DOE Oversight Bureau, New Mexico Environment Department

Soil Vapor Monitoring at Sandia National Laboratories/New Mexico Mixed Waste Landfill

Conducted by the New Mexico Environment Department DOE Oversight Bureau for FFY 2014 Q-4

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Final Report

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The purpose of this communication is to transmit soil vapor data collected by NMED DOE Oversight Bureau from Sandia National Laboratories/New Mexico Mixed Waste Landfill soil vapor monitoring wells MWL-SV01, MWL-SV02, MWL-SV03, MWL-SV04 and MWL-SV05 during fourth quarter FFY 2014.

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Introduction

The New Mexico Environment Department (NMED) DOE Oversight Bureau (Bureau) has compiled and assessed soil-vapor data collected during September 11, 2014. The Bureau collected soil vapor samples from Solid Waste Management Unit (SWMU) 76 at the Mixed Waste Landfill (MWL) soil-vapor monitoring wells MWL-SV01, MWL-SV02, MWL-SV03, MWL-SV04 and MWL-SV05 (Figure 1). Samples were collected using standard Sandia National Laboratories/New Mexico (SNL/NM or Sandia) sampling procedures and equipment. Samples were collected in 6-liter SUMMA canisters at various depths and were shipped to an independent analytical laboratory for volatile organic compounds (VOCs) analysis. Note that the samples were not collected as split samples. Rather, they were collected consecutively. All samples were below established trigger levels for VOCs in soil vapor, as outlined in the SNL/NM Long-Term Monitoring and Maintenance Plan (LTMMP) for the Mixed Waste Landfill, March 2012.

Soil-vapor monitoring wells MWL-SV01 and MWL-SV02 were installed during the construction of the evapotranspirative (ET) cover at the Mixed Waste Landfill in 2009. Both wells contain only one (1) sampling port. Monitoring well MWL-SV01 was installed at 42.5 feet (ft) below ground surface (bgs) and MWL-SV02 was installed at 41.5 ft bgs.

The three (3) new soil-vapor wells, MWL-SV03, MWL-SV04 and MWL-SV05, were installed between May and July 2014. Each monitoring well was constructed of Flexible Liner Underground Technologies (FLUTe™). Also, each monitoring soil-vapor well was constructed with multi-ports at sampling depths of approximately 50 ft, 100 ft, 200 ft, 300 ft, and 400 ft bgs.

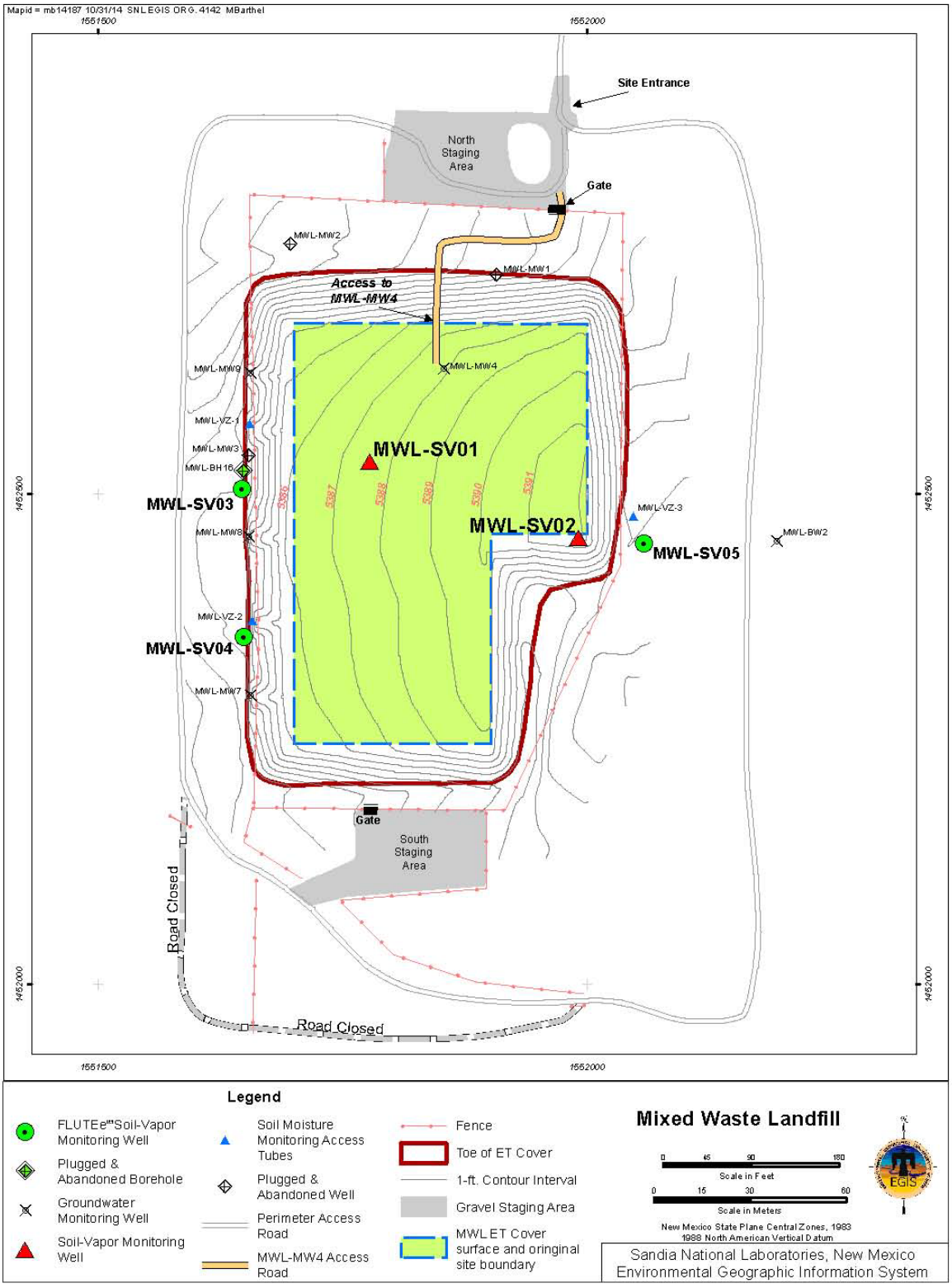

Figure 1.**Soil-Vapor Monitoring Well Locations at the Mixed Waste Landfill**

Data Assessment

Data results are compared to VOC trigger levels listed in the SNL/NM LTMMP for the MWL, March 2012. Trigger levels for tetrachloroethylene (PCE), trichloroethylene (TCE), and total VOCs in soil vapor at the MWL are 20 parts per million by volume (ppmv) for PCE and TCE, and 25 ppmv for total VOCs. These trigger levels are equivalent to 20,000 parts per billion by volume (ppbv) and 25,000 ppbv, respectively. All trigger levels apply only to samples collected from the deepest sampling port (i.e., 400 feet bgs) in each of the three FLUTe™, or equivalent, soil-vapor monitoring wells.

The Oversight Bureau collected samples from the following soil vapor monitoring wells and depths measured as ft bgs.

Soil Vapor Monitoring Well	First Sampling Depth (ft bgs)	Second Sampling Depth (ft bgs)
MWL-SV01	42.5	NA
MWL-SV02	41.5	NA
MWL-SV03	300	400
MWL-SV04	300	400
MWL-SV05	300	400

Results

Analytical results for VOCs are presented in Tables 1 through 5-1. All samples were analyzed for VOCs using analytical method TO-15. Sample results are presented in units of part per billion per volume (ppbv). Tetrachlorethene (PCE) ranged from 61 ppbv at MWL-SV04 300ft to 460 ppbv at MWL-SV01. Trichloroethene (TCE) ranged from 33 ppbv at monitoring well MWL-SV04 300ft to 200 ppbv at MWL-SV03 400ft. Total VOCs ranged from 147.5 ppbv at MWL-SV04-400ft to 833.7 ppbv at MWL-SV01.

Below are the sample results for TCE and PCE, as well as total VOCs, in units of ppbv directly measured by the analytical laboratory.

Soil Vapor Monitoring Well	Tetrachlorethene (PCE) (ppbv)	Trichloroethene (TCE) (ppbv)	Total VOCs (ppbv)
MWL-SV01-42.5ft	460	110	833.7
MWL-SV02-41.5ft	69	68	515.5
MWL-SV03-300ft	200	120	460.6
MWL-SV03-400ft	350	200	825.4
MWL-SV04-300ft	61	33	158.7
MWL-SV04-400ft	67	40	147.5
MWL-SV05-300ft	73	70	282.8
MWL-SV05-400ft	71	56	802
Trigger Level [a]	20,000	20,000	25,000

Note: [a]= The trigger levels only apply to samples collected at the 400ft depth (SNL/NM LTMMP for the MWL, March 2012).

Conclusions

The soil-vapor samples collected by DOE-OB during September 2014 were measured at levels well below the trigger levels listed in the SNL/NM Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill.

The samples collected by the DOE Oversight Bureau and Sandia were not collected as split samples; therefore, a variation in analytical results is to be expected.

In addition, the lab used by DOE Oversight Bureau reported the data at higher detection levels due to analytical method constraints imposed at the lab. The concentration ranges of PCE and TCE at each site were comparable to SNL/NM results. However, due to the higher detection levels of the DOE Oversight Bureau results, multiple compounds were considered non-detects and were not added to the total VOCs. This resulted in the DOE Oversight Bureau total VOC results being slightly lower compared to the total VOCs reported by SNL/NM.

Due to a high background concentration of CO_2 in the samples, which significantly impacts the internal standard response, the analytical laboratory chose to report all analytes at a 1:10 dilution. For “E” flagged results, the analyte exceeded the calibration range.

The DOE Oversight Bureau plans to collect soil vapor samples again from the same sites during the 3nd quarter FFY 2015 (April to June 2015) sampling event.

References

Sandia National Laboratories, New Mexico Environmental Restoration Operations. Installation Report for Two Soil-Vapor Monitoring Wells at the Mixed Waste Landfill, October 2010.

Sandia National Laboratories, New Mexico Environmental Restoration Operations. Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill, March 2012.

Sandia National Laboratories, New Mexico Environmental Restoration Operations. Installation of Three FLUTe™ Soil-Vapor Monitoring Wells (MWL-SV03, MWL-SV04, and MWL-SV05) at the Mixed Waste Landfill, September 2014.

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Table-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV01 sampled at a depth of 42.5 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV01 42.5 ft	1,1,1-Trichloroethane	43	5	1.5	
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	7.2	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	3	5	3	U
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	8.1	5	1.5	
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	1.5	5	1.5	U
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	1.5	5	1.5	U
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV01 sampled at a depth of 42.5 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV01 42.5 ft	Freon 11	130	5	1.5	
	Freon 113	73	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	1.5	5	1.5	U
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	2.4	5	1.5	J
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	460	5	1.5	E
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	1.5	5	1.5	U
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	110	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

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U = Qualifier indicates that the analyte was not detected above the MDL.

Table-2 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV02 sampled at a depth of 41.5 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV02 41.5 ft	1,1,1-Trichloroethane	61	5	1.5	
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	8.5	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	3	5	3	U
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	1.5	5	1.5	U
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	61	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-2 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV02 sampled at a depth of 41.5 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV02 41.5ft	Freon 11	210	5	1.5	E
	Freon 113	38	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	1.5	5	1.5	U
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	1.5	5	1.5	U
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	69	5	1.5	
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	1.5	5	1.5	U
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	68	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-3 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV03 sampled at a depth of 300 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV03 300 ft	1,1,1-Trichloroethane	1.5	5	1.5	U
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	13	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	14	5	3	
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	1.5	5	1.5	U
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	21	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-3 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV03 sampled at a depth of 300 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV03 300 ft	Freon 11	6.4	5	1.5	
	Freon 113	73	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	2.7	5	1.5	J
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	3.8	5	1.5	J
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	200	5	1.5	
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	6.7	5	1.5	
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	120	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-3-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV03 sampled at a depth of 400 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV03 400 ft	1,1,1-Trichloroethane	1.5	5	1.5	U
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	17	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	3	5	3	U
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	7	5	1.5	
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	28	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-3-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV03 sampled at a depth of 400 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV03 400 ft	Freon 11	7.7	5	1.5	
	Freon 113	56	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	6.4	5	1.5	
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	3.3	5	1.5	J
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	350	5	1.5	E
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	150	5	1.5	
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	200	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-4 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV04 sampled at a depth of 300 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV04 300 ft	1,1,1-Trichloroethane	1.5	5	1.5	U
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	5.2	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	3	5	3	U
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	1.5	5	1.5	U
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	12	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-4 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV04 sampled at a depth of 300 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV04 300 ft	Freon 11	4.5	5	1.5	J
	Freon 113	37	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	1.5	5	1.5	U
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	2.7	5	1.5	J
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	61	5	1.5	
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	3.3	5	1.5	J
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	33	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-4-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV04 sampled at a depth of 400 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV04 400 ft	1,1,1-Trichloroethane	1.5	5	1.5	U
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	2.5	5	1.5	J
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	3	5	3	U
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	1.5	5	1.5	U
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	11	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-4-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV04 sampled at a depth of 400 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV04 400 ft	Freon 11	3.2	5	1.5	J
	Freon 113	19	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	1.5	5	1.5	U
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.9	5	1.5	J
	n-Hexane	1.5	5	1.5	U
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	67	5	1.5	
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	2.9	5	1.5	J
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	40	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-5 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV05 sampled at a depth of 300 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV05 300 ft	1,1,1-Trichloroethane	1.5	5	1.5	U
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	18	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	4.7	5	3	J
	Benzene	1.5	5	1.5	U
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.6	5	1.5	J
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	1.5	5	1.5	U
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	22	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-5 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV05 sampled at a depth of 300 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV05 300 ft	Freon 11	12	5	1.5	
	Freon 113	72	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	1.5	5	1.5	U
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	1.5	5	1.5	U
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	2.6	5	1.5	J
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	70	5	1.5	
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	6.9	5	1.5	
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	73	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-5-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV05 sampled at a depth of 400 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV05 400 ft	1,1,1-Trichloroethane	1.5	5	1.5	U
	1,1,2,2-Tetrachloroethane	1.5	5	1.5	U
	1,1,2-Trichloroethane	1.5	5	1.5	U
	1,1-Dichloroethane	1.5	5	1.5	U
	1,1-Dichloroethene	9.6	5	1.5	
	1,2,4-Trichlorobenzene	3	10	3	U
	1,2,4-Trimethylbenzene	1.5	5	1.5	U
	1,2-Dibromoethane	1.5	5	1.5	U
	1,2-Dichlorobenzene	3	10	3	U
	1,2-Dichloroethane	1.5	5	1.5	U
	1,2-Dichloropropane	1.5	5	1.5	U
	1,3,5-Trimethylbenzene	1.5	5	1.5	U
	1,3-Butadiene	1.5	5	1.5	U
	1,3-Dichlorobenzene	1.5	5	1.5	U
	1,4-Dichlorobenzene	1.5	5	1.5	U
	2-Hexanone	3	10	3	U
	4-Ethyl toluene	1.5	5	1.5	U
	Acetone	7.6	5	3	
	Benzene	1.8	5	1.5	J
	Benzyl chloride	3	10	3	U
	Bromodichloromethane	1.5	5	1.5	U
	Bromoform	1.5	5	1.5	U
	Bromomethane	1.5	5	1.5	U
	Carbon disulfide	1.5	5	1.5	U
	Carbon tetrachloride	1.5	5	1.5	U
	Chlorobenzene	1.5	5	1.5	U
	Chloroform	1.5	5	1.5	U
	cis-1,2-Dichloroethene	1.5	5	1.5	U
	cis-1,3-Dichloropropene	1.5	5	1.5	U
	Cyclohexane	5.7	5	1.5	
	Dibromochloromethane	1.5	5	1.5	U
	Dichlorodifluoromethane	14	5	1.5	
	Ethyl acetate	1.5	10	1.5	U
	Ethyl benzene	1.5	5	1.5	U
	Ethyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.

Table-5-1 NMED DOE OB FFY 2014 Q-4 Mixed Waste Landfill Soil Vapor Quality Results: Volatile Organic Compounds by Method TO-15, September 11, 2014

MWL-SV05 sampled at a depth of 400 feet below ground surface

Trigger levels are 20 ppmv for PCE and TCE and 25 ppmv for total VOCs at samples collected from 400ft ports.

Monitoring Well/ Sample Depth	Analyte	Result (ppbv)	Reporting Limit (ppbv)	MDL (ppbv)	Laboratory Qualifier
MWL-SV05 400 ft	Freon 11	11	5	1.5	
	Freon 113	27	5	1.5	
	Freon 114	1.5	5	1.5	U
	Heptane	2.2	5	1.5	J
	Hexachloro-1,3-butadiene	3	10	3	U
	m,p-Xylene	1.5	5	1.5	U
	Methyl chloride	3.8	5	1.5	J
	Methyl ethyl ketone	1.5	5	1.5	U
	Methyl isobutyl ketone	1.5	5	1.5	U
	Methyl t-butyl ether	1.5	5	1.5	U
	Methylene chloride	1.5	5	1.5	U
	n-Hexane	2.3	5	1.5	J
	o-Xylene	1.5	5	1.5	U
	Styrene	1.5	5	1.5	U
	Tetrachloroethene	71	5	1.5	
	Tetrahydrofuran	1.5	5	1.5	U
	Toluene	590	5	1.5	E
	trans-1,2-Dichloroethene	1.5	5	1.5	U
	trans-1,3-Dichloropropene	1.5	5	1.5	U
	Trichloroethene	56	5	1.5	
	Vinyl acetate	1.5	5	1.5	U
	Vinyl chloride	1.5	5	1.5	U

E = Qualifier indicates that the analyte result exceeds calibration range.

J = Qualifier indicates that the analyte value is between the MDL and the RL.

U = Qualifier indicates that the analyte was not detected above the MDL.