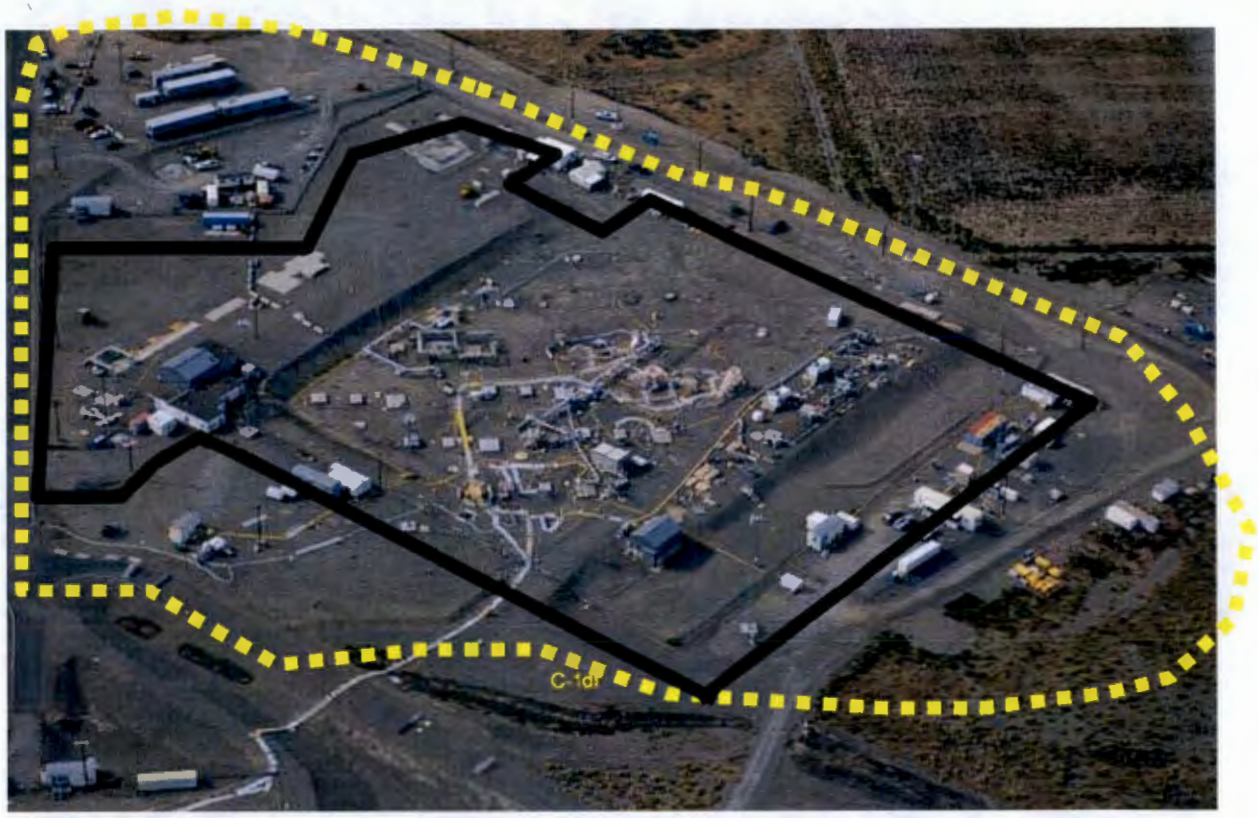
ABBREVIATIONS AND ACRONYMS

amsl	above mean sea level
ATL	Advanced Technologies and Laboratories International, Inc.
bgs	below ground surface
CFR	Code of Federal Regulations
CHPRC	CH2M HILL Plateau Remediation Company
DOE	U.S. Department of Energy
DQO	Data Quality Objective
Ecology	State of Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
FSAP	field sampling and analysis plan
g	gram
G/P	glass or plastic
HASQARD	*Hanford Analytical Services Quality Assurance Requirements Documents*
HEIS	Hanford Environmental Information System
IC	ion chromatography
IDMS	Integrated Document Management System
kg	kilogram
LCS	laboratory control sample
m	meter
mg	milligram
mL	milliliter
pCi	picoCurie
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RPD	relative percent difference
SAP	sampling and analysis plan
WAC	Washington Administrative Code
WSCF	Waste Sampling and Characterization Facility
WMA C	Waste Management Area C
WRPS	Washington River Protection Solutions, LLC

1.0 SAMPLING AND ANALYSIS OBJECTIVES

Waste Management Area C (WMA C) encompasses the 241-C Tank Farm located in the east central portion of the 200 East Area. It includes equipment, soil, and groundwater contaminated by C Farm operations. In general, the WMA C boundary is represented by the fenceline surrounding the C Farm tanks. The boundary for vadose zone soil sampling, as defined by the data quality objective (DQO), includes WMA C and the immediate surrounding areas (see Figure 1-1).

Figure 1-1. Aerial Boundary of Waste Management Area C and Data Quality Objective Study Area



Study Boundary

WMA C Fenceline

1.1 PURPOSE

This field sampling and analysis plan (FSAP) provides direction for field sampling, laboratory analysis, and data reporting of the new groundwater monitoring well C7570 (299-E27-24) outside of WMA C. The requirement for sampling this well is identified in RPP-PLAN-39114, *Phase 2 RCRA Facility Investigation/Corrective Measures Study Work Plan for Waste Management Area C* and Attachment 4 of RPP-PLAN-40564, *Field Sampling and Analysis Plan*

for Waste Management Area C. Specifically, vadose zone samples will be collected from any new groundwater monitoring well placed within 100 ft of WMA C. This well will be approximately 100 ft east of WMA C fenceline.

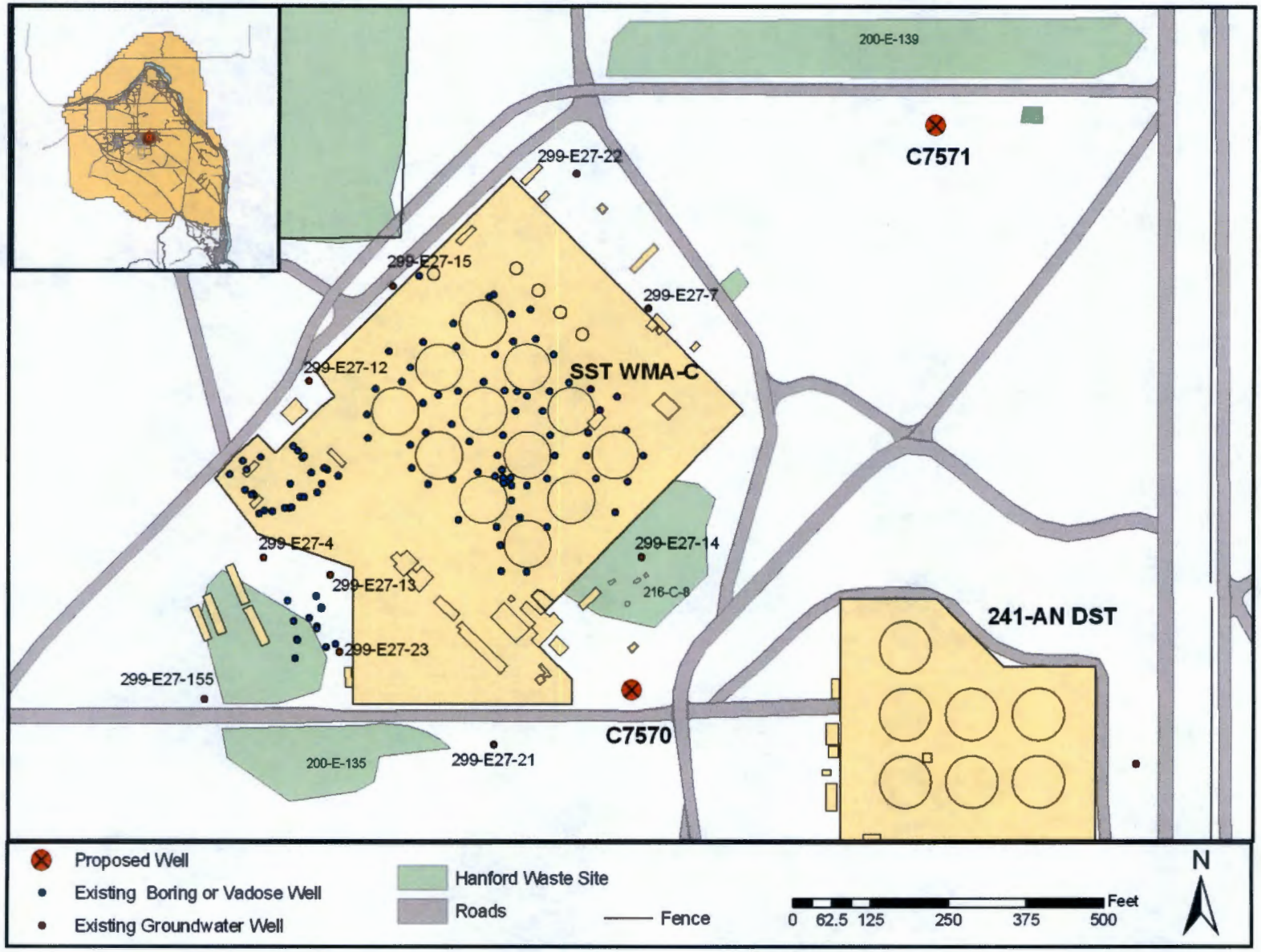
The requirements are based on the results of DQO process documented in RPP-RPT-38152, *Data Quality Objectives Report Phase 2 Characterization for Waste Management Area C Corrective Measures Study*. The State of Washington Department of Ecology (Ecology), the U.S. Department of Energy (DOE), and its contractors participated in the DQO process. The sampling and analysis plan (SAP), RPP-PLAN-38777, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C* and RPP-PLAN-39114 provide information that is consistent with guidelines for contents as described in *Washington Administrative Code* (WAC) 173-340-820, "Sampling and Analysis Plans," and this plan will be provided to Ecology for information prior to sample collection. Detailed analytical requirements from these documents have been modified with concurrence from all parties as described in the meeting minutes in Appendix A.

1.2 SCOPE

The focus of this FSAP was developed during a working meeting with Ecology held November 23, 2009. The meeting minutes are provided in Appendix A. During the development of Revision 1 of RPP-PLAN-39114, it was thought the new groundwater monitoring wells would be placed close to WMA C. However due to on-going retrieval activities and groundwater sampling needs, the location of these wells are at (Well ID C7570) and beyond (Well ID C7571) the 100 ft limit called out in RPP-PLAN-39114 (Figure 1-2).

The meeting with Ecology on November 23 was to determine a path forward for deep vadose zone sampling at these locations. At that meeting it was determined not to collect deep vadose samples at well C7571 because it is greater than 500 ft north of WMA C. For well C7571, it was determined to collect deep vadose zone samples every 5 ft beginning approximately 20 ft above the water table. Samples will only be analyzed for percent moisture, nitrate, and ^{99}Tc in order to determine if there is a relationship between these results, groundwater concentrations, and high groundwater table levels during operations. The decision to sample for only these constituents was agreed to by DOE's Office of River Protection and regulators and as documented in the meeting minutes in Appendix A.

Figure 1-2. Approximate Location of New Well C7570



2.0 SAMPLING EVENT REQUIREMENTS

All field sampling activities shall be conducted in accordance with this FSAP and the appropriate procedures and work packages. Soil sampling services for this work will be provided by CH2M HILL Plateau Remediation Company (CHPRC). The soil samplers shall follow CHPRC and/or Washington River Protection Solutions, LLC (WRPS) sampling protocols and procedures, as applicable. These protocols and procedures cover items such as sampling, cleaning of sampling devices, chain of custody etc. Samples shall be delivered to the 222-S Laboratory for analysis.

2.1 SOIL SAMPLING DESIGN AND STRATEGY

The soil in this area is expected to consist primarily of sand and gravel. In general, particles with a diameter greater than ¼ inch cannot be used for analysis and must be removed in the laboratory or in the field. Therefore, enough soil must be collected to account for the loss of the larger soil particles. A description of the equipment, soil, and groundwater in WMA C is provided in Section 2 of RPP-PLAN-39114 along with information on past unplanned releases of contaminants.

Well C7570 is located at approximately 99 ft from the WMA C fenceline and is being installed to meet *Resource Conservation and Recovery Act of 1976* (RCRA) Groundwater Assessment requirements (refer to Figure 1-2). The new well is up the stratigraphic dip of the Hanford H2 Unit at WMA C and therefore it is not expected that waste in the vadose zone will travel towards this well (PNNL-15503, *Characterization of Vadose Zone Sediments Below the C Tank Farm: Borehole C4297 and RCRA Borehole 299-E27-22*). Geophysical surveys including spectral and moisture logs will also be performed.

2.2 SAMPLE COLLECTION

The drilling method for this well borehole will be double wall percussion using a Becker Hammer rig. Sample collection method will be done using split spoons. Table 2-1 provides the approximate vertical depths in feet below ground surface (bgs) for the required four samples. These vertical depths are based on information from Hanford Environmental Information System (HEIS) and Hanford Well Information System – ground surface elevation (202.74 m above mean sea level [amsl]) and interpolated water table elevation (122 m amsl). Samples will be collected every 5 ft beginning approximately 20 ft above the groundwater table to examine the vadose zone directly above the water table for the presence of ^{99}Tc and nitrate.

The CHPRC samplers shall document recovery, sample condition, and volume recovery percent. The samplers will then package and transport samples under chain-of-custody control to 222-S Laboratory. CH2M HILL Plateau Remediation Company shall also provide required sampling support vehicles and equipment.

Table 2-1. Vertical Depths for Vadose Zone Samples at Well C7570

Constants	Value
Ground Surface Elevation (m amsl)	202.74
Approximant Water Table Elevation (m amsl)	121.97
Depth to Groundwater (m)	80.77
Depth to Groundwater (ft)	265
Vertical Sample	**Depth (ft bgs)**
Sample 1	245
Sample 2	250
Sample 3	255
Sample 4	260

amsl = above mean sea level
bgs = below ground surface

Sample preservation, containers, and holding times for analytes are shown in Table 2-2. Field quality control (QC) samples, specifically an equipment rinsate blank, shall be collected to evaluate the potential for cross-contamination and laboratory performance.

Table 2-2. Sample Preservation, Container, and Holding Time Guidelines

Analytes	Matrices	Bottle	Preservation	Packing Requirements	Holding Time
Percent Moisture	Soil/sludge/ sediment/scale[a]	1 - 250 mL G/P clear jar per sample collection event	None	Cool ≤ 4 °C	None
Radionuclides (^{99}Tc)	Soil/sludge/ sediment/scale[a]		None		6 months
IC anion (Nitrate)	Soil/sludge/ sediment/scale[a]		None		48 hours after sample preparation
Radionuclides (^{99}Tc)	Reagent water[b]	1 - 250 mL G/P amber or clear jar per sample collection event	HNO_3 to pH<2	None	6 months
IC anion (Nitrate)	Reagent water[b]	1 - 250 mL G/P amber or clear jar per sample collection event	None	Cool ≤ 4 °C	48 hours

Additional Requirements:

[a]Soil/sludge/sediment/scale samples:

- Jar should be at least 80% full.
- Soil particles with diameters greater than 0.25 inch cannot be used for analysis; therefore, the sampling crew will make an effort to remove particles greater than 0.25 inch.

[b]Equipment Rinsate Blank:

- Use reagent water for the Waste Sampling and Characterization Facility and collect per CH2M HILL Plateau Remediation Company procedures.

G/P = glass or plastic
IC = ion chromatography

2.3 SAMPLE HANDLING AND SHIPPING

Whenever possible, soil samples shall be maintained at 4 °C or below. The samples shall be transported to the laboratory (222-S), as soon as possible, to meet applicable holding times. However, it is recognized that some samples may have elevated levels of radioactivity. These samples must be stored and transported in shielded shipping containers that may not allow the samples to be maintained at 4 °C. Samples not meeting temperature or holding time requirements shall be discussed in the laboratory data report. The impact on subsequent use or interpretation of these data will be evaluated on a case-by-case basis by the WRPS project personnel.

Radiological control technician(s) will measure contamination levels and dose rates on the outside of each sample jar. The radiological control technician(s) also will measure radiological activity on the outside of the sample container (through the container) and will document the highest contact radiological reading in millirem per hour. This information, along with other data, will be used to select proper packaging, marking, labeling, and shipping paperwork in accordance with U.S. Department of Transportation regulations (Title 49, *Code of Federal Regulations*, "Transportation") and to verify that the sample can be received by the analytical laboratory in accordance with the laboratory's radiological acceptance criteria.

2.4 SAMPLE IDENTIFICATION

The HEIS database will be the electronic repository for the laboratory analytical results. The HEIS sample numbers will be issued to the sampling organization for this project in accordance with established procedures. Each sample will be identified and labeled with a unique HEIS sample number. The sample location, depth, and corresponding HEIS number will be documented in the sampler's field logbook.

Each sample container will be labeled with the following information using a waterproof marker on firmly affixed water-resistant labels:

a. Sample identification number

b. Sample collection date and time

c. Name or initials of person collecting the sample

d. Preservation method (if applicable)

e. Sample location (Well number and depth of collection).

2.5 SAMPLE CUSTODY

The sampling team shall initiate a chain-of-custody form for each sample. The chain-of-custody form shall accompany each sample. At a minimum, the following sampling information shall be included on the chain-of-custody form:

a. Project name

b. Signature of the collector

c. Date and time of collection

d. Sample type (e.g., soil)

e. Requested analysis or a reference for sample analysis

f. Signatures of persons involved in the chain of possession

g. Date and time relinquished to the laboratory

h. Unique HEIS sample identification number assigned to the sample

i. Sample location (Well number and depth of collection)

j. A notation of pertinent sampling information including unusual characteristics or sampling problems

k. A brief description of the sample matrix, such as color or consistency, if possible.

Any pertinent sampling information (recovery, unusual characteristics, or sampling problems) shall be recorded in the comments section of the chain-of-custody form. Each sample will be shipped to 222-S Laboratory in an approved shipping container in accordance with approved procedures. Each sample will be sealed with a sample seal, marked with a unique identification number, to demonstrate that the samples have reached the laboratory without alteration.

3.0 LABORATORY ANALYSIS REQUIREMENTS

Samples are normally received from the field at door 13 of the 222-S Laboratory Multicurie Section. Samples transported in coolers will be stored under refrigeration until they are processed. On receipt, the Sample Custodian verifies the identification number on each sample container and ensures it matches the sample seal on the sample container and the chain of custody. Laboratory sample identification numbers are affixed to each container that is retained past initial receipt. Residual sample material remaining after analysis will be maintained in refrigerated storage until directed otherwise by WRPS project personnel.

After the samples are received at the laboratory, the samples shall be prepared and analyzed in accordance with this FSAP. The laboratory shall use the least possible dilution to obtain the lowest practical detection limits for all requested analytes. Refer to Table 3-1 for the required analytical methods and detection limits for ^{99}Tc and nitrate.

Table 3-1. Required Analytical Methods and Detection Limits for Technetium-99 and Nitrate

CAS# or Constituent Identifier	Analyte	Analytical Method	Target Detection Limit	Required Detection Limit
NA	Percent Moisture	Gravimetric	NA	NA
14133-76-7	^{99}Tc	Inductively coupled plasma/Mass spectroscopy	1 pCi/g	As low as achievable
14797-55-8	Nitrate	Ion chromatography	2.5 mg/kg	NA[a]

[a]Use a detection limit of 0.25 mg/kg

NA = Not applicable

The following steps will be followed prior to and for analyses.

- Individual samples will be documented photographically. A licensed geologist with Hanford experience will describe the samples collected from this well. Visual inspection and simple manual manipulations will be performed to provide a geologic description of each sample. The sediment descriptions will be recorded and used to classify the sediment texture on a modified Folk/Wentworth diagram.

- Percent moisture for each sample is calculated per established procedure.

- Analyses of nitrate and ^{99}Tc will be performed on 1:1 water digest.

3.1 INSUFFICIENT RECOVERY OF SAMPLE MATERIAL

If sample material is insufficient to perform the analyses requested in this FSAP, the laboratory shall notify the Characterization Task Lead within 1 working day. The Characterization Task Lead will identify the analyses priority based on available sample material and discussion with

the Vadose Zone Program Manager. Additionally, the Characterization Task Lead shall also inform Ecology of the lack of sample material and which analyses would likely not be performed due to the lack of sufficient sample material. Any analyses prescribed by this FSAP, but not performed, shall be identified in the data report. In addition, justification for not performing the analyses shall be provided.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Documents* (HASQARD), identifies the quality requirements for environmental data collection, including sampling, field measurements, and laboratory analysis and complies with the requirements of:

a. DOE Order 414.1C, *Quality Assurance*

b. Title 10, *Code of Federal Regulations*, Part 830, "Quality Assurance Requirements," subpart 120, "Scope" (10 CFR 830.120)

c. U.S. Environmental Protection Agency (EPA) guidance document EPA/240/B-01/003, *EPA Requirements for Quality Assurance Project Plans EPA QA/R-5*.

Hanford onsite laboratories performing analyses in support of this FSAP will have approved and implemented quality assurance (QA) plans. As required by TFC-PLN-02, "Quality Assurance Program Description," these QA plans will meet the minimum requirements of HASQARD as the baseline for laboratory quality systems. If subcontracting any portion of the analytical requirements to a commercial laboratory off the Hanford Site, the subcontractor's implementing QA program shall comply with DOECAP, *Consolidated Audit Program Quality Systems for Analytical Services*, or be scheduled for DOECAP certification.

All sampling and analysis activities will be performed using approved methods, procedures, and work packages that are written in accordance with approved operational and laboratory QA plans, which are consistent with the requirements of this FSAP. Sampling and analysis activities shall be performed by qualified personnel using properly maintained and calibrated equipment.

Sampling and laboratory personnel shall complete the necessary training and must receive appropriate certification to perform assigned tasks in support of the characterization project. The environmental safety and health training program provides workers with the knowledge and skills necessary to safely execute assigned duties. Field personnel typically will have completed the required training before starting work.

A graded approach is used to ensure that workers receive a level of training commensurate with their responsibilities that complies with applicable DOE orders and government regulations. Specialized employee training includes pre-job briefings, on-the-job training, emergency preparedness, plan-of-the-day activities, and facility/worksite orientations.

4.1 QUALITY CONTROL FOR FIELD SAMPLING

Prior to sampling, all sampling equipment shall be cleaned using a procedure that is consistent with SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* sampling equipment cleaning protocol. Only new (unused) pre-cleaned, quality assured sample containers or containers cleaned onsite in accordance with the SW-846 protocol shall be used for sampling.

Field QC samples shall be collected to evaluate the potential for cross-contamination and laboratory performance. For this sampling effort an equipment rinsate blank will be collected.

4.1.1 Equipment Rinsate Blanks

Equipment rinsate blanks are usually prepared in the laboratory after cleaning the sampling equipment; they are used to verify the adequacy of sampling equipment decontamination procedures and shall be collected for each sampling method or type of equipment used. Equipment blanks shall consist of reagent water from Waste Sampling and Characterization Facility washed through decontaminated sampling equipment. The equipment rinsate blanks will be prepared by CHPRC samplers.

4.1.2 Prevention of Cross-Contamination

Special care should be taken to prevent cross-contamination of soil samples. Particular care will be exercised to avoid the following common ways in which cross-contamination or background contamination may compromise the samples.

a. Improperly storing or transporting sampling equipment and sample containers.

b. Contaminating the equipment or sample bottles by setting them on or near potential contamination sources, such as uncovered ground.

c. Handling bottles or equipment with dirty hands. Sample containers should be filled with care so as to prevent any portion of the collected sample coming in contact with the sampler's gloves.

d. Improperly decontaminating equipment before sampling or between sampling events. Samples should not be collected or stored in the presence of exhaust fumes.

4.2 QUALITY ASSURANCE OBJECTIVE

The QA objective of this plan is to develop implementation guidance that will provide data of known and appropriate quality. Data quality is assessed by representativeness, comparability, accuracy, and precision. These terms are defined in Table 4-1. The applicable QC guidelines, quantitative target limits, and levels of effort for assessing data quality are dictated by the intended use of the data and the nature of the analytical method.

Table 4-1. Data Quality Definitions

Data Quality Term	Definition
Representativeness	Measure of how closely results match actual concentrations
Comparability	Measure of confidence with which one data set can be compared to another
Accuracy	Measure of how close value is to true value
Precision	Measure of the data reproducibility (e.g., duplicate sample)

4.3 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS FOR LABORATORY ANALYSIS

ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*, specifies the requirements for ensuring the quality of sample analyses performed by Advanced Technologies and Laboratories International, Inc., (ATL) at the 222-S Laboratory. Analyses performed by ATL shall be governed by ATS-MP-1032, *222-S Laboratory Quality Assurance Plan*, and ATL-MP-1002, *Quality Assurance Program Description*. All analyses shall be performed in accordance with these requirements. Laboratories performing analyses in support of this FSAP shall have approved and implemented QA Plans. These QA plans shall meet DOE/RL-96-68 minimum requirements as the baseline for laboratory quality systems.

The analytical QC requirements (duplicates, spikes, etc.) are identified in Table 4-2. The laboratory shall also use calibration and calibration check standards appropriate for the analytical instrumentation being used (see HASQARD for definitions of QC samples and standards). The criteria presented in the tables are goals for demonstrating reliable method performance. The laboratory will use its internal QA system for addressing any QC failures. If the QC failures are systematic and cannot be resolved by the internal protocols, the Quality Assurance Lead shall be consulted to determine the proper action. The laboratory should suggest a course of action at that time. All data not meeting the QC requirements shall be properly noted, and the associated QC failures shall be discussed in the narrative of the data report.

Table 4-2. Quality Control Parameters and Requirements

Analytes	Analytical Method	Quality Control Acceptance Criteria		
		LCS % Recovery[a]	Spike % Recovery[b]	Duplicate RPD[c]
Percent Moisture	Gravimetric	NA	NA	≤20%
Nitrate	Ion chromatography	80 – 120%	75 – 125%	≤30%
^{99}Tc	Inductively coupled plasma/ Mass spectroscopy	80 – 120%	75 – 125%	≤30%

[a] LCS = Laboratory control sample. An LCS is a sample of similar matrix to the samples being analyzed to which has been added a known amount(s) of the analyte(s). The sample is carried through the entire analytical process. The accuracy of a method is expressed as the percent recovery of the LCS analyte(s). The percent recovery equals the amount measured divided by the known or expected amount times 100.

[b] The effect of the sample matrix on analytical accuracy is estimated from the matrix spike. A matrix spike is an aliquot of the sample to which a known amount of the analyte(s) has been added. The recovery of the matrix spike is calculated by subtracting the amount found in the sample from the amount found in the spike, dividing by the amount added and multiplying by 100. Samples are batched with similar matrices.

[c] RPD = Relative percent difference between the samples. Sample precision is estimated by analyzing duplicates taken separately through preparation and analysis. Acceptable sample precision is usually ≤ 30% RPD if the sample result is at least 10 times the instrument detection limit.

NA = Not applicable

4.3.1 Laboratory Quality Control

The laboratory method blanks, duplicates, laboratory control sample/blank spike, and matrix spikes are defined in Chapter 1 of SW-846 and will be run at the frequency specified in Chapter 1 of SW-846. In the event sample material is not sufficient to perform all analyses, sample quantity will be prioritized and allocated to completion of the method analysis. If insufficient sample is available for completion of laboratory QC analyses, the laboratory will make note of the condition in the data package narrative, and the associated data results will have laboratory qualifiers added as appropriate. Where spike duplicates are required, duplicates do not need to be analyzed and where duplicates are required, spiked duplicates are not required. Minimally, a duplicate and spike (or spike duplicate) is required per laboratory batch.

4.3.2 Instrument/Equipment Testing, Inspection, and Maintenance

Measurement and testing equipment used in the field or in the laboratory that directly affects the quality of analytical data will be subject to preventive maintenance measures to ensure minimization of measurement system downtime. Laboratories and onsite measurement organizations must maintain and calibrate their equipment specified by manufacturer or other applicable guidelines. Maintenance requirements (such as parts lists and documentation of routine maintenance) will be included in the individual laboratory and the onsite organization QA plan or operating procedures (as appropriate). Calibration of laboratory instruments will be performed in a manner consistent with SW-846 or HASQARD.

Consumables, supplies, and reagents will be reviewed in accordance with SW-846 requirements and will be appropriate for their use. Note that contamination is monitored by the QC samples discussed in Section 4.1.

5.0 CHANGE CONTROL

Field activity and laboratory work scope changes may be required because of unexpected field conditions, new information, health and safety concerns, or other unplanned circumstances. These work scope changes will be documented on a change request form. Laboratory changes will be communicated to the Characterization Task Lead and documented in the Format II laboratory report(s) narrative. Justification for the changes to work scope shall be provided in sufficient detail to understand the basis for the change.

Field sampling and survey methods and analytical strategies (e.g., constituent listings and data analysis) may be updated as new technologies or data become available. The impact of these updates will be judged as they are identified to determine if revisions to the SAP or FSAP will be necessary. The State of Washington Department of Ecology, DOE, and its contractors will participate in the process of SAP update evaluations and with any subsequent revisions, as applicable.

6.0 DATA REPORTING AND ELECTRONIC DATA MANAGEMENT

This section describes the laboratory reporting requirements for the soil samples taken from Well C7570, as well as the entering of the sampling data into the HEIS. This data is considered to be supplemental data to support RCRA efforts and results will be provided in Format II rather than Format VI. The data is considered to be supplemental because only ^{99}Tc and nitrate are being analyzed rather than the full RCRA analytical suite.

Analyses results will be issued as a Format II data package. Sample analysis data will be reviewed by ATL laboratory QA and chemist prior to issuance of a draft data package. The final data package will be provided to the Characterization Task Lead via hardcopy. The laboratory shall issue the Format II data package within 120 calendar days following receipt of the last samples. Preliminary results shall be available within 60 days following receipt of the last sample. As indicated in Section 5.0, laboratory changes will be communicated to the Characterization Task Lead and documented in the Format II laboratory report(s) narrative.

In addition to this data package, an electronic version of the analytical results shall be uploaded to HEIS within 14 calendar days of release of the data package. The electronic version shall be in the standard electronic format for HEIS [CP-15383, *Common Requirements of the Format for Electronic Analytical Data (FEAD)*]. The record copy of the data package will be placed in the Hanford Integrated Document Management System.

7.0 DOCUMENTS AND RECORDS

All information pertinent to field sampling and surveying will be recorded in field checklists and/or bound logbooks in accordance with existing sample collection protocols. The sampling team will be responsible for recording all relevant sampling information. Entries made in the logbook will be dated and signed by the individual who made the entry. Program requirements for managing the generation, identification, transfer, protection, storage, retention, retrieval, and disposition of records will be followed.

7.1 RECONCILIATION WITH USER REQUIREMENTS

The data quality assessment process compares completed field-sampling activities to those proposed in corresponding sampling documents and provides an evaluation of the resulting data. The purpose of the data evaluation is to determine if quantitative data are of the correct type and are of adequate quality and quantity to meet the project DQOs. Data quality assessment(s) will be performed according to guidelines in EPA/600/R-96/084, *Guidance for Data Quality Assessment, Practical Methods for Data Analysis EPA QA/G-9*.

8.0 WASHINGTON RIVER PROTECTION SOLUTIONS, LLC PROJECT ORGANIZATION

Key WRPS personnel are described in Table 8-1. Random surveillances and assessments to verify compliance with the requirements outlined in this FSAP, project work packages, the project quality management plan, procedures, and regulatory requirements may be performed. Deficiencies associated with WRPS activities that are identified by these assessments shall be reported in accordance with existing programmatic requirements. Corrective actions to WRPS activities will be implemented as required by the Tank Operation Contractor policy and procedures. Management will be made aware of deficiencies identified by assessments and surveillances and subsequent corrective actions.

Table 8-1. Key Washington River Protection Solutions, LLC Personnel

Title	Responsibility	Primary Contact	Alternate Contact
Project Manager	• Provides oversight for Washington River Protection Solutions, LLC (WRPS) activities to ensure work is performed safely and cost effectively • Coordinates with U.S. Department of Energy and Ecology regarding WRPS activities and information	Susan Eberlein	Mike Connelly
Characterization Task Lead	• Provides direction to field personnel • Ensures field requirements are met • Coordinates with necessary organizations to ensure field activities are conducted safely and correctly • Select laboratory to perform the analyses and request assessments/surveillances of the laboratories • Reviews sample data against existing knowledge and data quality assessment guidelines in EPA/240/B-01/003, *Guidance for Data Quality Assessment EPA QA/G-9*	Cindy Tabor	Andrew Templeton
Laboratory Contact	• Oversees laboratory analyses to ensure work is performed per requirements • Coordinates with Characterization Task Lead if there are issues regarding analyses • Provides preliminary data and final data via hard copy and electronically as identified in plan	Steve McKinney	Gerald Ritenour
Quality Assurance Lead	• Provides oversight for WRPS activities to ensure data integrity • Performs assessments and surveillance, as necessary	Kathi Dunbar	Mike Elroy

9.0 REFERENCES

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APPENDIX A

NOVEMBER 23, 2009 WMA C MEETING MINUTES

Meeting Minutes

Subject: Possible changes to the WMA C work plan

Location: Ecology

Date: 11/23/3009

Attendees: Mike Barnes (Ecology)
Michael Connelly (WRPS)
Dwayne Crumpler (CEES)
Bob Lober (ORP)
Jeff Lyon (Ecology)
Harold Sydnor (WRPS)

Purpose: To discuss possible changes to the WMA C work plan.

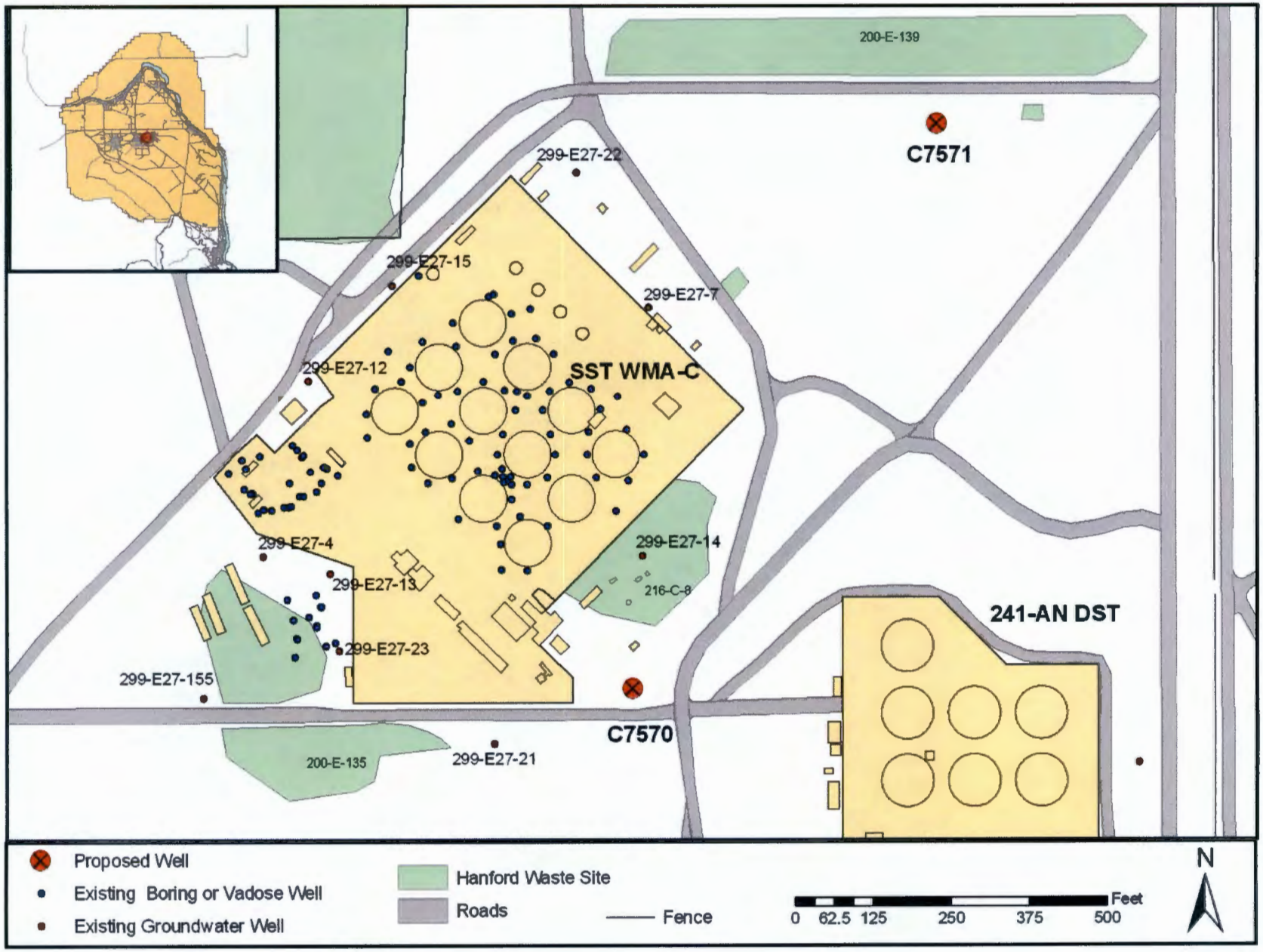
Topics Covered

1. Vadose zone sampling during the installation of the two new groundwater monitoring wells. These wells are scheduled to be installed in December of 2009 or January 2010.

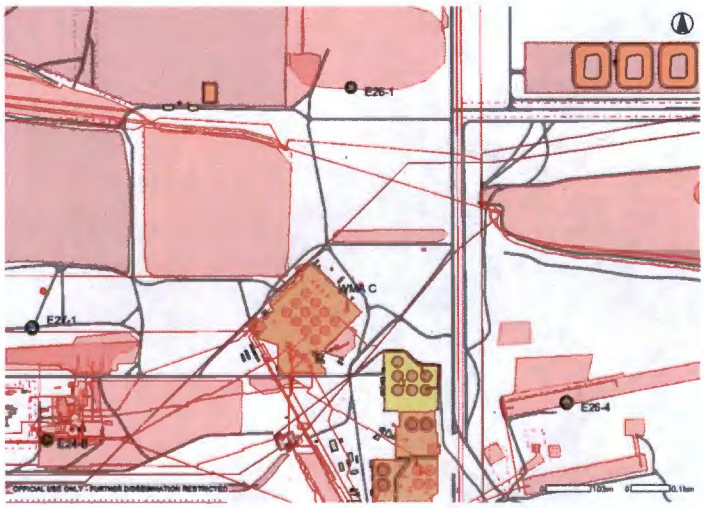
2. Discuss additional characterization efforts around the C-801 Cesium Loadout facility.

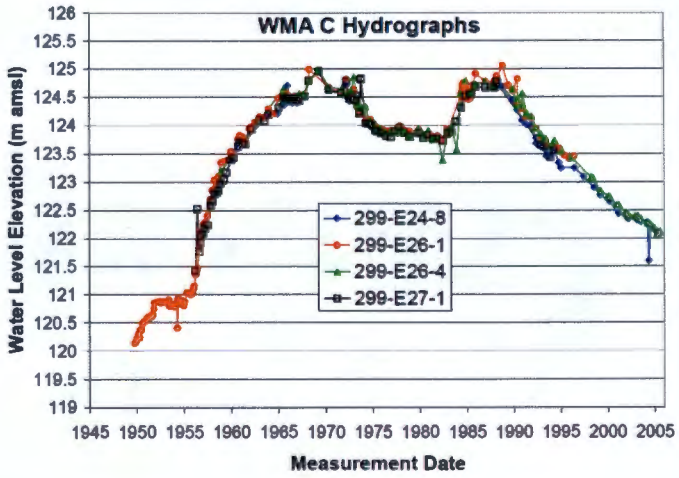
Discussion 1 Vadose Zone Samples at New Groundwater Monitoring Wells: The work plan states that if the new groundwater monitoring wells are placed within a 100 ft of WMA C then vadose samples should be taken. The following figure shows the location for the new groundwater monitoring wells. Well C7571 is greater than 500 ft from WMA C and no vadose zone samples would be taken at that location. Well 7570 is located at approximately 100 ft from the WMA C fenceline. Mr. Connelly prepared a brief white paper (see Appendix A) with a topographic analysis of the top of the H2 formation. Given the fact the new well is up the stratigraphic dip of the Hanford H2 Unit at WMA C and therefore waste should not be traveling downdip toward this well, and the fact that grab samples are taken every 5ft for geologic purposes; Mr. Connelly recommended if the spectral and moisture logs indicated contamination then the grab samples taken during drilling would be used for chemical analysis. However, it should be noted the grab samples taken during drilling would not have a chain of custody and may not meet full QA/QC for chemical analysis.

Mike Barnes from Ecology countered that here is an opportunity to recover deep vadose zone samples from 0 to 20 ft above the water table and that only nitrate and tc-99 analysis should be done on these samples. The purpose of collecting the samples would be examine the vadose zone directly above the water table to tc-99 and nitrate are present in this region and then compare the sample results to the tc-99 and nitrate against the sample results for groundwater. It may be possible the tc-99 is related to the highwater table during operations. All parties agreed that this was a good idea. Mr. Connelly was tasked with providing a cost estimate for collecting these samples.


200-E-139
C7571
299-E27-22
299-E27-15
299-E27-7
299-E27-12
SST WMA-C
299-E27-4
299-E27-14
299-E27-13
216-C-8
241-AN DST
299-E27-23
299-E27-155
C7570
200-E-135
299-E27-21
Proposed Well
Existing Boring or Vadose Well
Existing Groundwater Well
Hanford Waste Site
Roads
Fence
0 62.5 125 250 375 500
Feet
N

Additional Information: Mr. Connelly after the meeting queried the databases for the water table trends since 1945. The following figures show the water table trends in the vicinity of WMA C. The high water table occurred in the 1960s and again in the 1980s. The maximum is approximately 125 m above msl. The present day water table (7/17/2009) in this region is approximately 122 m above msl.





Cost Estimate: A cost estimate comes from discussions with Chris Wright of CHPRC. If the sample consists of collecting another jar of material when collecting the grab sample for geologic purposes there would be no additional costs except for analyzing the sample. If we needed a chain of custody and samplers for the grab sample then he estimated the cost would come from having 2 to 3 NCO for 2 to 3 days and the cost would approximately $10K. Furthermore the chain of custody grab samples would have to be documented in the FSAP and all the sampling paperwork would have to be completed by the time they drilled this well.

Discussion 2 C-801 Cesium Loadout Facility: Due to additional information being found about the history of C-801 Cesium Loadout Facility Mike Barnes requested about the possibility of doing additional characterization in this vicinity. Mike Barnes thought these dry wells may be 70 or more feet below ground surface. However, before the meeting Mike Connelly queried IDMS for information about the facility and descriptions of these dry wells. A description of the dry wells comes from RPP-6637 Rev. 1 *Hazard Evaluation for AX-IX, ITS1, 241-SX-401, 241-SX-402, 241-C-801, 241-A-431* which is provided below:

> *The first dry well is a standard dry well located approximately 100 ft northeast of the building. It is just outside the tank farm fence. Two floor drains are routed to the dry well: a 2-in. line from the valve pit and a 3-in. drain from the loadout ramp area. This dry well is considered part of the facility.*
>
> *The second dry well received condensate from the steam to the building. Three steam traps are routed to a 1-in. line to the dry well. The standard dry well is located just to the northeast of the middle of the building. This dry well is considered part of the facility.*

An as-built of the first dry well is given on drawing H-2-4566. The dry well is a 4 ft diameter concrete pipe (8 ft long) placed vertically in the soil 3 ft below grade the drain.

A nitric acid recovery process was used to recover nitric acid in this building. If there was a spill in the building, then it is assumed the nitric acid would go down the drain and out to the dry well. In which case, the nitric acid would interact with the carbonate in the sediments and the carbonate content should be lower than what is typically found in these sediments. If the nitric acid was neutralize with sodium hydroxide before going down the drain and out to the drywell, then the sediments would have elevated sodium content.

Mike Barnes requested that SGE be deployed in the vicinity of the 801-C because of the nitric acid/waste that may have gone to the dry well. Mr. Connelly said that deploying SGE in the vicinity is not currently in the baseline because SGE at 801-C was not identified in the WMA C Work Plan and that a baseline change request would have to be done to do this work. We then discussed other possibilities for this area. The path forward was to check to see if carbonate and sodium are part of the required analysis for Site F which was identified to evaluate C-801 in the work plan. If they are not part of the required analysis, then they should be added to provide information if waste fluids from 801-C have interacted with the sediments. Either the carbonate should be depleted or sodium would be elevated. After receiving the results from these analyses and sharing them with Ecology, we would then determine a path forward for additional characterization in vicinity of 801-C. Following the meeting Mr. Connelly determined that carbonate is not included in the analyte list in the SAP and that sodium is but as a secondary constituent.

On the following page is a map of where the CHPRC will be installing new groundwater monitoring wells. We have in our work plan that we would take vadose zone samples if the new boreholes are within a 100 ft of the WMA fenceline. One of the new boreholes is at 99 ft of the fenceline by my calculations. Here is the language in the work plan

RPP-39114 Rev 1. Page 4-18

The request to twin soil samples from new groundwater well boreholes with soil samples from direct push is a reasonable technical request that was provided by the Nez Perce in review of Revision 0 of this work plan. Although soil samples from direct pushes have been acquired, they are spatially separated by tens of feet from soil samples associated with boreholes. These soil samples can be compared and have shown similarities in pH and moisture content. However, with the potential changes in soil properties that might occur over those distances a meaningful comparison related to the differences in techniques is problematic. It would be more beneficial to have direct push soil samples that were located a few feet (~2 ft) apart from soil samples from the new groundwater monitoring well(s) borehole to allow a more valid comparison. The soil samples from the direct pushes and the proposed new groundwater well(s) can be compared and similarities in analytical values can be demonstrated. This twinning exercise will also support the technical merits of using moisture as an indicator for soil sampling targets. If we are successful in placing two new groundwater wells within 100 ft of the WMA C boundary, we propose placing twin direct push probe holes with those wells. If we

cannot place the new wells, we will place the direct push probes holes to twin the geophysical logging of existing wells. Furthermore, this approach will also allow us to collect soil samples from new groundwater wells. The exact location will be dependent on waste retrieval activities associated with access to various locations. The preferred location as recommended by the Nez Perce and concurred with DOE-ORP and the contractor would be close to existing groundwater wells 299-E27-7 or 299-E27-14, which have shown groundwater impacts related to regional contamination as well as contamination associated with WMA C; however the location may be modified due to existing site conditions and waste retrieval operations.

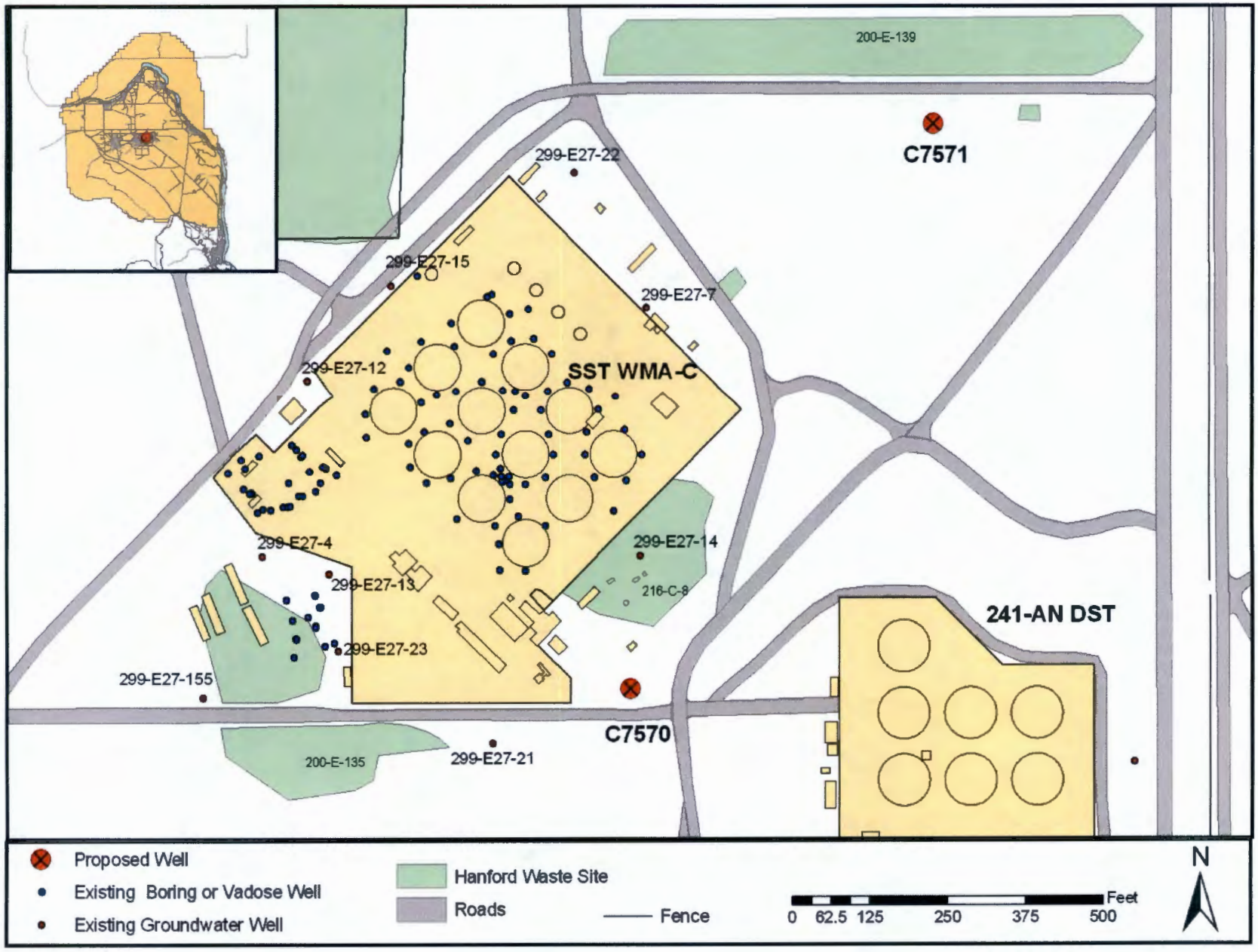
A planning process will be conducted to address collection of vadose zone data during installation of a planned RCRA groundwater monitoring well similar to the one conducted for 299-E27-22 (PNNL-13024).

Continuation on page 4-21 of RPP-39114 Rev 1. pages 4-19 and 4-20 are figures)

Drill cutting samples will be collected in conjunction with the installation of a RCRA groundwater monitoring well. From this well, near-continuous sediment samples from about 10 ft bgs to refusal will be collected. Drill cuttings and driven splitspoon samples will be collected from 10 ft bgs to near the total depth of the water table. Selected portions (21 samples) of the driven samples and cuttings will be analyzed for chemical and physical characteristics. From each stratigraphic unit, potential vertical locations for analyses will include stratigraphic contacts, weathered bedding structures, and lithologic facies changes. Splitspoon-driven soil samples will be taken every 10 ft starting at 50 ft bgs for a total of 21 samples. Inorganic chemicals, pH, moisture, and radionuclide suite of analyses will be performed on the samples for planning purposes.

Please note the location for Well C7570 (E27-24) is at approximately the limit for collecting samples (99 ft). Furthermore, I have done a topographic analysis of the top of the H2 sands. I would not expect waste from WMA C (see figure following borehole locations) to intersect this new well in the vadose zone. It is topographically up-dip from the WMA C and I would not expect to find contaminants in this borehole, but I have been wrong in the past over this. Additionally, Greg Thomas mentions there is a pipeline within 25 ft of this borehole.

Grab samples are taken every five ft during the drilling process for geologic purposes, which means that Chain of Custody is not prepared for those grab samples. My recommendation would be to log the borehole following drilling for moisture and spectral gamma. If the spectral gamma logging showed contamination, we would then go back analyze the grab samples, but being aware that those samples may not meet full QA/QC.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SST WMA-C
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299-E27-13
216-C-8
241-AN DST
299-E27-23
299-E27-155
C7570
200-E-135
299-E27-21
Proposed Well
Existing Boring or Vadose Well
Existing Groundwater Well
Hanford Waste Site
Roads
Fence
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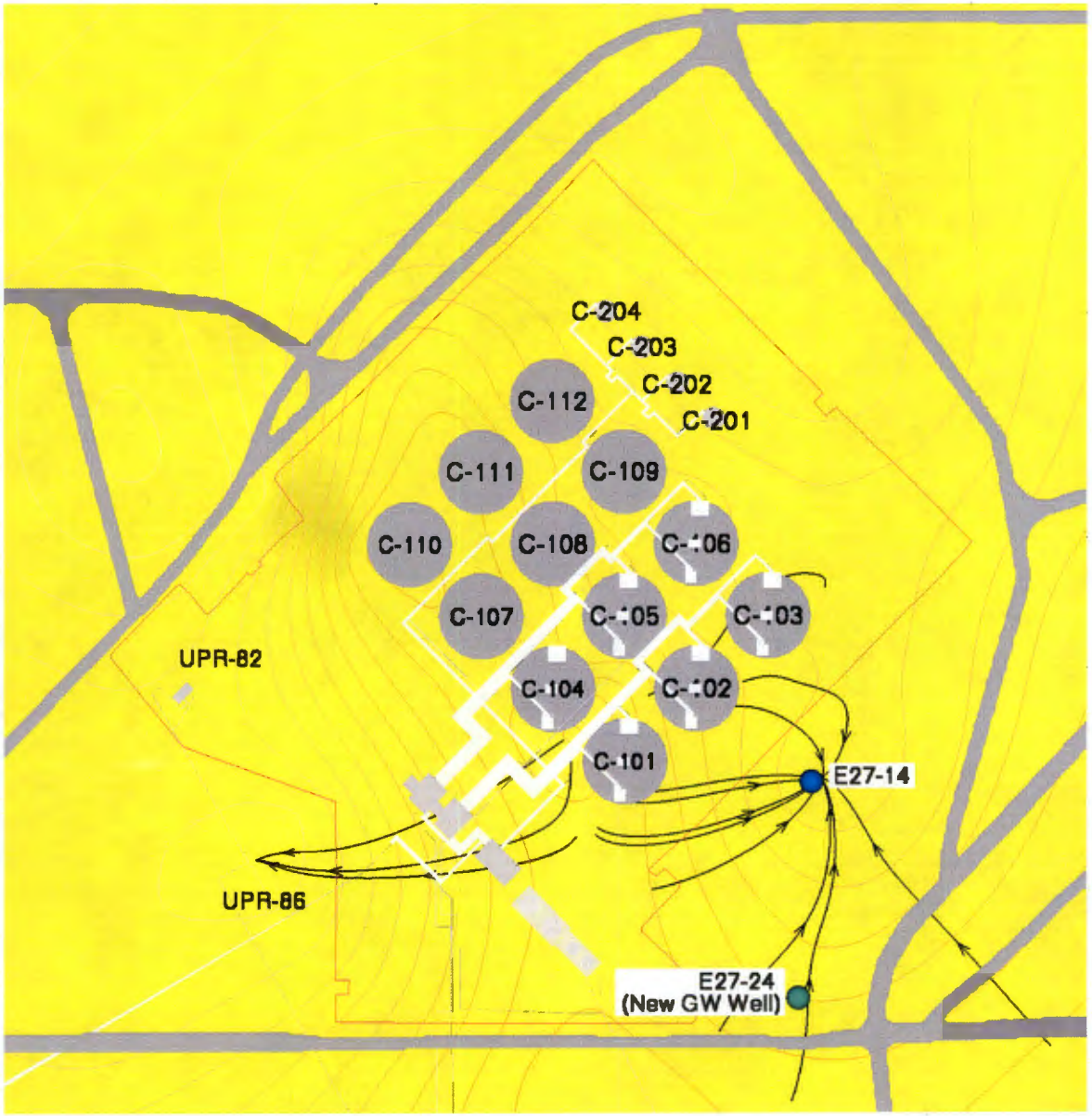
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C-107
C-105
C-103
C-104
C-102
C-101
UPR-82
UPR-86
E27-14
E27-24
(New GW Well)