

# Data Validation Package

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**December 2014  
Groundwater Sampling at the  
Central Nevada Test Area**

**February 2015**

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# Sampling Event Summary

**Site:** Central Nevada Test Area

**Sampling Period:** December 16–18, 2014

The U.S. Department of Energy Office of Legacy Management conducted annual sampling at the Central Nevada Test Area (CNTA) December 16–18, 2014, in accordance with the 2004 *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 443: Central Nevada Test Area (CNTA)—Subsurface* and the addendum to the Corrective Action Decision Document/Corrective Action Plan completed in 2008. Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). Samples were submitted to ALS Laboratory Group in Fort Collins, Colorado, for the determination of tritium. A duplicate sample from location HTH-1RC was included with this submittal.

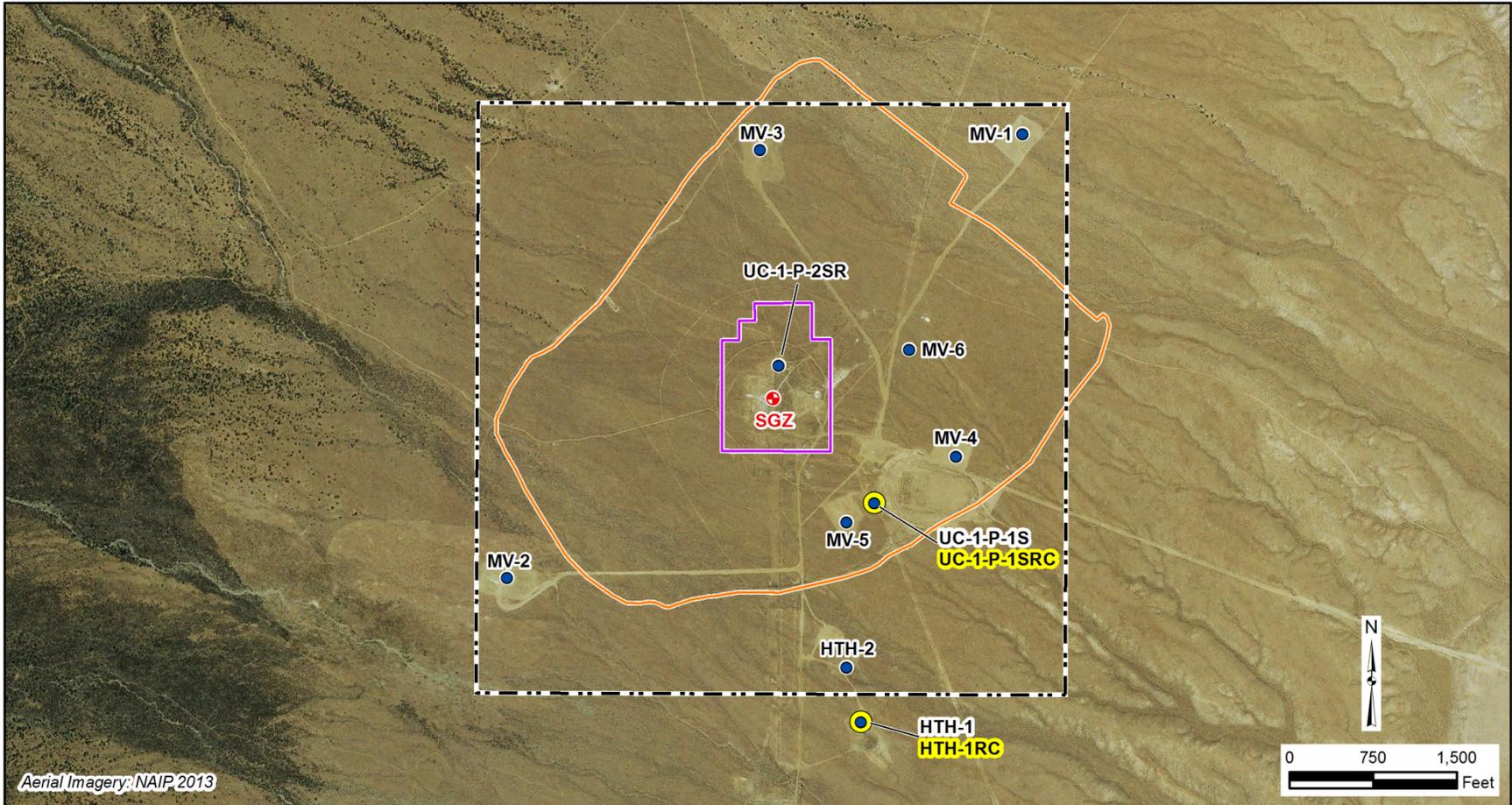
Analytical results from this sampling event are consistent with those of previous events. Tritium was not detected in any of the samples.



\_\_\_\_\_  
Rick Findlay, Site Lead  
Stoller Newport News Nuclear, Inc.,  
a wholly owned subsidiary of  
Huntington Ingalls Industries, Inc.,

2-23-2015

\_\_\_\_\_  
Date



**LEGEND**

- + Surface Ground Zero (UC-1 Emplacement Borehole)
- Existing Well
- Existing Well (Recompleted June 2009)
- Model Predicted Contaminant Boundary
- Fault Block Boundary / Compliance Boundary
- Withdrawal Boundary

U.S. DEPARTMENT OF ENERGY  
 GRAND JUNCTION, COLORADO

Work Performed by  
**S.M. Stoller Corporation**  
 Under DOE Contract  
 No. DE-AC01-07LM00080

**Well Location Map**  
 Central Nevada Test Area - UC-1

DATE PREPARED:  
 January 22, 2014

FILENAME:  
 S1145900

M:\LTS\1111\0083\05\006\S11459\S1145900.mxd smithw 01/22/2014 8:42:00 AM

*Location Map of Monitoring Wells and Boundaries at CNTA*

# **Data Assessment Summary**

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### Water Sampling Field Activities Verification Checklist

<b>Project</b>	<u>CNTA</u>	<b>Date(s) of Water Sampling</b>	<u>December 16–18, 2014</u>
<b>Date(s) of Verification</b>	<u>February 9, 2015</u>	<b>Name of Verifier</b>	<u>Stephen Donovan</u>

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures?  List any Program Directives or other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order letter dated October 16, 2014, Program Directive CNT-2013-02.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	
3. Were calibrations conducted as specified in the above-named documents?	<u>Yes</u>	<u>Calibration was performed on December 12 and 17, 2014.</u>
4. Was an operational check of the field equipment conducted daily?  Did the operational checks meet criteria?	<u>Yes</u>  <u>Yes</u>	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>Yes</u>	
6. Were wells categorized correctly?	<u>No</u>	<u>Per Program Directive, wells MV-6, HTH-2, and UC-1-P-1SRC were sampled using a dedicated high-flow submersible pump.</u>
7. Were the following conditions met when purging a Category I well:  Was one pump/tubing volume purged prior to sampling?  Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?  Was the flow rate less than 500 mL/min?	<u>NA</u>	<u>There were no Category I wells.</u>

### Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well: Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected at location HTH-1RC.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	An equipment blank was not required.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	NA	Sample cooling was not required.
19. Were water levels measured at the locations specified in the planning documents?	NA	Water levels were not measured during this event.

## Laboratory Performance Assessment

### General Information

Report Numbers (RINs): 14116587  
Sample Event: December 16–18, 2014  
Site(s): Central Nevada Test Area  
Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
Work Order No.: 1412470  
Analysis: Radiochemistry  
Validator: Stephen Donovan  
Review Date: February 9, 2015

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), “Standard Practice for Validation of Environmental Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

*Table 1. Analytes and Methods*

Analyte	Line Item Code	Prep Method	Analytical Method
Tritium	LSC-A-001	SOP 700	SOP 704

### Data Qualifier Summary

None of the analytical results required qualification.

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received ten water samples on December 29, 2014, accompanied by a Chain of Custody form. Copies of the air bills were included in the receiving documentation. The Chain of Custody was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody was complete with no errors or omissions.

### Preservation and Holding Times

The sample shipment was received intact at ambient temperature which complies with requirements. All samples were preserved correctly. All samples were received in the correct container types and all samples were analyzed within the applicable holding times.

## Detection and Quantitation Limits

For radiochemical analytes (those measured by radiometric counting), the results are evaluated using the minimum detectable concentration (MDC), Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a “U” flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as 3 times the MDC. Results not previously “U” qualified that are less than the DL are qualified with a “J” flag as estimated values.

The reported MDCs for radiochemical analytes demonstrate compliance with contractual requirements.

## Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

## Radiochemical Analysis

### *Tritium*

The tritium quench calibration curve was generated on July 11, 2014, for quench indicator values ranging from 145 to 256. Nitromethane was added to the samples to adjust the sample quench values within the calibration range for the analysis. A high-energy window (Window 2) was established to monitor for any potential interferences that might be present due to higher energy beta emitters that would bias the results high. All samples had Window 2 count rates that were within the control limits. Daily instrument performance checks were acceptable.

## Method Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. The radiochemistry method blank results were less than the DLC.

## Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. For radiochemical measurements, the relative error ratio (the ratio of the absolute difference between the sample and duplicate results and the sum of the 1-sigma uncertainties) is used to

evaluate duplicate results and should be less than 3. All replicate results met these criteria, demonstrating acceptable precision.

#### Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

#### Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

#### Electronic Data Deliverable (EDD) File

The EDD file arrived on January 27, 2015. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure that all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

# SAMPLE MANAGEMENT SYSTEM

## General Data Validation Report

RIN: 14116587    Lab Code: PAR    Validator: Stephen Donovan    Validation Date: 02/09/2015  
Project: Central Nevada Test Area    Analysis Type:    Metals    General Chem    Rad    Organics  
# of Samples: 10    Matrix: WATER    Requested Analysis Completed: Yes

### Chain of Custody

Present: OK    Signed: OK    Dated: OK

### Sample

Integrity: OK    Preservation: OK    Temperature: OK

### Select Quality Parameters

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

The reported detection limits are equal to or below contract requirements.

There was 1 duplicate evaluated.

**SAMPLE MANAGEMENT SYSTEM**  
**Radiochemistry Data Validation Worksheet**

**RIN:** 14116587                      **Lab Code:** PAR                      **Date Due:** 01/20/2015  
**Matrix:** Water                      **Site Code:** CNT01                      **Date Completed:** 01/28/2015

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate RER
HTH-2	H-3	01/23/2015						0.15
HTH-2	H-3	01/23/2015					107.0	
Blank_Spike	H-3	01/24/2015				108.00		
Blank	H-3	01/24/2015	112.0000	U				

## Sampling Quality Control Assessment

The following information summarizes and assesses quality control for this sampling event.

### Sampling Protocol

Sample results for wells HTH-1RC, MV-1, MV-2, MV-3, MV-4, and MV-5 met the low-flow sampling criteria and were qualified with an “F” flag, indicating the wells were purged and sampled using the low-flow sampling method, and also qualified with a “Q” flag, indicating the data are considered qualitative because these are Category II wells.

As per Program Directive CNT-2013-02, some wells were *not* sampled using low-flow criteria. Wells MV-6, HTH-2, and UC-1-P-1SRC were sampled using a dedicated high-flow submersible pump. The field parameters specified in the directive met the required stability criteria over the final three readings.

### Equipment Blank Assessment

An equipment blank was not required.

### Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from location HTH-1RC. The relative error ratio (the ratio of the absolute difference between the sample and duplicate results and the sum of the 1-sigma uncertainties) is used to evaluate duplicate results and should be less than 3. The duplicate results met these criteria, demonstrating acceptable precision.

**SAMPLE MANAGEMENT SYSTEM**  
**Validation Report: Field Duplicates**

RIN: 14116587    Lab Code: PAR    Project: Central Nevada Test Area    Validation Date: 02/09/2015

Duplicate: 2670

Sample: HTH-1RC

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
H-3	-68.1	U	222	1	99.1	U	227	1		1.0	pCi/L

### Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Stephen Donovan 2-19-2015  
Stephen Donovan Date

Data Validation Lead: Stephen Donovan 2-19-2015  
Stephen Donovan Date

**Attachment 1**  
**Assessment of Anomalous Data**

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# Potential Outliers Report

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## Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers can result from transcription errors, data-coding errors, or measurement system problems. However, outliers can also represent true extreme values of a distribution and can indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. **Identify extreme values that may be potential outliers.** Do this by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made as to whether the data are normally distributed using the Shapiro-Wilk Test.
2. **Apply the appropriate statistical test.** Dixon's Test for extreme values is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. **Scientifically review statistical outliers and decide on their disposition.** The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

There were no potential outliers identified, and the data for this event are acceptable as qualified.

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# **Attachment 2**

## **Data Presentation**

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## **Groundwater Quality Data**

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**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: HTH-1RC WELL Previously in database as HTH-1, until recompleted on 5/6/2009

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/16/2014	N001	2357.75	- 2658.05	254		FQ	#		
Dissolved Oxygen	mg/L	12/16/2014	N001	2357.75	- 2658.05	1.29		FQ	#		
Oxidation Reduction Potential	mV	12/16/2014	N001	2357.75	- 2658.05	-125		FQ	#		
pH	s.u.	12/16/2014	N001	2357.75	- 2658.05	8.35		FQ	#		
Specific Conductance	umhos /cm	12/16/2014	N001	2357.75	- 2658.05	590		FQ	#		
Temperature	C	12/16/2014	N001	2357.75	- 2658.05	14.2		FQ	#		
Tritium	pCi/L	12/16/2014	N001	2357.75	- 2658.05	-68.1	U	FQ	#	380	222
Tritium	pCi/L	12/16/2014	N002	2357.75	- 2658.05	99.1	U	FQ	#	380	227
Turbidity	NTU	12/16/2014	N001	2357.75	- 2658.05	5.44		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: HTH-2 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/17/2014	N001	504 - 1000	159			#		
Dissolved Oxygen	mg/L	12/17/2014	N001	504 - 1000	5.52			#		
Oxidation Reduction Potential	mV	12/17/2014	N001	504 - 1000	45.4			#		
pH	s.u.	12/17/2014	N001	504 - 1000	7.67			#		
Specific Conductance	umhos /cm	12/17/2014	N001	504 - 1000	303			#		
Temperature	C	12/17/2014	N001	504 - 1000	18.48			#		
Tritium	pCi/L	12/17/2014	N001	504 - 1000	-115	U		#	380	221
Turbidity	NTU	12/17/2014	N001	504 - 1000	3.15			#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: MV-1 WELL

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/16/2014	N001	3750	- 3909.56	190		FQ	#		
Dissolved Oxygen	mg/L	12/16/2014	N001	3750	- 3909.56	0.76		FQ	#		
Oxidation Reduction Potential	mV	12/16/2014	N001	3750	- 3909.56	-170		FQ	#		
pH	s.u.	12/16/2014	N001	3750	- 3909.56	9.47		FQ	#		
Specific Conductance	umhos/cm	12/16/2014	N001	3750	- 3909.56	670		FQ	#		
Temperature	C	12/16/2014	N001	3750	- 3909.56	13.8		FQ	#		
Tritium	pCi/L	12/16/2014	N001	3750	- 3909.56	74.8	U	FQ	#	380	227
Turbidity	NTU	12/16/2014	N001	3750	- 3909.56	5.79		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: MV-2 WELL

Parameter	Units	Sample		Depth Range		(Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID					Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/16/2014	N001	3039.49	-	3202.24	249		FQ	#		
Dissolved Oxygen	mg/L	12/16/2014	N001	3039.49	-	3202.24	0.57		FQ	#		
Oxidation Reduction Potential	mV	12/16/2014	N001	3039.49	-	3202.24	-200		FQ	#		
pH	s.u.	12/16/2014	N001	3039.49	-	3202.24	11.04		FQ	#		
Specific Conductance	umhos/cm	12/16/2014	N001	3039.49	-	3202.24	1815		FQ	#		
Temperature	C	12/16/2014	N001	3039.49	-	3202.24	13.4		FQ	#		
Tritium	pCi/L	12/16/2014	N001	3039.49	-	3202.24	93.8	U	FQ	#	370	224
Turbidity	NTU	12/16/2014	N001	3039.49	-	3202.24	3.3		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: MV-3 WELL

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/17/2014	N001	4046	- 4207.75	403		FQ	#		
Dissolved Oxygen	mg/L	12/17/2014	N001	4046	- 4207.75	0.92		FQ	#		
Oxidation Reduction Potential	mV	12/17/2014	N001	4046	- 4207.75	-100		FQ	#		
pH	s.u.	12/17/2014	N001	4046	- 4207.75	7.06		FQ	#		
Specific Conductance	umhos/cm	12/17/2014	N001	4046	- 4207.75	950		FQ	#		
Temperature	C	12/17/2014	N001	4046	- 4207.75	13.3		FQ	#		
Tritium	pCi/L	12/17/2014	N001	4046	- 4207.75	-42.4	U	FQ	#	370	219
Turbidity	NTU	12/17/2014	N001	4046	- 4207.75	8.69		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: MV-4 WELL

Parameter	Units	Sample		Depth Range		(Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID					Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/17/2014	N001	1719.33	-	2023.43	193		FQ	#		
Dissolved Oxygen	mg/L	12/17/2014	N001	1719.33	-	2023.43	1.31		FQ	#		
Oxidation Reduction Potential	mV	12/17/2014	N001	1719.33	-	2023.43	-240		FQ	#		
pH	s.u.	12/17/2014	N001	1719.33	-	2023.43	10.01		FQ	#		
Specific Conductance	umhos/cm	12/17/2014	N001	1719.33	-	2023.43	480		FQ	#		
Temperature	C	12/17/2014	N001	1719.33	-	2023.43	13		FQ	#		
Tritium	pCi/L	12/17/2014	N001	1719.33	-	2023.43	-76.8	U	FQ	#	380	219
Turbidity	NTU	12/17/2014	N001	1719.33	-	2023.43	2.86		FQ	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: MV-5 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range		(Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
				Lab	Data			QA				
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/17/2014	N001	1838.57	-	2163	216	FQ	#			
Dissolved Oxygen	mg/L	12/17/2014	N001	1838.57	-	2163	1.58	FQ	#			
Oxidation Reduction Potential	mV	12/17/2014	N001	1838.57	-	2163	-215	FQ	#			
pH	s.u.	12/17/2014	N001	1838.57	-	2163	10.64	FQ	#			
Specific Conductance	umhos/cm	12/17/2014	N001	1838.57	-	2163	630	FQ	#			
Temperature	C	12/17/2014	N001	1838.57	-	2163	13	FQ	#			
Tritium	pCi/L	12/17/2014	N001	1838.57	-	2163	-80	U	FQ	#	380	220
Turbidity	NTU	12/17/2014	N001	1838.57	-	2163	3.3	FQ	#			

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: MV-6 WELL

Parameter	Units	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft	BLS)		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/18/2014	N001	838.02	- 1000.66	109			#		
Dissolved Oxygen	mg/L	12/18/2014	N001	838.02	- 1000.66	4.51			#		
Oxidation Reduction Potential	mV	12/18/2014	N001	838.02	- 1000.66	171.3			#		
pH	s.u.	12/18/2014	N001	838.02	- 1000.66	7.71			#		
Specific Conductance	umhos/cm	12/18/2014	N001	838.02	- 1000.66	238			#		
Temperature	C	12/18/2014	N001	838.02	- 1000.66	20.69			#		
Tritium	pCi/L	12/18/2014	N001	838.02	- 1000.66	100	U		#	370	225
Turbidity	NTU	12/18/2014	N001	838.02	- 1000.66	5.99			#		

**Groundwater Quality Data by Location (USEE100) FOR SITE CNT01, Central Nevada Test Area Site**

REPORT DATE: 02/09/2015

Location: UC-1-P-1SRC WELL Previously in database as UC-1-P-1S, until recompleted on 6/2/2009

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	12/17/2014	N001	512.04 - 573.02	144			#		
Dissolved Oxygen	mg/L	12/17/2014	N001	512.04 - 573.02	5.68			#		
Oxidation Reduction Potential	mV	12/17/2014	N001	512.04 - 573.02	129.5			#		
pH	s.u.	12/17/2014	N001	512.04 - 573.02	7.5			#		
Specific Conductance	umhos /cm	12/17/2014	N001	512.04 - 573.02	310			#		
Temperature	C	12/17/2014	N001	512.04 - 573.02	17.93			#		
Tritium	pCi/L	12/17/2014	N001	512.04 - 573.02	-41.8	U		#	370	219
Turbidity	NTU	12/17/2014	N001	512.04 - 573.02	7.6			#		

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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**Attachment 3**  
**Sampling and Analysis Work Order**

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October 16, 2014

Task Assignment 104  
Control Number 15-0057

U.S. Department of Energy  
Office of Legacy Management  
ATTN: Mark Kautsky  
Site Manager  
2597 Legacy Way  
Grand Junction, CO 81503

SUBJECT: Contract No. DE-LM0000415, The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries (Stoller)  
Task Assignment 104 LTS&M - Nevada Offsites and Monticello  
November 2014 Environmental Sampling at the Central Nevada Test Area, Nevada, Site

REFERENCE: Task Assignment 104, 3-104-1-07-613, Central Nevada Test Area Site

Dear Mr. Kautsky:

The purpose of this letter is to inform you of the upcoming monitoring event at the Central Nevada Test Area (CNTA). It provides details on the routine sampling activities, the hydraulic head monitoring, and the supplemental activities that are not part of our typical annual monitoring. Standard sampling activities for this annual monitoring event will include the analyses of samples from the site monitoring wells for tritium as specified in the Addendum to the Corrective Action Decision Document/Corrective Action Plan. No supplemental activities will be conducted for this monitoring event. Enclosed are a map and tables that specify the sampling locations and analytes for the annual monitoring event. This monitoring event is scheduled to begin the week of November 10, 2014.

The following list shows the locations scheduled to be sampled during this event.

**Monitoring Wells**

MV-1	MV-3	MV-5	HTH-1RC	HTH-2	UC-1-P-1SRC
MV-2	MV-4	MV-6			

Samples will be collected from wells UC-1-P-1SRC, HTH-2, and MV-6 using the dedicated submersible electric pumps. At least one well volume will be removed, and field parameters (temperature, pH, and specific conductance) will be allowed to stabilize before samples are collected. Monitoring wells MV-1, MV-2, MV-3, MV-4, MV-5, and HTH-1RC will be sampled using the dedicated submersible bladder pumps. The bladder pump in well HTH-1RC was not operable during last year's sampling event, and it is uncertain if it will be operable during this event, but an attempt will be made to fix the pump. The wells with bladder pumps will be sampled using the low-flow sampling methodology. Before samples are collected from the designated wells the transducer will be downloaded, and a water level will be determined.

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES

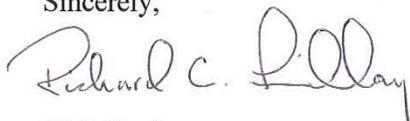
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

Mark Kautsky  
Control Number 15-0057  
Page 2

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* ([http://www.lm.doe.gov/Long-Term Surveillance and Maintenance.aspx#](http://www.lm.doe.gov/Long-Term%20Surveillance%20and%20Maintenance.aspx#)) and will meet the requirements of the *Addendum to the Corrective Action Decision Document/Corrective Action Plan (CADD/CAP) for Corrective Action Unit (CAU) 443: Central Nevada Test Area (CNTA) - Subsurface*. Refer to Table 2 for the required analyses.

Please contact me at (970) 248-6419 if you have any questions.

Sincerely,



Rick Findlay  
Site Lead

RF/lcg/bkb

Enclosures (3)

cc: (electronic)

Christina Pennal, DOE  
Steve Donivan, Stoller  
Rick Findlay, Stoller  
Lauren Goodknight, Stoller  
Rex Hodges, Stoller  
Rick Hutton, Stoller  
Diana Osborne, Stoller  
EDD Delivery  
rc-grand.junction  
File: CNT 400.02

## Sampling Frequencies for Locations at Central Nevada Test Area

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
<b>Monitoring Wells</b>						
MV-1			X			Download transducers
MV-2			X			Download transducers
MV-3			X			Download transducers
HTH-1RC			X			Download transducers
HTH-2			X			Download transducers
UC-1-P-1SRC			X			Download transducers
MV-4			X			Download transducers
MV-5			X			Download transducers
MV-6			X			Download transducers

Sampling conducted in early November

## Constituent Sampling Breakdown

Site	CNTA		Required Detection Limit (mg/L)	Analytical Method	Line Item Code	Laboratory	
	Groundwater	Surface Water				ALS	University of Arizona
<b>Approx. No. Samples/yr</b>	8	0					
<b>Field Measurements</b>							
Alkalinity	X						
Dissolved Oxygen	X						
Redox Potential	X						
pH	X						
Specific Conductance	X						
Turbidity	X						
Temperature	X						
<b>Laboratory Measurements</b>							
Aluminum							
Ammonia as N (NH <sub>3</sub> -N)							
Bromide							
Calcium							
Chloride							
Chromium							
Gamma Spec							
Gross Alpha							
Gross Beta							
Iodine-129							
Iron							
Lead							
Magnesium							
Manganese							
Molybdenum							
Nickel							
Nitrate + Nitrite as N (NO <sub>3</sub> +NO <sub>2</sub> )-N							
Potassium							
Selenium							
Silica							
Sodium							
Strontium							
Sulfate							
Sulfide							
Tritium	X		400 pCi/L	Liquid Scintillation	LSC-A-001	X	
Tritium, enriched							
Uranium							
Vanadium							
Zinc							
<b>Total No. of Analytes</b>	1	0					

All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

# **Attachment 4 Trip Report**

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Memorandum

DATE: January 5, 2015  
TO: Rick Findlay  
FROM: Dan Sellers  
SUBJECT: Trip Report (LTHMP Sampling)

**Site:** Central Nevada Test Area (CNTA)

**Dates of Sampling Event:** December 15-18, 2014

**Team Members:** Rob Rice, Dan Sellers, David Atkinson, and Jeff Price.

**Number of Locations Sampled:** Eight on-site monitoring wells were sampled for tritium.

**Locations Not Sampled/Reason:** N/A

**Quality Control Sample Cross Reference:** The following is the false identification assigned to the quality control sample:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2670	HTH-1RC	Duplicate	Groundwater	MMR 662

**RIN Number Assigned:** Samples were assigned to RIN 14116587.

**Sample Shipment:** Samples were shipped to ALS Laboratory Group on 12/22/14.

**Water Level Measurements:** Water levels for all wells are presented in the following table and were taken on November 9, 2014. Water levels were noted in the comment section of FDSCS for each location.

**Trip Summary:** Mark Kautsky (DOE) was present on December 16 for a site visit and to observe the sampling event. Prior to sampling of the wells with dedicated electrical pumps, David Atkinson and Dan Sellers traveled to Reno, Nevada, on December 15-16 to pick up the trailer mounted diesel generator. The bladder pump in well HTH-1RC, which had been inoperable for the last two sampling events, was repaired. It appears that the pump had become entangled with the water level access tube which plugged the pump discharge line. The water level access tube was temporarily lifted about 100 feet freeing the entangled pump.

**Sampling Method:**

- Water samples were collected according to the Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites (LMS/PRO/S04351, continually updated).
- Samples collected from wells MV-6, UC-1-P-1SRC, and HTH-2 were sampled using the dedicated high-flow submersible pumps after purging a prescribed volume as directed in program directive CNT-2013-02.

The following table lists purge volumes for all wells. Well MV-6 was purged overnight, as requested by Rick Finley.

Well ID	Date Installed	Pump Depth (ft)	DTW (ft)	Drop Tube Length (ft)	Sample Intake Depth (ft)	Tubing Purge Volume Prior to Sampling (Gal)
MV-1	5/30/09	700	508	3100	3800	9.2
MV-2	6/26/09	500	369.41	2600	3100	7.6
MV-3	6/25/09	800	601.70	3300	4100	10.0
MV-4	11/5/13	550	504.65	1250	1800	4.5
MV-5	11/5/13	645	559.75	1450	2095	5.0
MV-6 (Electric Pump)		828	504.65	N/A	828	13,110 (extended purge) Normal purge 750
HTH-1RC	6/24/09	700	486.10	1900	2600	5.9
HTH-2 (Electric Pump)		697	556.50	N/A	697	1748
UC-1-P1SRC (Electric Pump)		500	281.21	N/A	500	324

**Field Variance:** None.

**Equipment:** All equipment functioned properly.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** No issues were observed.

**Vegetation/Noxious Weed Concerns:** None observed.

**Safety Issues:** None.

**Access Issues:** None.

**Corrective Action Required/Taken:** Maintenance was completed on all sampled well lids to ensure all locks would work and that all would open and close properly. The area around MV-6 was cleaned up and cleared of orange fencing and fence posts.

(DS/lcg)

cc: (electronic)  
 Mark Kautsky, DOE  
 Sam Campbell, Stoller  
 Paul Darr, Stoller  
 Steve Donovan, Stoller  
 Rick Findlay, Stoller  
 Rex Hodges, Stoller  
 EDD Delivery