

Plantation Pipeline Gasoline Pipe Line Release
Double Oak Mountain, AL
Preliminary Summary of Air Monitoring Results
September 5, 2014

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)

Introduction

On August 23, 2014, Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Plantation Pipe Line to initiate air monitoring in support of response activities following a gasoline pipeline release in Double Oak Mountain, AL. Site monitoring consisted of manually-logged real-time monitoring as well as remote-telemetry monitoring.

This submittal summarizes air monitoring data for September 4, 2014 15:00 to September 5, 2014 15:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged monitoring was conducted for benzene, percent of the Lower Explosive Limit (LEL), oxygen (O₂), and Volatile Organic Compounds (VOCs), with instruments such as RAESystems® MultiRAEs (MRs), and RAESystems® UltraRAEs. Table 1 summarizes data for manually-logged real-time readings in the Work Area and Roll-off Staging Area.

Table 1: Manually-Logged Real-Time Air Monitoring Summary¹
September 4, 2014 15:00 – September 5, 2014 15:00

Analyte	Instrument	Number of Readings	Number of Detections	Average of Detections	Concentration Range
Roll-off Staging Area					
Benzene	UltraRAE	2	0	NA	<0.05 ppm
LEL	MultiRAE Plus	1	0	NA	<1 %
VOC	MultiRAE Plus	7	0	NA	<0.1 ppm
Work Area					
Benzene	UltraRAE	19	3	0.12 PPM	0.05 - 0.15 ppm
LEL	MultiRAE Plus	18	0	NA	<1 %
O ₂	MultiRAE Plus	3	3	20.9 %	20.9 - 20.9 %
VOC	MultiRAE Plus	25	11	4.1 PPM	0.1 - 17.1 ppm

¹Please note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.

²Maximum detections preceded by the "<" symbol are considered non-detects at or above reporting limit value to the right.

Remote-telemetry Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Remote-telemetry monitoring was conducted for percent of the Lower Explosive Limit (LEL), oxygen (O₂), and Volatile Organic Compounds (VOCs) with RAESystems® AreaRAEs. Table 2 summarizes data for remote-telemetry data in the work area and Appendix B includes the remote-telemetry data graphs.

Table 2: Remote-telemetry Air Monitoring Summary¹
September 4, 2014 15:00 – September 5, 2014 15:00

Unit	Analyte	Number of Readings	Number of Detections	Average of Detections	Concentration Range
AR06	LEL	2810	0	NA	<1 %
	O ₂	2810	2810	21.1 %	20.9 - 21.3 %
	VOC	2810	1385	2.8 ppm	0.1 - 29 ppm
AR08	LEL	2846	0	NA	<1 %
	O ₂	2846	2846	20.9 %	20.9 - 20.9 %
	VOC	2846	2810	7.6 ppm	0.1 - 203.3 ppm
AR09	LEL	2747	0	NA	<1 %
	O ₂	2747	2747	20.9 %	20.9 - 20.9 %
	VOC	2747	1162	0.9 ppm	0.1 - 6 ppm
AR10	LEL	2721	0	NA	<1 %
	O ₂	2721	2721	20.9 %	20.9 - 20.9 %
	VOC	2721	2721	5.6 ppm	0.1 - 69.2 ppm

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Data Logging Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Data logging monitoring was conducted for percent of the Lower Explosive Limit (LEL), oxygen (O₂), and Volatile Organic Compounds (VOCs), with RAESystems® MultiRAEs (MRs). Table 3 summarizes data for data-logged readings in the Work Area and Appendix C includes the data logging data graphs.

Table 3: Work Area – Data Logged Air Monitoring Summary¹
September 4, 2014 08:18 – September 4, 2014 17:27

Unit	Analyte	Number of Readings	Number of Detections	Average of Detections	Concentration Range
Excavation Operations					
095-527929 9/4 08:31 - 9/4 17:12	LEL	2087	0	NA	<1 %
	O2	2087	2087	20.9 %	20.9 - 29.2 %
	VOC	2087	540	10.3 ppm	0.1 - 92.2 ppm
095-528061 9/4 08:35 - 9/4 17:14	LEL	2055	0	NA	<1 %
	O2	2055	2055	20.9 %	20.9 - 25 %
	VOC	2055	323	2.0	0.1 - 17.4 ppm
Vac Operations					
095-528024 9/4 08:18 - 9/4 17:27	LEL	1762	0	NA	<1 %
	O2	1762	1762	20.9 %	20.6 - 20.9 %
	VOC	1762	706	2.5 ppm	0.1 - 52.9 ppm

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Personal Sampling

In accordance with the Occupational Safety and Health Administration (OSHA) benzene standard 29 CFR 1910.1028, analytical air samples (3M 3520 organic vapor badges) were collected in the breathing space of representative workers to monitor personal exposures to selected petroleum mixture constituents during work activities. In accordance with the OSHA access to employee exposure and medical records standard 29 CFR 1910.1020, notification letters will be produced for delivery to employees sampled. All analytical samples were shipped to an off-site accredited laboratory for chemical analysis. A detailed list of personal sampling results from the work area is provided in Table 4.

Table 4: Personal Air Sampling Results¹
August 24, 2014 – August 27, 2014

Sample Date	Sample ID	Sample Duration	Benzene (ppm)	Ethyl Benzene (ppm)	Naphthalene (ppm)	N-Hexane (ppm)	Toluene (ppm)	Xylene (ppm)
8/24/2014	NT5436^	555	<0.03	<0.07	<0.32	0.1	0.1	<0.24
	NW7912^	379	<0.05	<0.1	<0.47	<0.1	<0.1	<0.34
	WA5387^	483	0.09	<0.08	<0.36	0.31	0.38	<0.27
	WA5458^	1440	0.05	<0.03	<0.12	0.14	0.18	0.14
	WB2699^	181	0.2	<0.2	<0.97	0.77	0.62	<0.72
	WB3172^	631	1.4*	5.1*	1.6*	4.9*	19*	27*
	WB3397^	628	0.16	0.09	<0.28	0.58	0.76	0.44
8/25/2014	NT5611	517	<0.03	<0.08	<0.34	<0.08	0.1	<0.25
	NT5675^	311	<0.06	<0.1	<0.57	<0.1	<0.1	<0.42
	NV5817	558	<0.03	<0.07	<0.32	<0.08	<0.07	<0.23
8/26/2014	WA5298	429	0.07	<0.1	<0.41	0.24	0.33	<0.3
	WB3173	452	0.05	<0.09	<0.39	0.22	0.27	<0.29
	WB3243	468	0.04	<0.09	<0.38	0.2	0.24	<0.28
	WP8037	609	<0.03	<0.07	<0.29	0.1	0.17	<0.21
	WP8117	616	0.04	<0.07	<0.29	0.19	0.31	<0.21
	WB3166	490	0.04	<0.08	<0.36	0.2	0.25	<0.27
8/27/2014	WP8181	435	<0.04	<0.09	<0.41	<0.1	0.2	<0.3
	WP8209	485	0.1	<0.08	<0.36	0.28	0.41	<0.27
	WP8240	537	0.05	<0.08	<0.33	0.1	0.23	<0.24

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* - Individual wearing this exposure badge tripped, resulting in the badge falling to the ground and breaking open near the released product.

For this reason, the result of this sample may be anomalous and not representative of the individual's exposure to these volatile organic compounds

^ - Lab Results have level 2 validation through a third party validator.

Area Sampling

Analytical air samples (3M 3520 organic vapor badges) were collected in the surrounding community to monitor community exposures to selected petroleum mixture constituents during work activities. All analytical samples were shipped to an off-site accredited laboratory for chemical analysis. A detailed list of area sampling results is provided in Table 5. A map detailing sample locations is provided in appendix A.

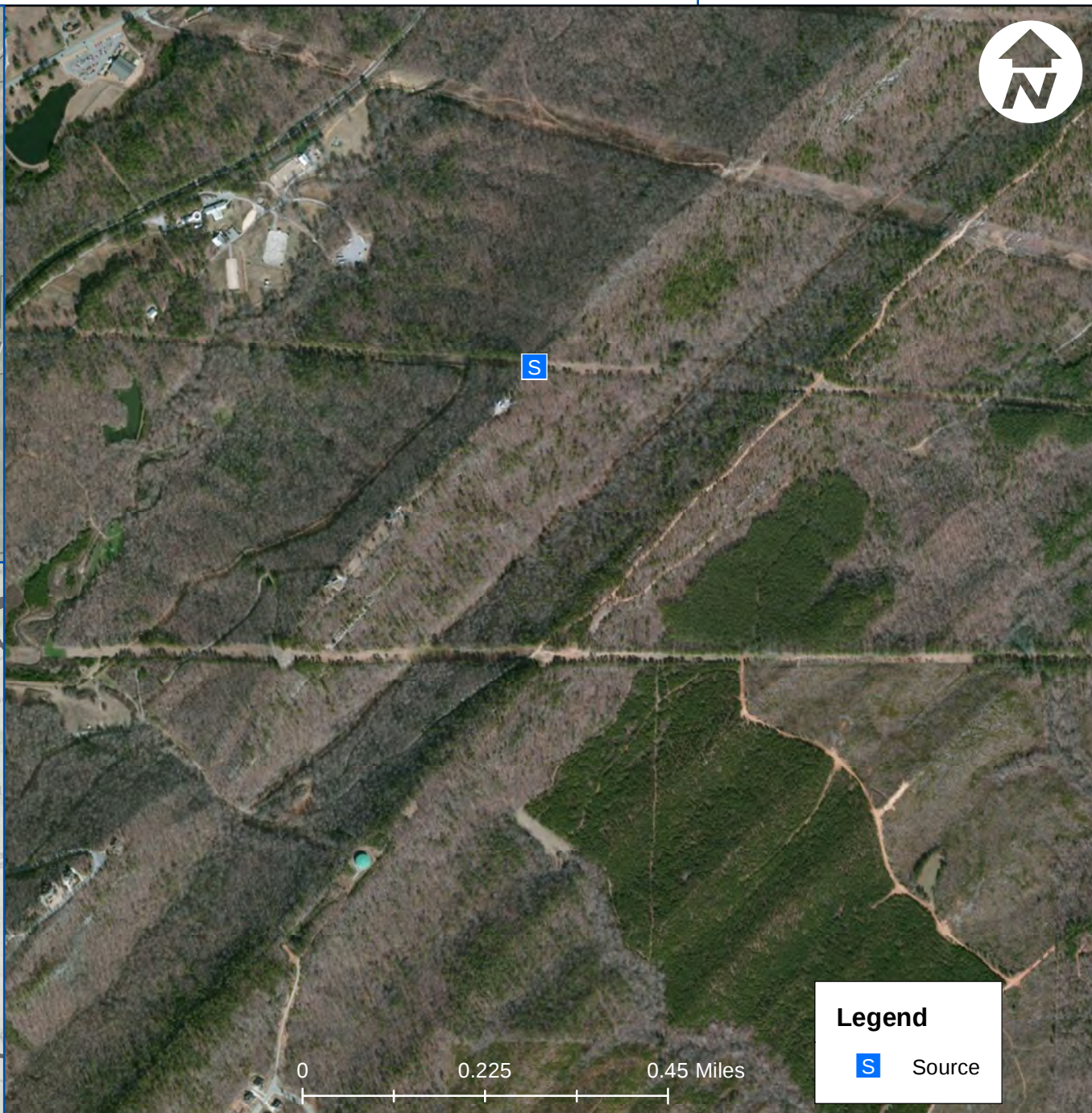
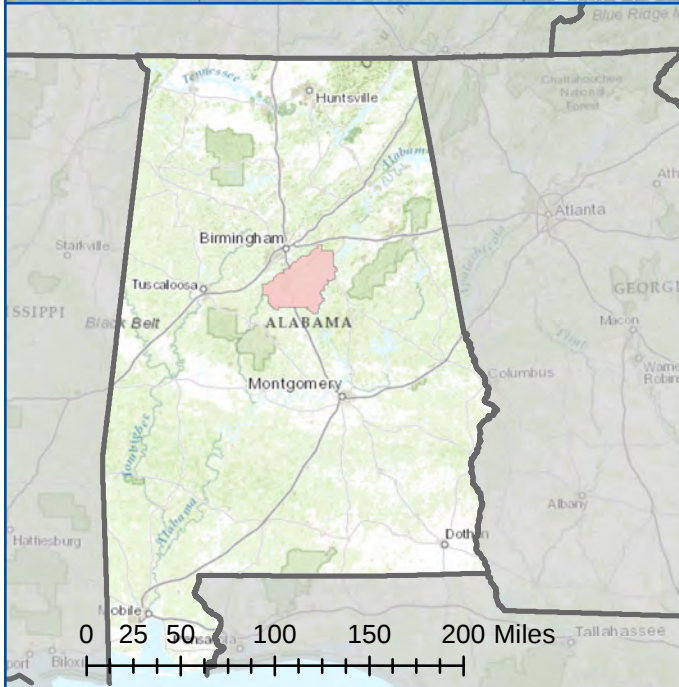
Table 5: Area Air Sampling Results¹
August 24, 2014 – August 25, 2014

Sample Date	Location	Sample ID	Benzene (ppm)	Ethyl Benzene (ppm)	Naphthalene (ppm)	N-Hexane (ppm)	Toluene (ppm)	Xylene (ppm)
8/24/2014	AS-003	NT5862	<0.04	<0.08	<0.36	<0.09	<0.08	<0.27
	AS-004	WB2716	<0.04	<0.08	<0.35	<0.09	<0.08	<0.26
8/25/2014	AS-002	NT5690	<0.04	<0.09	<0.37	<0.09	<0.09	<0.27

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Appendix A: Incident Maps



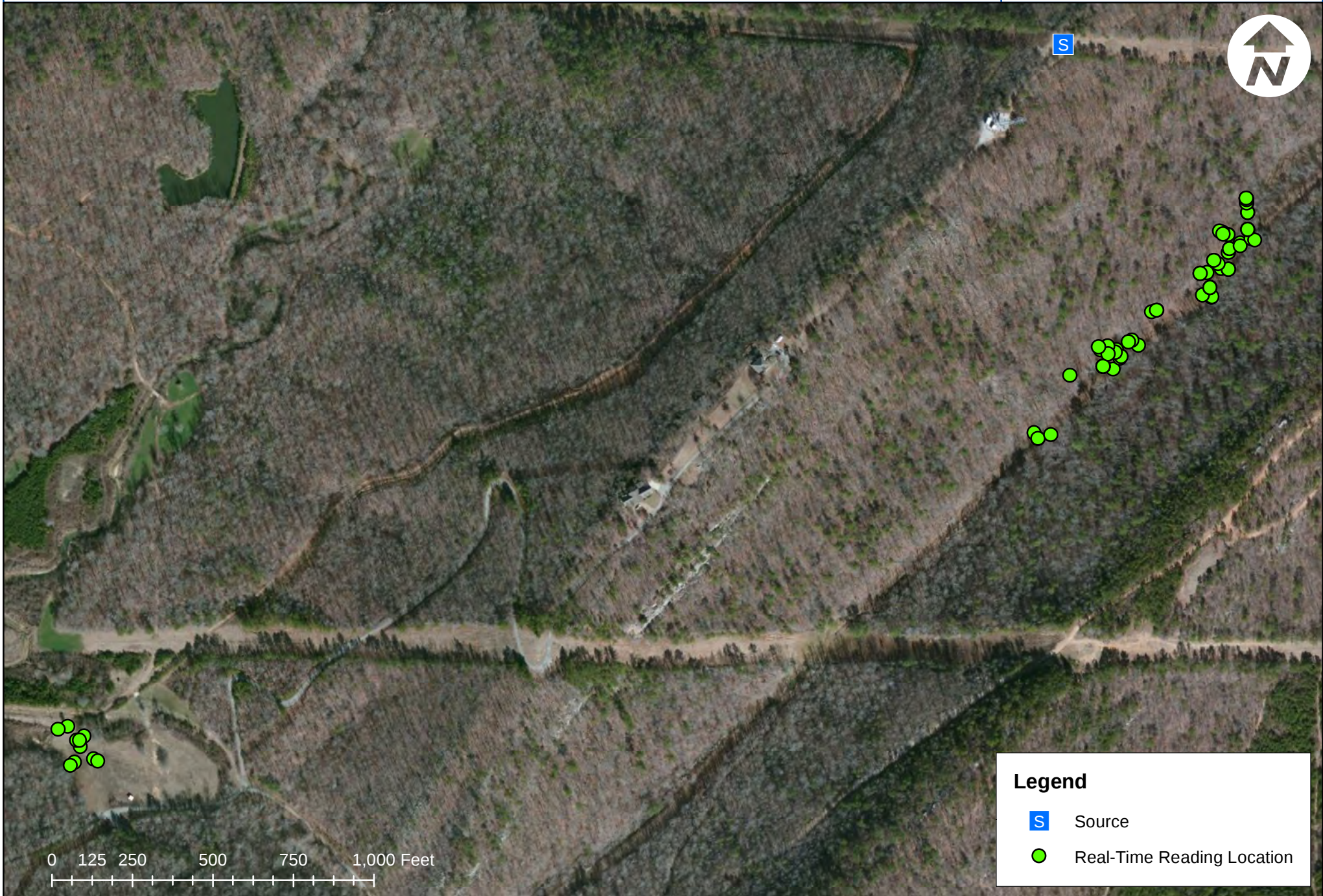
Legend

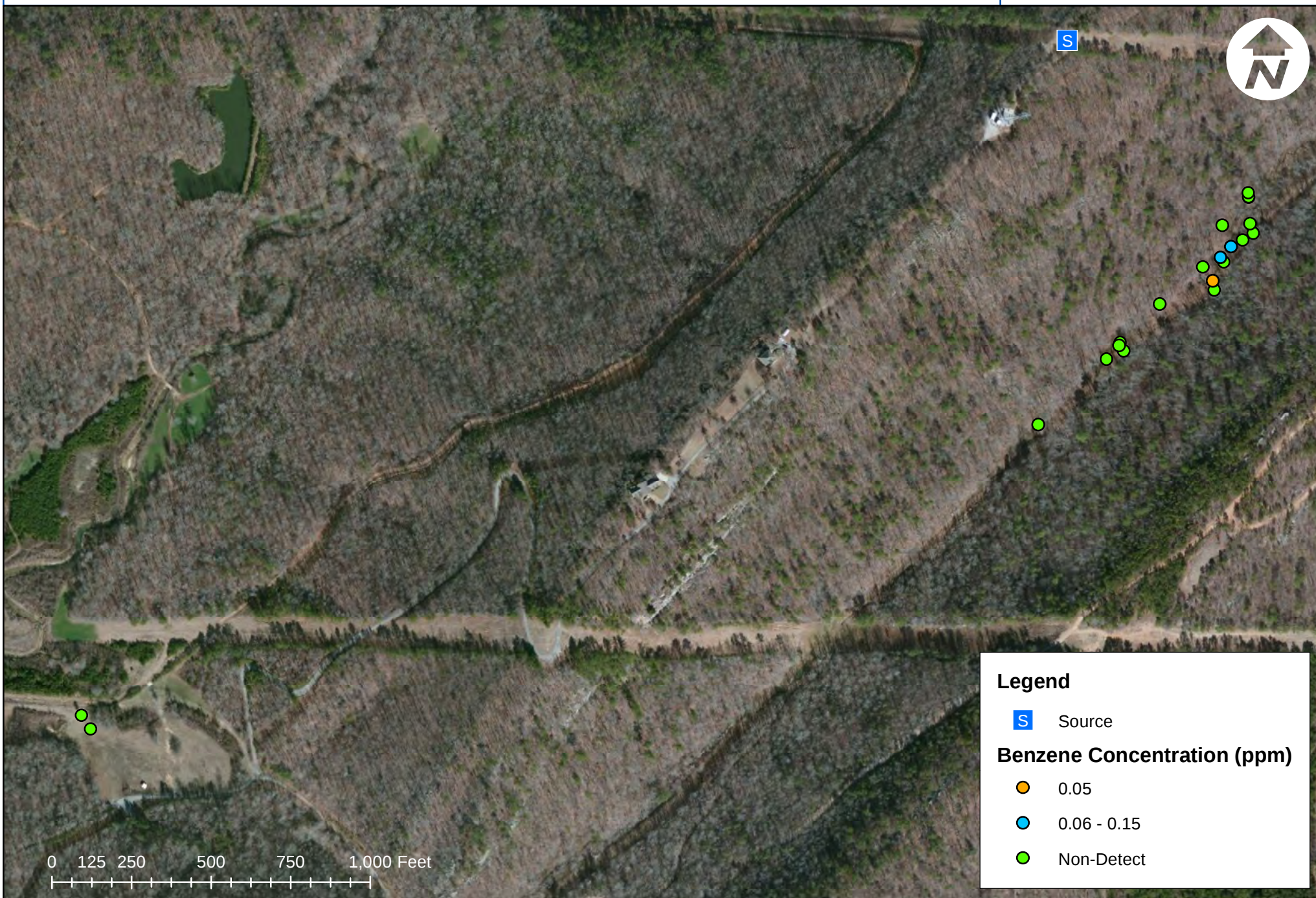
S Source

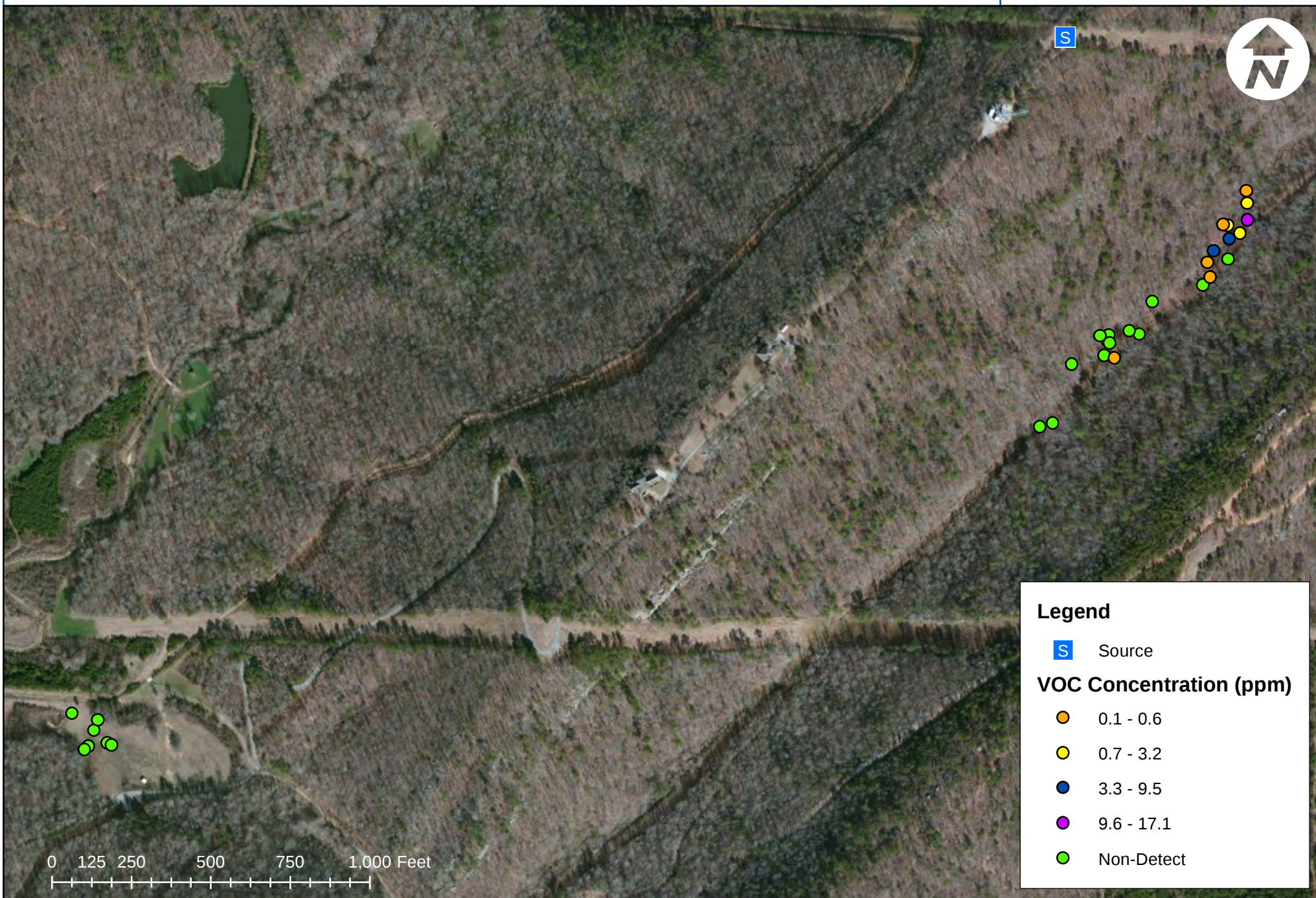


Legend

-  Source
-  AreaRAE Station
-  Interceptor Trench
-  New Underflow Dam
-  Underflow Dam







**Legend**

- S Source
- Analytical Air Sample Location
- Interceptor Trench
- New Underflow Dam
- Underflow Dam

Appendix B:

Remote-telemetry Air Monitoring Graphs

Remote-telemetry Air Monitoring - Double Oak Mountain, AL - 9/4/2014 15:00 - 9/5/2014 15:00



Please note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format

Analyte

- LEL (%), 15 Minute Rolling Average
- LEL (%), Concentration
- O2 (%), 15 Minute Rolling Average
- O2 (%), Concentration
- VOC (ppm), 15 Minute Rolling Average
- VOC (ppm), Concentration

Remote-telemetry Air Monitoring - Double Oak Mountain, AL - 9/4/2014 15:00 - 9/5/2014 15:00



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Analyte

- LEL (%), 15 Minute Rolling Average
- LEL (%), Concentration
- O2 (%), 15 Minute Rolling Average
- O2 (%), Concentration
- VOC (ppm), 15 Minute Rolling Average
- VOC (ppm), Concentration

Remote-telemetry Air Monitoring - Double Oak Mountain, AL - 9/4/2014 15:00 - 9/5/2014 15:00



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Analyte

- LEL (%), 15 Minute Rolling Average
- LEL (%), Concentration
- O2 (%), 15 Minute Rolling Average
- O2 (%), Concentration
- VOC (ppm), 15 Minute Rolling Average
- VOC (ppm), Concentration

Remote-telemetry Air Monitoring - Double Oak Mountain, AL - 9/4/2014 15:00 - 9/5/2014 15:00



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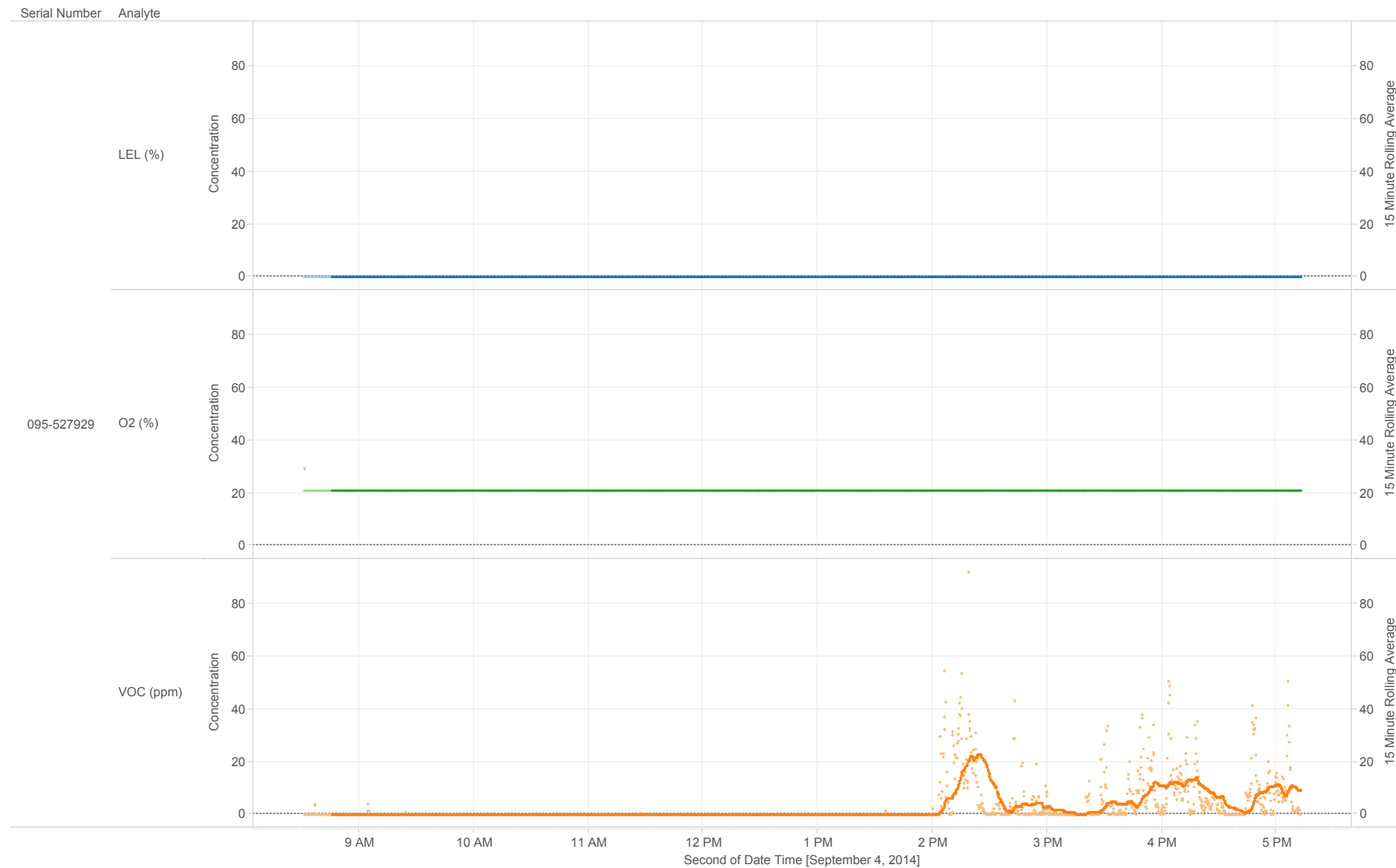
Analyte

- LEL (%), 15 Minute Rolling Average
- LEL (%), Concentration
- O2 (%), 15 Minute Rolling Average
- O2 (%), Concentration
- VOC (ppm), 15 Minute Rolling Average
- VOC (ppm), Concentration

Appendix C:

Data Logging Air Monitoring Graphs

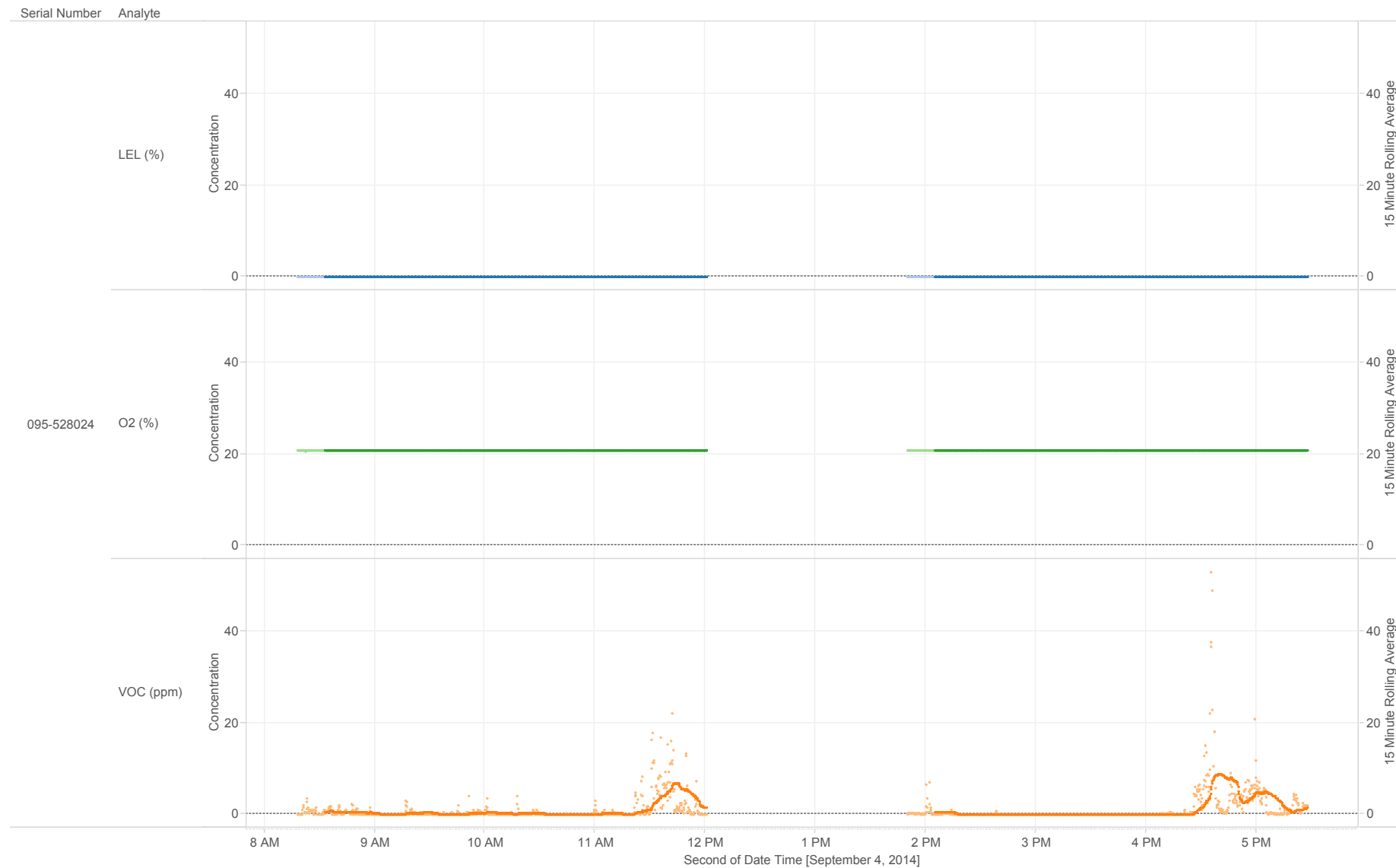
MultiRAE Data Logging Air Monitoring - Double Oak Mountain, AL - 9/4/2014 08:18 - 9/4/2014 17:27



Please note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format

- Analyte**
- LEL (%), 15 Minute Rolling Average
 - LEL (%), Concentration
 - O2 (%), 15 Minute Rolling Average
 - O2 (%), Concentration
 - VOC (ppm), 15 Minute Rolling Average
 - VOC (ppm), Concentration

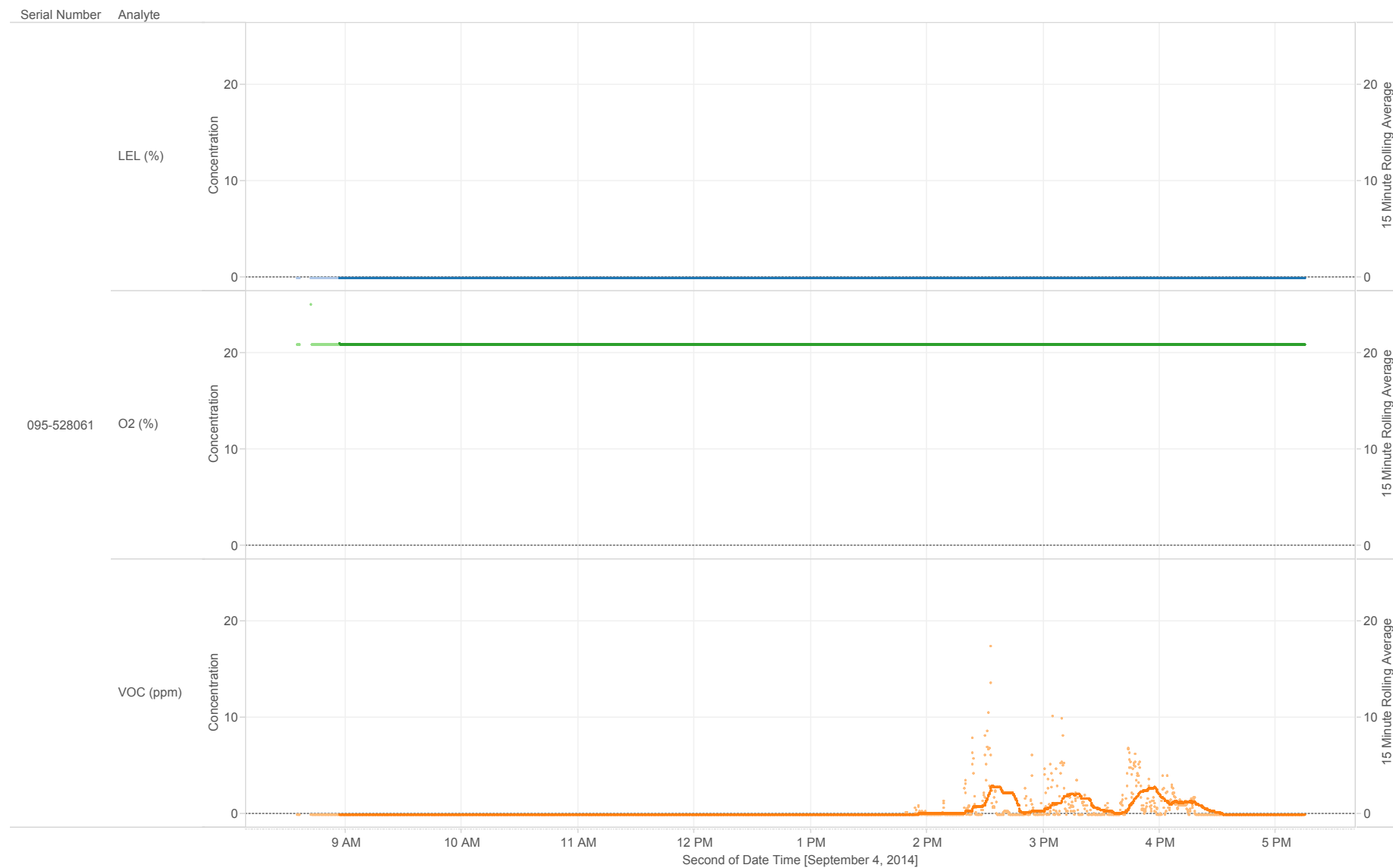
MultiRAE Data Logging Air Monitoring - Double Oak Mountain, AL - 9/4/2014 08:18 - 9/4/2014 17:27



Please note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format

- Analyte**
- LEL (%), 15 Minute Rolling Average
 - LEL (%), Concentration
 - O2 (%), 15 Minute Rolling Average
 - O2 (%), Concentration
 - VOC (ppm), 15 Minute Rolling Average
 - VOC (ppm), Concentration

MultiRAE Data Logging Air Monitoring - Double Oak Mountain, AL - 9/4/2014 08:18 - 9/4/2014 17:27



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Analyte

- LEL (%), 15 Minute Rolling Average
- LEL (%), Concentration
- O2 (%), 15 Minute Rolling Average
- O2 (%), Concentration
- VOC (ppm), 15 Minute Rolling Average
- VOC (ppm), Concentration

Appendix D: Calibration Logs

Calibration Log

Date	Time	Instrument	Serial Number	Cal Gas	Concentration	Lot Number	Expiration/ Mfg. Date	Calibrated By
9/4	0615	AR8	292-504133	ISO Quad	100 ppm 50% 20.9	971552 970235	8/17 7/16	SC
	0622	AR6	292-500716					SC
	0631	AR9	292-504109					SC
	0640	AR10	292-504111					SC
9/4	0620	MR	095-528039	ISO Quad	100 ppm 50% 20.9	955459 972283	4/16 2/16	MM
9/4	0624	MR	095-528061					
9/4	0630	MR	095-527915					
9/4	0636	UltraPac	596-905842	Benzene	5 ppm	968564	5/17	
9/4	0641	VidraPac	596-901157					
9/4	0645	MR	095-527929	ISO Quad	100 ppm 50% 20.9	955459 972283	4/16 2/16	
9/4	0647	MR	095-528024				4/16 2/16	
7/5/14	0618	MR	095-528039					MM
	0622	MR	095-528024					
	0625	MR	095-527929					
	0629	MR	095-528061					
	0633	MR	095-527915					
	0639	VR	596-905842	Benzene	5 ppm	968564	5/17	MM
	0640	VR	596-901157					
	0645	VR	596-901284					

