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Date: **JUN 30 2020**
Symbol: EPC-DO: 20-196
LA-UR: 20-24353
Locates Action No.: NA

Mr. Kevin Pierard
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

**Subject: Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report,
Quarter 11, Los Alamos National Laboratory EPA ID #NM0890010515**

The United States Department of Energy (DOE) National Nuclear Security Administration, Los Alamos Field Office and the Triad National Security, LLC (Triad) submit this report to the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) in accordance with Section 3.14.3 of the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (the Permit). The Permit requires that a soil vapor monitoring system for the LANL Technical Area (TA)-63 Transuranic Waste Facility (TWF) be sampled for certain volatile organic compounds (VOCs) and evaluated on a quarterly basis after operations at the facility commence. This report provides analytical data for the eleventh quarter period following the start of operations in October, 2017. The sampling results indicate that vapor concentrations at the site do not exceed the soil gas screening levels established by the Permit.

The attached enclosure for this report includes a discussion of the history and analytical findings for the eleventh quarter, a figure of the LANL TWF permitted unit with the soil vapor monitoring well locations, a data summary with analytical results for the quarter, a data comparison table, and sample collection logs. Specifically, Table 1 is a summary of the analytical results for the eleventh quarter and includes detected VOCs, detection limits, the appropriate soil gas screening levels from Permit Tables 3.14.3.1-3, and a percentage comparison of the detected levels of VOCs with the screening levels. Table 2 is a listing of the analytical results for the sampling event. Table 3 is a comparison table of the detected VOCs for the eleven quarters of sampling currently collected for the soil vapor

monitoring wells. This report also presents a statistical evaluation of the data collected for the project to this date.

A report certification is included with this submittal in compliance with Permit Section 1.9.16. A compact disc with copies of this submittal and the analytical data in an Excel format is also included to facilitate the review of the monitoring results by NMED-HWB.

If you have questions or comments concerning this report, please contact Karen E. Armijo, DOE, at (505) 665-7314, karen.armijo@nnsa.doe.gov, or Patrick L. Padilla, Triad, at (505) 667-3932, plpadilla@lanl.gov.

Sincerely,

JENNIFER PAYNE (Affiliate)
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Sincerely,

Karen E. Armijo
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Karen E. Armijo
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

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Enclosure: 1) Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report,
Quarter 11, Los Alamos National Laboratory EPA ID #NM0890010515

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The attached enclosure for this report includes a discussion of the history and analytical findings for the eleventh quarter, a figure of the LANL TWF permitted unit with the soil vapor monitoring well locations, a data summary with analytical results for the quarter, a data comparison table, and sample collection logs. Specifically, Table 1 is a summary of the analytical results for the eleventh quarter and includes detected VOCs, detection limits, the appropriate soil gas screening levels from Permit Tables 3.14.3.1-3, and a percentage comparison of the detected levels of VOCs with the screening levels. Table 2 is a listing of the analytical results for the sampling event. Table 3 is a comparison table of the detected VOCs for the eleven quarters of sampling currently collected for the soil vapor

ENCLOSURE 1

**TA-63 Transuranic Waste Facility
Soil Vapor Monitoring System Report,
Quarter 11,
Los Alamos National Laboratory
EPA ID #NM0890010515**

EPC-DO-20-196

LAUR-20-24353
Unclassified

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**Technical Area 63 Transuranic Waste Facility
Soil Vapor Monitoring System Report
Quarter 11
Los Alamos National Laboratory
EPA ID #NM0890010515**

I. Introduction

This report presents the eleventh quarterly sampling of a soil vapor monitoring system for the Technical Area (TA)-63 Transuranic Waste Facility (TWF) at Los Alamos National Laboratory (LANL). Construction of the TWF was approved by the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB) as a modification to the LANL Hazardous Waste Facility Permit (Permit) on December 23, 2013. The permit modification included requirements for monitoring subsurface vapors to prevent worker exposure to potentially harmful levels of volatile organic compounds (VOCs) at the TWF (Permit Section 3.14.3 and Attachment A.6.10). Sampling and analysis for the eleventh quarter of waste management operations at TWF has established that soil vapor concentrations at the site do not exceed the screening levels established by the Permit. This report also presents a statistical analysis of the data as part of an on-going review of the need for sampling on a quarterly timeframe.

II. TWF Soil Vapor Monitoring Wells

The TWF subsurface vapor monitoring network consists of five vapor monitoring wells in or near the permitted storage unit as specified in Permit Section A.6.10. The TWF is located south-east of the TA-50 Material Disposal Area C, Solid Waste Management Unit 50-009, (MDA-C) at LANL, which appears to be the source of the soil vapor constituents being monitored. Two of the monitoring wells are located close to the storage building foundations adjacent to the unit boundary facing MDA-C and the utility corridor on Puye Road as depicted by well locations VMW-1 (LANL Structure Number 63-2009) and VMW-2 (63-2010) in Figure 56 of Attachment N, *Figures*, of the Permit (see Figure 1 of this submittal). A third monitoring well within the permitted unit is located at a point on the western edge of the unit close to the utility corridor on Pajarito Road, as depicted by well location VMW-3 (63-2011) in Figure 56. The sampling ports for these three wells are located at a 5 foot nominal depth below the concrete pad of the TWF permitted storage unit. Two monitoring wells are located outside the permitted unit across Puye Road to the north and closer to MDA-C, as depicted by well locations VMW-4 (63-2012) and VMW-5 (63-2013) in Figure 56. There are two sampling ports for both these wells located at depths of 25 and 60 feet.

III. Soil Vapor Sampling

The soil vapor monitoring wells at the TA-63 TWF were sampled for the eleventh quarter of waste management operations on April 30, 2020. Sampling procedures and VOC analyses of the obtained samples were scheduled and performed in compliance with the conditions contained in the Permit. Analytical results for the samples were compared to the soil gas screening levels (SGSLs) for individual VOC constituents in Section 3.14.3 of the Permit.

Sampling and analysis was performed as required by U.S. Environmental Protection Agency (EPA) Method TO-15. Soil vapor gases were extracted through the stainless steel tubing of the sampling ports of the TA-63 TWF wells and were collected from all sampling ports. All gas samples were collected in stainless steel canisters and submitted for laboratory analysis of VOCs using the method. The samples were analyzed for the constituents identified in Tables 3.14.3.1, 3.14.3.2 and 3.14.3.3 in the Permit. There were no variances in the sampling procedures from the Permit requirements.

IV. Analytical Results

A summary of the analytical results for the relevant VOCs detected for this sampling event is presented in Table 1 of this report. While analyses of the samples indicated some results above the report detection limits for trichloroethylene (TCE) and other VOCs, none of the concentrations exceeds the relevant SGSLs contained in Permit Tables 3.14.3.1 through 3. Table 1 of this report lists the detected VOCs and includes the calculated percentage of the SGSL as an indicator of the relative concentrations. A complete listing of the full analytical results is included in Table 2.

TCE is the highest concentration VOC detected in this sample event and in previous TA-63 TWF quarterly sampling events. TCE concentrations were detected in all of the five monitoring well locations. The VMW-4 and VMW-5 locations at the 60 foot depth contain the highest concentrations for each of the monitoring wells at 8.1% and 1.5% of the SGSL respectively. These are the soil vapor monitoring wells closest to MDA-C and are not located within the permitted storage unit site at TA-63. The three monitoring wells within the permitted unit (VMW-1, VMW-2 and VMW-3) have detected concentrations for TCE of less than 1.0% of the SGSL.

Additional VOC constituents of concern (i.e., chloroform, dichlorodifluoromethane, tetrachloroethylene, carbon tetrachloride) that are routinely seen in this project and included in the soil gas monitoring screening level tables in the Permit were determined to be present at concentrations higher than the report detection limits in two of the soil vapor monitoring wells. The well locations north of Puye Road (VMW-4 and VMW-5) detected these additional VOC results that are included in Table 1. None of the additional VOC detections at these two locations exceeded 1.0% of the SGSLs listed in the Permit. The three well locations within the boundary of the TWF permitted unit (VMW-1, VMW-2 and VMW-3) did not indicate additional VOCs other than TCE above the report detection limits for this quarter.

Four additional VOCs were indicated above the report detection limits in the duplicate field sample for Well VMW-5, 60-foot port at the last quarter sampling (LANL, 2020c) and a notification of additional constituents was submitted to NMED-HWB on March 26, 2020 (LANL, 2020b) providing information regarding this occurrence as required by Permit Section 3.14.3. These detections were not repeated in this quarter of sampling.

The TA-63 TWF soil vapor monitoring wells were originally installed in August 2015. Baseline soil vapor monitoring samples were taken in September 2015 and the results submitted to NMED on October 29, 2015 (LANL, 2015). Reports were submitted with analytical results for the ten previous quarters of waste management operations at the TWF and are listed in the references following this discussion. In reply to a letter from NMED-HWB dated May 23, 2018 (NMED, 2018), Table 3 is included in this report to show the current and previous quarterly soil gas screening level results at the facility for tracking purposes. The sampling results reported herein for the eleventh quarter of operations at TWF are consistent with the previous results and do not appear to indicate additional contaminant concerns pending future sampling events subject to the Permit.

V. Additional Discussion

This section of the report discusses additional issues related to the analytical results presented. The primary concern addressed in this quarter's data is the presence of any correlating data for the detection of four new VOC constituents in the VMW-5 60-foot sampling port field duplicate. As discussed in the notification of additional constituents submitted to NMED (LANL, 2020b), there were no previous or supporting indications for the detections at that point in the sampling project. As proposed, the sampling for this quarter repeated the field duplicate sampling for that well to attempt to re-detect the constituents and provide an additional data point. This quarter's data did not duplicate the detection indicating that the last quarter's detection was anomalous. This issue will be evaluated for re-occurrence in future sampling events.

Two VOC constituents included in the Permit tables (ethylbenzene and xylene isomers) have been detected in the field blank samples for the sixth through tenth quarters (LANL, 2019a; LANL, 2019b; LANL, 2019c; LANL, 2020a; LANL, 2020c) and were not detected in samples taken from the actual soil vapor monitoring wells. Ethylbenzene and xylene isomers have also been detected in the sampling for this quarter. The relative concentrations of these constituents are well below the permitted SGSLs for the constituent concentrations (<0.1%). Review of the analytical laboratory data does not indicate a data quality error and this may be an equipment or procedural anomaly as it is limited to the blank sample.

The following statistical discussion is included to demonstrate that the sampling data collected for TCE as the main soil vapor constituent detected during the TA-63 TWF operating period has been relatively stable. The mean and standard deviation for the quarterly TCE concentrations in each port in the soil vapor monitoring wells during facility waste operations are presented in Table 4 of this submittal to determine whether the concentrations for the major constituent detected by this project can be described statistically as within a range of defined concentrations.

As shown in Table 4, the TCE concentrations analyzed for the soil vapor monitoring wells for the eleven quarters have remained within the limits of a two standard deviation interval of the sample above or below the mean analytical values with a confidence probability of 95% with two near-range exceptions. A three standard deviation calculation has been added to Table 4 for the wells with exceptions to demonstrate that the concentrations for the exceptions fall within a range with a confidence probability of 99%. Therefore, no significant deviations have been observed for the average TCE concentrations for each sampling port or well to that approximate level of confidence.

Simple linear regression plots for the wells have also been included in Figures 2 and 3 to evaluate whether any significant trends are readily discernable regarding constituent concentration changes over quarters. The line plots for the concentrations determined for separate sampling locations are relatively flat and there does not appear to be a data relationship between the well results that would indicate a consistent effect in changing constituent concentrations such as seasonal variations. The concentrations detected are also far below the permitted maximum SGSL constituent concentrations for TCE (at least one order of magnitude). This suggests that any trend in increasing VOC concentrations that would be of concern according to the Permit conditions for reporting would not occur in a short time interval. The TCE concentrations for the quarters collected to this date appear relatively stable.

References

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LANL, 2017. *Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report, Quarter 1*, Los Alamos National Laboratory EPA ID #NM0890010515, (EPC-DO:17-560), December 21, 2017. Los Alamos National Laboratory, Los Alamos, New Mexico.

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LANL, 2018b. *Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report, Quarter 3*, Los Alamos National Laboratory EPA ID #NM0890010515, (EPC-DO:18-245) of June 28, 2018. Los Alamos National Laboratory, Los Alamos, New Mexico.

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LANL, 2019b. *Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report, Quarter 7, Los Alamos National Laboratory EPA ID #NM0890010515*, (EPC-DO:19-203) of June 26, 2019. Los Alamos National Laboratory, Los Alamos, New Mexico.

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LANL, 2020a. *Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report, Quarter 9, Los Alamos National Laboratory EPA ID #NM0890010515*, (EPC-DO:19-467) of January 10, 2020. Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2020b. *Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Additional Information, Los Alamos National Laboratory EPA ID #NM0890010515*, (EPC-DO:20-121) of March 26, 2020. Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2020c. *Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report, Quarter 10, Los Alamos National Laboratory EPA ID #NM0890010515*, (EPC-DO:20-121) of March 30, 2020. Los Alamos National Laboratory, Los Alamos, New Mexico.

NMED, 2010. *Los Alamos National Laboratory Hazardous Waste Facility Permit*, issued by New Mexico Environment Department, Hazardous Waste Bureau, November 30, 2010 and subsequent revisions.

NMED, 2018. Letter: “*Technical Area 63 Transuranic Waste Facility Soil Vapor Monitoring System Report, Quarter 2, Los Alamos National Laboratory EPA ID#NM0890010515, HWB-LANL-18-016*,” dated May 23, 2018. New Mexico Environment Department, Hazardous Waste Bureau, Santa Fe, New Mexico.

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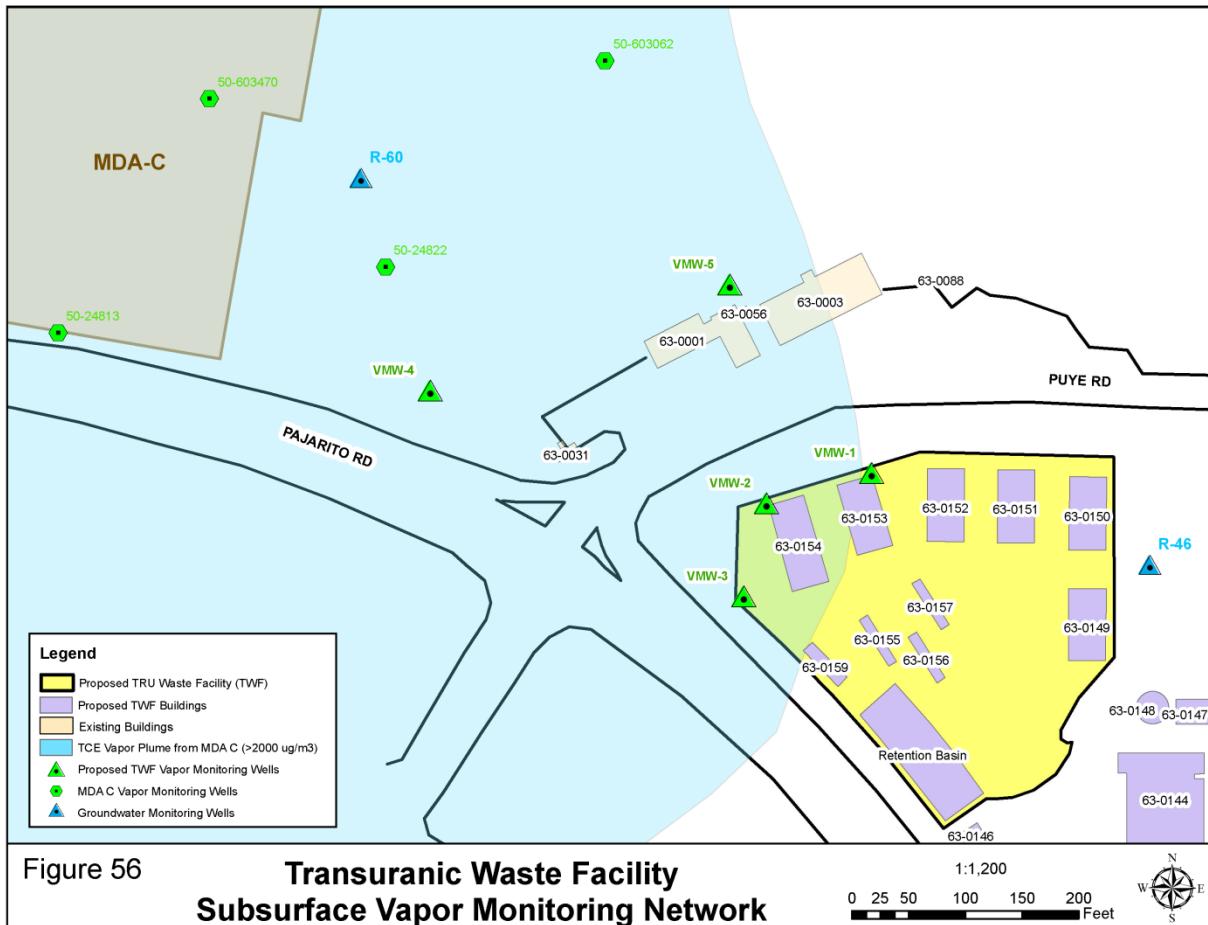


Figure 1

Soil Vapor Monitoring Well Locations at TA-63 TWF

(Source: Los Alamos National Laboratory Hazardous Waste Facility Permit, November, 2010, Figure 56 [as revised by *Notification of Class 1 Permit Modification Construction Updates for the Technical Area 63 Transuranic Waste Facility Container Storage Unit, Los Alamos National Laboratory Hazardous Waste Facility Permit, EPA ID # NM0890010515*, March 11, 2016, EPC-DO-16-055])

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Table 1. Detected Volatile Organic Compounds
at TA-63 Transuranic Waste Facility – Quarter 11

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Table 1: Detected Volatile Organic Compounds
at TA-63 Transuranic Waste Facility Soil Vapor Monitoring System – Quarter 11

Well	Sample ID	Sample Port Depth (ft)	Analyte/Constituent	Listing in Permit Tables	Result (ug/m ³)	EPA Data Qualifier	Report Detection Limit (ug/m ³)	Soil-Gas Screening Level (ug/m ³)	Percentage Of SGSL (%)
VMW-1 63-2009	TWF63- 20-200945	5	Trichloroethane[1,1,1-]	1,1,1-Trichloroethane	7.6	J	49	4.86E+07	<0.1
			Trichloroethene	Trichloroethylene	41	J	48	1.94E+04	0.2
VMW-2 63-2010	TWF63- 20-200946	5	Dichlorodifluoromethane	Dichlorodifluoromethane	6.9	J	45	1.03E+06	<0.1
			Trichloroethene	Trichloroethylene	97	NQ	49	1.94E+04	0.5
VMW-3 63-2011	TWF63- 20-200947	5	Trichloroethene	Trichloroethylene	97	NQ	52	1.94E+04	0.5
VMW-4 63-2012	TWF63- 20-200948	25	Tetrachloroethene	Tetrachloroethylene	35	J	61	2.63E+06	<0.1
			Carbon tetrachloride	Carbon tetrachloride	47	J	57	1.06E+05	<0.1
			Chloroform	Chloroform	93	NQ	44	2.30E+04	0.4
			Trichloroethane[1,1,1-]	1,1,1-Trichloroethane	9.3	J	49	1.16E+08	<0.1
			Dichlorodifluoromethane	Dichlorodifluoromethane	79	NQ	44	2.61E+06	<0.1
			Trichloro-1,2,2-trifluoroethane[1,1,2-]	1,1,2-Trichloro-1,2,2-trifluoroethane	19	J	69	6.86E+08	<0.1
			Trichloroethene	Trichloroethylene	2800	NQ	48	1.57E+05	1.8
VMW-4 63-2012	TWF63- 20-200949	60	Tetrachloroethene	Tetrachloroethylene	81	NQ	70	2.05E+06	<0.1
			Dichloroethene[cis-1,-2]	cis-1,2-Dichloroethylene	23	J	40	2.91E+06	<0.1
			Carbon Tetrachloride	Carbon tetrachloride	100	NQ	60	2.13E+05	<0.1
			Chloroform	Chloroform	240	NQ	50	4.44E+04	0.5
			Trichloroethane[1,1,1-]	1,1,1-Trichloroethane	18	J	50	2.34E+08	<0.1
			Dichlorodifluoromethane	Dichlorodifluoromethane	190	NQ	50	5.38E+06	<0.1
			Trichloro-1,2,2-trifluoroethane[1,1,2-]	1,1,2-Trichloro-1,2,2-trifluoroethane	38	J	80	1.38E+09	<0.1
			Trichloroethene	Trichloroethylene	7500	NQ	50	9.27E+04	8.1
VMW-5 63-2013	TWF63- 20-200950	25	Chloroform	Chloroform	41	J	44	2.30E+04	0.2
			Trichloroethane[1,1,1-]	1,1,1-Trichloroethane	24	J	49	1.16E+08	<0.1
			Dichlorodifluoromethane	Dichlorodifluoromethane	47	NQ	44	2.61E+06	<0.1
			Trichloroethene	Trichloroethylene	380	NQ	48	1.57E+05	0.2

Table 1: Detected Volatile Organic Compounds
at TA-63 Transuranic Waste Facility Soil Vapor Monitoring System – Quarter 11

Well	Sample ID	Sample Port Depth (ft)	Analyte/Constituent	Listing in Permit Tables	Result (ug/m ³)	EPA Data Qualifier	Report Detection Limit (ug/m ³)	Soil-Gas Screening Level (ug/m ³)	Percentage Of SGSL (%)
VMW-5 63-2013	TWF63-20-200951	60	Carbon Tetrachloride	Carbon tetrachloride	19	J	55	2.13E+05	<0.1
			Chloroform	Chloroform	23	J	43	4.44E+04	<0.1
			Trichloroethane[1,1,1-]	1,1,1-Trichloroethane	47	J	48	2.34E+08	<0.1
			Dichlorodifluoromethane	Dichlorodifluoromethane	84	NQ	43	5.38E+06	<0.1
			Trichloroethene	Trichloroethylene	1400	NQ	47	9.27E+04	1.5
VMW-5 63-2013	TWF63-20-200952 Field Duplicate	60	Carbon Tetrachloride	Carbon tetrachloride	19	J	57	2.13E+05	<0.1
			Chloroform	Chloroform	29	J	44	4.44E+04	<0.1
			Trichloroethane [1,1,1-]	1,1,1-Trichloroethane	47	J	50	2.34E+08	<0.1
			Dichlorodifluoromethane	Dichlorodifluoromethane	79	NQ	45	5.38E+06	<0.1
			Trichloroethene	Trichloroethylene	1500	NQ	49	9.27E+04	1.6
VMW-5 63-2013	TWF63-20-200953 Field Blank		Ethyl benzene	Ethylbenzene	36	J	150	5.40E+05	<0.1
			Xylene[1,2-]	o-Xylene	33	J	150	4.27E+06	<0.1
			Xylene[1,3-] +Xylene[1,4-]	m-Xylene + p-Xylene	140	J	150	5.15E+06 4.74E+06	<0.1

EPA Data Qualifier “J” indicates analytes that are detected but results are estimated as less than the report detection limit.

EPA Data Qualifier “NQ” indicates analytes that are detected above the report detection limit with no data qualifiers.

Table 2. Analytical Results for Soil Vapor Monitoring Wells
at TA-63 Transuranic Waste Facility – Quarter 11

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TA-63 Transuranic Waste Facility Soil Vapor Monitoring System

Sampling and Analysis - Quarter 11

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Validation Qualifier	Detected	Sample Type	Sample Purpose	Method Category	Lab Method	Report Method	Detection Limit	Report Detection Limit
TWF63-20-200953	63-2013	04/30/2020	Trichloroethene	180	ug/m3	U	N	GAS	FB	VOC	EPA:TO15		34	180
TWF63-20-200953	63-2013	04/30/2020	Tetrachloroethane[1,1,2,2-]	230	ug/m3	U	N	GAS	FB	VOC	EPA:TO15		32	230
TWF63-20-200953	63-2013	04/30/2020	Hexachlorobutadiene	1500	ug/m3	U	N	GAS	FB	VOC	EPA:TO15		200	1500
TWF63-20-200953	63-2013	04/30/2020	Xylene[1,2-]	33	ug/m3	J	Y	GAS	FB	VOC	EPA:TO15		24	150
TWF63-20-200953	63-2013	04/30/2020	Dichlorobenzene[1,2-]	200	ug/m3	U	N	GAS	FB	VOC	EPA:TO15		44	200
TWF63-20-200953	63-2013	04/30/2020	Trimethylbenzene[1,2,4-]	170	ug/m3	U	N	GAS	FB	VOC	EPA:TO15		18	170
TWF63-20-200953	63-2013	04/30/2020	Isopropylbenzene	170	ug/m3	U	N	GAS	FB	VOC	EPA:TO15		25	170
TWF63-20-200953	63-2013	04/30/2020	Xylene[1,3-]+Xylene[1,4-]	140	ug/m3	J	Y	GAS	FB	VOC	EPA:TO15		30	150

Table 3. Current and Previous
Quarterly Results

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Table 3: Current and Previous Quarter Results

Well	Sample Port Depth (ft)	Analyte/Constituent (as Listed in Permit Tables)	Quarter 1		Quarter 2		Quarter 3		Quarter 4		Quarter 5		Quarter 6		Quarter 7		Quarter 8		Quarter 9		Quarter 10		Quarter 11			
			Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage of SGSL (%)	Result (ug/m ³)	Percentage Of SGSL (%)	Result (ug/m ³)	Percentage Of SGSL (%)	Result (ug/m ³)	Percentage Of SGSL (%)	Result (ug/m ³)	Percentage Of SGSL (%)		
63-2009 Field Duplicate																										
		Dichlorodifluoromethane													6.9	<0.1										
VMW-5 63-2013 Field Duplicate	60	Trichloroethylene														1560	1.7	1340	1.4	1340	1.4	1500	1.6			
		Carbon tetrachloride														18.2	<0.1					17.6	<0.1	19	<0.1	
		1,1,1-Trichloroethane														47.4	<0.1	48.5	<0.1	46.3	<0.1	47	<0.1			
		Dichlorodifluoromethane														64.2	<0.1	69.2	<0.1	79.1	<0.1	79	<0.1			
		1,1,2-Trichloro-1,2,2-trifluoroethane														15.3	<0.1	17.6	<0.1							
		Chloroform															20.5	<0.1	19.5	<0.1	29	<0.1				
		Methylethylketone (2-butanone)																			162	<0.1				
		1,2,4-Trimethylbenzene																			10.3	<0.1				

Table 4. Statistical Analysis

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Table 4. Statistical Analysis
TWF Soil Vapor Monitoring
Trichloroethylene Data Statistics
Mean and 95% Confidence Range

	VMW-1 (ug/m ³)	VMW-2 (ug/m ³)	VMW-3 (ug/m ³)	VMW-4 25 ft (ug/m ³)	VMW-4 60 ft (ug/m ³)	VMW-5 25 ft (ug/m ³)	VMW-5 60 ft (ug/m ³)
Quarter 1	64.4	134	69.8	3810	8060	483	1340
Quarter 2	31.1	80.6	64.4	2793	6982	258	1343
Quarter 3	48.3	129	96.7	3437	8593	414	1557
Quarter 4	53.7	85.9	59.1	2954	8056	344	1504
Quarter 5	43.5	107	75.2	2900	8056	365	1396
Quarter 6	36.0	113	85.9	2900	7520	360	1400
Quarter 7	44.0	118	107	2790	7520	360	1560
Quarter 8	59.1	102	85.9	3010	8590	424	1500
Quarter 9	40.3	96.7	64.4	2790	6980	338	1400
Quarter 10	41.9	102	75.2	2740	7520	392	1500
Quarter 11	41	97	97	2800	7500	380	1400
Mean (M)	46.5	106	80.1	2990	7760	374	1440
Standard Deviation (SD) [n-1]	9.9	16.6	15.6	333	557	57.0	81.2
Lower Limit (95% = M - 2xSD)	26.7	72.8	48.9	2324	6646	260	1278
Upper Limit (95% = M + 2xSD)	66.3	139	111	3656	8874	488	1602
Lower Limit (99% = M - 3xSD)				1990		203	
Upper Limit (99% = M + 3xSD)				3990		545	

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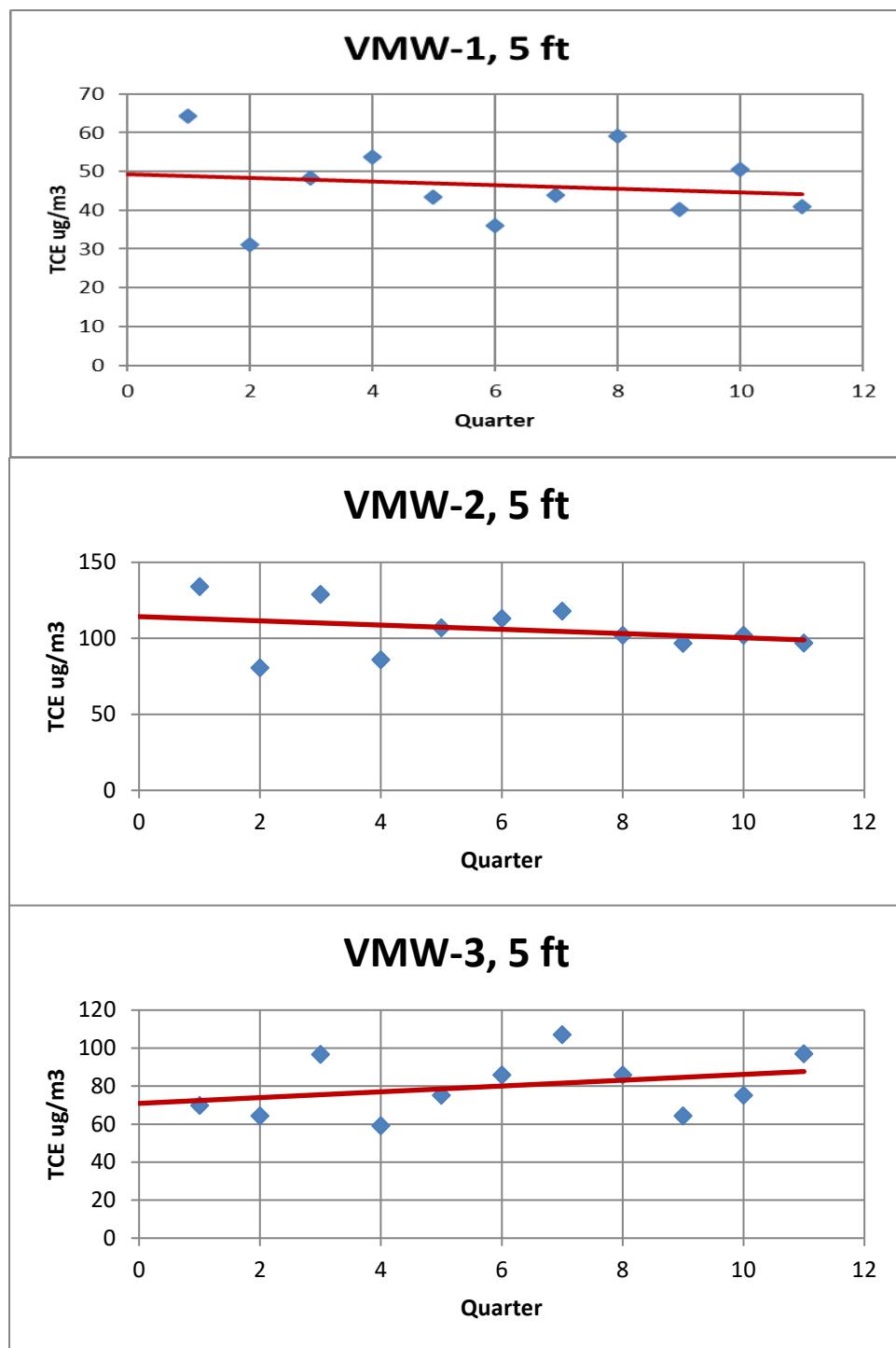


Figure 2. Simple Linear Regression Plots for TA-63 TWF Soil Vapor Monitoring Wells Inside the Permitted Unit

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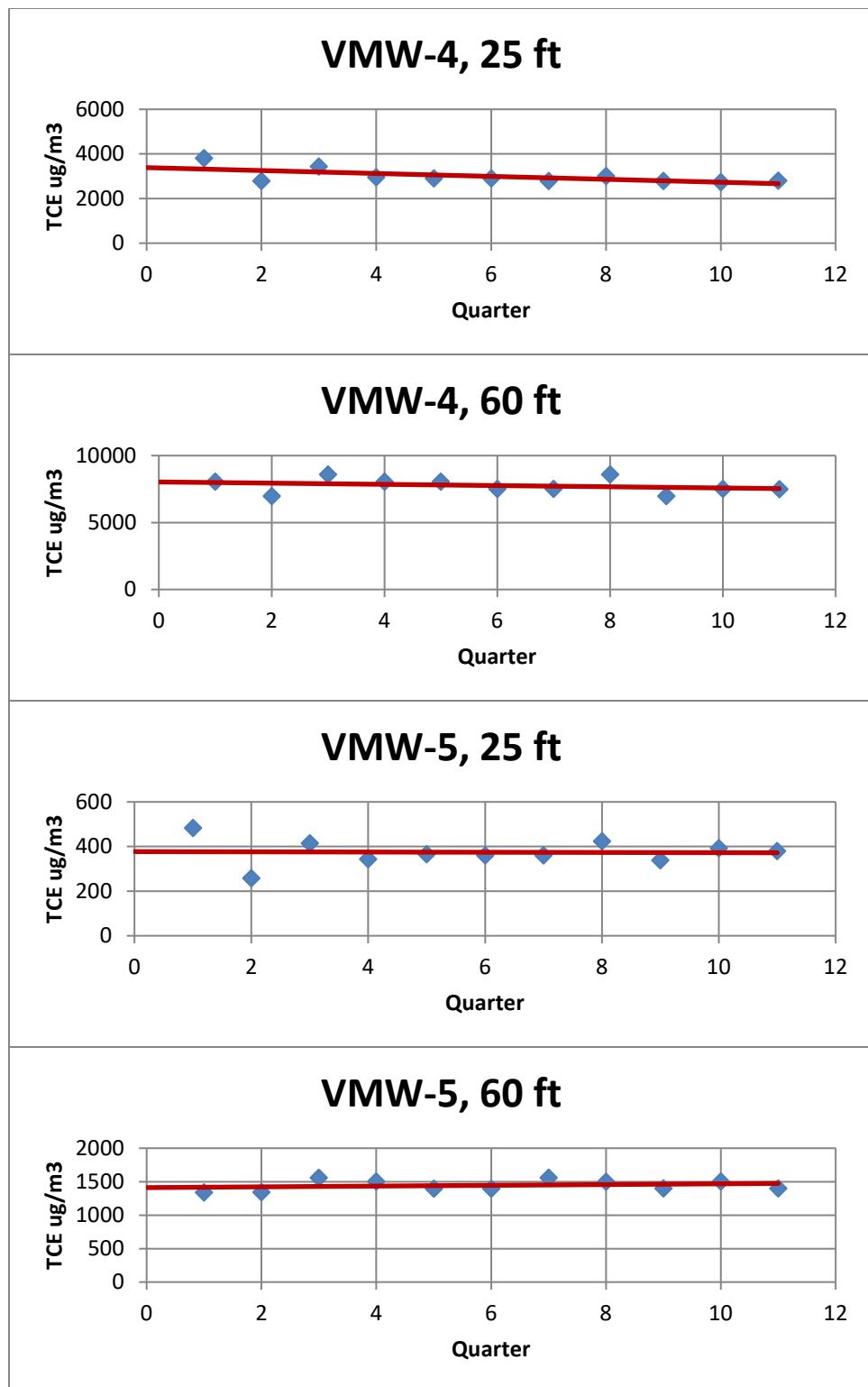


Figure 3. Simple Linear Regression Plots for TA-63 TWF Soil Vapor Monitoring Wells Outside the Permitted Unit

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Sample Collection Logs
TA-63 Transuranic Waste Facility – Quarter 11

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SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 -
TWF - April

SAMPLE ID: TWF63-20-200945

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	4/30/20	o/c		FIELD MATRIX:	GAS
TIME COLLECTED (HH:MM):	1054			MEDIA:	Gas
PRS ID:	TA-63			SAMPLE TECH CODE:	VOST
LOCATION ID:	63-2009			FIELD PREP:	NA
LOCATION TYPE:	AMS			FIELD QC TYPE:	REG
TOP DEPTH:	6.5			SAMPLE USAGE:	INV
BOTTOM DEPTH:	7.5			EXCAVATED:	YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
	TO15	6 Liter Summa Canister	1	NONE	y	6 Liter Summa

SAMPLE COMMENTS: Summa # 00925

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time 114 HH:MM

$$CH_4 = \underline{0} \% \quad CO_2 = \underline{9225} \text{ ppm} \quad O_2 \% = \underline{20.3\%} \quad VOC = \underline{0} \text{ ppm}$$

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 -
TWF - April

SAMPLE ID: TWF63-20-200946

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/30/2020	OK	FIELD MATRIX:	GAS	OK
TIME COLLECTED (HH:MM):	1116		MEDIA:	GAS	
PRS ID:	TA-C3		SAMPLE TECH CODE:	VOST	
LOCATION ID:	63-2010		FIELD PREP:	NA	
LOCATION TYPE:	AMS		FIELD QC TYPE:	REG	
TOP DEPTH:	6.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	7.5		EXCAVATED:		YES / NO / <input checked="" type="checkbox"/>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
UA	TO15	6 Liter Summa Canister	1	NONE	Y	6 Liter Summa

SAMPLE COMMENTS: Summa # NQ618

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time 1116 HH:MM
$$CH_4 = \underline{0} \% \quad CO_2 \underline{5350} \text{ ppm} \quad O_2 = \underline{20.8} \% \quad VOC = \underline{0} \text{ ppm}$$
COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 4/30/20 1401	RECEIVED BY (Printed Name) (Signature)	Date/Time <u>M. Shendo</u> <u>4/30/2020</u>
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 - TWF - April

SAMPLE ID: TWF63-20-200947

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/20/2020	ok	FIELD MATRIX:	GAS	ok
TIME COLLECTED (HH:MM):	1139	ok	MEDIA:	GAS	
PRS ID:	TA-63		SAMPLE TECH CODE:	VOST	
LOCATION ID:	63-2011		FIELD PREP:	NA	
LOCATION TYPE:	AMS		FIELD QC TYPE:	REG	
TOP DEPTH:	6.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	7.5	U	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
W	TO15	6 Liter Summa Canister	1	NONE	✓	6 Liter Summa

SAMPLE COMMENTS: Summa #5325

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time 1137 HH:MM

$\text{CH}_4 = \underline{0} \%$ $\text{CO}_2 = \underline{0.3434}$ ppm $\text{O}_2 = \underline{20.9}$ % $\text{VOC} = \underline{0.0}$ ppm

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) <u>Daniel Jrank</u> (Signature) <u>DJR</u>	Date/Time 4/20/20 1401	RECEIVED BY (Printed Name) (Signature) <u>Melissa Neph</u> <u>MN</u>	Date/Time 4/20/2020 1401
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 -
TWF - April

SAMPLE ID: TWF63-20-200948

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/30/2020	OK	FIELD MATRIX:	GAS	OK
TIME COLLECTED (HH:MM):	1224	OK	MEDIA:	GAS	
PRS ID:	TW-63		SAMPLE TECH CODE:	VOST	
LOCATION ID:	63-2012		FIELD PREP:	NA	
LOCATION TYPE:	AMS		FIELD QC TYPE:	REG	
TOP DEPTH:	24		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	25		EXCAVATED:		YES / NO / <input checked="" type="checkbox"/>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
Y	TO15	6 Liter Summa Canister	1	NONE	Y	6 Liter Summa

SAMPLE COMMENTS: Summa #30844 Rort 1

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM

$$\text{CH}_4 = \underline{0} \% \quad \text{CO}_2 = \underline{\text{over } 0.00 \text{ ppm}} \quad \text{ppm} \quad \text{O}_2 = \underline{19.4} \% \quad \text{VOC} = \underline{0.0} \text{ ppm}$$

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 4/30/2020 1401	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/30/2020 1401
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 -
TWF - April

SAMPLE ID: TWF63-20-200949

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/30/2020	OK	FIELD MATRIX:	GAS	OK
TIME COLLECTED (HH:MM):	1240	OK	MEDIA:	Gas	
PRS ID:	TA-63		SAMPLE TECH CODE:	VOST	
LOCATION ID:	63-2012		FIELD PREP:	NA	
LOCATION TYPE:	AMS		FIELD QC TYPE:	REG	
TOP DEPTH:	59		SAMPLE USAGE:	INV	✓
BOTTOM DEPTH:	60	✓	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
W	TO15	6 Liter Summa Canister	1	NONE	Y	6 Liter Summa

SAMPLE COMMENTS: Summa # 6LQ4 Part 2

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time 1240 HH:MM

$$CH_4 = 0 \% \quad CO_2 = \frac{0}{0.000} ppm \quad O_2 = 19.4 \% \quad VFC = 1.0 ppm$$

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) Daniel Frank (Signature)	Date/Time 4/30/2020 1401	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/30/2020 1401
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 -
TWF - April

SAMPLE ID: TWF63-20-200950

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	4/30/20	OK	FIELD MATRIX:	GAS	OK
TIME COLLECTED (HH:MM):	1307		MEDIA:	GAS	
PRS ID:	TA-63		SAMPLE TECH CODE:	VOST	
LOCATION ID:	63-2013		FIELD PREP:	NA	
LOCATION TYPE:	AMS		FIELD QC TYPE:	REG	
TOP DEPTH:	24		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	25		EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
	TO15	6 Liter Summa Canister	1	NONE		6 Liter Summa

SAMPLE COMMENTS: Summa # 00345

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM

$$\text{CH}_4 = \underline{0} \% \quad \text{CO}_2 = \underline{\text{avg } 1000 \text{ ppm}} \quad \text{ppm} \quad \text{O}_2 = \underline{14.5 \%} \quad \text{N}_2 = \underline{0.0} \quad \text{ppm}$$

COLLECTED BY (PRINT): M. Shendo

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 - TWF - April

SAMPLE ID: TWF63-20-200951

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/30/2020	ok	FIELD MATRIX:	GAS	ok
TIME COLLECTED (HH:MM):	1322	ok	MEDIA:	GAS	
PRS ID:	TWF63		SAMPLE TECH CODE:	VOST	
LOCATION ID:	63-2013		FIELD PREP:	NA	
LOCATION TYPE:	AMS		FIELD QC TYPE:	REG	
TOP DEPTH:	59		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	60		EXCAVATED:		YES / NO (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
4	TO15	6 Liter Summa Canister	1	NONE	9	6 Liter Summa

SAMPLE COMMENTS: Summa # N8725

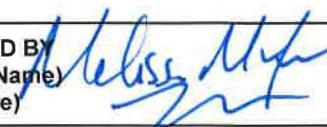
LOCATION COMMENTS: FD Summa # 35275

FIELD PARAMETERS:

Sample Time 1322 HH:MM

CH₄ = 0 % CO₂ = over 10.000 ppm ppm O₂ = 18.8 % VOC = 0.0 ppm

COLLECTED BY (PRINT): M. Shandor

RELINQUISHED BY (Printed Name) Daniel Scare (Signature) 	Date/Time 4/30/20 1401	RECEIVED BY (Printed Name) (Signature) 	Date/Time 4/30/2020 1401
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 - TWF - April

SAMPLE ID: TWF63-20-200952

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/30/2020	ok	FIELD MATRIX:	GAS	OK
TIME COLLECTED (HH:MM):	1323	OK	MEDIA:	6145	
PRS ID:	TA 63		SAMPLE TECH CODE:	VOST	
LOCATION ID:	UNK		FIELD PREP:	NA	
LOCATION TYPE:	BH over 10ft		FIELD QC TYPE:	FD	
TOP DEPTH:	59		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	60		EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
Y	TO15	6 Liter Summa Canister	1	NONE	Y	6 Liter Summa

SAMPLE COMMENTS: Summa # 35275

LOCATION COMMENTS: QC sample of TWF63-20-200951

FIELD PARAMETERS:

Sample Time 1323 HH:MM

$\text{CH}_4 = 0 \text{ %}$ $\text{CO}_2 = \frac{0.0}{1000 \text{ ppm}}$ ppm $\text{O}_2 = 18.8 \text{ %}$ $\text{VOC} = 0.0 \text{ ppm}$

COLLECTED BY (PRINT): M. Slansky

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 4/30/2020 1401	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/30/2020 1401
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 13084

EVENT NAME: FY 2020 - Poregas Sampling - TA-63 -
TWF - April

SAMPLE ID: TWF63-20-200953

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>	<u>AS PLANNED</u>	<u>AS COLLECTED</u>
Date Collected (MM/DD/YYYY):	04/30/2020	ok	FIELD MATRIX:	GAS
TIME COLLECTED (HH:MM):	1345		MEDIA:	Nitrogen
PRS ID:	TA-63		SAMPLE TECH CODE:	VOST
LOCATION ID:	UNK		FIELD PREP:	NA
LOCATION TYPE:	DS 413010 B Hover Soil		FIELD QC TYPE:	FB
TOP DEPTH:	u		SAMPLE USAGE:	QC
BOTTOM DEPTH:	v		EXCAVATED:	YES / NO / <u>NA</u>

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
<u>u</u>	TO15	6 Liter Summa Canister	1	NONE	y	6 Liter Summa

SAMPLE COMMENTS:

QC Sample of TWF63-20-200951

LOCATION COMMENTS:

FIELD PARAMETERS:

Sample Time _____ HH:MM

Summa # 34200

COLLECTED BY (PRINT): M. Shands

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 4/30/20 1401	RECEIVED BY (Printed Name) (Signature)	Date/Time 4/30/2020 1401
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

CERTIFICATION

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CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

JENNIFER
PAYNE (Affiliate)

Digitally signed by JENNIFER
PAYNE (Affiliate)
Date: 2020.06.29 15:19:43
-06'00'

6/29/20

Jennifer E. Payne
Division Leader
Environmental Protection and Compliance Division
Triad National Security, LLC

Date Signed

Karen E.
Armijo

Digitally signed by Karen
E. Armijo
Date: 2020.06.30
13:07:56 -06'00'

6/30/20

Karen E. Armijo
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

Date Signed

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