Message

From: CENCETTI Jean-Marie [jeanmarie.cencetti@arkema.com]
Sent: 9/8/2017 8:24:44 PM
To: Hill, Craig (PCS) [Craig.Hill@pcs.hctx.net]
CC: Quiroz Guadalupe_TCEQ [Guadalupe.quiroz@tceq.texas.gov]; Bernier, Roberto [bernier.roberto@epa.gov]
Subject: FW: Compilation of daily summaries - Arkema facility - Crosby, TX
Attachments: 109489 - Arkema Draft CTEH Air Monitoring Summary_09.07.2017_AM.PDF; 109489 - Arkema Draft CTEH Air Monitoring Summary_09.06.2017_AM.PDF; 109489 - Arkema Draft CTEH Air Monitoring Summary_09.05.2017_AM.PDF; 109489 - Arkema Draft CTEH Air Monitoring Summary_09.04.2017_AM_rev1.pdf; 109489 - Arkema - Draft CTEH Air Monitoring Summary_09.01.2017_AM_rev2_o....pdf; 109489 - Arkema CTEH Evacuation Zone Data Summary.pdf; 109489 - Arkema DRAFT CTEH Air Monitoring Summary_09.03.2017_AM_rev1.pdf; 109489 - Arkema Draft CTEH Air Monitoring Summary_09.02.2017_AM_rev1.pdf; Arkema Air SAP v1.3 9.8.2017.pdf

Craig, as requested enclosed please find the Air Monitoring Plan and Air Monitoring reports with available data for September 1 through September 7, 2017.

JeanMarie CENCETTI
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CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 1, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel on from August 31, 2017 through September 1, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for carbon monoxide (CO) and volatile organic compounds (VOCs) using RAE Systems MultiRAE Plus instruments. Additionally, levels of particulate matter ($PM_{2.5}$) potentially related to fire smoke were assessed using TSI SidePak AM510 and Dusttrak aerosol monitors. **Table 1** summarizes the data for all real-time air monitoring readings recorded in Crosby, TX from 12:57 August 31, 2017 through 06:00 on September 1, 2017. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Real-time Handheld Air Monitoring Readings
12:57 August 31, 2017 – 06:00 September 1, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	23	0	< 1.0 ppm
CO	MultiRAE Plus	16	0	< 1.0 ppm
Cumene	Gastec Tube 122L	6	0	< 50 ppm
LEL	MultiRAE Plus	6	0	< 1.0 %
VOCs	MultiRAE Plus	139	0	< 0.1 ppm
$PM_{2.5}$	AM510	110	110	0.023 – 0.074 mg/m^3
	Dusttrak	25	25	0.023 – 0.049 mg/m^3

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

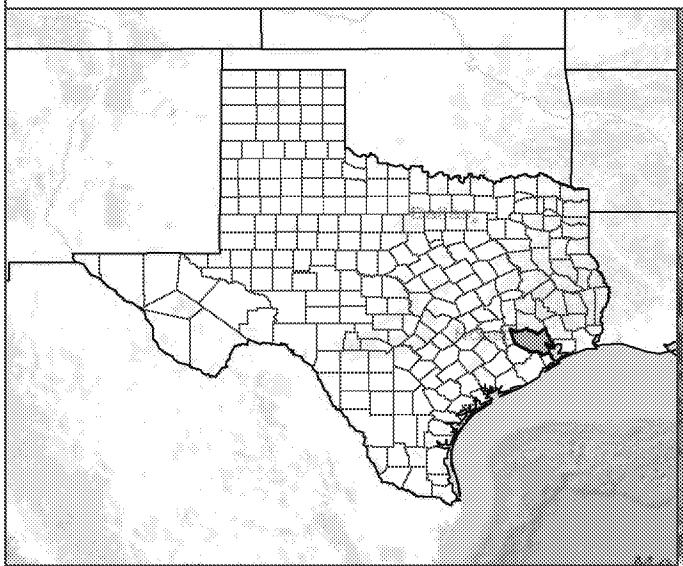
CTEH

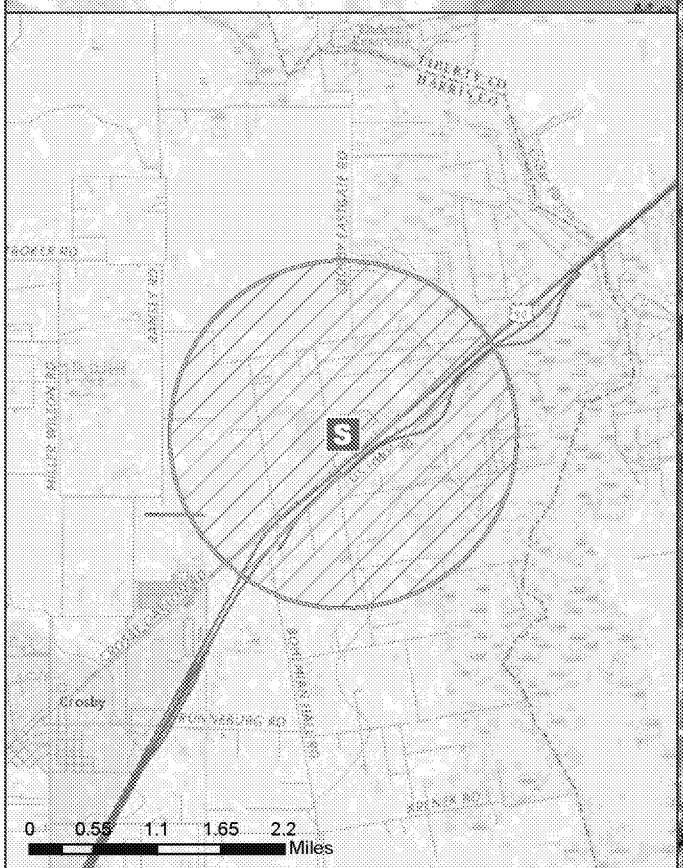
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/1/2017 10:00:58 AM*

Attachment B

Handheld Real-time Air Monitoring Locations

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Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

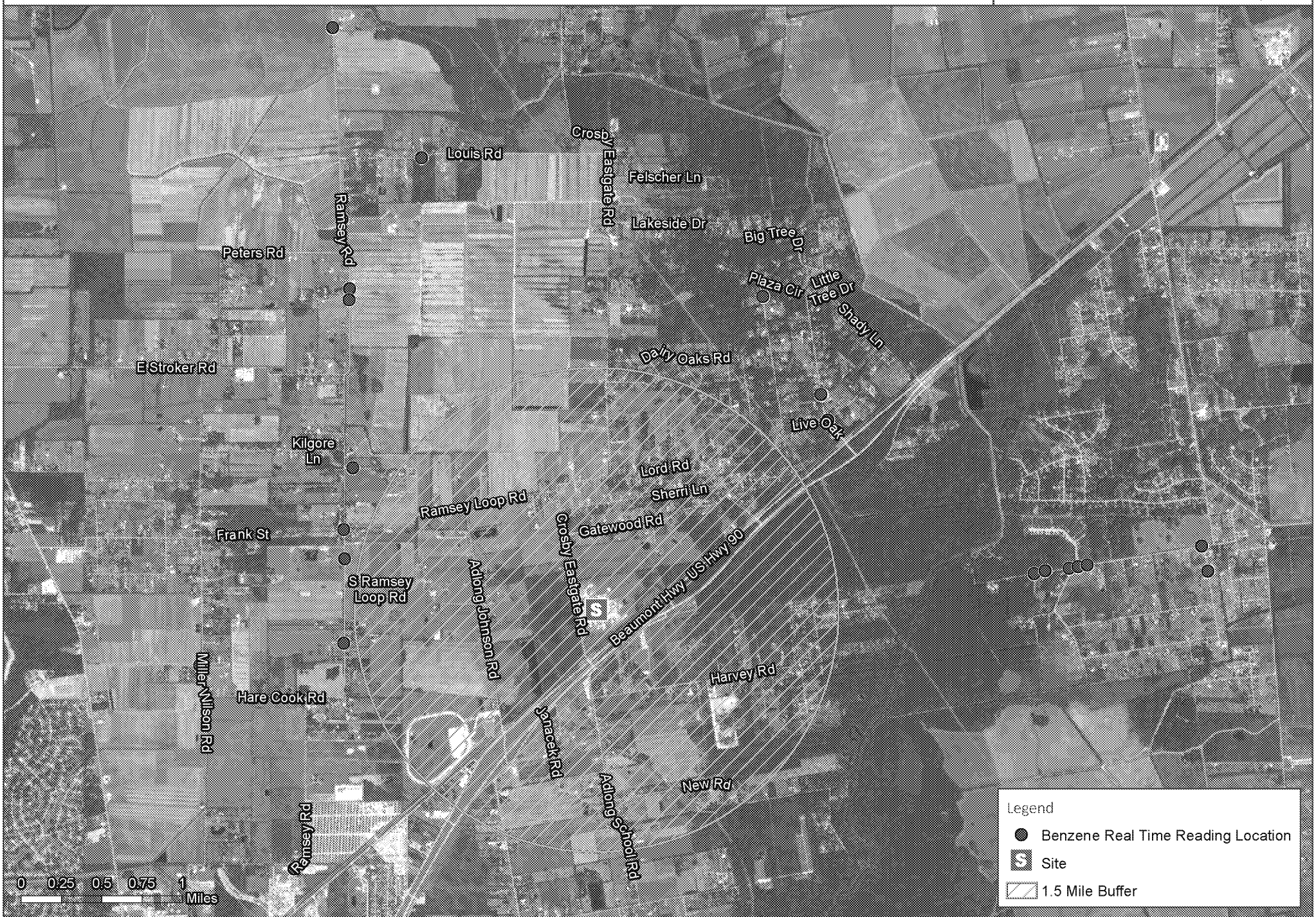
Last Updated: 9/1/2017 9:48:57 AM

CTEH

Benzene Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



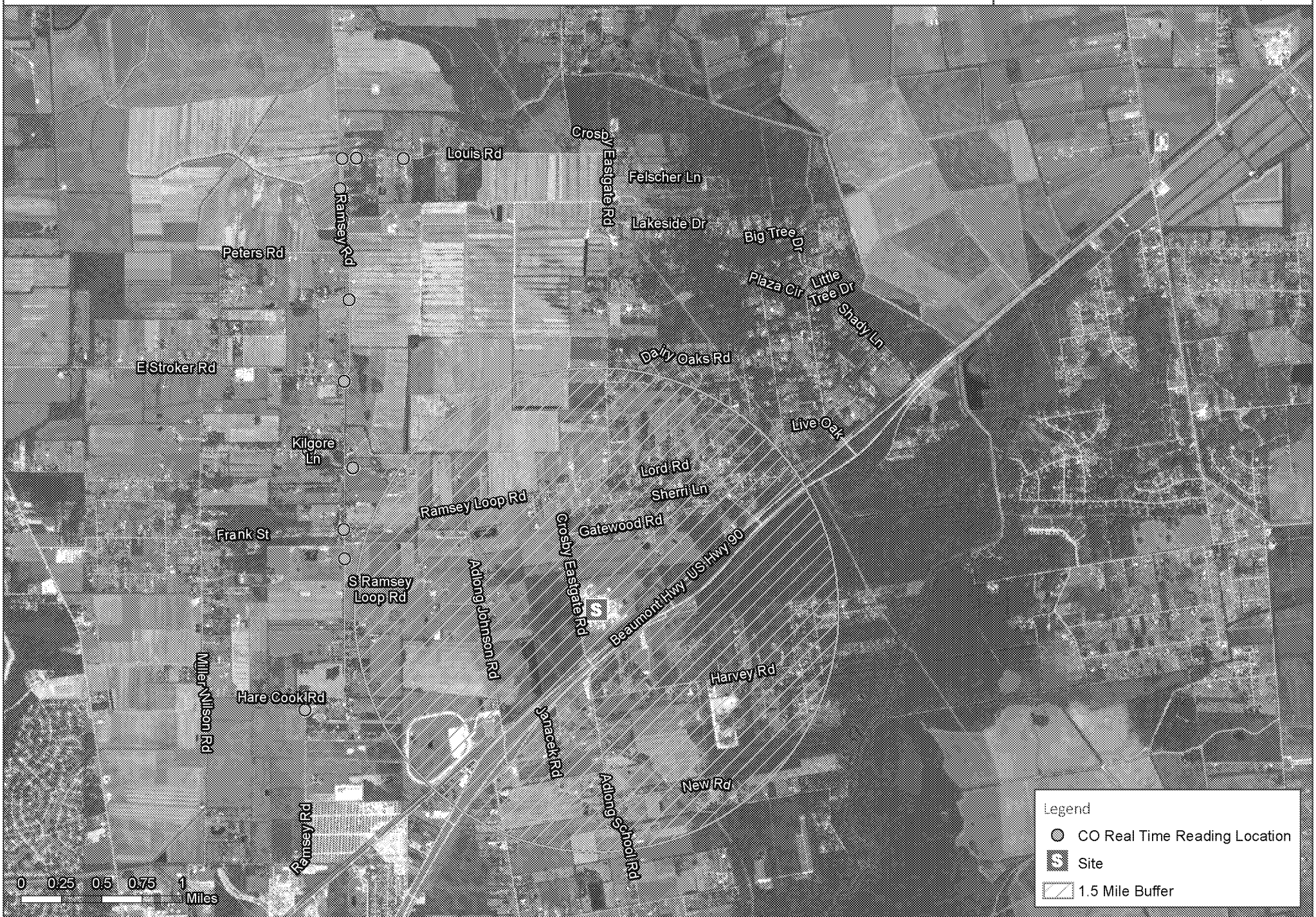
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/1/2017 11:45:57 AM

Carbon Monoxide Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

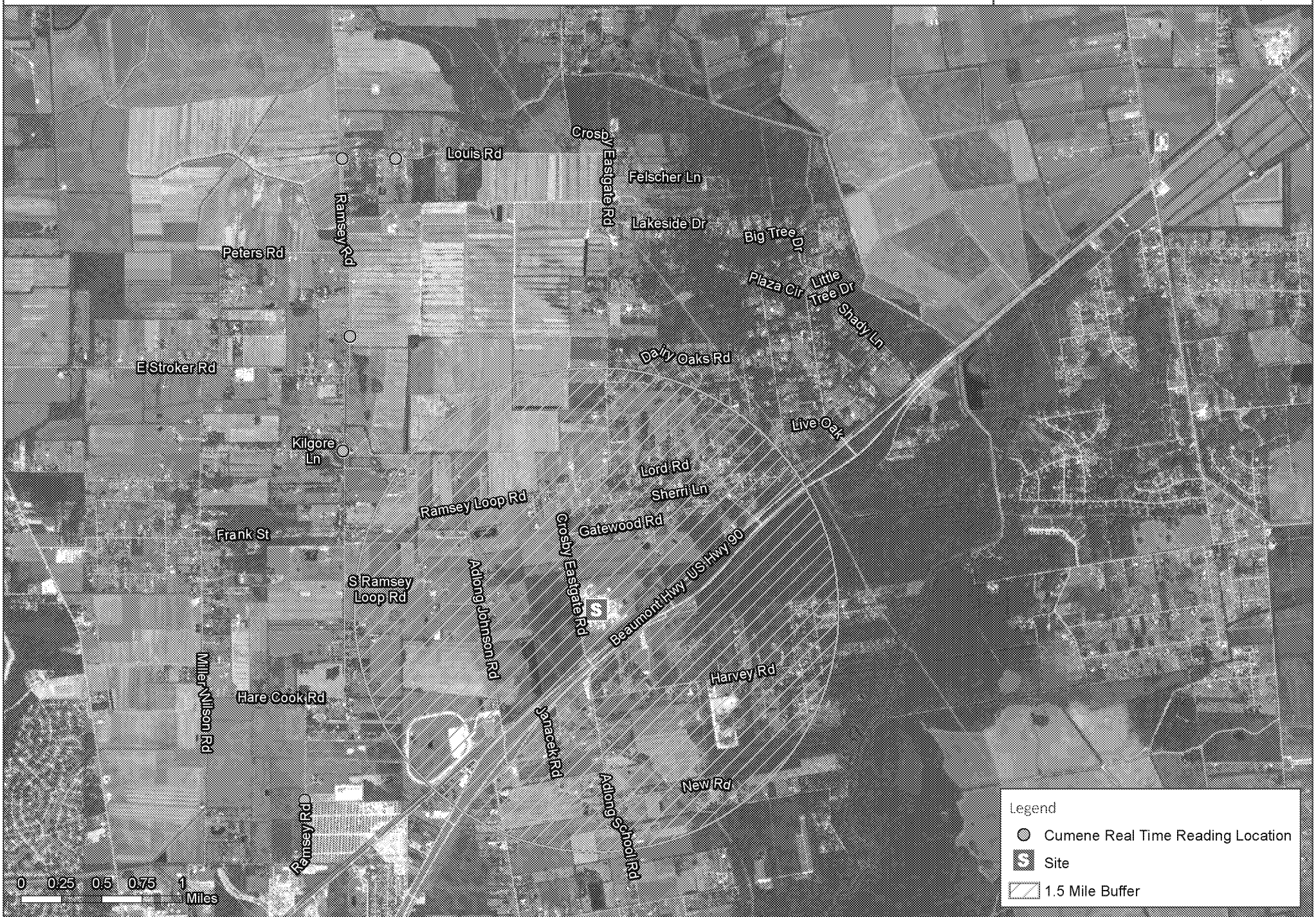
Last Updated: 9/1/2017 11:52:28 AM

CTEH

Cumene Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

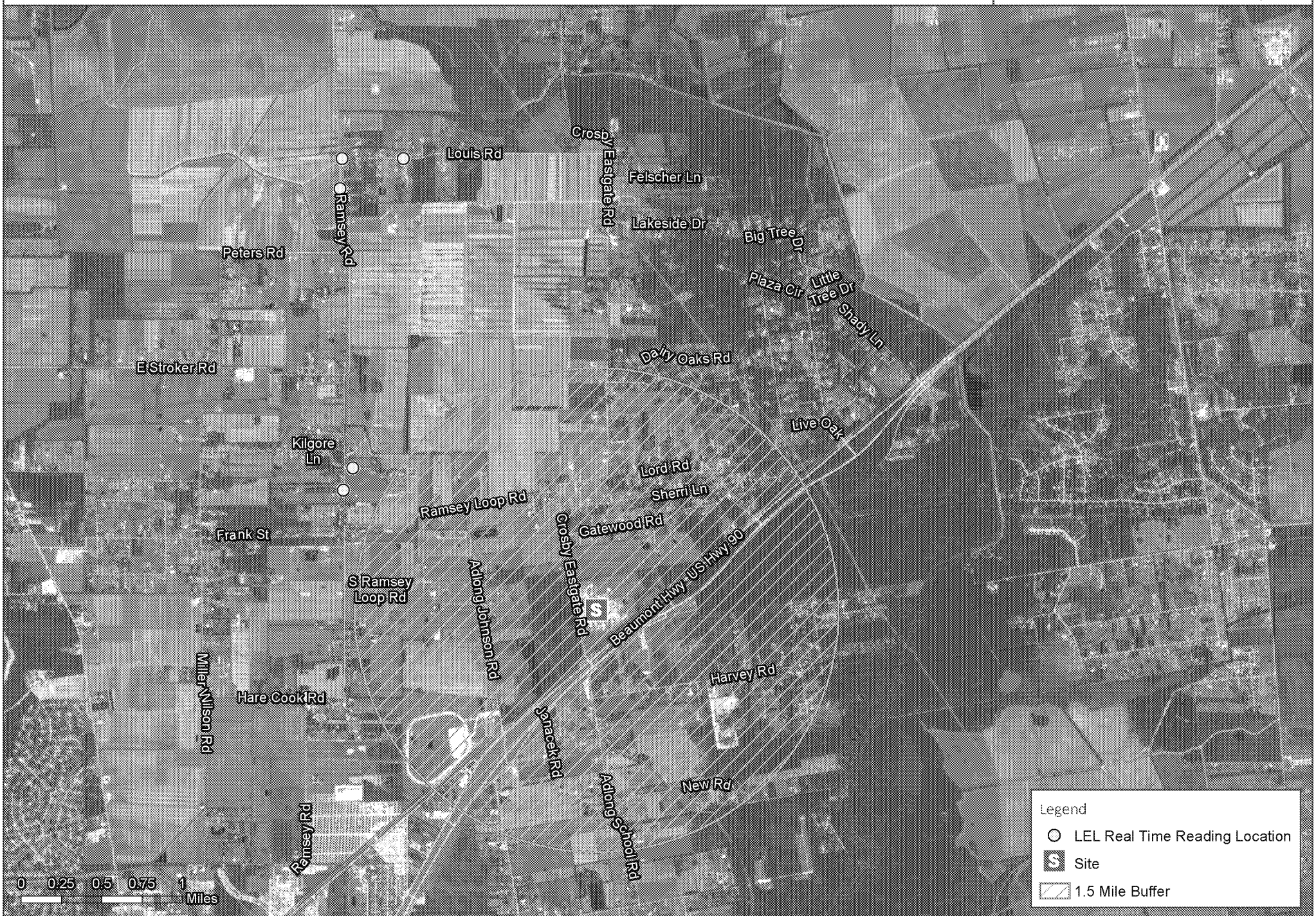
Last Updated: 9/1/2017 12:02:52 PM

CTEH

LEL Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/1/2017 12:06:08 PM

CTEH

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

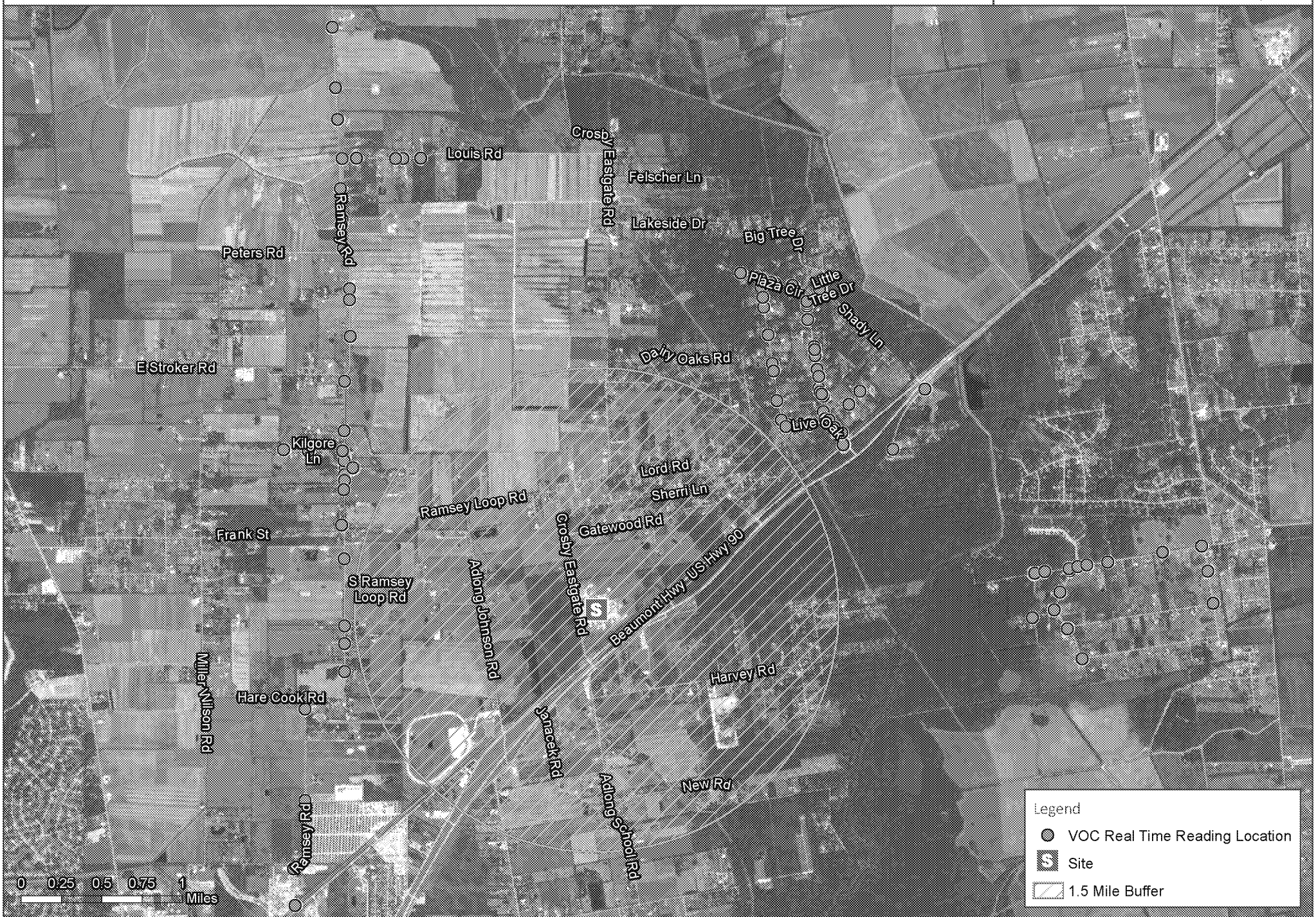
Last Updated: 9/1/2017 12:09:21 PM

CTEH

VOC Hand-held Real-time Reading Locations

Harvey Response - 12:57 August 31, 2017 to 06:00 September 1, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/1/2017 12:18:14 PM

Attachment C

Map of Analytical Air Sampling Locations

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Analytical Air Monitoring Station Locations

Harvey Response - August 31, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

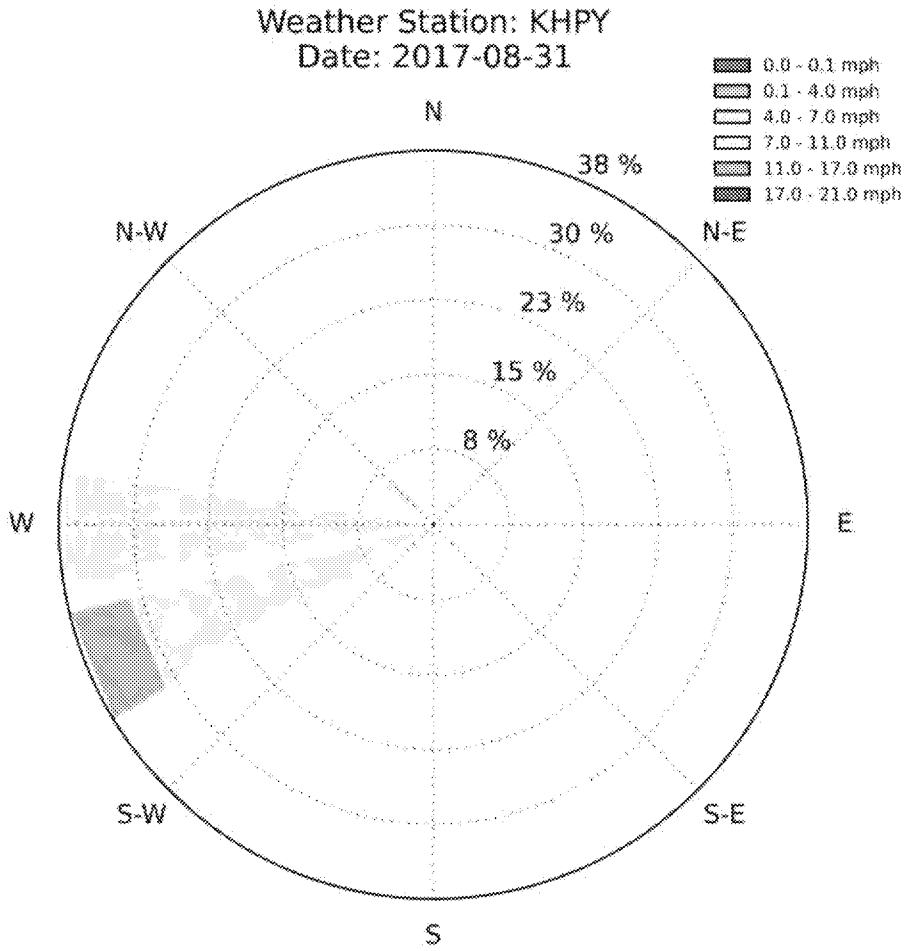
Last Updated: 9/1/2017 10:06:50 AM

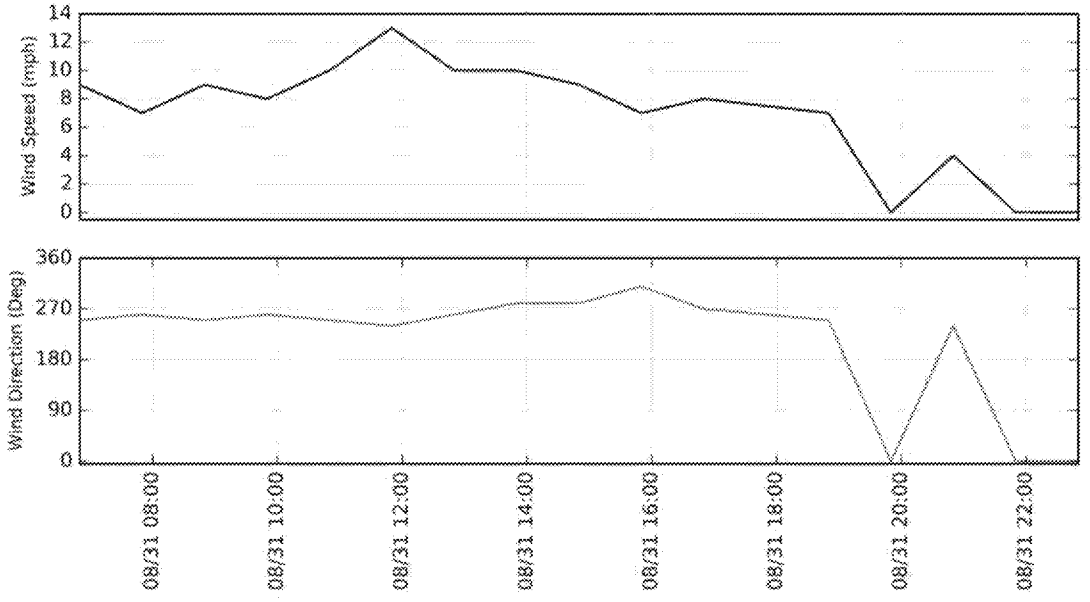
Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-08-31
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
38 %
30 %
23 %
15 %
8 %


Wind Speed (mph)
0
2
4
6
8
10
12
14
Wind Direction (Deg)
0
90
180
270
360
08/31 08:00
08/31 10:00
08/31 12:00
08/31 14:00
08/31 16:00
08/31 18:00
08/31 20:00
08/31 22:00

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CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 4, 2017

Project #109489 Evacuation Zone Data Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On September 3, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) initiated air monitoring in the community areas within the evacuation zone to support data needs for the evaluation of evacuation zone adequacy by unified command. This submittal summarizes the results of the real-time air monitoring that was conducted by CTEH® personnel from 21:04 on September 3, 2017 to 05:50 on September 4, 2017. A map of the 193 readings is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for benzene, and volatile organic compounds (VOCs) using the RAE Systems MultiRAE and UltraRAE. Additionally, combustion byproducts potentially associated with fire smoke, such as particulate matter ($PM_{2.5}$), and sulfur dioxide (SO_2), were assessed. **Table 1** summarizes the data for all real-time air monitoring readings recorded within a 1.5-mile radius of the Arkema facility in Crosby, TX from 21:04 on September 3, 2017 to 05:50 on September 4, 2017.

Table 1 Real-time Handheld Air Monitoring Readings
21:04 September 3, 2017 – 05:50 September 4, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	7	0	< 0.025 ppm
CO	MultiRAE Plus	23	0	< 1.0 ppm
$PM_{2.5}$	AM510	46	46	0.025 - 0.129 mg/m^3
	Dusttrak	22	22	0.027 - 0.48 mg/m^3
SO_2	MultiRAE Plus	23	0	< 0.1 ppm
VOCs	MultiRAE Plus	72	0	< 0.1 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

Attachment A

Handheld Real-time Air Monitoring Locations

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Hand-held Real-time Reading Locations

Harvey Response - 21:04 September 3, 2017 to 05:50 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

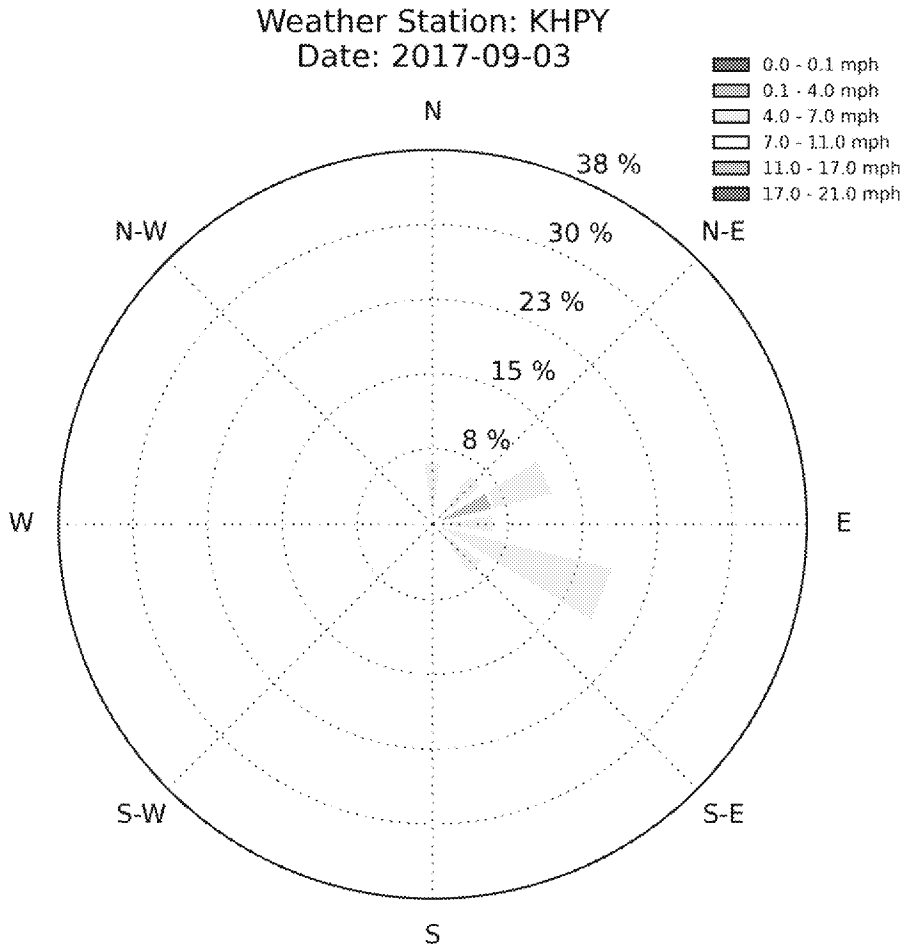
Last Updated: *9/4/2017 2:43:28 PM*

Attachment B

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-09-03
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
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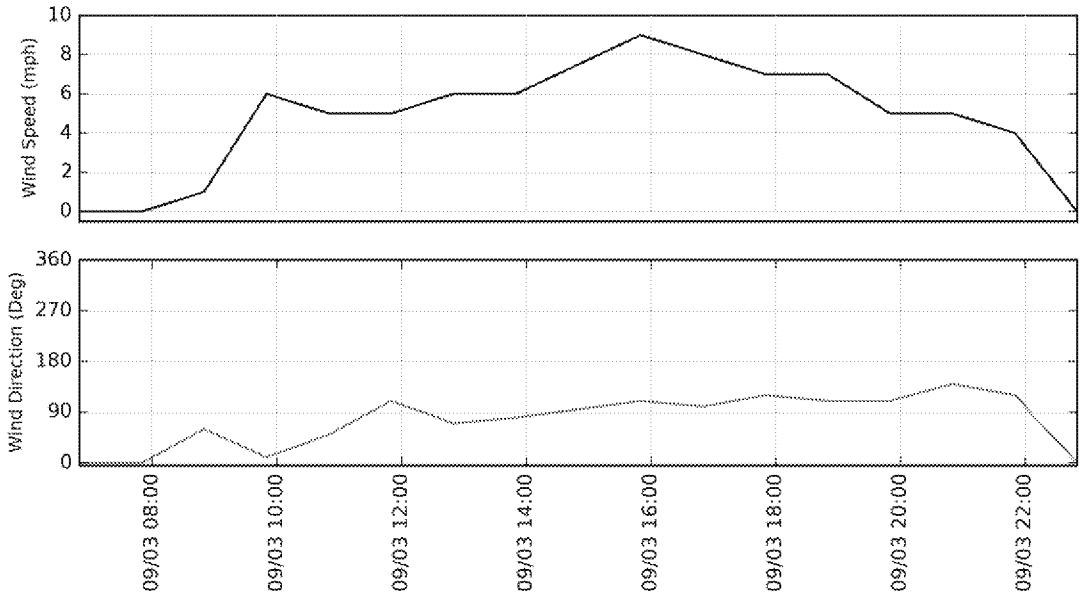
E
S-E
S
S-W
W
N-W
38 %
30 %
23 %
15 %
8 %


Wind Speed (mph)
10
8
6
4
2
0
Wind Direction (Deg)
360
270
180
90
0
09/03 08:00
09/03 10:00
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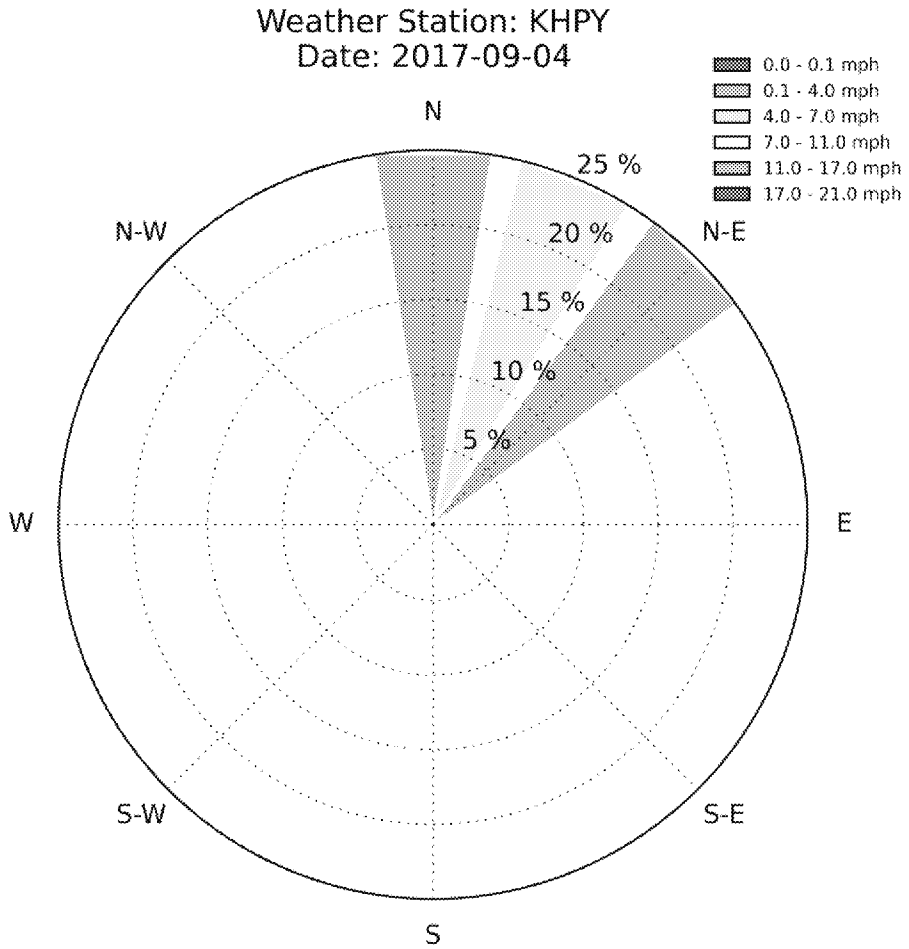
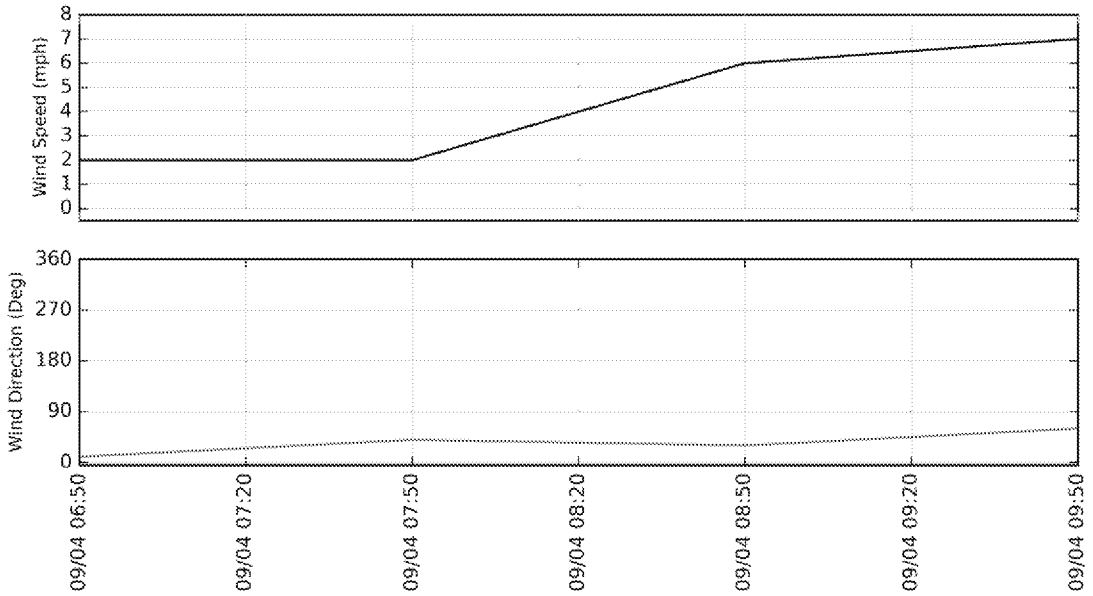
09/03 14:00
09/03 16:00
09/03 18:00
09/03 20:00
09/03 22:00

CTEH


Weather Station: KHPY
Date: 2017-09-04
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
25 %
20 %
15 %
10 %
5 %


Wind Speed (mph)
0
1
2
3
4
5
6
7
8
Wind Direction (Deg)
0
90
180
270
360
09/04 06:50
09/04 07:20
09/04 07:50
09/04 08:20
09/04 08:50
09/04 09:20
09/04 09:50

CTEH

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 2, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 1, 2017 to 06:00 on September 2, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for benzene, cumene, atmosphere flammability (lower explosive limit - LEL), and volatile organic compounds (VOCs) using RAE Systems and Gastec instruments. Additionally, combustion byproducts potentially associated with fire smoke, such as particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) were assessed. **Table 1** summarizes the data for all real-time air monitoring readings recorded in Crosby, TX from 06:00 on September 1, 2017 through 06:00 on September 2, 2017. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Real-time Handheld Air Monitoring Readings
06:00 September 1, 2017 – 06:00 September 2, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	31	0	< 0.025 ppm
	Gastec Tube 121L	7	0	< 0.05 ppm
CO	MultiRAE Plus	40	0	< 1.0 ppm
Cumene	Gastec Tube 122L	2	0	< 50 ppm
LEL	MultiRAE Plus	2	0	< 1.0 %
NO_2	MultiRAE Plus	14	0	< 0.1 ppm
	Gastec Tube 9L	1	0	< 0.1 ppm
$PM_{2.5}$	AM510	170	170	0.013 - 0.065 mg/m^3
	Dusttrak	68	68	0.012 - 0.112 mg/m^3
SO_2	MultiRAE Plus	54	0	< 0.1 ppm
VOCs	MultiRAE Plus	229	0	< 0.1 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

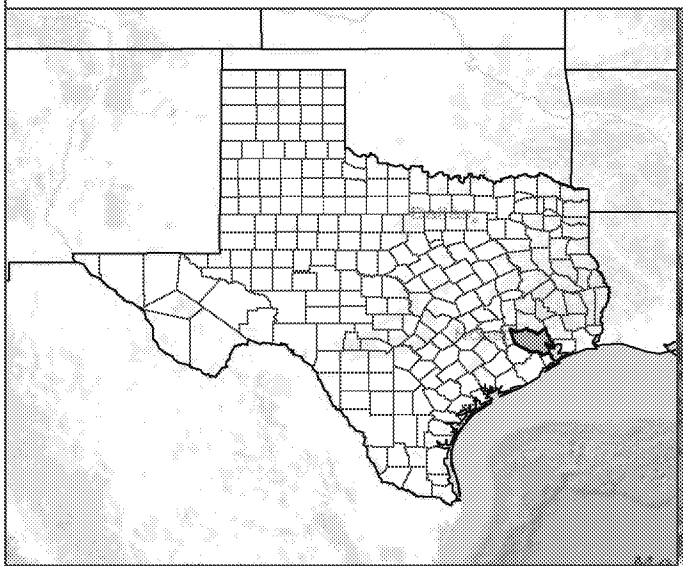
CTEH

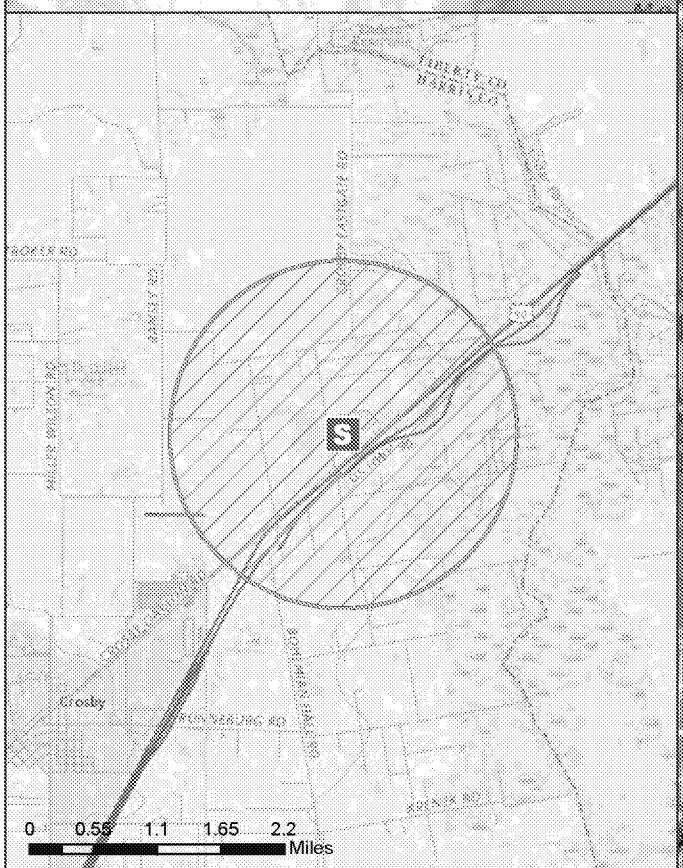
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/1/2017 10:00:58 AM*

Attachment B

Handheld Real-time Air Monitoring Locations

CTEH

CTEH

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/2/2017 6:50:04 AM

CTEH

Benzene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84 Last Updated: 9/2/2017 7:22:15 AM

CTEH

Carbon Monoxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

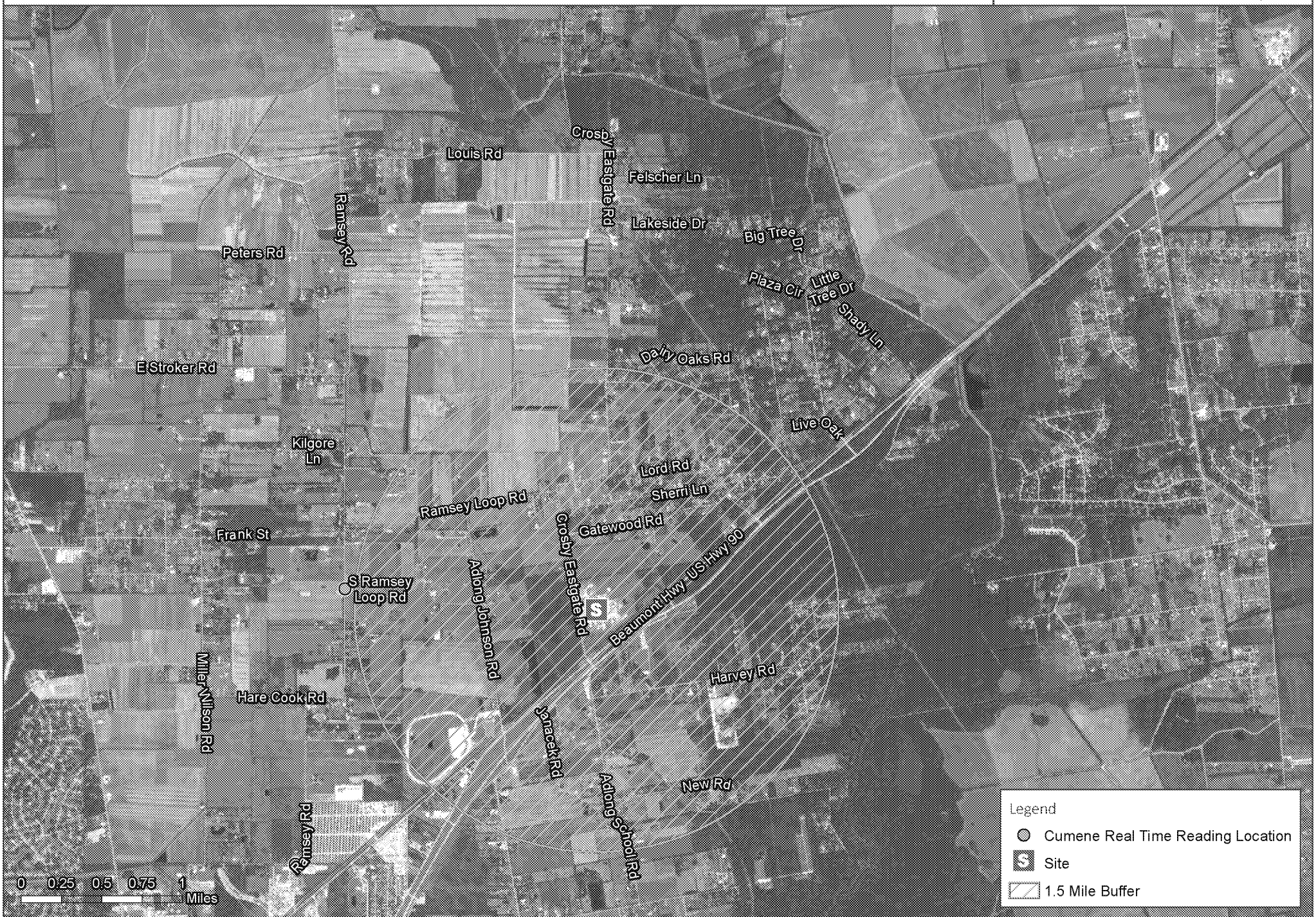
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84 Last Updated: 9/2/2017 8:12:35 AM

CTEH

Cumene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/2/2017 7:21:37 AM

CTEH

LEL Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/2/2017 7:18:33 AM

Nitrogen Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/2/2017 7:58:59 AM

CTEH

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/2/2017 7:30:18 AM

CTEH

Sulfur Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

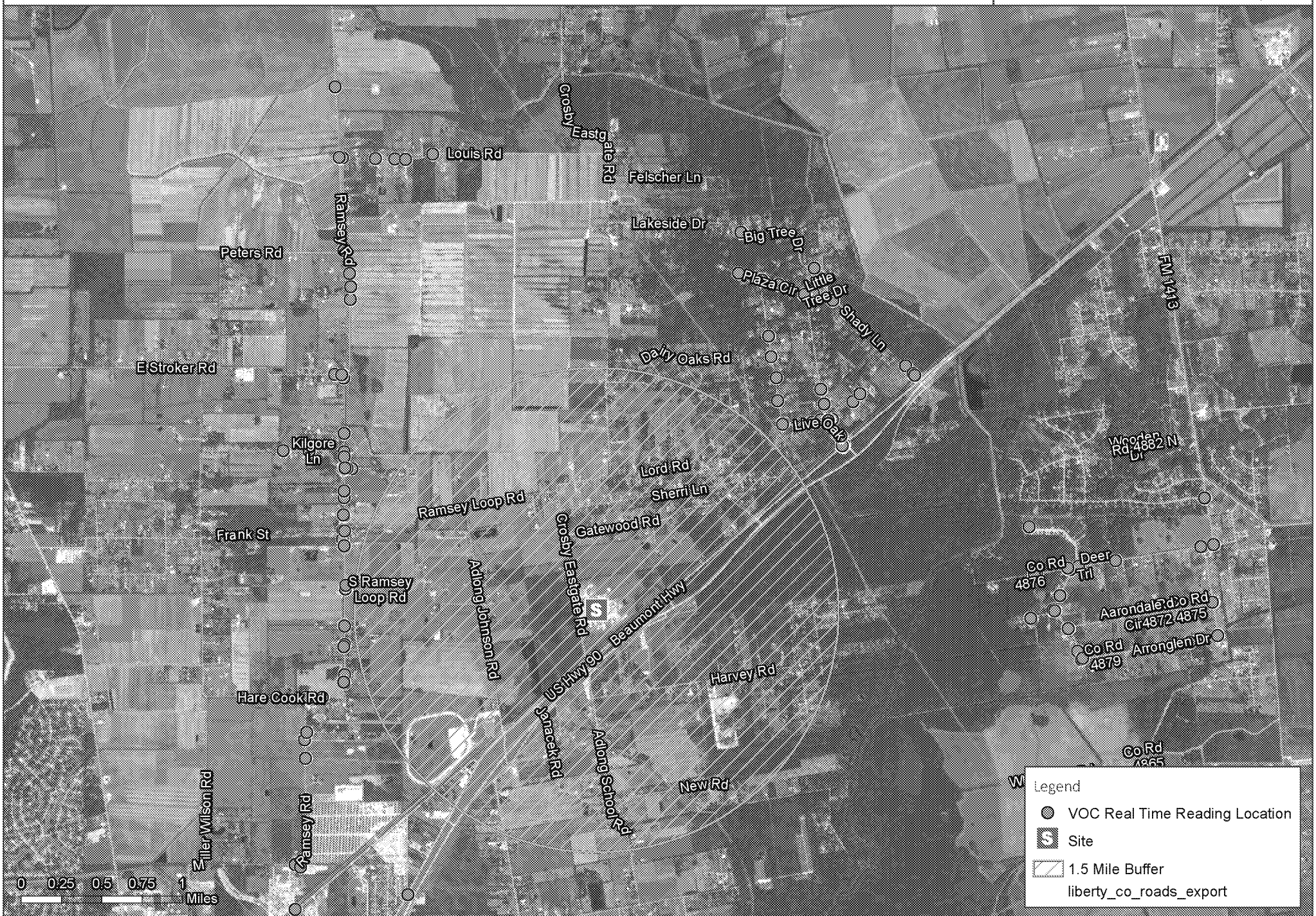
Last Updated: 9/2/2017 8:09:39 AM

CTEH

VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/2/2017 7:34:00 AM

Attachment C

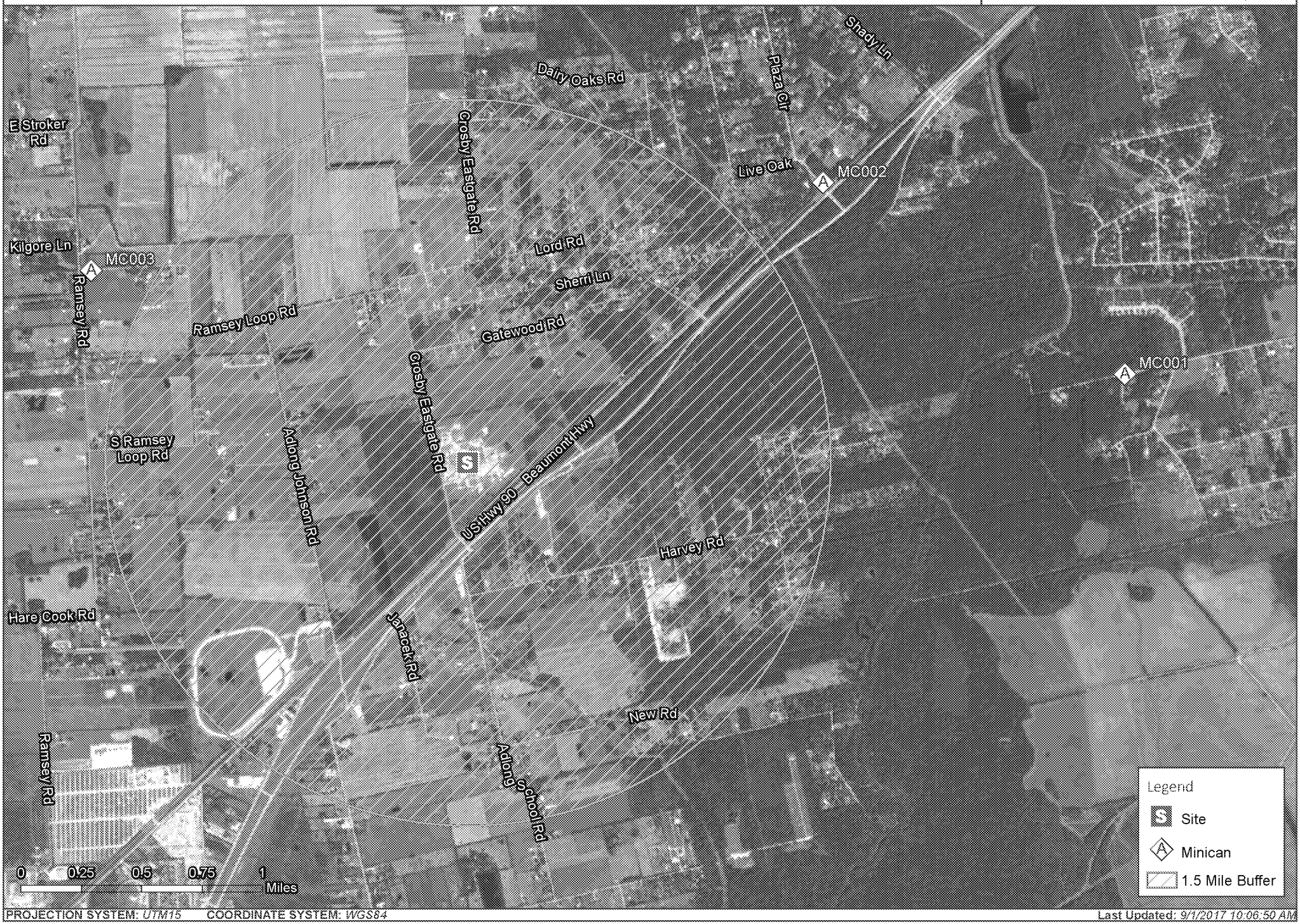
Map of Analytical Air Sampling Locations

CTEH

Analytical Air Monitoring Station Locations

Harvey Response - August 31, 2017

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

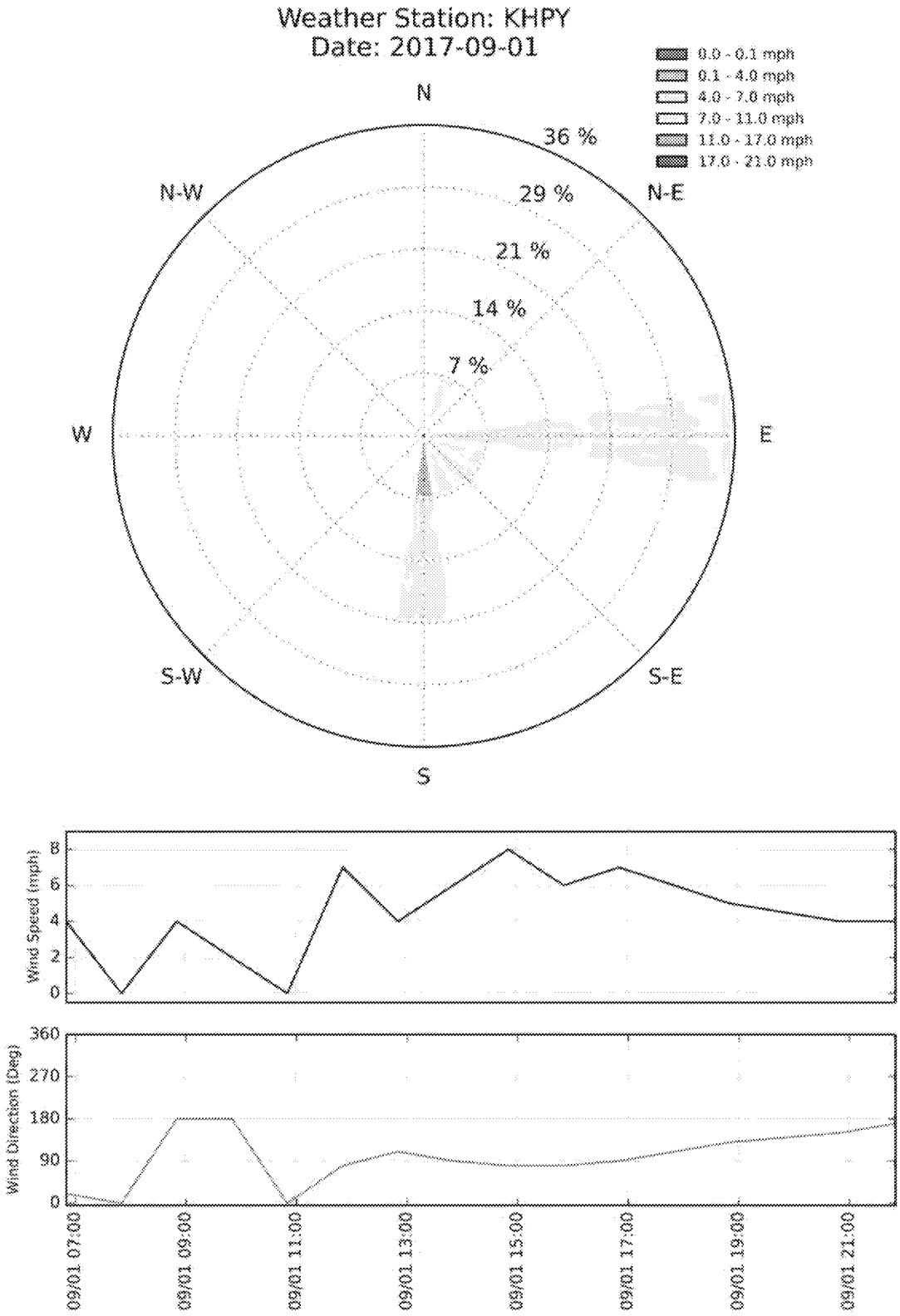
Last Updated: *9/1/2017 10:06:50 AM*

Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-09-01
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
36 %
29 %
21 %
14 %
7 %
Wind Speed (mph)
Wind Direction (Deg)
09/01 07:00
09/01 09:00
09/01 11:00
09/01 13:00
09/01 15:00
09/01 17:00
09/01 19:00
09/01 21:00

CTEH

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 3, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 2, 2017 to 06:00 on September 3, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for benzene, cumene, and volatile organic compounds (VOCs) using RAE Systems and Gastec instruments. Additionally, combustion byproducts potentially associated with fire smoke, such as particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) were assessed. **Table 1** summarizes the data for all real-time air monitoring readings recorded in Crosby, TX from 06:00 on September 2, 2017 through 06:00 on September 3, 2017. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Real-time Handheld Air Monitoring Readings
06:00 September 2, 2017 – 06:00 September 3, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	47	0	< 0.025 ppm
Cumene	Gastec Tube 122L	2	0	< 2.0 ppm
NO_2	MultiRAE Plus	68	0	< 0.1 ppm
$PM_{2.5}$	AM510	142	142	0.022 - 0.13 mg/m^3
	Dusttrak	58	58	0.017 - 0.12 mg/m^3
SO_2	MultiRAE Plus	81	0	< 0.1 ppm
VOCs	MultiRAE Plus	211	5	0.6 - 1.4 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

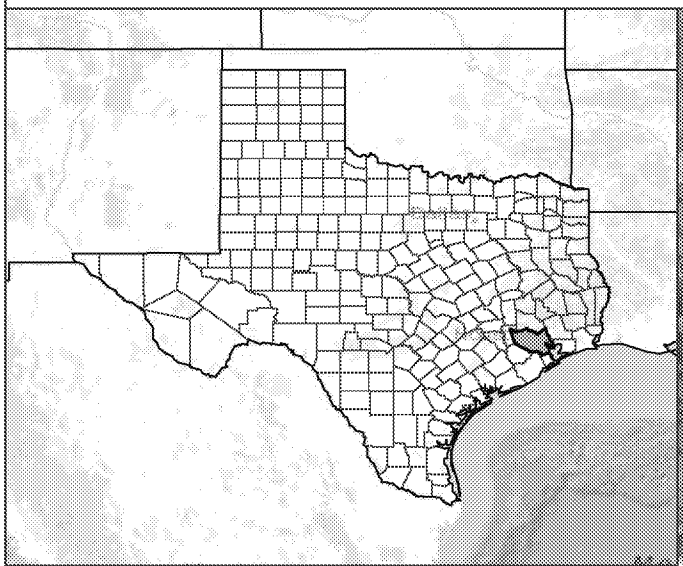
CTEH

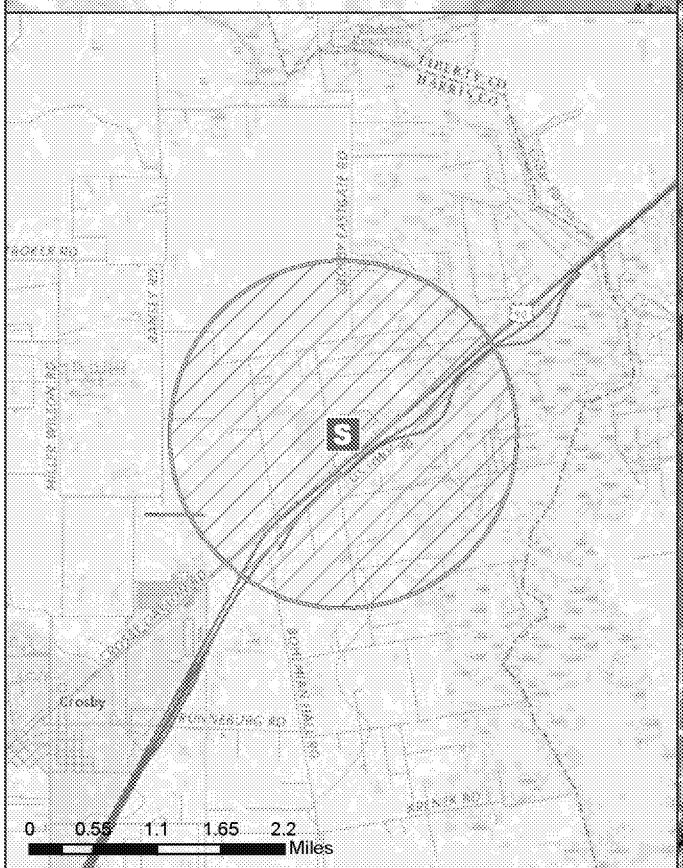
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/1/2017 10:00:58 AM*

Attachment B

Handheld Real-time Air Monitoring Locations

CTEH

CTEH

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

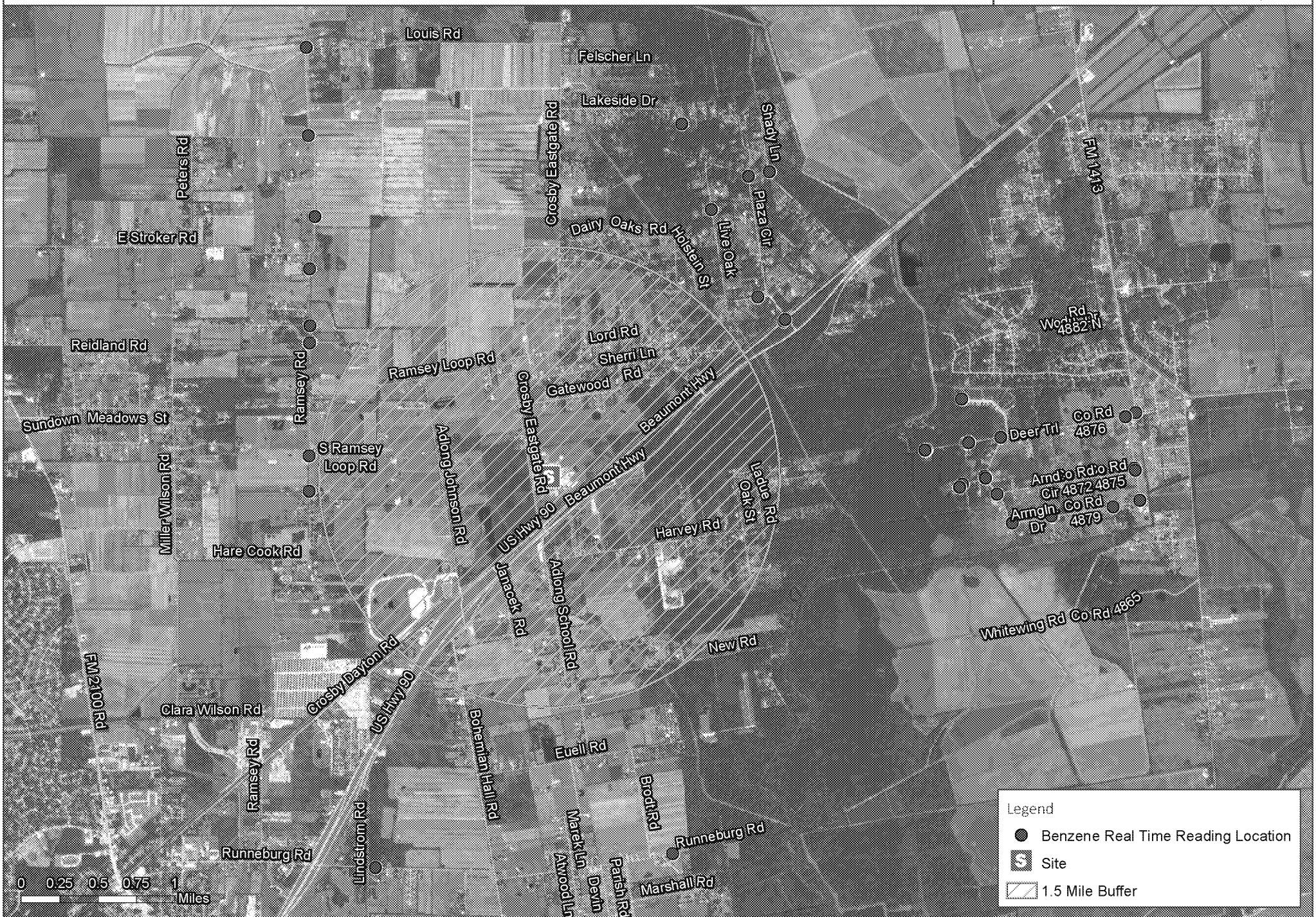
Last Updated: 9/3/2017 2:17:57 PM

CTEH

Benzene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/3/2017 12:12:19 PM

CTEH

Cumene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

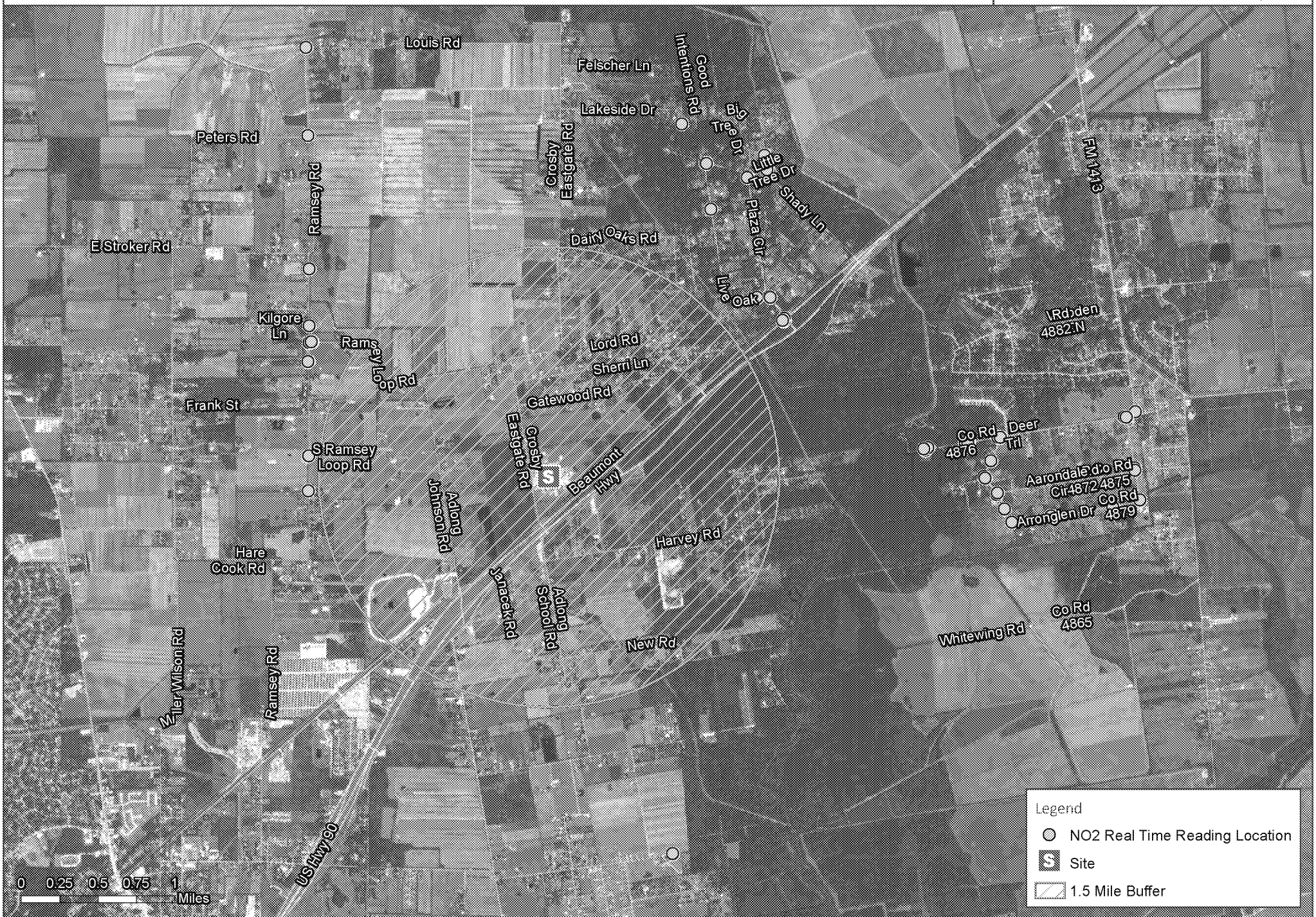
Last Updated: 9/3/2017 12:36:36 PM

CTEH

Nitrogen Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/3/2017 2:25:30 PM

CTEH

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/3/2017 1:03:12 PM

CTEH

Sulfur Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

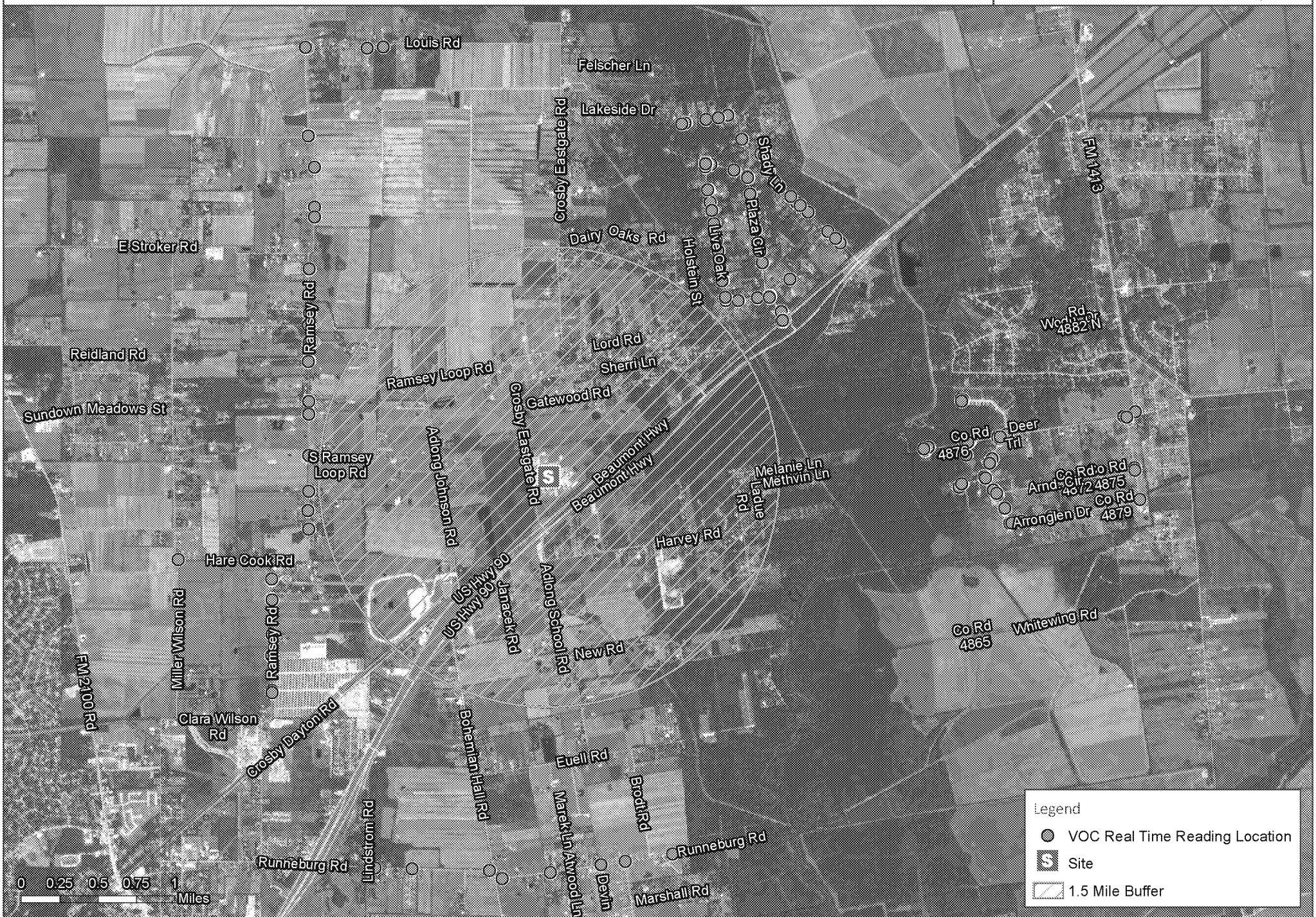
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84 Last Updated: 9/3/2017 12:54:34 PM

CTEH

VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/3/2017 12:55:55 PM

Attachment C

Map of Analytical Air Sampling Locations

CTEH

CTEH

Analytical Air Monitoring Station Locations as of September 3, 2017

Harvey Response

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

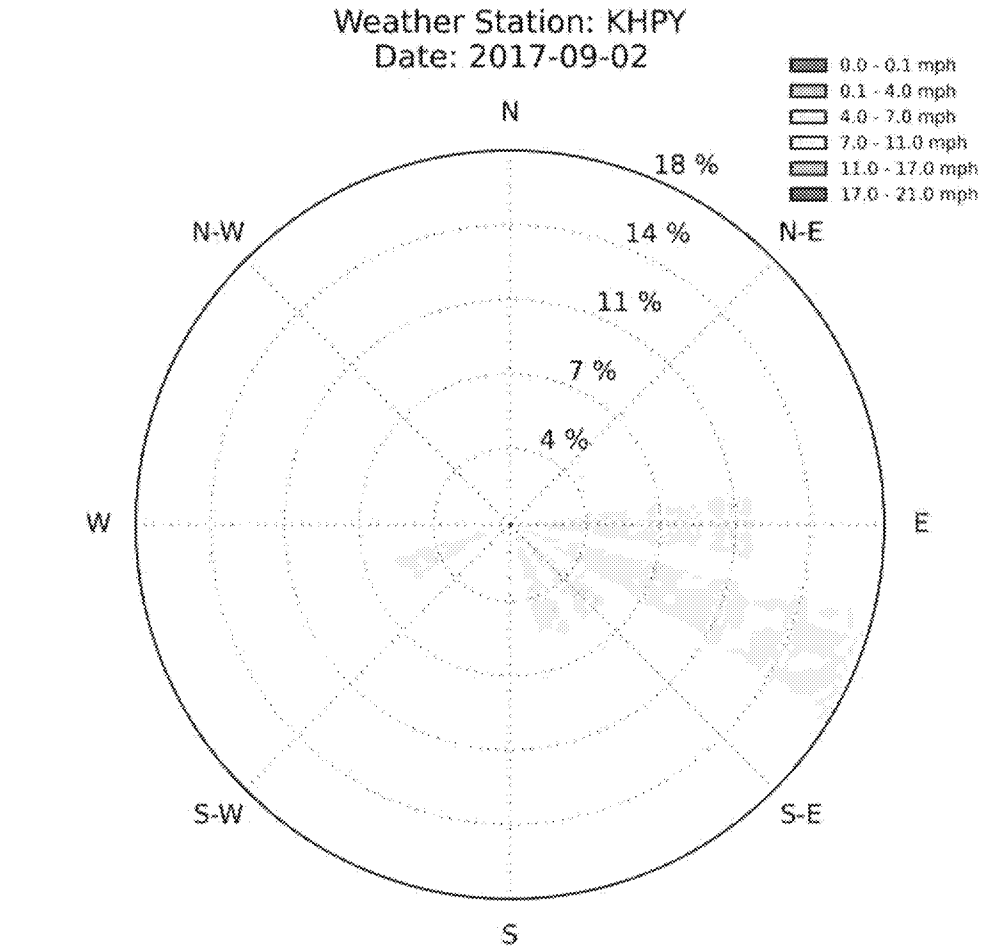
Last Updated: *9/3/2017 1:45:30 PM*

Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH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Date: 2017-09-02
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
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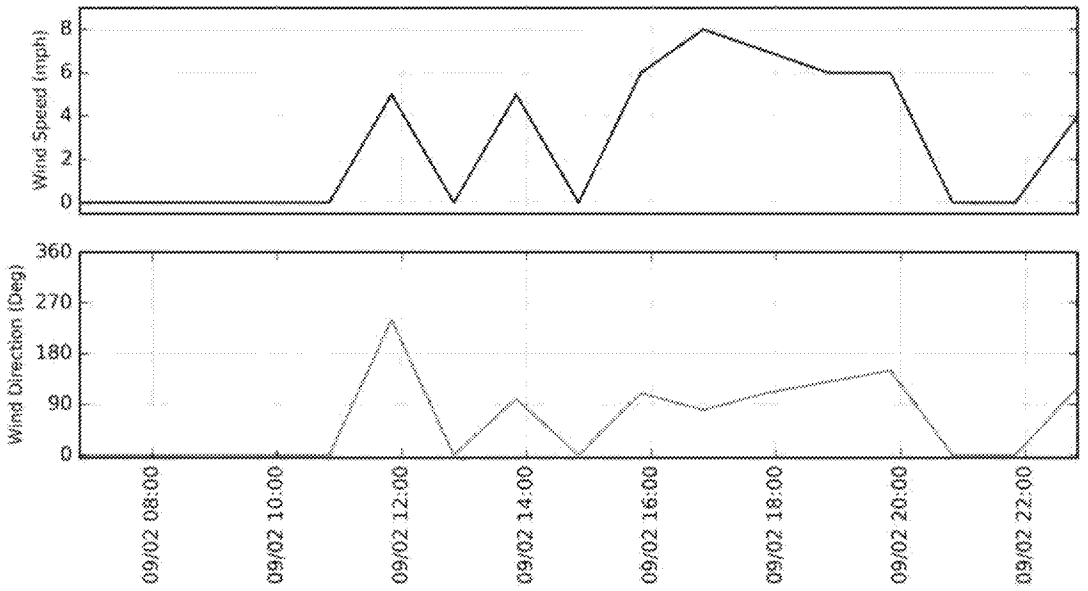
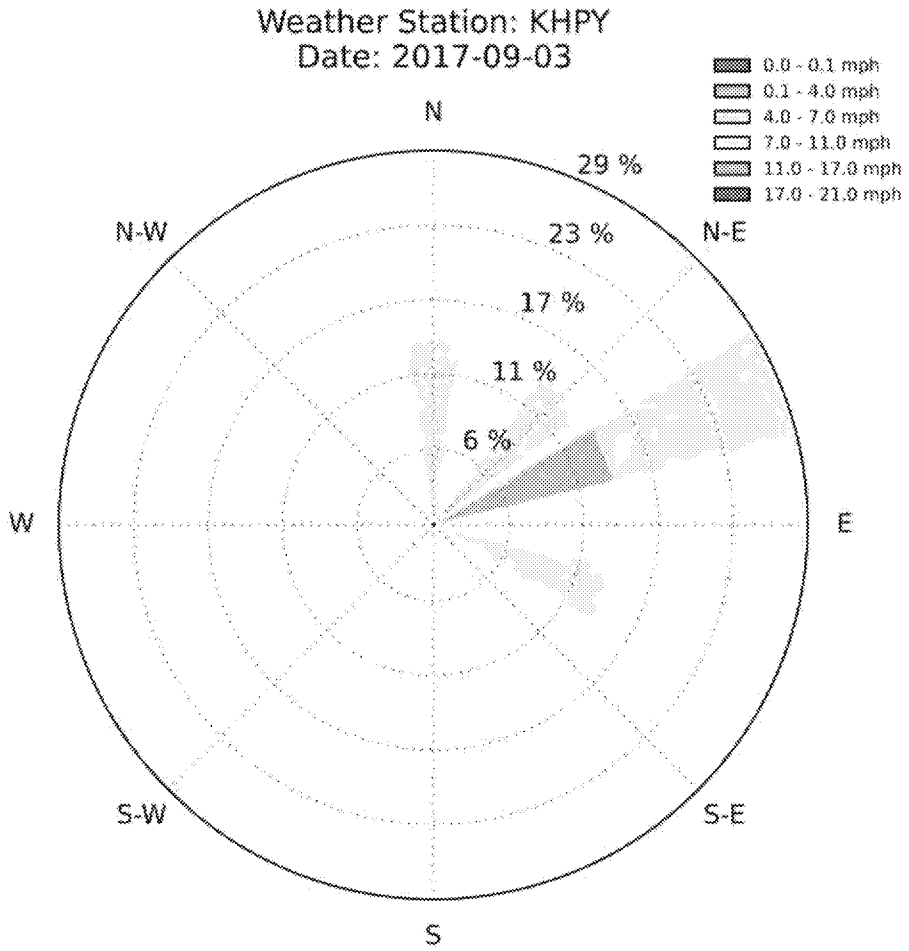
18 %
14 %
11 %
7 %
4 %


Wind Speed (mph)
0
2
4
6
8
Wind Direction (Deg)
0
90
180
270
360
09/02 08:00
09/02 10:00
09/02 12:00
09/02 14:00
09/02 16:00
09/02 18:00
09/02 20:00
09/02 22:00

CTEH


Weather Station: KHPY
Date: 2017-09-03
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
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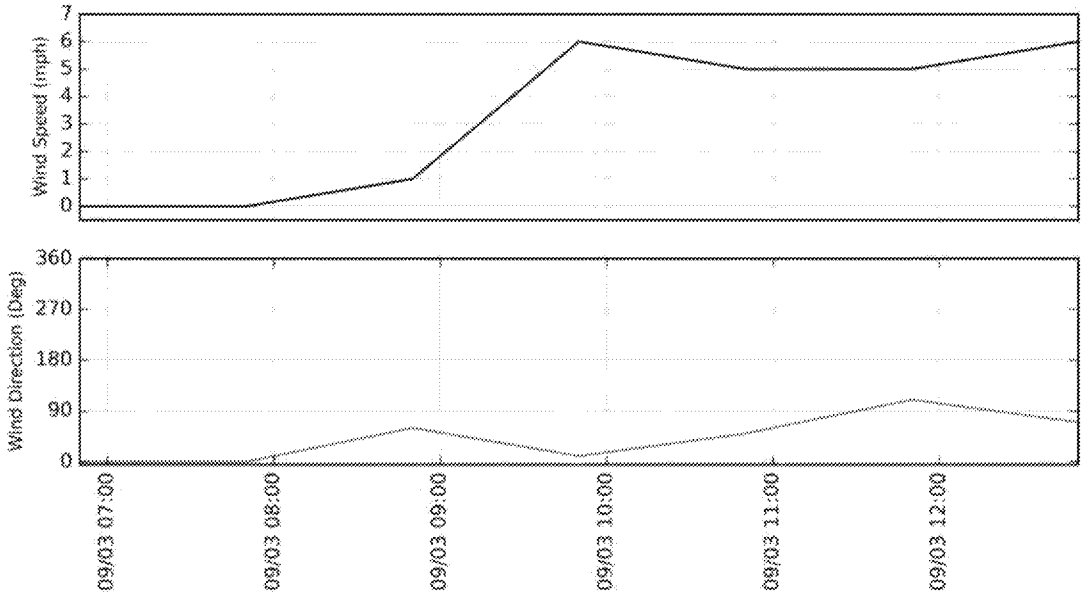
W
N-W
29 %
23 %
17 %
11 %
6 %


Wind Speed (mph)
0
1
2
3
4
5
6
7
Wind Direction (Deg)
0
90
180
270
360
09/03 07:00
09/03 08:00
09/03 09:00
09/03 10:00
09/03 11:00
09/03 12:00

CTEH

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 4, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 3, 2017 to 06:00 on September 4, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for benzene and volatile organic compounds (VOCs) using RAE Systems UltraRAE and MultiRAE instruments. Additionally, combustion byproducts potentially associated with fire smoke, such as particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) were assessed using Gastec Tubes, DustTraks, and AM510s. **Table 1** summarizes the data for all real-time air monitoring readings recorded in Crosby, TX from 06:00 on September 3, 2017 through 06:00 on September 4, 2017. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Real-time Handheld Air Monitoring Readings
06:00 September 3, 2017 – 06:00 September 4, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	27	0	< 0.025 ppm
CO	MultiRAE Plus	71	0	< 1.0 ppm
NO_2	Gastec Tube 9L	3	0	< 0.1 ppm
	MultiRAE Plus	5	0	< 0.1 ppm
$PM_{2.5}$	AM510	142	142	0.020 - 0.213 mg/m^3
	Dusttrak	66	66	0.023 - 0.051 mg/m^3
SO_2	MultiRAE Plus	65	0	< 0.1 ppm
VOCs	MultiRAE Plus	215	0	< 0.1 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

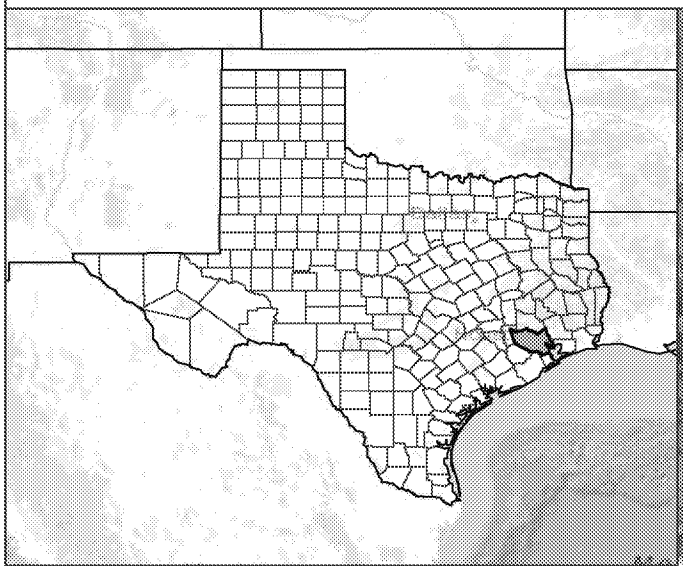
CTEH

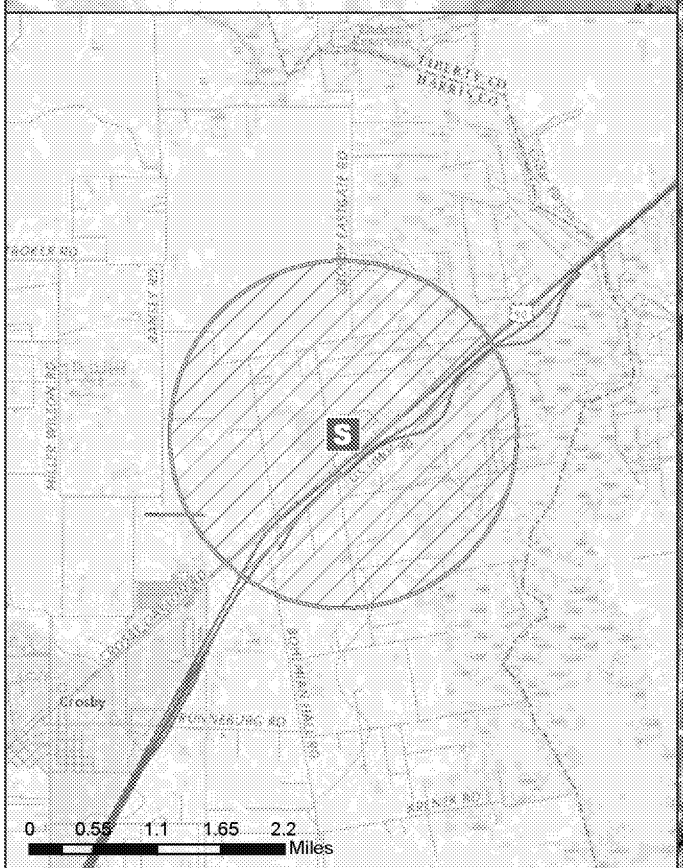
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/1/2017 10:00:58 AM*

Attachment B

Handheld Real-time Air Monitoring Locations

CTEH

CTEH

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/4/2017 10:21:35 AM

CTEH

Benzene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/4/2017 9:08:39 AM

CTEH

Carbon Monoxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/4/2017 10:27:52 AM

Nitrogen Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/4/2017 9:39:15 AM

CTEH

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/4/2017 10:23:53 AM

Sulfur Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

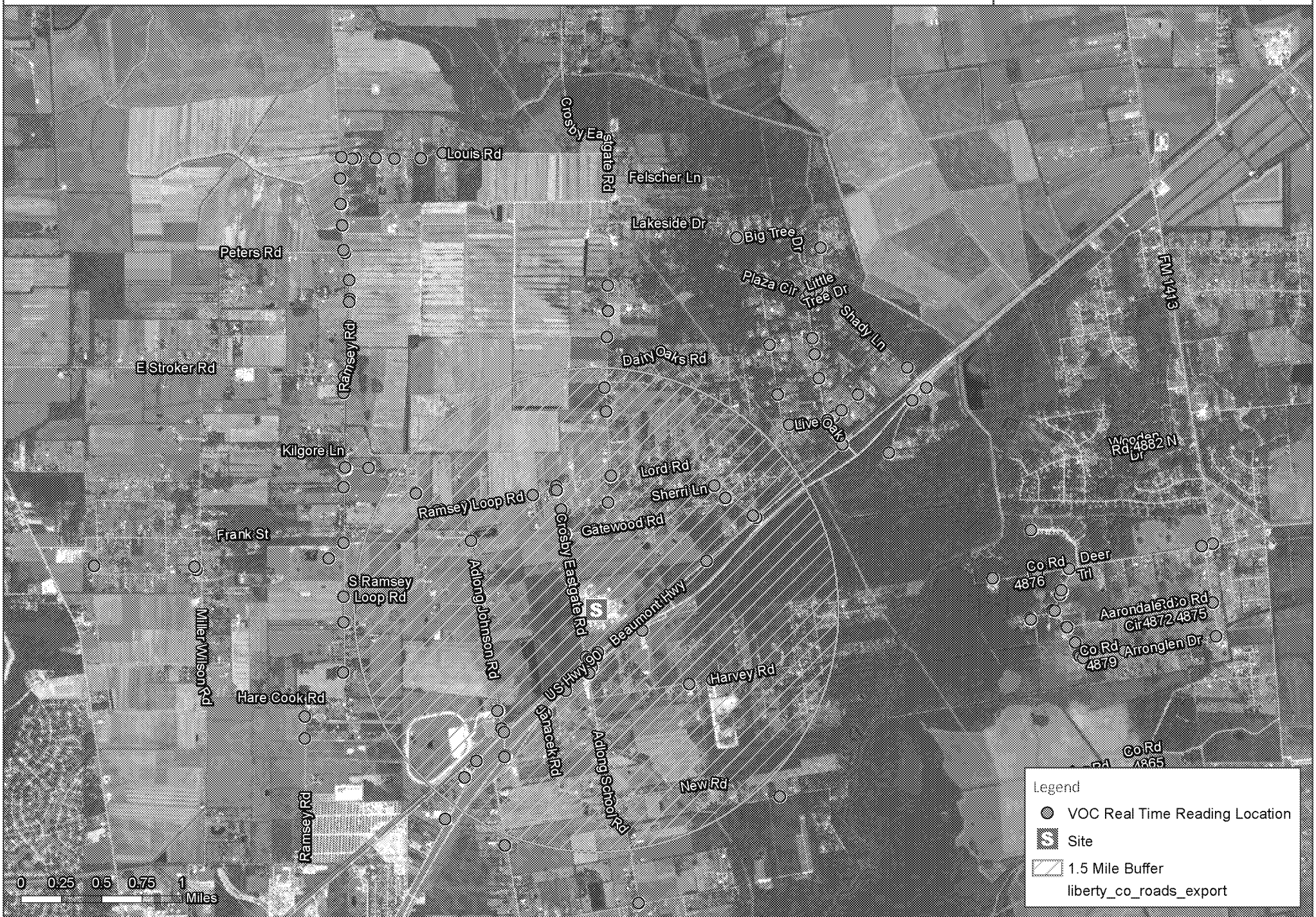
Last Updated: 9/4/2017 9:10:35 AM

CTEH

VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 3, 2017 to 06:00 September 4, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/4/2017 10:25:11 AM

Attachment C

Map of Analytical Air Sampling Locations

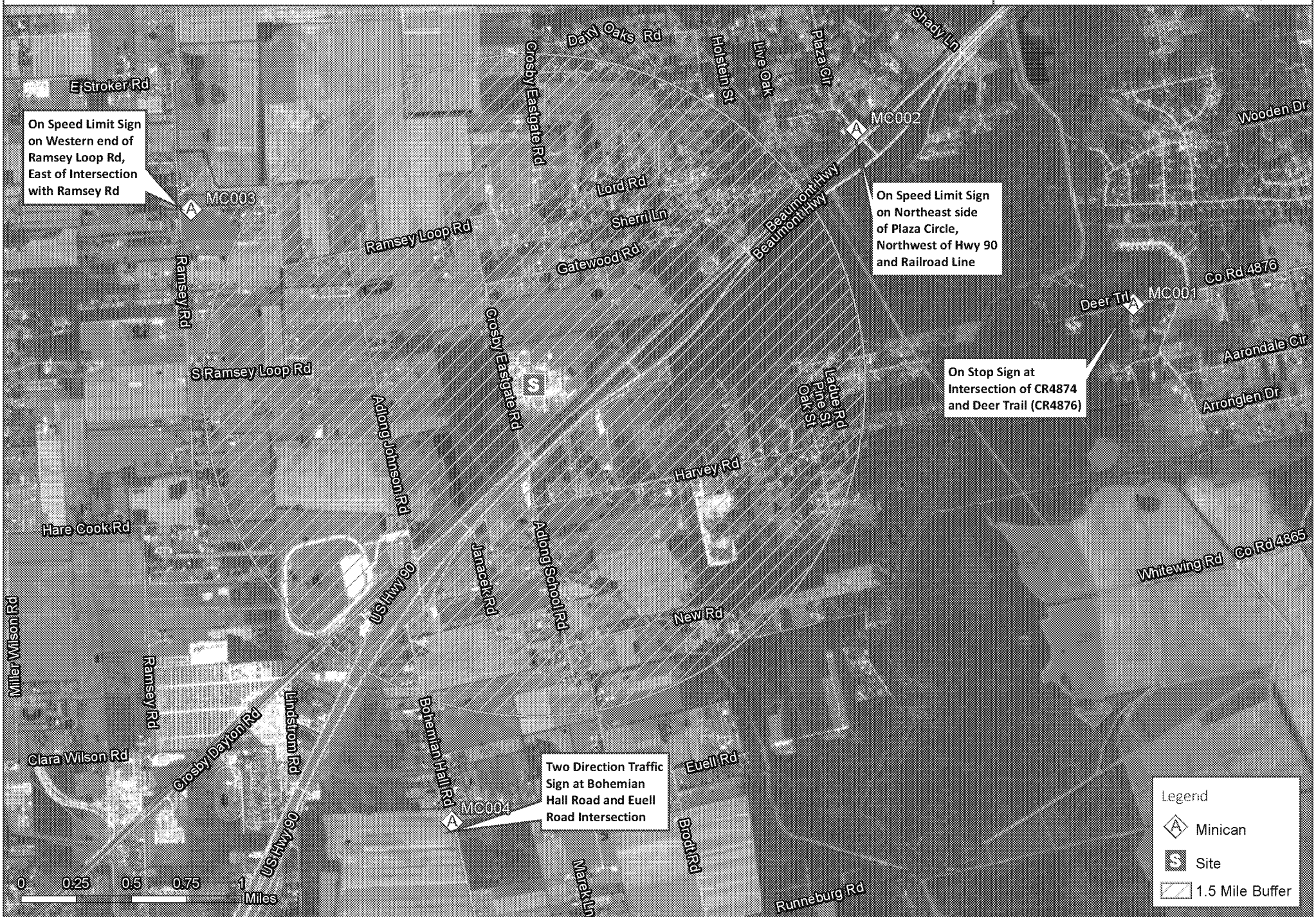
CTEH

CTEH

Analytical Air Monitoring Station Locations as of September 4, 2017

Harvey Response

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

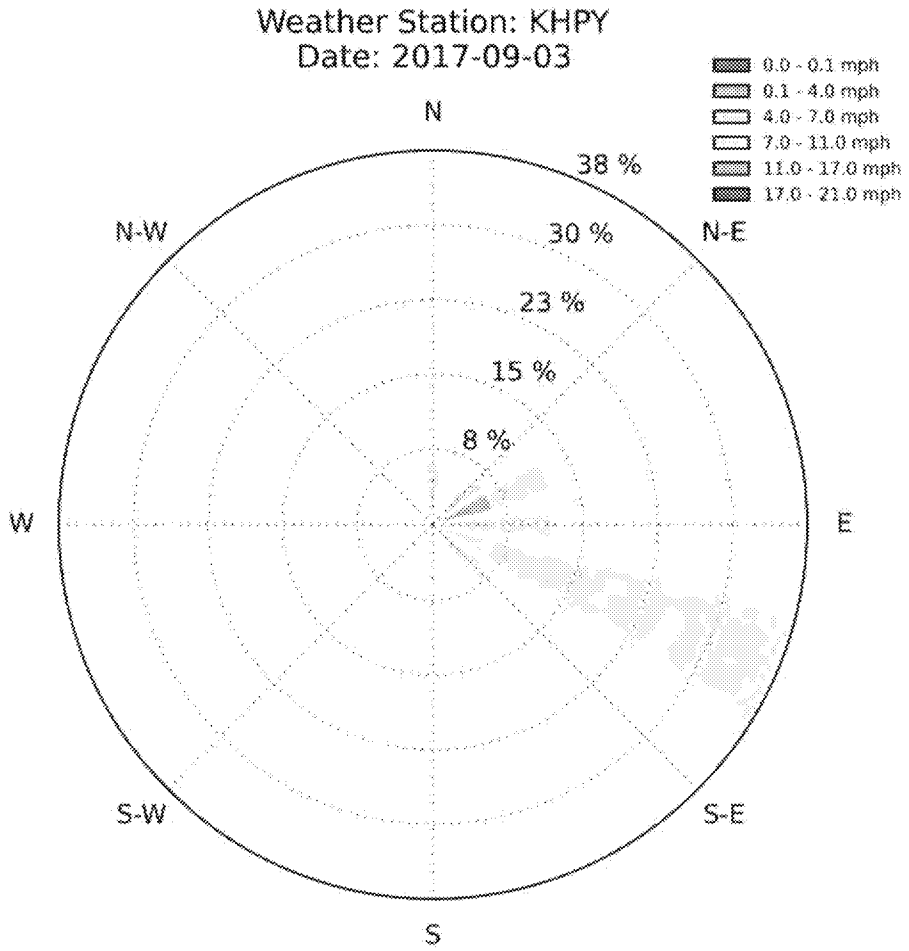
Last Updated: 9/4/2017 10:40:39 PM

Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-09-03
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
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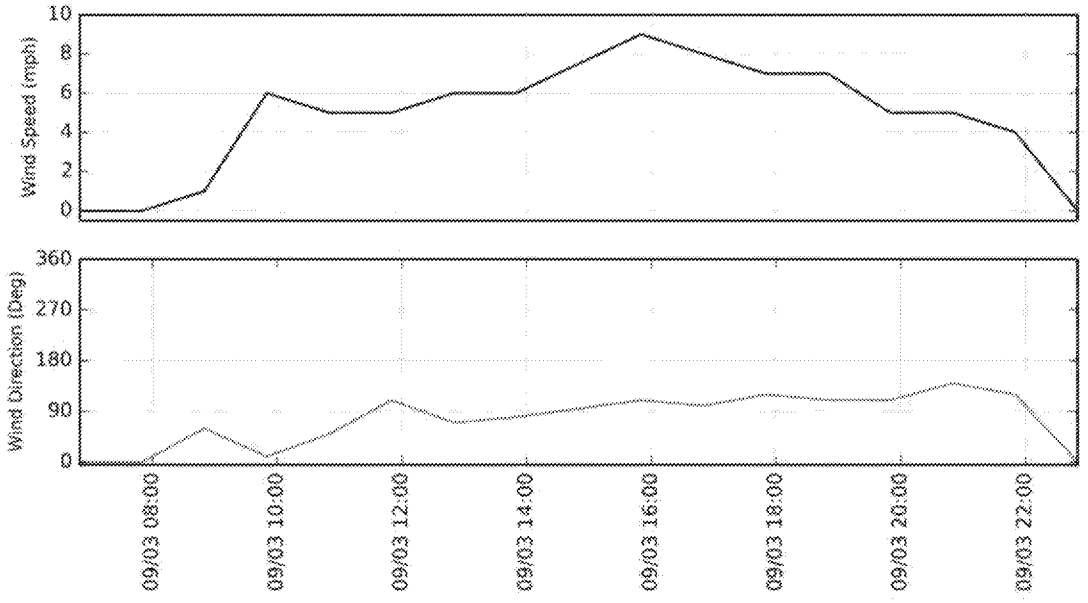
N-W
38 %
30 %
23 %
15 %
8 %


Wind Speed (mph)
10
8
6
4
2
0
Wind Direction (Deg)
360
270
180
90
0
09/03 08:00
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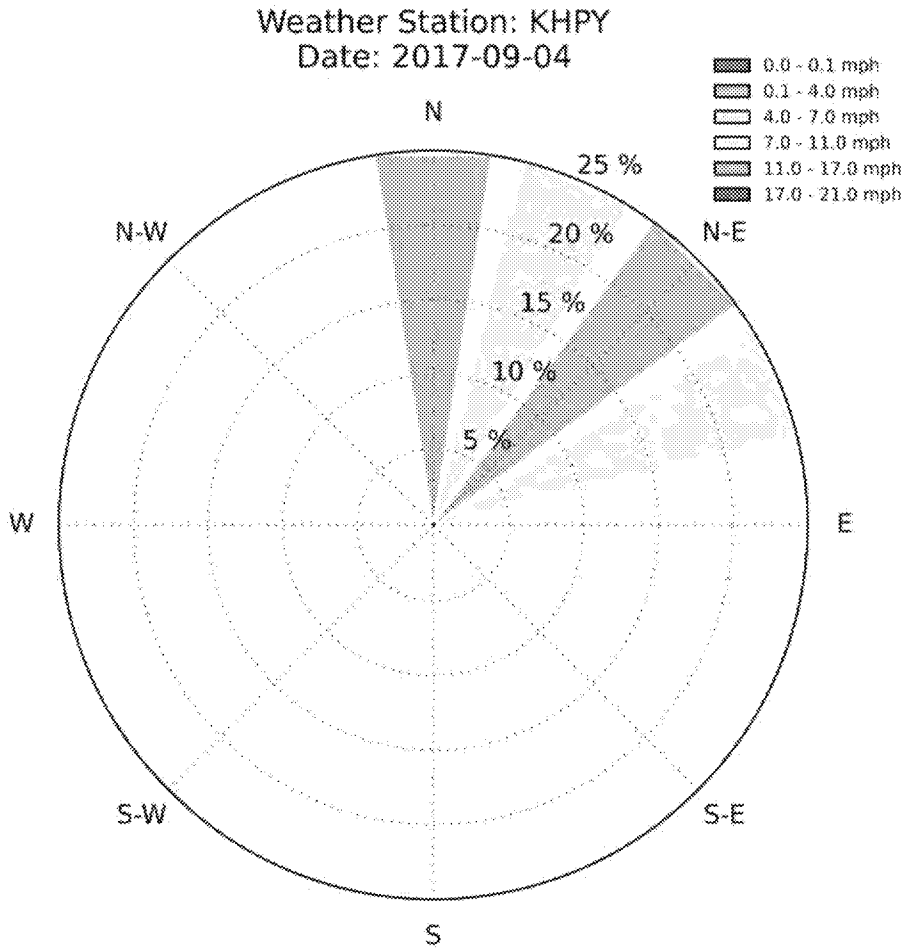
09/03 16:00
09/03 18:00
09/03 20:00
09/03 22:00

CTEH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Date: 2017-09-04
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
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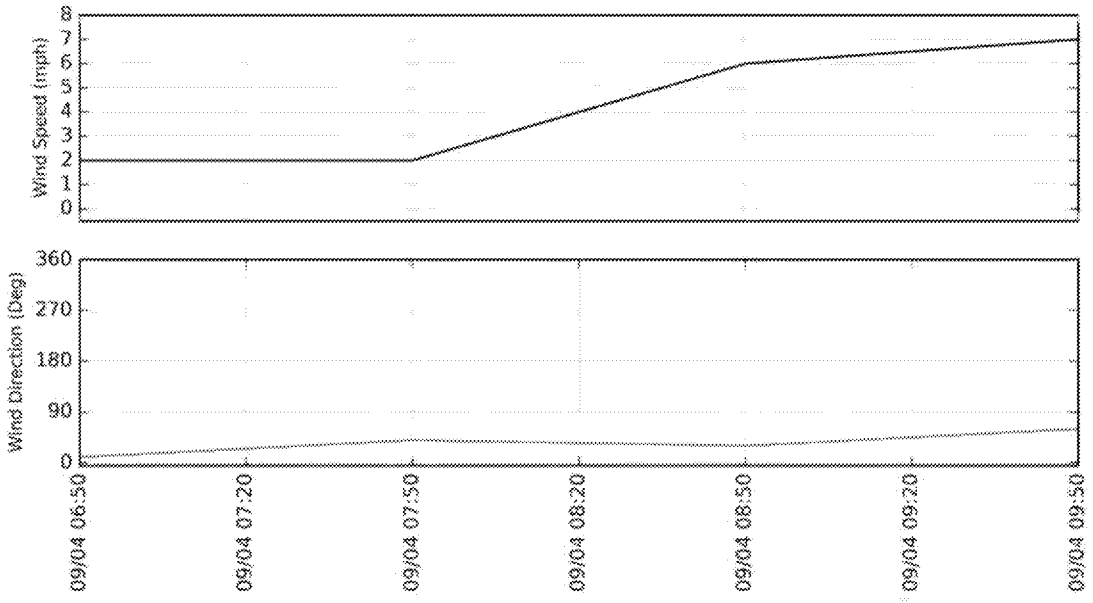
W
N-W
25 %
20 %
15 %
10 %
5 %


Wind Speed (mph)
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1
2
3
4
5
6
7
8
Wind Direction (Deg)
0
90
180
270
360
09/04 06:50
09/04 07:20
09/04 07:50
09/04 08:20
09/04 08:50
09/04 09:20
09/04 09:50

CTEH

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 5, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 3, 2017 to 06:00 on September 4, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for benzene, carbon monoxide, oxygen (O_2), sulfur dioxide (SO_2), and volatile organic compounds (VOCs) using RAE Systems UltraRAE and MultiRAE instruments. Additionally, particulate matter ($PM_{2.5}$) was assessed using DustTraks, and AM510s. **Table 1** summarizes the data for all real-time air monitoring readings recorded in the Crosby, TX Community from 06:00 on September 3, 2017 through 06:00 on September 4, 2017 and Table 2 summarizes the Worker Activity real-time air monitoring readings from within the site boundary for the same period. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Community Real-time Handheld Air Monitoring Readings
06:00 September 4, 2017 – 06:00 September 5, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	1	0	< 0.025 ppm
CO	MultiRAE	5	0	< 1.0 ppm
$PM_{2.5}$	AM510	151	151	0.012 - 0.408 mg/m^3
	Dusttrak	26	26	0.023 - 0.047 mg/m^3
SO_2	MultiRAE	7	0	< 0.1 ppm
VOCs	MultiRAE	173	0	< 0.1 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

Table 2 Worker Activity Real-time Handheld Air Monitoring Readings
06:00 September 4, 2017 – 06:00 September 5, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
O_2	MultiRAE	1	1	20.9 %
VOCs	MultiRAE	13	4	0.7 - 2.4 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

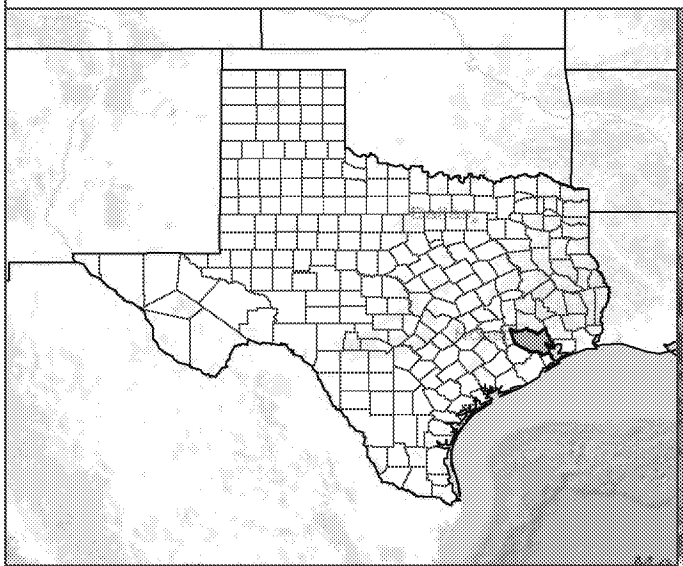
CTEH

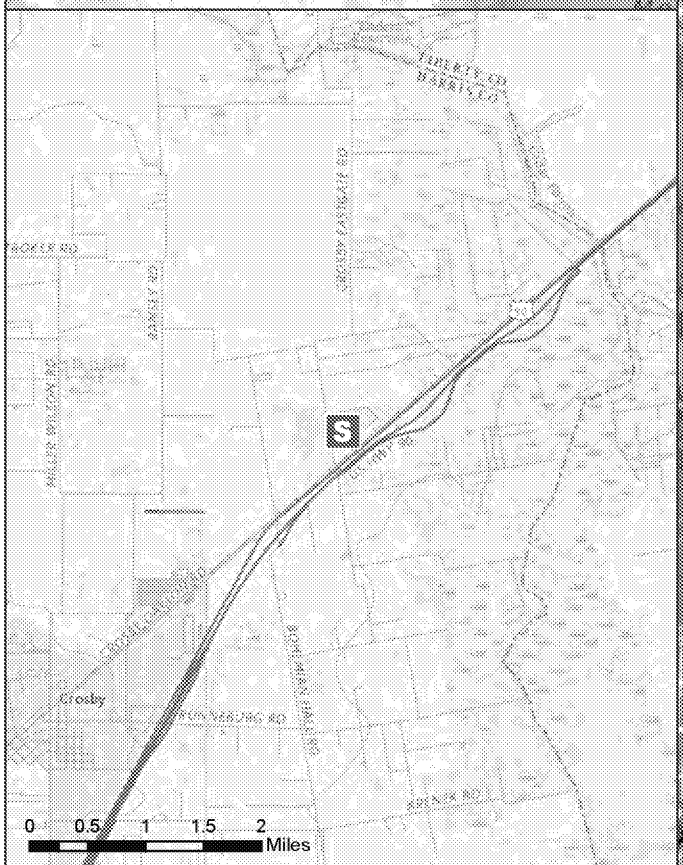
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/5/2017 2:25:53 PM*

Attachment B

Handheld Real-time Air Monitoring Locations

CTEH

CTEH

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

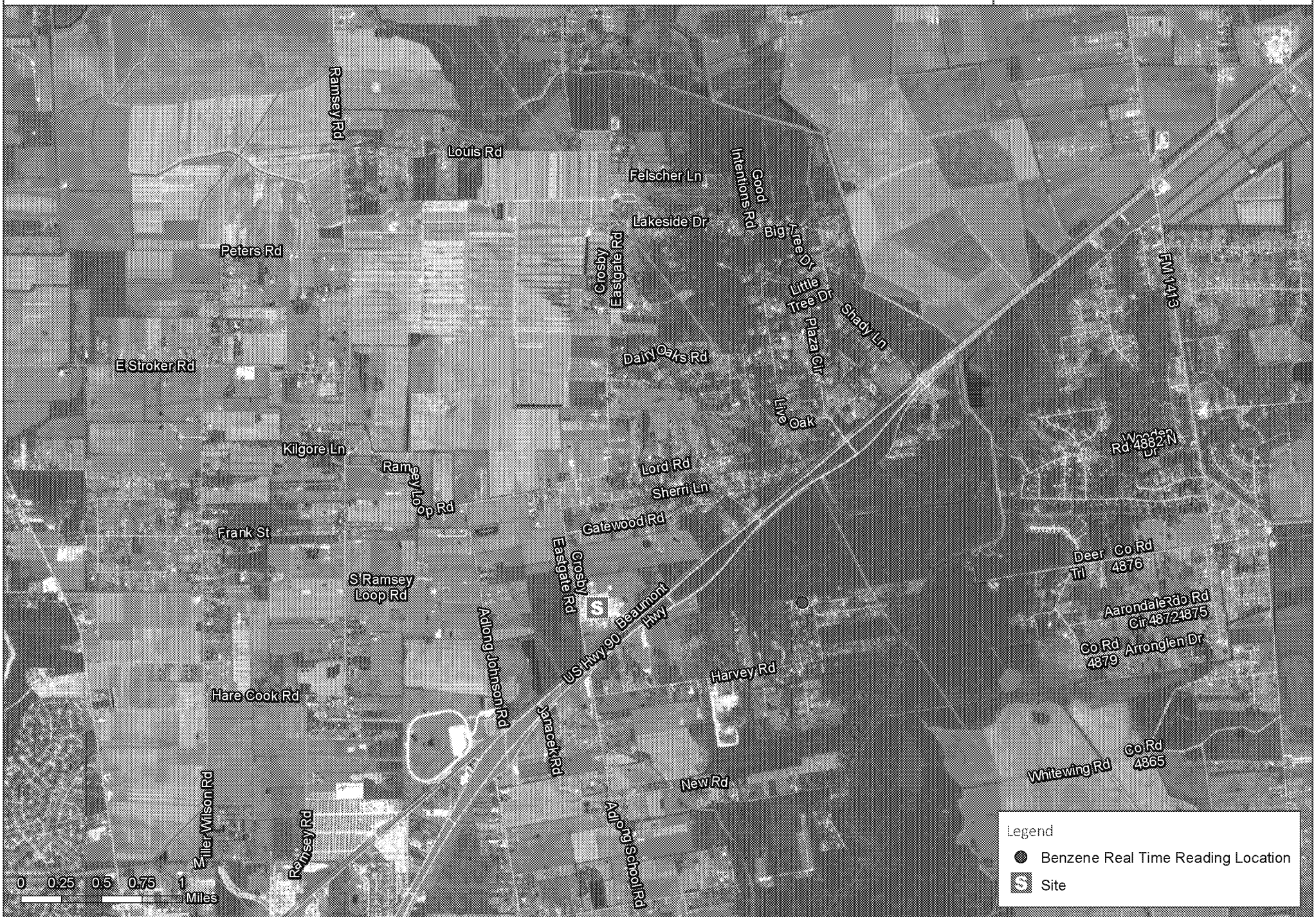
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/5/2017 12:53:17 PM

Benzene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/5/2017 2:22:56 PM

Carbon Monoxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/5/2017 2:11:39 PM

CTEH

Oxygen Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

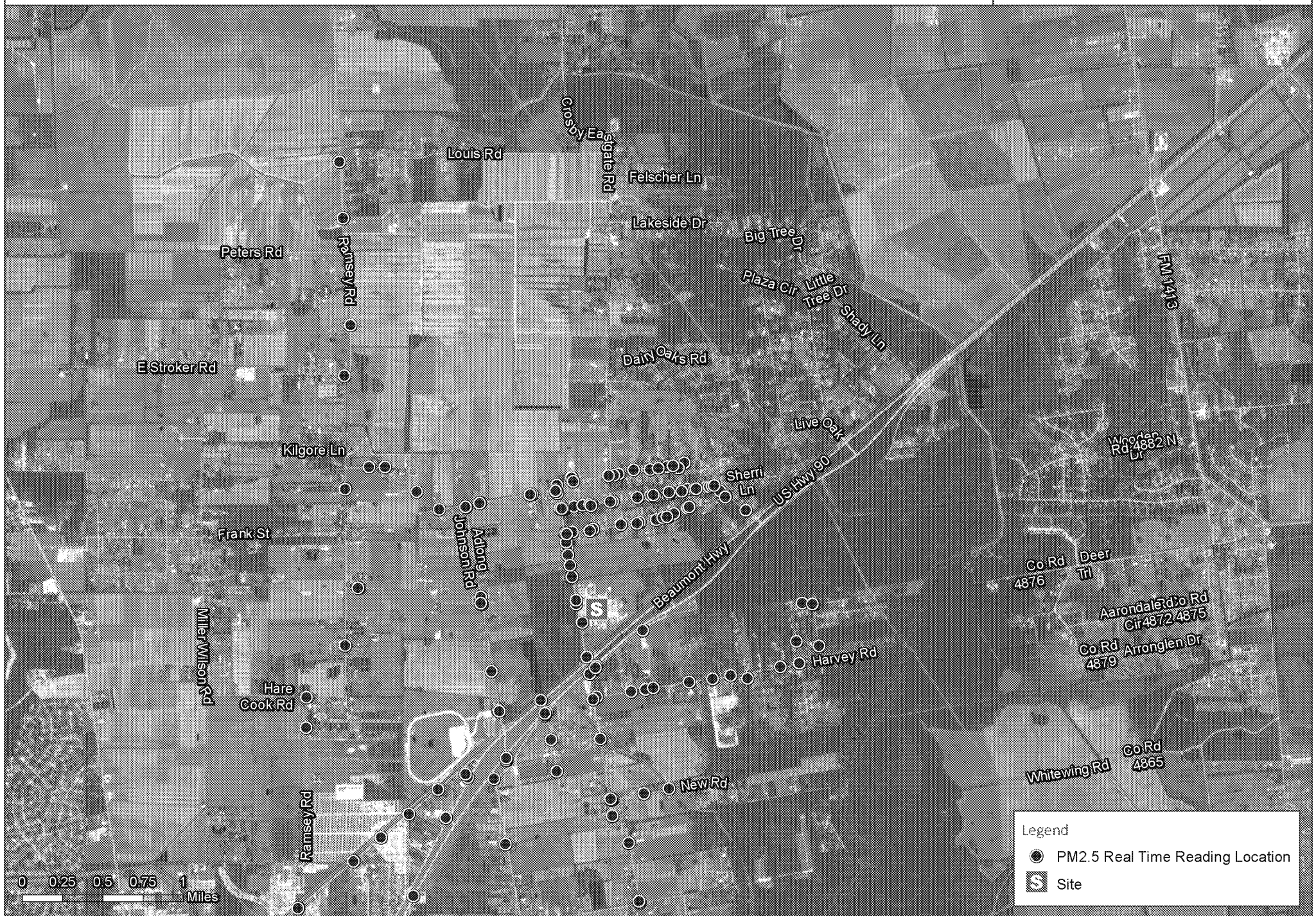
Last Updated: 9/5/2017 7:28:40 PM

CTEH

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

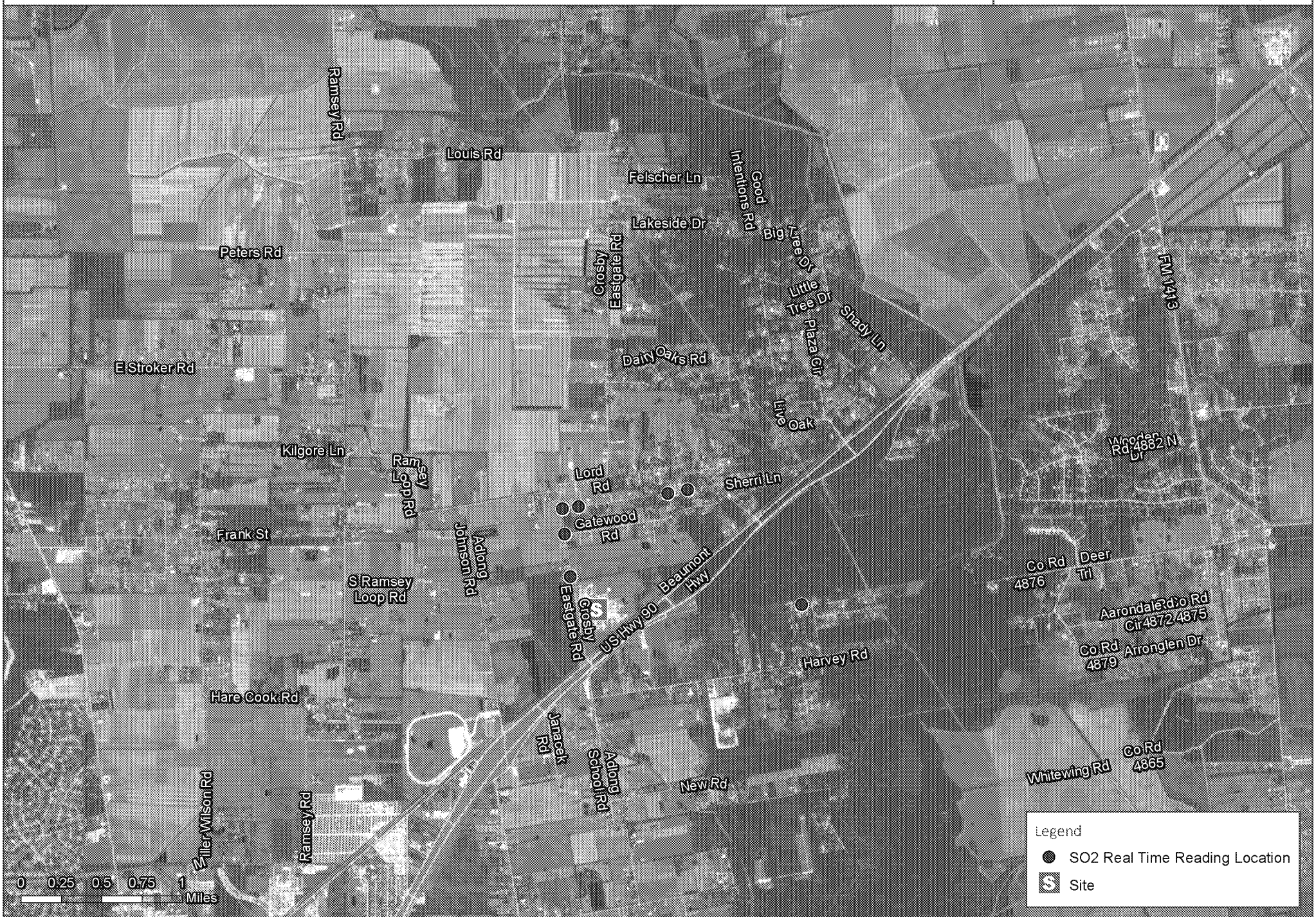
Last Updated: 9/5/2017 12:58:35 PM

CTEH

Sulfur Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



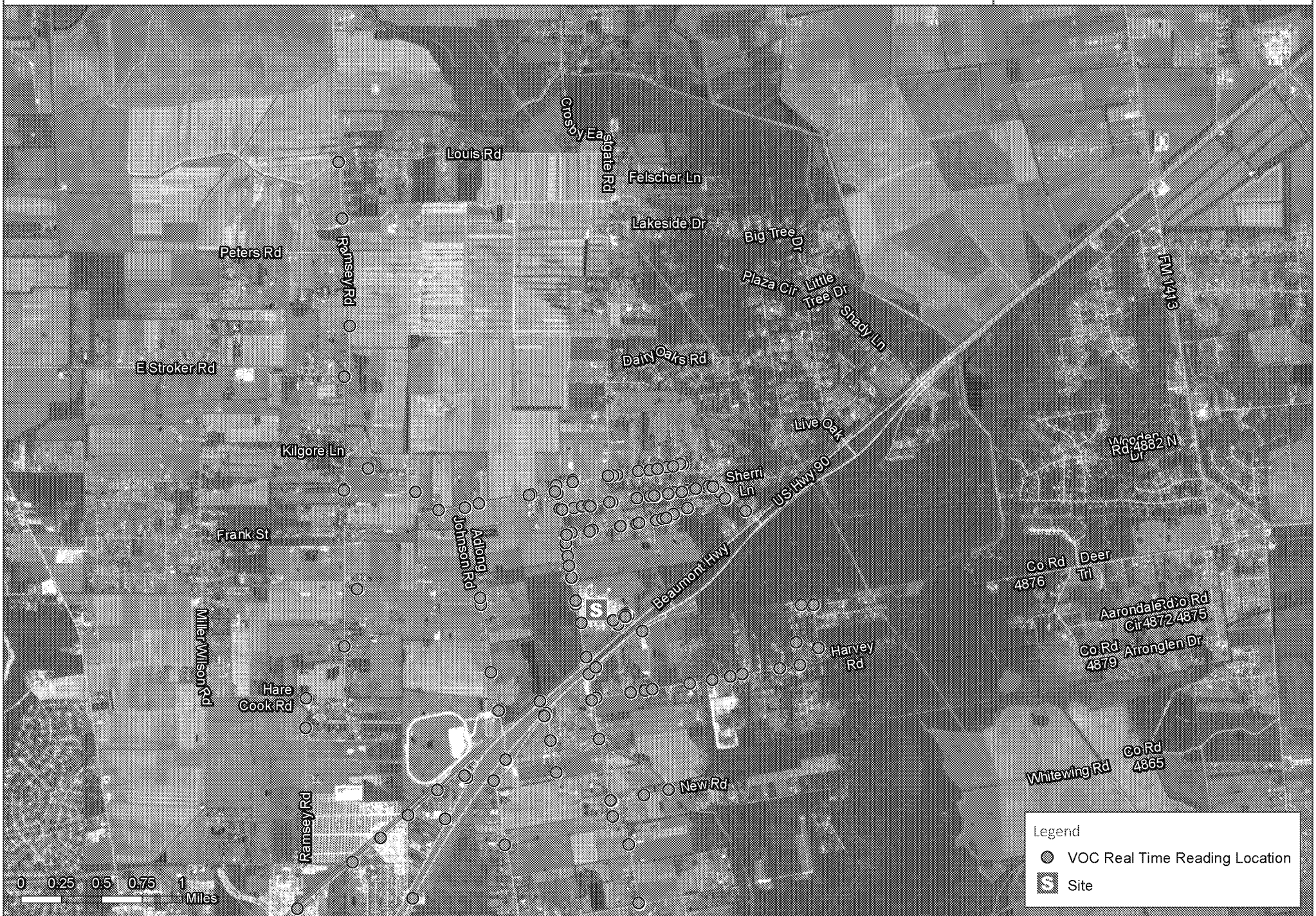
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/5/2017 1:01:55 PM

VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 4, 2017 to 06:00 September 5, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/5/2017 12:53:49 PM

Attachment C

Map of Analytical Air Sampling Locations

CTEH

CTEH

Analytical Air Monitoring Station Locations as of September 5, 2017

Harvey Response

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

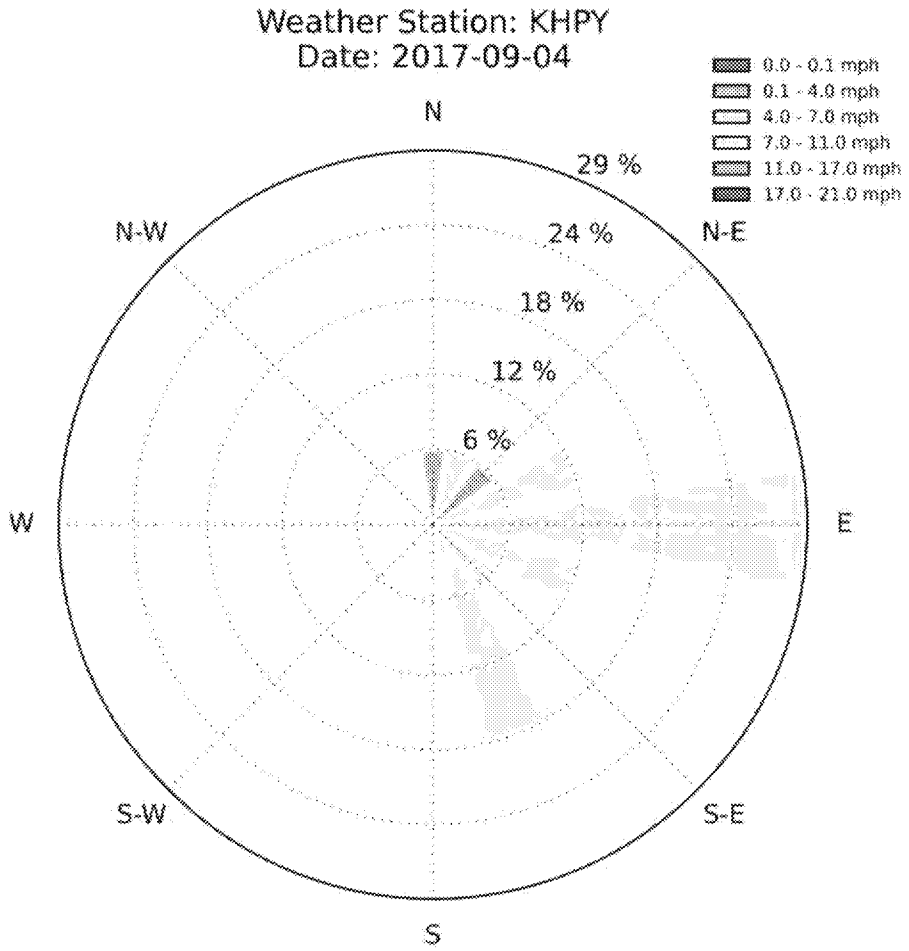
Last Updated: 9/5/2017 8:49:04 PM

Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-09-04
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
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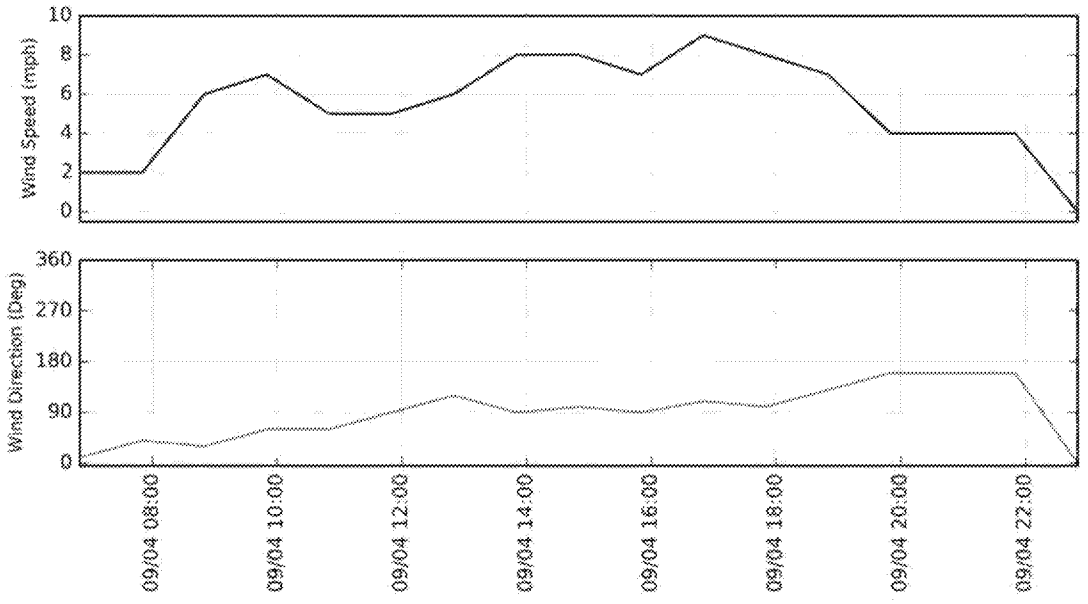
N-W
29 %
24 %
18 %
12 %
6 %


Wind Speed (mph)
10
8
6
4
2
0
Wind Direction (Deg)
360
270
180
90
0
09/04 08:00
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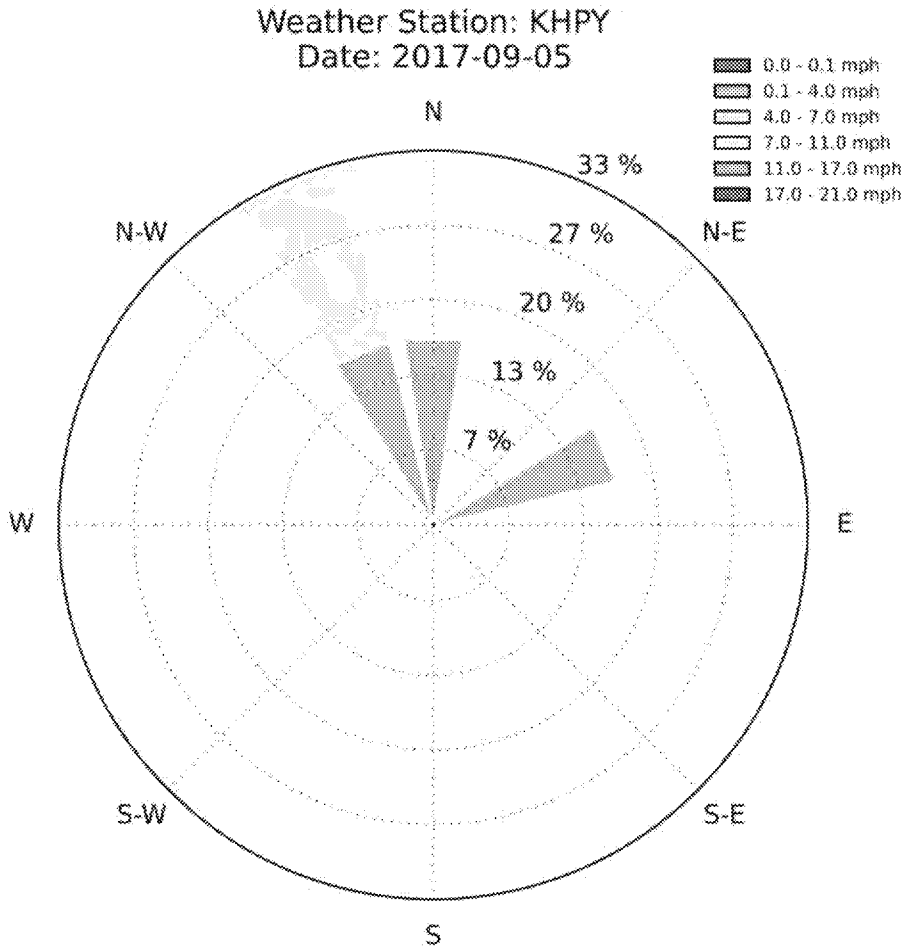
09/04 12:00
09/04 14:00
09/04 16:00
09/04 18:00
09/04 20:00
09/04 22:00

CTEH


Weather Station: KHPY
Date: 2017-09-05
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
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E
S-E
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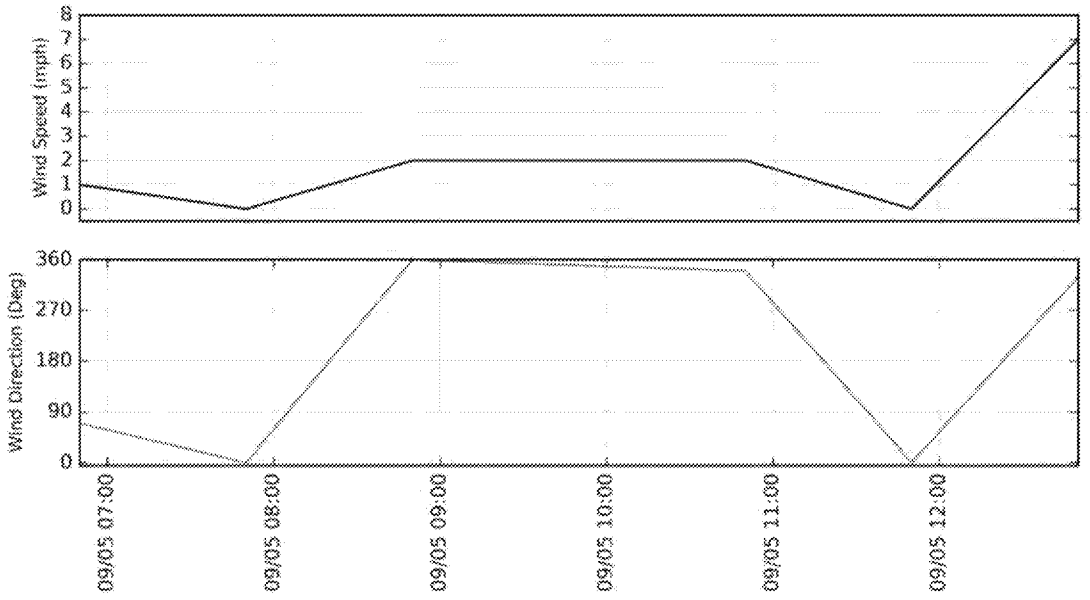
S-W
W
N-W
33 %
27 %
20 %
13 %
7 %


Wind Speed (mph)
0
1
2
3
4
5
6
7
8
Wind Direction (Deg)
0
90
180
270
360
09/05 07:00
09/05 08:00
09/05 09:00
09/05 10:00
09/05 11:00
09/05 12:00

CTEH

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 6, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 5, 2017 to 06:00 on September 6, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for carbon monoxide (CO), lower explosive limit (LEL), oxygen (O_2), and volatile organic compounds (VOCs) using RAE Systems UltraRAE and MultiRAE instruments. Additionally, particulate matter ($PM_{2.5}$) was assessed using DustTraks, and AM510s. **Table 1** summarizes the data for all real-time air monitoring readings recorded in the Crosby, TX Community from 06:00 on September 5, 2017 through 06:00 on September 6, 2017 and Table 2 summarizes the Worker Activity real-time air monitoring readings from within the site boundary for the same period. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Community Real-time Handheld Air Monitoring Readings
06:00 September 5, 2017 – 06:00 September 6, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
CO	MultiRAE	2	0	< 1.0 ppm
$PM_{2.5}$	AM510	85	85	0.010 - 0.280 mg/m^3
VOCs	MultiRAE	84	0	< 0.1 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

Table 2 Worker Activity Real-time Handheld Air Monitoring Readings
06:00 September 5, 2017 – 06:00 September 6, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
LEL	MultiRAE	4	0	< 1.0 %
O_2	MultiRAE	1	1	20.9 - 21.2 %
VOCs	MultiRAE	77	4	0.4 - 0.9 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

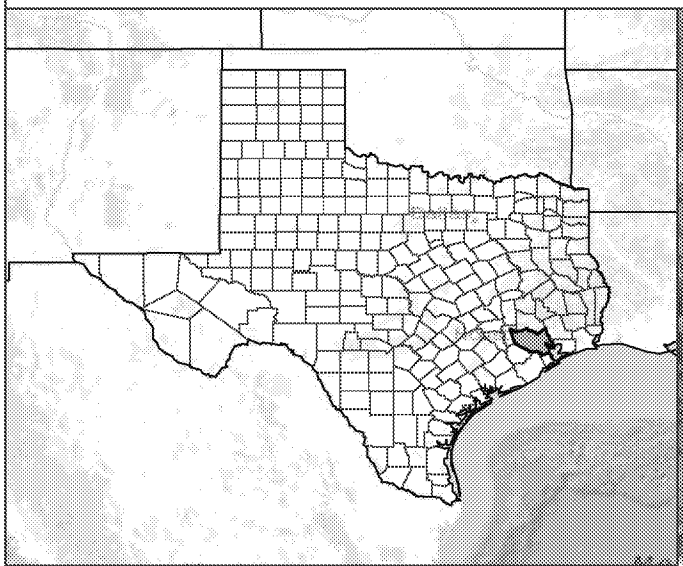
CTEH

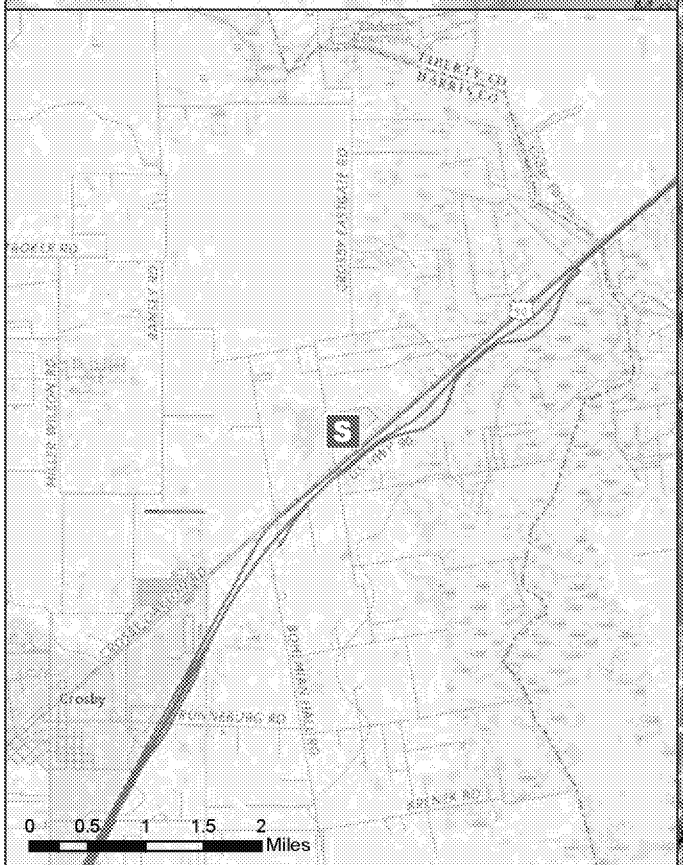
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/5/2017 2:25:53 PM*

Attachment B

Handheld Real-time Air Monitoring Locations

CTEH

CTEH

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

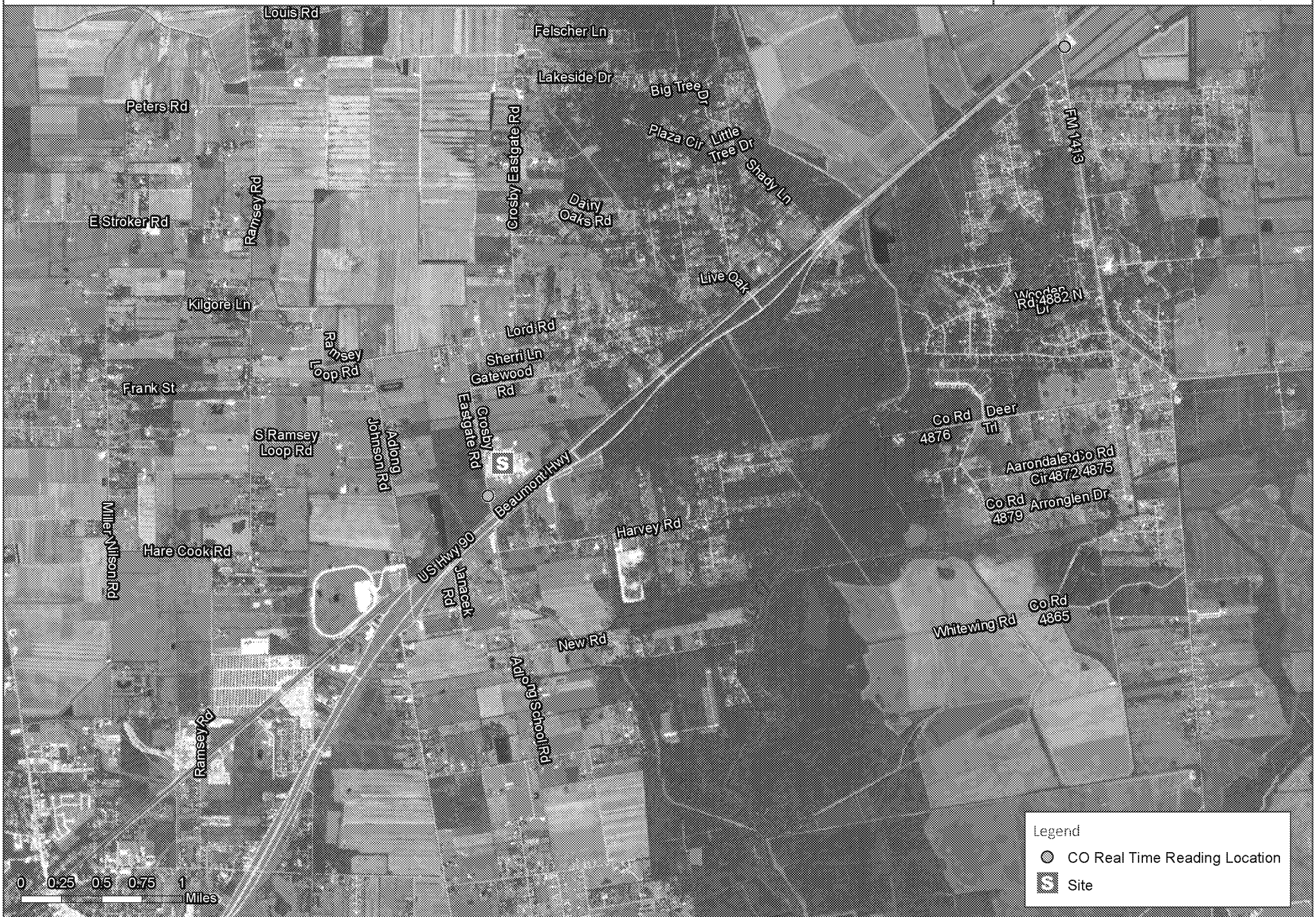
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/6/2017 6:38:55 PM

Community Carbon Monoxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/6/2017 4:04:03 PM

Community PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

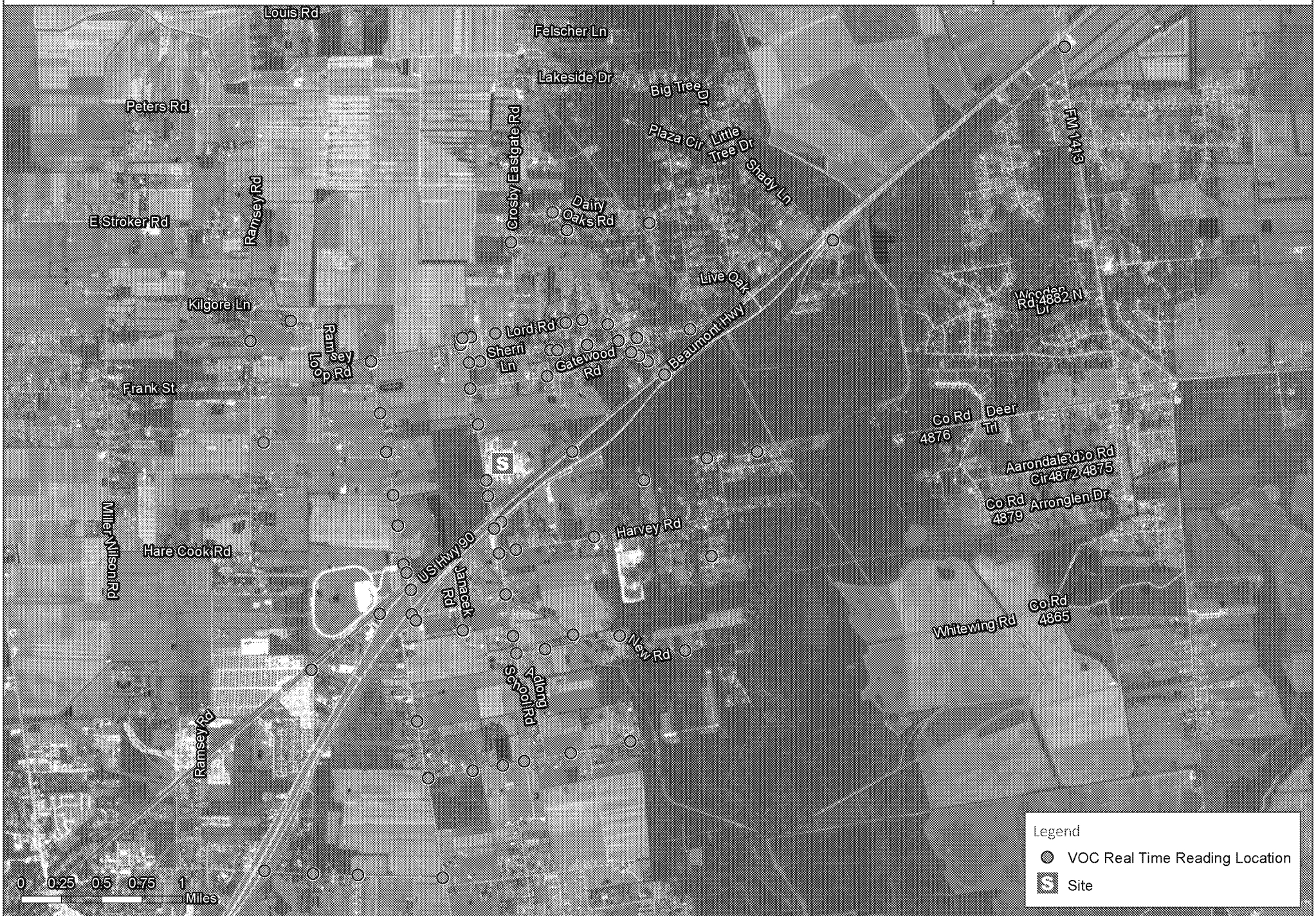
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/6/2017 4:02:16 PM

Community VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/6/2017 4:00:34 PM

CTEH

VOC Hand-held Real-time Reading Locations - Worker Activity

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

Last Updated: *9/7/2017 8:08:49 AM*

CTEH

LEL Hand-held Real-time Reading Locations - Worker Activity

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

Last Updated: *9/6/2017 1:39:01 PM*

CTEH

Oxygen Hand-held Real-time Reading Locations - Worker Activity

Harvey Response - 06:00 September 5, 2017 to 06:00 September 6, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

Last Updated: *9/6/2017 1:40:33 PM*

Attachment C

Map of Analytical Air Sampling Locations

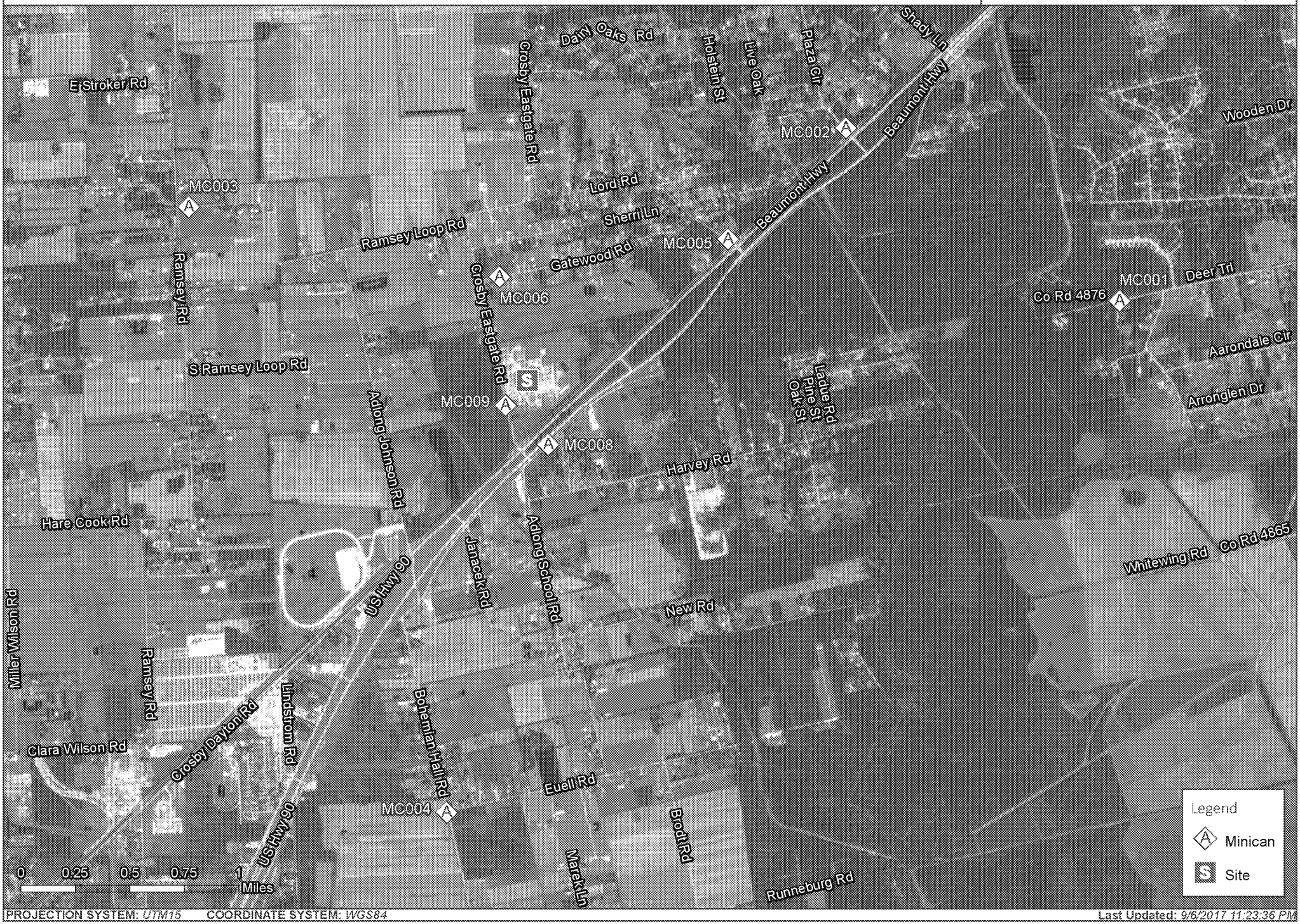
CTEH

CTEH

Analytical Air Monitoring Station Locations as of September 6, 2017

Harvey Response

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

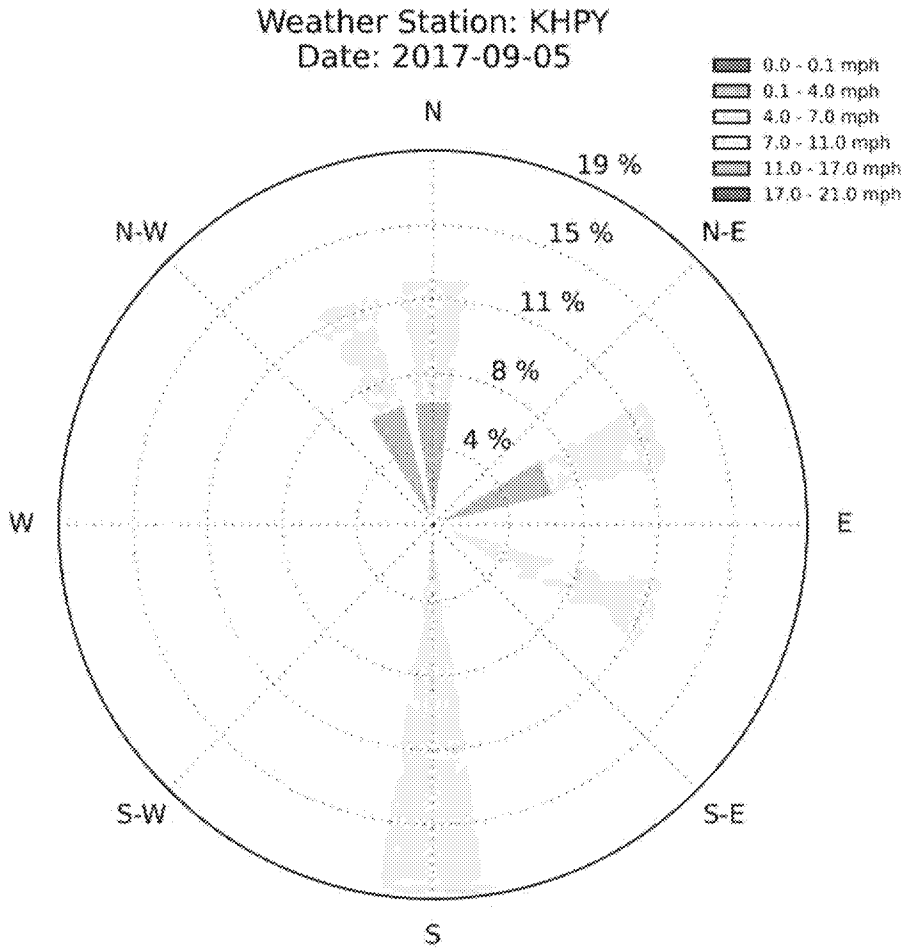
Last Updated: *9/6/2017 11:23:36 PM*

Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-09-05
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
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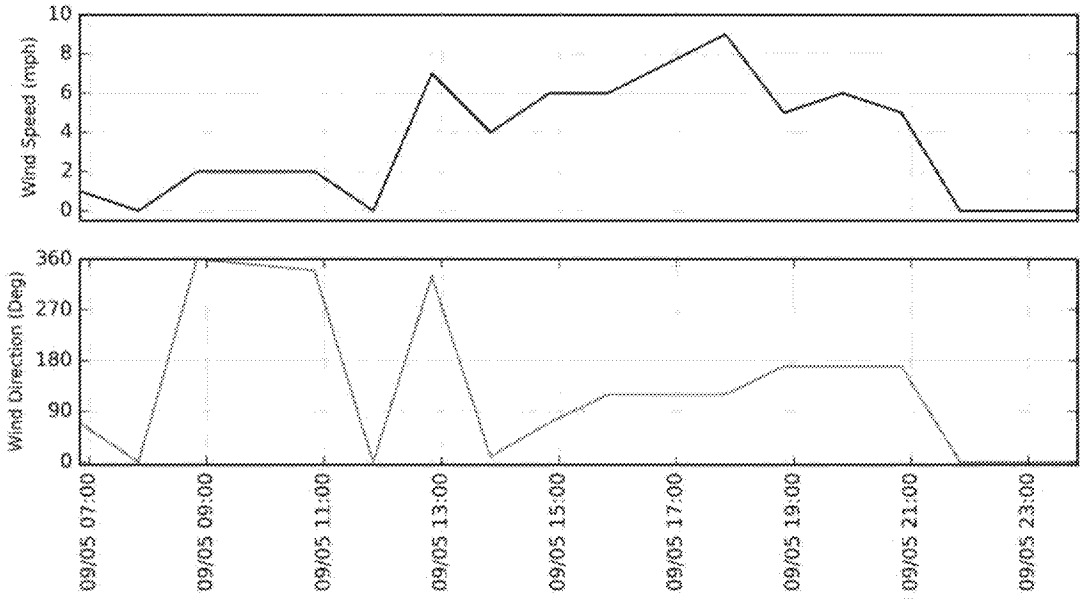
W
N-W
19 %
15 %
11 %
8 %
4 %


Wind Speed (mph)
10
8
6
4
2
0
Wind Direction (Deg)
360
270
180
90
0
09/05 07:00
09/05 09:00
09/05 11:00
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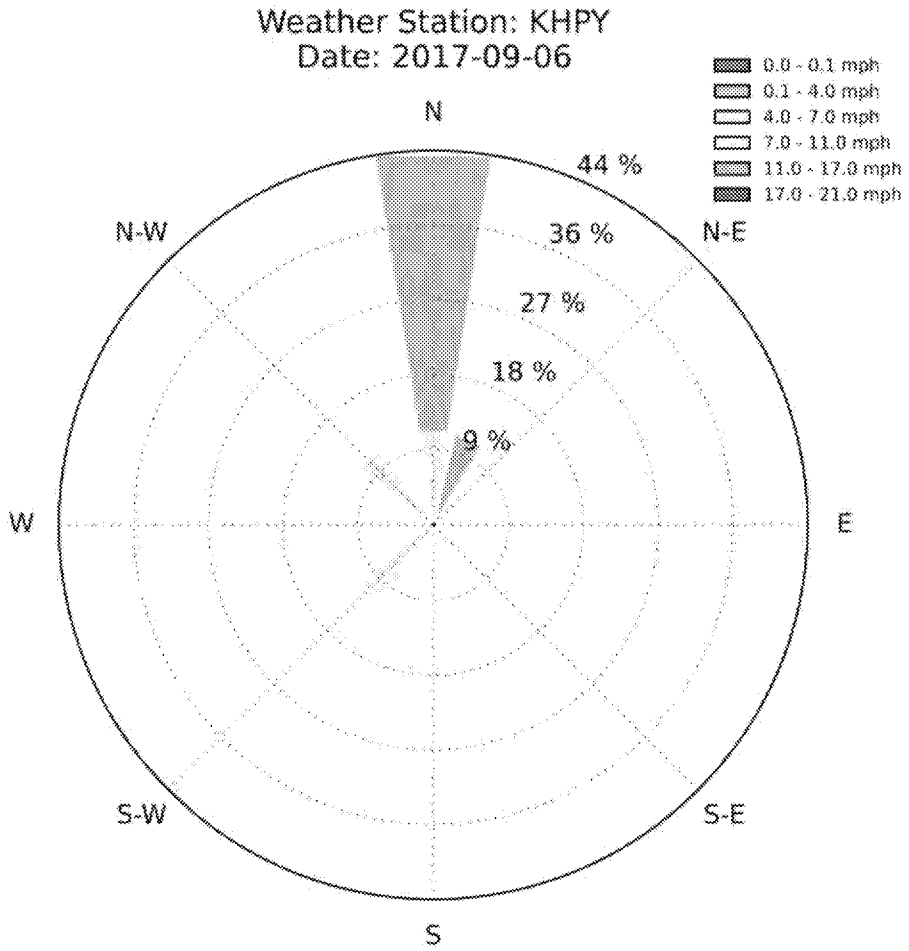
09/05 17:00
09/05 19:00
09/05 21:00
09/05 23:00

CTEH


Weather Station: KHPY
Date: 2017-09-06
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
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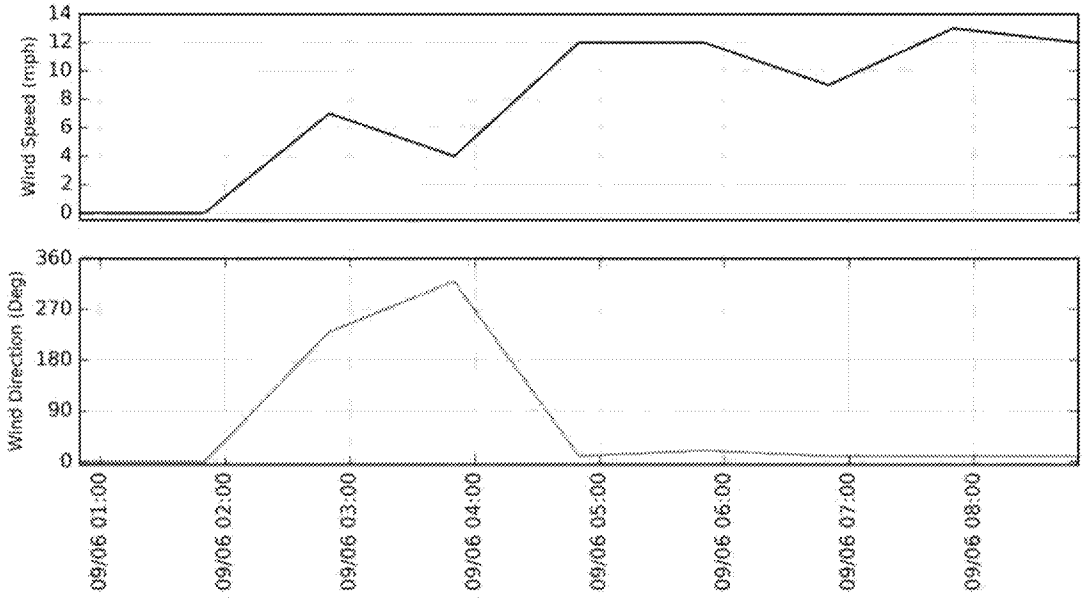
W
N-W
44 %
36 %
27 %
18 %
9 %


Wind Speed (mph)
0
2
4
6
8
10
12
14
Wind Direction (Deg)
0
90
180
270
360
09/06 01:00
09/06 02:00
09/06 03:00
09/06 04:00
09/06 05:00
09/06 06:00
09/06 07:00
09/06 08:00

CTEH

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 7, 2017

Project #109489 Summary

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 6, 2017 to 06:00 on September 7, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for oxygen (O_2) and volatile organic compounds (VOCs) using RAE Systems MultiRAE instruments. Additionally, particulate matter ($PM_{2.5}$) was assessed using TSI SidePak AM510s. **Table 1** summarizes the data for all real-time air monitoring readings recorded in the Crosby, TX Community from 06:00 on September 6, 2017 through 06:00 on September 7, 2017 and Table 2 summarizes the Worker Activity real-time air monitoring readings from within the site boundary for the same period. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Community Real-time Handheld Air Monitoring Readings
06:00 September 6, 2017 – 06:00 September 7, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
$PM_{2.5}$	AM510	85	85	0.012 - 0.320 mg/m^3
VOCs	MultiRAE	86	0	< 0.1 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

Table 2 Worker Activity Real-time Handheld Air Monitoring Readings
06:00 September 6, 2017 – 06:00 September 7, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
O_2	MultiRAE	13	13	20.9 %
VOCs	MultiRAE	51	2	0.4 - 3.3 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

Attachment A

Site Location Map

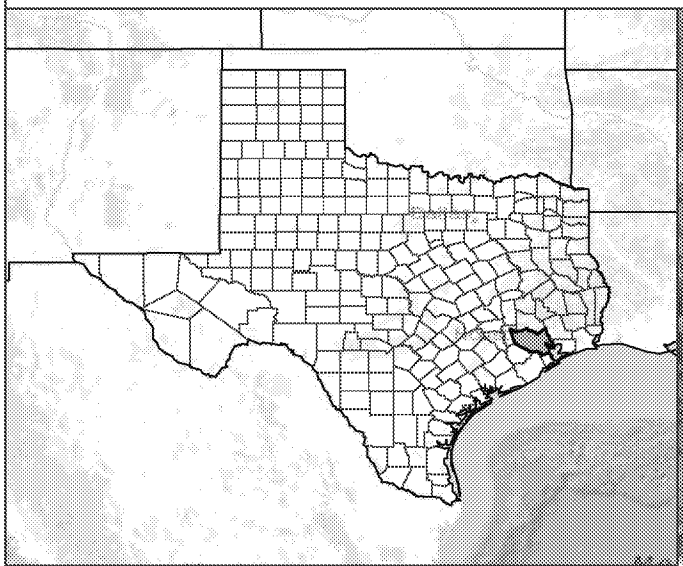
CTEH

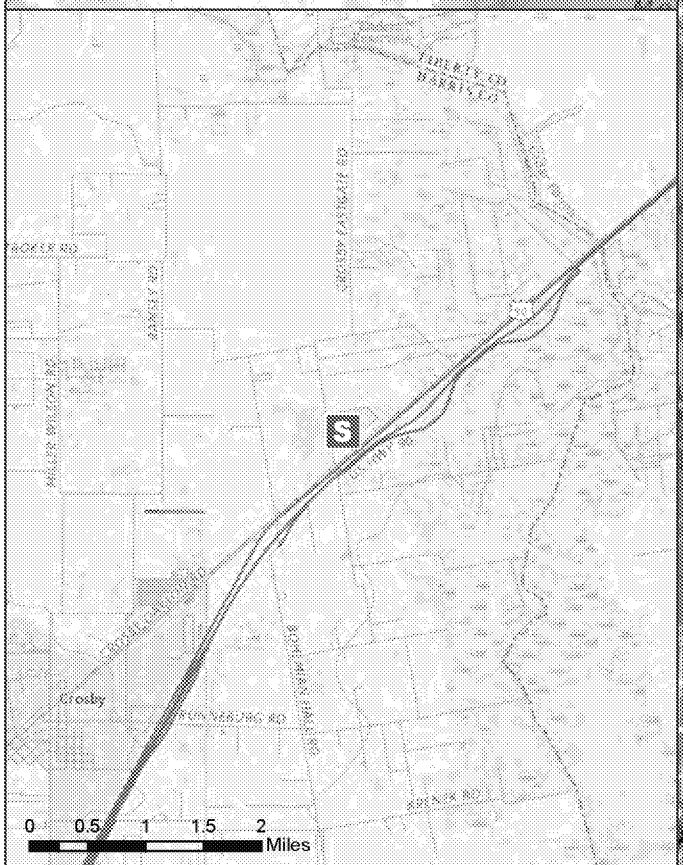
CTEH

Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris





PROJECTION SYSTEM: *Transverse Mercator* DATUM: *WGS 1984* LAST UPDATED: *9/5/2017 2:25:53 PM*

Attachment B

Handheld Real-time Air Monitoring Locations

CTEH

CTEH

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 6, 2017 to 06:00 September 7, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

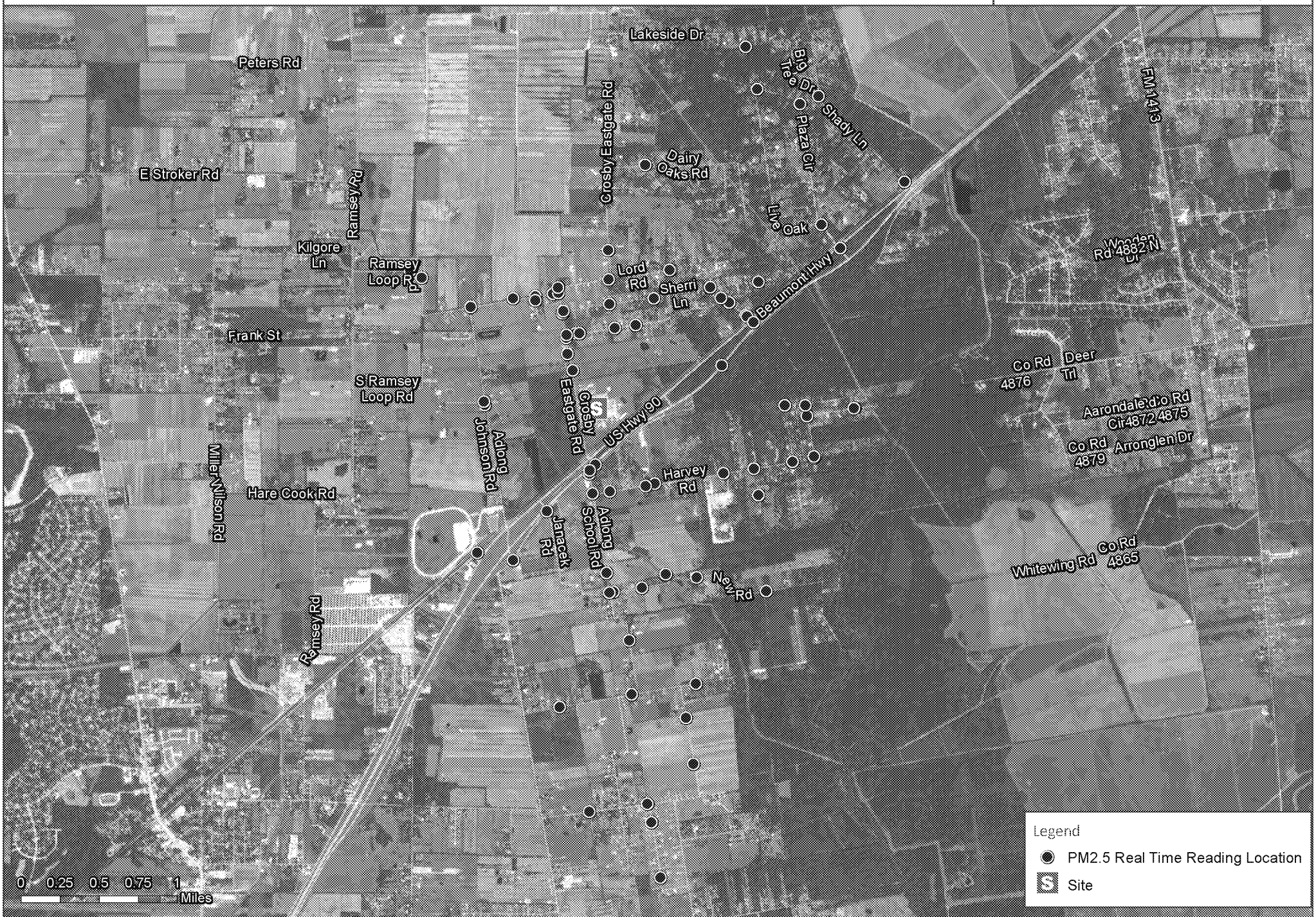
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/7/2017 5:52:15 PM

Community PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 6, 2017 to 06:00 September 7, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



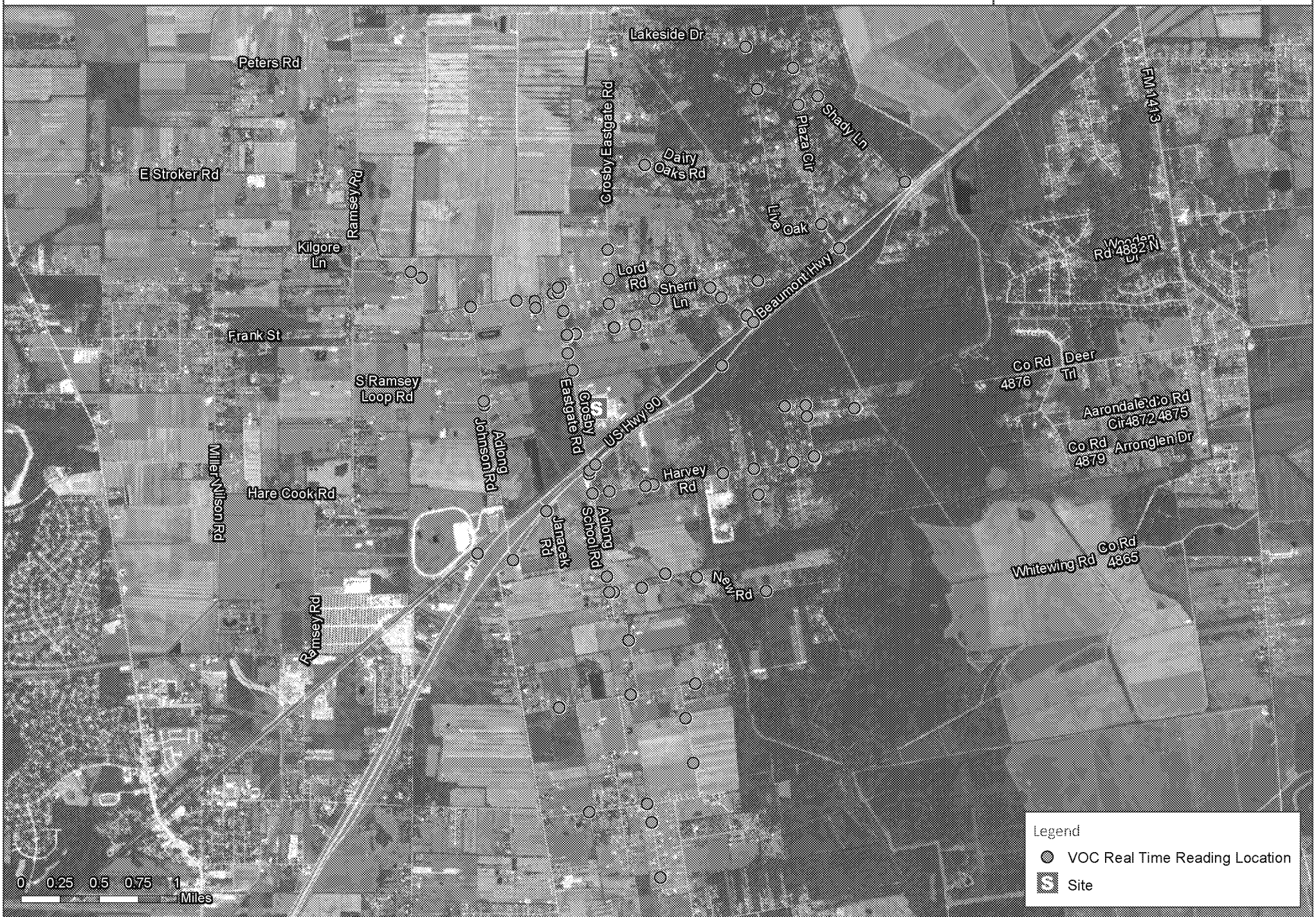
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/7/2017 6:07:01 PM

Community VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 6, 2017 to 06:00 September 7, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

Last Updated: 9/7/2017 6:07:13 PM

CTEH

Oxygen Hand-held Real-time Reading Locations - Worker Activity

Harvey Response - 06:00 September 6, 2017 to 06:00 September 7, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

Last Updated: *9/7/2017 6:29:25 PM*

CTEH

VOC Hand-held Real-time Reading Locations - Worker Activity

Harvey Response - 06:00 September 6, 2017 to 06:00 September 7, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

Last Updated: *9/7/2017 6:12:16 PM*

Attachment C

Map of Analytical Air Sampling Locations

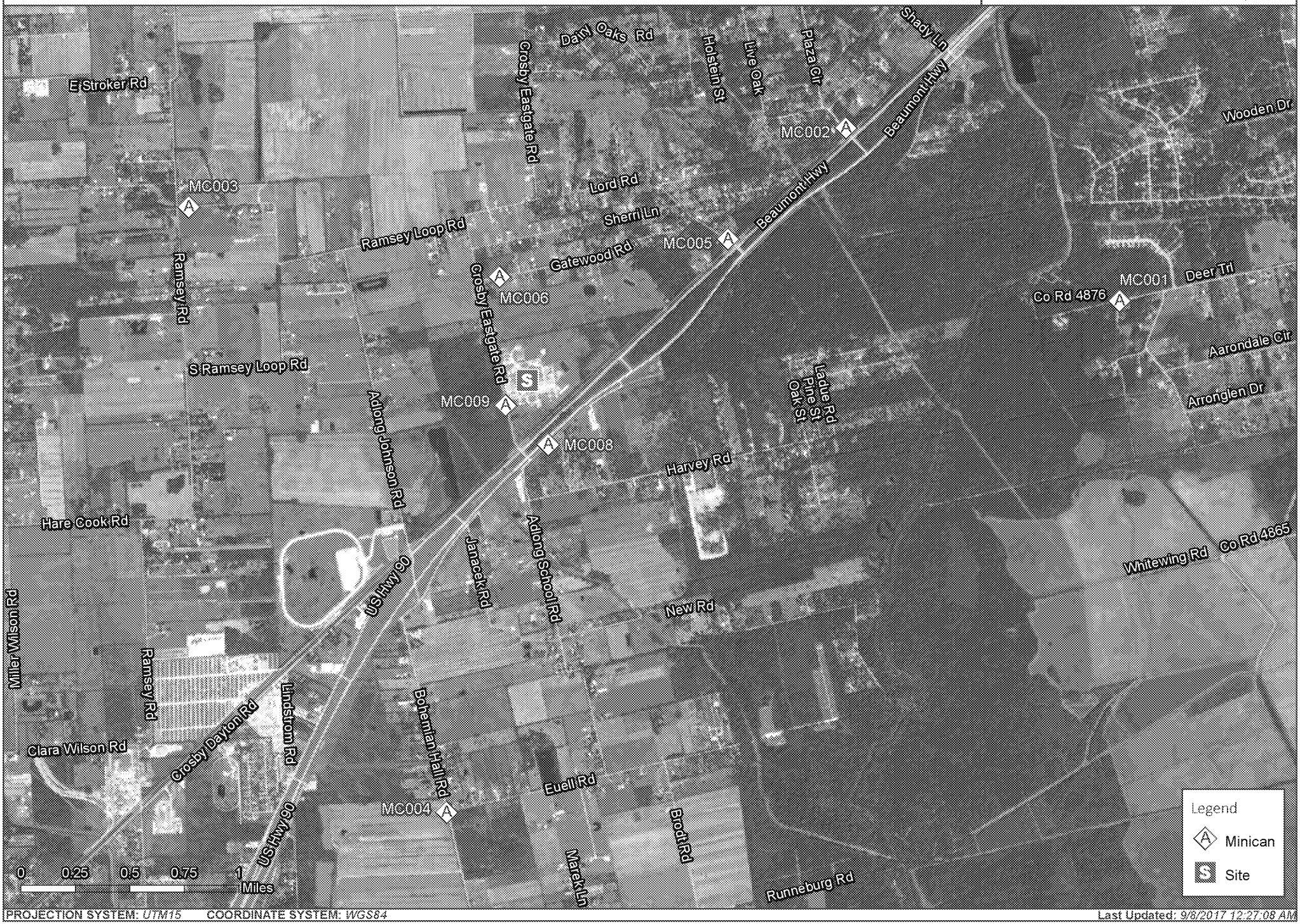
CTEH

CTEH

Analytical Air Monitoring Station Locations as of September 7, 2017

Harvey Response

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: *UTM15* COORDINATE SYSTEM: *WGS84*

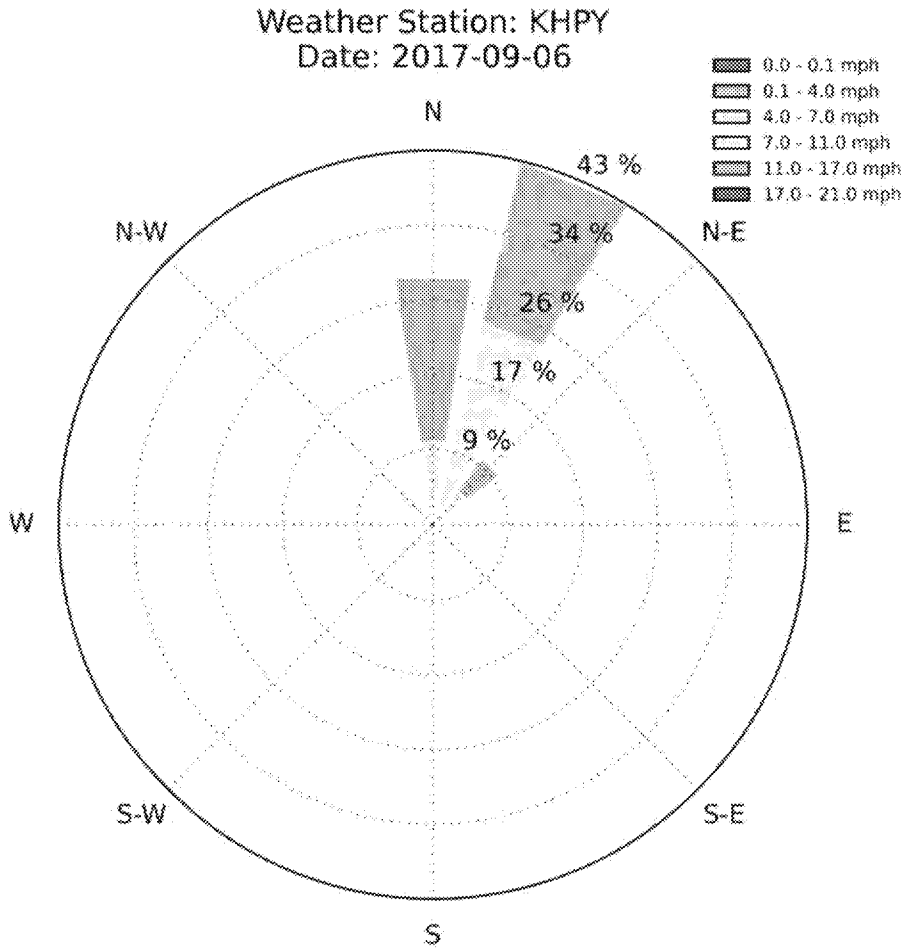
Last Updated: *9/8/2017 12:27:08 AM*

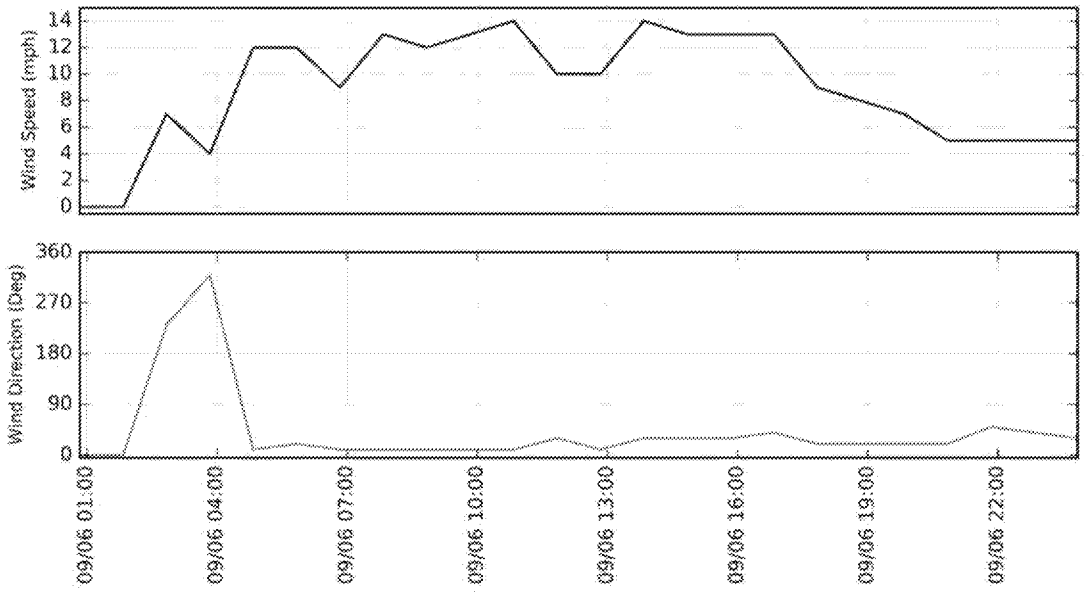
Attachment D

KHPY Windrose

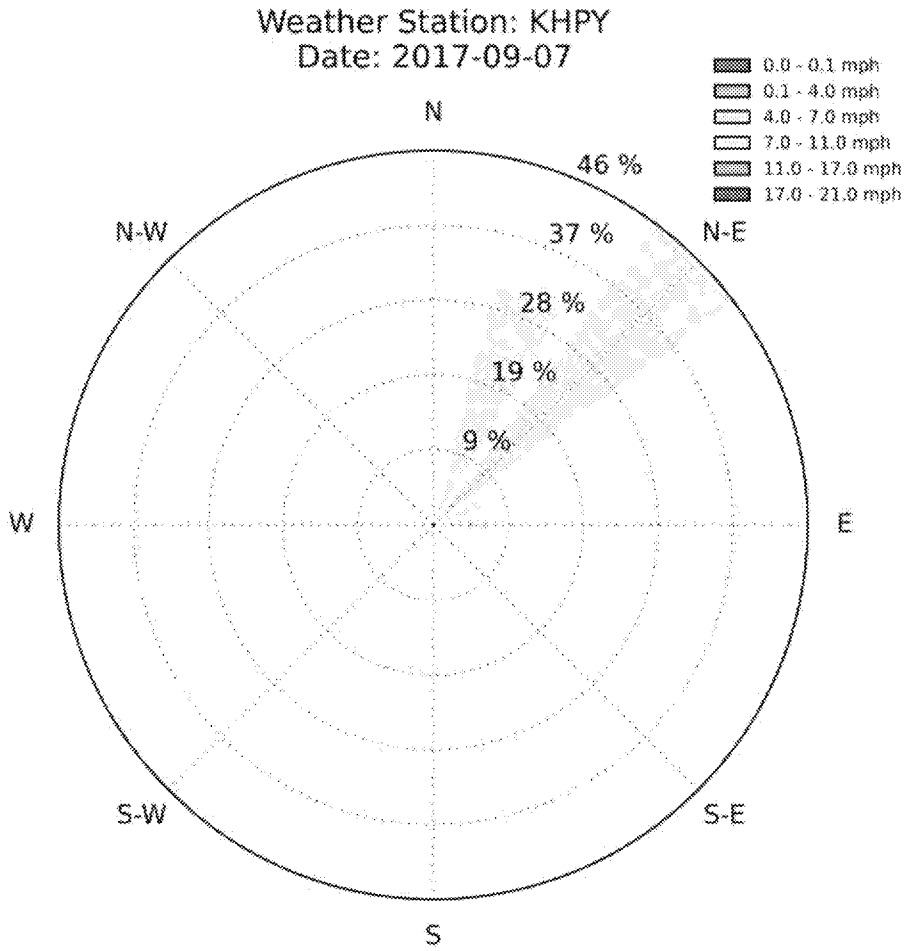
(Highland Park Airport - 12.5 miles SSE of Site)

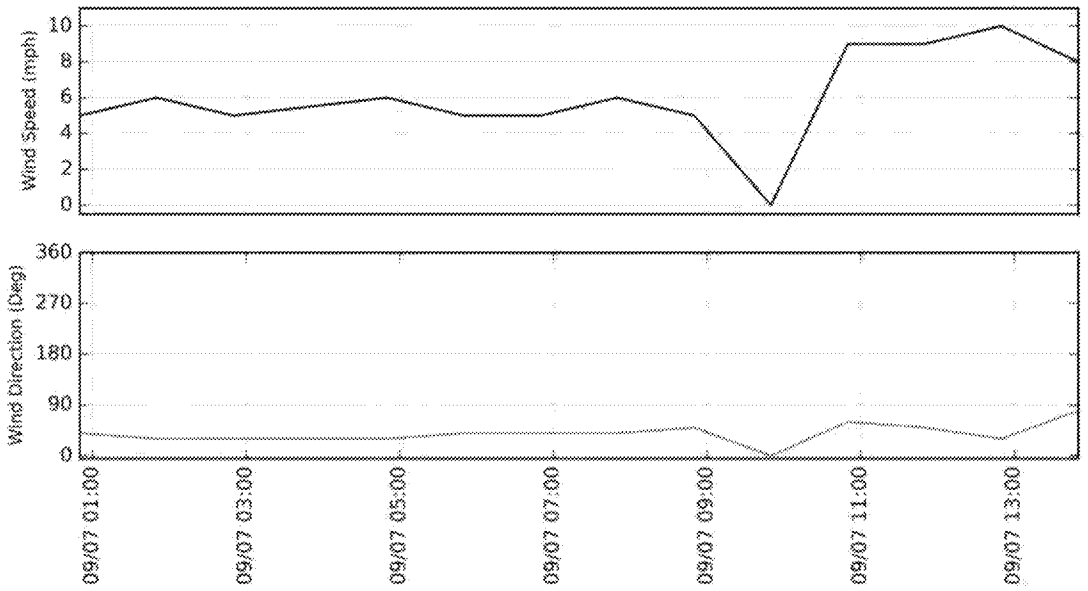
CTEH


Weather Station: KHPY
Date: 2017-09-06
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
43 %
34 %
26 %
17 %
9 %


Wind Speed (mph)
0
2
4
6
8
10
12
14
Wind Direction (Deg)
0
90
180
270
360
09/06 01:00
09/06 04:00
09/06 07:00
09/06 10:00
09/06 13:00
09/06 16:00
09/06 19:00
09/06 22:00

CTEH


Weather Station: KHPY
Date: 2017-09-07
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
46 %
37 %
28 %
19 %
9 %


Wind Speed (mph)
10
8
6
4
2
0
Wind Direction (Deg)
360
270
180
90
0
09/07 01:00
09/07 03:00
09/07 05:00
09/07 07:00
09/07 09:00
09/07 11:00
09/07 13:00

CTEH

CTEH CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Organic Peroxide Facility

Air Monitoring

Crosby, TX

Air Sampling and Analysis Plan

Version 1.3

Prepared On Behalf Of:

Arkema

Prepared By:

Center for Toxicology and Environmental Health, L.L.C.
5120 Northshore Drive
North Little Rock, AR 72118

9/8/2017

Version 1.2			
	Name/Organization	Signature	Date Signed
Prepared by:	Pablo Sanchez Soria, Ph.D. – Project Technical Director		9/8/17
Reviewed by:	Jamie Beck – Project Manager		
Reviewed by:			
Approved by:			
Approved by:			
Approved by			
Approved by			

Change from version 1.0 to 1.1			
Added SO_2 and NO_2 as target analytes. Corrected measuring range on MultiRAE Plus instruments.			
	Name/Organization	Signature	Date Signed
Prepared by:	Pablo Sanchez Soria		9/1/2017
Review by:			
Approved by:			
Approved by:			
Approved by			
Approved by			

Change from version 1.1 to 1.2			
Air Monitoring Plans for Worker Area and Site Characterization added			
	Name/Organization	Signature	Date Signed
Prepared by:	Pablo Sanchez Soria		9/5/2017
Review by:	Jamie Beck		
Approved by:			
Approved by:			
Approved by			

Change from version 1.2 to 1.3			
Added carbon monoxide as a target analyte for Work Area Monitoring due to the heavy presence of generators throughout the facility			
	Name/Organization	Signature	Date Signed
Prepared by:	Pablo Sanchez Soria		9/8/2017
Review by:	Jamie Beck		
Approved by:			
Approved by:			

Air Monitoring and Sampling Strategy

CTEH® is focusing on the chemicals chosen below because they are among the most important and readily monitored hazards of this response. The possible hazards of this response vary by the source and type of the chemical as well as with the environmental conditions associated with the release. Monitoring and sampling for some chemicals or indicators of the presence of this response may be conducted less frequently or even discontinued as product-specific information becomes available or as initial monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly defined monitoring plans: **1)** Worker Monitoring **2)** Site Characterization and **3)** Community Monitoring. Workers may be designated as the individuals actively or sporadically involved in remediation and/or normal work activities within a Work Area generally with established site control zones (exclusion zone, contaminant reduction zone, support zone) where remediation activities are taking place. Site Characterization may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. worst case determination, container head space, etc.) rather than monitoring for potential breathing zone exposures. Community Monitoring may take place in those residential and commercial locations surrounding the incident site, not necessarily currently occupied by members of the community.

Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release, and site conditions.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers (personal sampling) to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH Site-Specific Action Levels

CTEH® site-specific action levels may be employed in all air monitoring plans to provide information for corrective action to limit potential exposures. These values do not replace occupational or community exposure standards or guidelines, but are intended to represent a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practice may be assessed and then altered if necessary. Site-Specific Action Levels are not utilized for Site Assessment monitoring.

Plan 1: Worker Monitoring

Objective: Report air levels before they reach those requiring respiratory protection

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	30 ppm sustained for 5 min.	Assess for the presence of benzene/toluene/hexane, Report reading to Site Management	To avoid over exposure to benzene/toluene/ hexane	MultiRAE AreaRAE	0.1 ppm	MultiRAE and AreaRAE Range: 0-5,000 ppm	NA
Benzene	2.5 ppm sustained for 5 min.	Sample as requested. Exit Area or don air purifying respirator; Report reading to Site Management or IC	ACGIH STEL Action level	UltraRAE	0.05 ppm	Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1 – 65 ppm Volume: Variable	Var.
				MR Pro Sensor	0.1 ppm	Range: 0 – 100 ppm	NA
				Gastec tube #4LL	0.1 ppm	Range: 0.25 – 120 ppm Volume: Variable	Var.
Oxygen	<19.5%	Egress site or don supplied air respirator	Oxygen Deficient Atmosphere, as defined by OSHA	MultiRAE	0.1%	Range 0 – 30%	NA
Carbon Dioxide	5000 ppm sustained for 5 min	Egress site or don supplied air respirator	ACGIH TLV TWA	MultiRAE Sensor	100 ppm	Range 0 – 50,000 ppm	NA
LEL	10%	Egress site and report reading to site management	Industry Standard	MultiRAE, AreaRAE	1%	Range 0 – 100%	NA
Sulfur Dioxide	0.25 ppm sustained for 15 min	Sample as requested. Don full-face APR	ACGIH TLV TWA	MultiRAE sensor	0.1 ppm	Range 0 – 20 ppm	NA
Carbon Monoxide	25 ppm sustained for 15 minutes	Egress site and report reading to site management	ACGIH TLV TWA	MultiRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA

Plan 2: Site Characterization Monitoring

Objective: Characterize nature and extent of release (Non-breathing zone, i.e. headspace monitoring; excavation/trench monitoring, etc. As requested)

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	NA	Report reading to Site Management	NA	MultiRAE, AreaRAE	0.1 ppm	Measuring range: 0 – 5,000	NA
Oxygen	NA	Report reading to Site Management	NA	MultiRAE, AreaRAE	0.1%	Measuring range: 0 – 30%	NA
Carbon Dioxide	NA	Report reading to Site Management	NA	MultiRAE sensor	100 ppm	Measuring range 0 – 50,000 ppm	NA
LEL	NA	Report reading to Site Management	NA	MultiRAE, AreaRAE	1%	Measuring range: 0 – 100%	NA
Sulfur Dioxide	NA	Report reading to Site Management	NA	MultiRAE sensor	0.1 ppm	Measuring range: 0 – 20 ppm	NA

Plan 3: Community Monitoring

Objective: Report air levels before they reach those that may be associated with nuisance or health concerns.

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	30 ppm 5 minutes	Assess for the presence of cumene. Report reading to PM	To avoid over exposure to volatile compounds	MultiRAE PID	0.1 ppm	Measuring range: 0 – 2,000 ppm	NA
Particulate Matter ($PM_{2.5}$)	0.138 mg/m^3 sustained for 15 min.	Report reading to project manager	Wildfire Smoke Guidelines for 1 hr avg. upper-bound breakpoint for unhealthy AQI	SidePak AM510	0.001 mg/m^3	PM2.5 impactor – 50% cut-off at 2.5 microns;	NA
Carbon Monoxide	75 ppm sustained 5 min.	Report reading to PM	PAC-1 value	MR Sensor	1 ppm	MultiRAE - Measuring range: 0 – 100 ppm	NA
Cumene	50 ppm uncorrected (92.6 ppm corrected) sustained 5 min.	Report reading to PM	PAC-1 value	MultiRAE PID	0.1 ppm	Measuring range: 0 – 2,000 ppm	0.54
				Gastec tube #122L	2 ppm	Measuring range: 2 – 100 ppm. 2 strokes** See image attached below	NA
Nitrogen Dioxide	0.5 ppm sustained for 5 minutes	Report reading to PM	AEGL-1 value (8-hr)	Gastec tube #9L	0.1 ppm	Measuring range: 0.5 – 125 ppm	NA

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				MultiRAE sensor	0.1 ppm	Measuring range: 0 – 20 ppm	NA
Sulfur Dioxide	0.2 ppm sustained	Report reading to PM	AEGL-1 value (8-hr)	MultiRAE sensor	0.1 ppm	Measuring range: 0 – 20 ppm	NA
				Gastec tube #5La	0.1 ppm	Measuring range: 0.5 – 60 ppm	NA
				Gastec tube #5Lb	0.01 ppm	Measuring range: 0.05 – 10 ppm	NA
				Gastec tuve #5LC	0.02 ppm	Measuring range: 0.1 – 25 ppm	NA

Cumene scale on tube 122L:

Tube 122L can also be used for other substances as below:

Substance	Correction Factor	No. of Pump Strokes	Measuring Range
Xylene	2	1, 2, 4	2 - 200 ppm

(1) Ethyl benzene

Ethyl benzene	1 3 5 10 20 30 40 50 60 70
Tube 122L Reading (n = 2)	2 5 10 20 30 40 50

(2) Cumene

Cumene	2 10 20 30 40 50 60 70 80 90 100
Tube 122L Reading (n = 2)	2 5 10 20 30 40 50

(3) Diethyl benzene

Diethyl benzane	25 10 20 40 60 80 100 120 150
Tube 122L Reading (n = 4)	2 5 10 20 30 40

Analytical Methods			
Analyte	Media/Can	Method	Notes
VOCs	Minicans	EPA TO-15 + TICS	

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Real-Time Hand-held Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAE, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations.
Analytical sampling	Analytical sampling may be used to validate the hand-held data monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media, and sent to an off-site laboratory for further chemical analysis.

Quality Assurance/Quality Control Procedures

Method	Procedure
Real-Time	• Real-time instruments may be calibrated in excess of the manufacturer's recommendations. ○ At a minimum whenever indicated by site conditions or instrument readings. • Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field. • Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	• Chain of custody documents may be completed for each sample. • Level IV data validation may be performed on the first sample group analyzed. • Level II data validation may be performed on 20% of all samples. • Level IV data validation may be performed on 10% of all samples.
Reporting	• Daily Data Summaries may be provided for informational purposes using data that have not undergone complete QA/QC. • Comprehensive reports of real-time and/or analytical data may be generated following QA/QC and may be delivered 60 days following receipt of validated results, if applicable.

Glossary

Term	Definition
Sustained	Instrument reading above the action level continuously for the listed time period.
Excursion Limit	Whenever a reading exceeds a ACGIH® TLV reading by 5 times (if the chemical does not have a STEL or Ceiling based action level), exit the area and notify the PM
Breathing zone	The area within an approximate 10-inch radius of an individual's nose and mouth.
Ambient Air	That portion of the atmosphere (indoor or outdoor) to which workers and the general public have access.

Message

From: Thomas, Mark J. [Thomas.Markj@epa.gov]
Sent: 8/31/2017 10:47:07 PM
To: Bernier, Roberto [bernier.roberto@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]
Subject: RE: 31 Aug 2017 -- ASPECT update 15 -- 1555
Attachments: Infrared.png

Roberto,

Please find attached an ir image of the tankers. The dark ones appear to be cold. We count 8 cold tanks. The emissions may be residual from the fire.

Mark Thomas, PhD
ASPECT Program Manager
Field Operations Branch
CBRN Consequence Management Advisory Division
EPA Office of Emergency Management
11201 Renner Blvd
Lenexa, KS 66219

Office: 913-551-5018
Cell: 513-675-4753

From: Bernier, Roberto
Sent: Thursday, August 31, 2017 5:36 PM
To: Smalley, Bryant <smalley.bryant@epa.gov>
Cc: Thomas, Mark J. <Thomas.Markj@epa.gov>
Subject: RE: 31 Aug 2017 -- ASPECT update 15 -- 1555

Can we pinpoint the source (trailer) of the peroxide detection. It will be good info to estimate which trailer is getting to decomp state

---

From: Smalley, Bryant
Sent: Thursday, August 31, 2017 4:03 PM
To: Carroll, Craig <Carroll.Craig@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Smith, Monica <smith.monica@epa.gov>; Gray, David <gray.david@epa.gov>
Cc: Mason, Steve <mason.steve@epa.gov>; McAteer, Mike <mcateer.mike@epa.gov>; Bernier, Roberto <bernier.roberto@epa.gov>
Subject: Fwd: 31 Aug 2017 -- ASPECT update 15 -- 1555

FYSA

Sent from my iPhone

Begin forwarded message:

> **From:** "Thomas, Mark J." <Thomas.Markj@epa.gov>
> **Date:** August 31, 2017 at 3:58:37 PM CDT
> **To:** "Thomas, Mark J." <Thomas.Markj@epa.gov>, "Martin, John" <martin.john@epa.gov>, Beorn Leger <beornleger@airborneaspect.com>, "Rhotenberry, William" <Rhotenberry.William@epa.gov>, "Kudarauskas, Paul" <Kudarauskas.Paul@epa.gov>, "Curry, Tim" <Curry.Timothy@epa.gov>, "Kroutil,

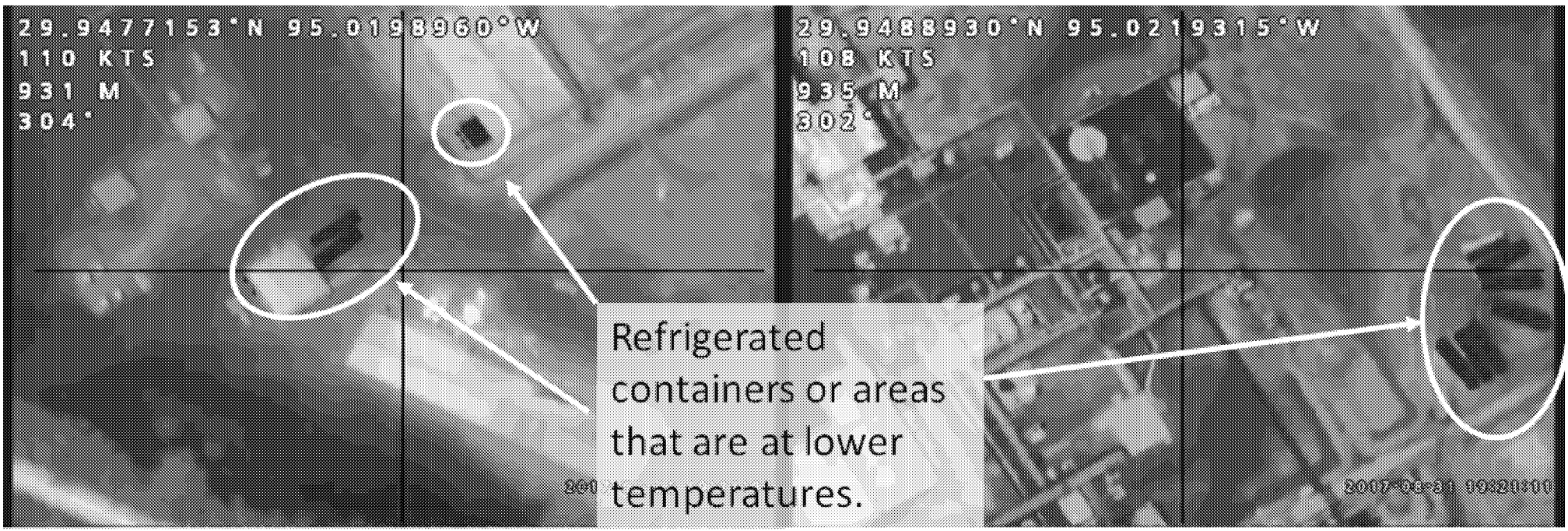
Robert" <robert.kroutil@kalmancoinc.com>, "Delgado, Eric" <Delgado.Eric@epa.gov>, R6HarveyENVL <R6HarveyENVL@epa.gov>, "Leonova, Larisa" <leonova.larisa@epa.gov>, "Rauscher, Jon" <Rauscher.Jon@epa.gov>, "Janine.Latham@WestonSolutions.com" <Janine.Latham@WestonSolutions.com>, "Smalley, Bryant" <smalley.bryant@epa.gov>, "Cardarelli, John" <Cardarelli.John@epa.gov>
Subject: 31 Aug 2017 -- ASPECT update 15 -- 1555

Refueling ops have been completed. The crew was able to push a large amount of data up to the server. We are working the data at this time. We are returning to the Arkema site ASAP.

The team is just about to start full resolution processing of the most recent data. I will send out products as soon as possible.

Mark Thomas, PhD
ASPECT Program Manager
Field Operations Branch
CBRN Consequence Management Advisory Division
EPA Office of Emergency Management
11201 Renner Blvd
Lenexa, KS 66219

Office: 913-551-5018
Cell: 513-675-4753


29.9477153°N 95.0198960°W
110 KTS
931 M
304°
29.9488930°N 95.0219315°W
108 KTS
935 M
302°
Refrigerated containers or areas that are at lower temperatures.

Scribe Data Element Dictionary

Category	Data Element	Required	Description	Format	Scribe Table.Field
Site	SiteNo	Yes	Site.SiteNo - format: Region (01, 02, 03, 04…)_user defined (i.e. 01_4AVE)	Text (12)	Site.Site_No
	Contract_Name	Yes	Name of contract	Text (50)	Site.Contract_Name
	Contractor	Yes	Contractor	Text (50)	Site.Contractor
	Contractor_Phone	No	Contractor phone number	Text (50)	Site.CTRphone
	SpillID	No	Spill ID for the site as recorded in CERCLIS.	Text(20)	Site.CERCLIS
	SiteName	Yes	SiteNo_Site_Name – format: SiteNo_'user defined' (01_4AVE_Lead_Site)	Text (50)	Site.Site_Name
Event	EventID	Yes	User-defined partition for data that makes site-specific sense. Must be unique within a Site.	Text (50)	Events.EventID
	EventDate	Yes	Start date of event	Day/Time (MM/DD/YYYY)	Events.EventDate
	EventRemarks	No	Brief description of the site-specific partition/data collection effort.	Text (250)	Events.EventRemarks
Property	PropertyID	Yes	Identifier for a parcel, building, facility or residence. Must be unique within a Site. Note: must be non-descript ensuring anonymity (no PII data).	Text (50)	PropertyInfo.PropertyID
	PropertyType	No	Category of property that is recorded.	Valid Values	PropertyInfo.PropertyType
	PropertyAddress1	No	Street number of a parcel, building, facility or residence.	Text (50)	PropertyInfo.PropertyAddress
	PropertyAddress2	No	Street name of a parcel, building, facility or residence.	Text (50)	PropertyInfo.PropertyAddress2
	PropertyAddress3	No	Appartment/suite number of a parcel, building, facility or residence.	Text (25)	PropertyInfo.Property Block Number
	PropertyCity	No	City in which a parcel, building, facility or residence is located.	Text (50)	PropertyInfo.PropertyCity
	PropertyState	No	State in which a parcel, building, facility or residence is located.	Valid Values	PropertyInfo.PropertyState
	PropertyZip	No	Zip Code in which a parcel, building, facility or residence is located.	Text (20)	PropertyInfo.PropertyZip
	PropertyRemarks	No	Comments associated with a parcel, building, facility or residence.	Text (250)	PropertyInfo.PropertyComment
Location	LocationID	Yes	Identifier for a geographic point where samples or monitoring results are collected. Must be unique within a Site.	Text (30)	Location.Location
	LocationDescription	No	Brief description of a geographic point where samples or monitoring results are collected.	Text (100)	Location.LocationDescription
	LocationZone	No	User defined area within which LocationIDs are found and samples or monitoring results are collected.	Text (25)	Location.LocationZone
	Latitude	No	Latitude measurement, in decimal degrees, of a geographic point where samples or monitoring results are collected.	Numeric (##.#######)	Location.Latitude
	Longitude	No	Longitude measurement, in decimal degrees, of a geographic point where samples or monitoring results are collected.	Numeric (-###.#######)	Location.Longitude
	Datum	Conditional	Conditional, if Lat/Long coordinates exists Datum must be populated. Geopositioning datum associated with Latitude and Longitude coordinates.	Valid Values	Location.Datum
	LocationRemarks	No	Comments associated with a geographic point where samples or monitoring results are collected.	Text (250)	Location.Comment
Instrument	InstrumentID	Yes	Identifier for a piece of equipment that is used to collect field measurements. Must be unique within a Site.	Text (50)	Instrument.InstrumentID
	InstrumentModel	No	Model of instrument	Text (50)	Instrument.Instrument_Model
	InstrumentType	No	Type of instrument	Text (50)	Instrument.Instrument_Type
	InstrumentRemarks	No	Comments associated with a piece of equipment that is used to collect field measurements.	Text (250)	Instrument.Instrument_Remark
Monitoring	MonitoringDate	Yes	Date when a field measurement or observation is collected.	Date/Time (MM/DD/YYYY)	Monitoring.Mon_Date
	MonitoringTime	Yes	Time when a field measurement or observation is collected.	Text (30)	Monitoring.Mon_Time
	MonitoringParameter	Yes	Analyte or parameter that is measured or observed.	Text (30)	Monitoring.Mon_Parameter
	MonitoringResult	No	Numeric result that is measured or observed.	Numeric	Monitoring.Mon_Measurement
	MonitoringResultUnits	Conditional	Conditional, if MonitoringResults exists ResultsUnits must be populated. Units associated with numeric result that is measured or observed.	Valid Values	Monitoring.Mon_Meas_Units
	MonitoringResultsQualifier	No	Can be used to record qualifiers and/or non-numeric results.	Text (10)	Monitoring.Mon_Qualifier
	MonitoringRemarks	No	Comments associated with a field measurement or observation.	Text (250)	Monitoring.Mon_Remark
Sample	SampleID	Yes	Identifier for a sample that is collected. Must be unique within a Site	Text (50)	Samples.Samp_No
	SampleMedia	No	Medium that is sampled.	Text (30)	Samples.SampleMedia
	SampleMatrix	Yes	Sub-medium or Matrix that is sampled.	Valid Values	Samples.Matrix
	SampleType	Yes	The category of sample that is collected.	Valid Values	Samples.SampleType
	SampleCollection	No	Sample collection method	Valid Values	Samples.SampleCollection
	SampleLinkID	Conditional	Identifier of the sample that should be associated with a duplicate or split sample. Required and only used if SampleType contains "Duplicate" or "Split".	Text (25)	Samples.LinkSampleID
	SampleDate	Yes	Date when a sample is collected. If a sampling duration is involved, enter the beginning date for this activity.	Date/Time (MM/DD/YYYY)	Samples.SampleDate
	SampleTime	Yes	Time when a sample is collected.	Text (HH:MM:SS)	Samples.SampleTime
	SampleDepth	No	Top depth of sample.	Numeric	Samples.Samp_Depth
	SampleDepthTo	No	Bottom depth of sample.	Numeric	Samples.Samp_Depth_To
	SampleDepthUnits	No	Units associated with depth(s).	Valid Values	Samples.Samp_Depth_Units
	Sampler	No	Organization_first name_last name of the person who collected the sample (i.e. START_Joe_Smith)	Text (30)	Samples.Sampler
	SampleRemarks	No	Comments associated with the sample.	Text (250)	Samples.Remarks
Lab Info	LabName	Yes	Name of laboratory.	Text (50)	refLabLst.Lab
	LabAddress	No	Street address of a laboratory.	Text (50)	refLabLst.Lab_Address
	LabCity	No	City in which a laboratory is located.	Text (50)	refLabLst.Lab_City
	LabState	No	State in which a laboratory is located.	Valid Values	refLabLst.Lab_State
	LabZip	No	Zip Code in which a laboratory is located.	Text (20)	refLabLst.Lab_Zip
Lab Result	LabSampleID	See "Instructions for Interim Emergency Response Electronic Data Deliverable", September 19, 2007.			
	PreparedDate				
	AnalyzedDate				
	AnalyteName				
	CASRegistryNumber				
	Result				
	ResultUnits				
	LabQualifier				
	ResultUncertainty				
	UncertaintyType				
	ResultBasis				
	ReportingLimit				
	ReportingLimitUnits				
	ReportingLimitType				
	AnalyteType				
	LabQCType				
	LabResultRemarks				

Data Element	Valid Value	Comments	Auditor
Analyte	1,1'-Biphenyl	8270	"1,1'-Biphenyl",
Analyte	1,2,4,5-Tetrachlorobenzene	8270	"1,2,4,5-Tetrachlorobenzene",
Analyte	1,4-Dioxane	8270	"1,4-Dioxane",
Analyte	2,2'-Oxybis(1-chloropropane)	8270	"2,2'-Oxybis(1-chloropropane)",
Analyte	2,3,4,6-Tetrachlorophenol	8270	"2,3,4,6-Tetrachlorophenol",
Analyte	2,4,5-Trichlorophenol	8270	"2,4,5-Trichlorophenol",
Analyte	2,4,6-Trichlorophenol	8270	"2,4,6-Trichlorophenol",
Analyte	2,4-Dichlorophenol	8270	"2,4-Dichlorophenol",
Analyte	2,4-Dimethylphenol	8270	"2,4-Dimethylphenol",
Analyte	2,4-Dinitrophenol	8270	"2,4-Dinitrophenol",
Analyte	2,4-Dinitrotoluene	8270	"2,4-Dinitrotoluene",
Analyte	2,6-Dinitrotoluene	8270	"2,6-Dinitrotoluene",
Analyte	2-Chloronaphthalene	8270	"2-Chloronaphthalene",
Analyte	2-Chlorophenol	8270	"2-Chlorophenol",
Analyte	2-Methylnaphthalene	8270	"2-Methylnaphthalene",
Analyte	2-Methylphenol	8270	"2-Methylphenol",
Analyte	3-Methylphenol	8270	"3-Methylphenol",
Analyte	2-Nitroaniline	8270	"2-Nitroaniline",
Analyte	2-Nitrophenol	8270	"2-Nitrophenol",
Analyte	3,3'-Dichlorobenzidine	8270	"3,3'-Dichlorobenzidine",
Analyte	3-Nitroaniline	8270	"3-Nitroaniline",
Analyte	4,6-Dinitro-2-methylphenol	8270	"4,6-Dinitro-2-methylphenol",
Analyte	4-Bromophenyl-phenylether	8270	"4-Bromophenyl-phenylether",
Analyte	4-Chloro-3-methylphenol	8270	"4-Chloro-3-methylphenol",
Analyte	4-Chloroaniline	8270	"4-Chloroaniline",
Analyte	4-Chlorophenyl-phenylether	8270	"4-Chlorophenyl-phenylether",
Analyte	4 Methylphenol	8270	"4 Methylphenol",
Analyte	4-Nitroaniline	8270	"4-Nitroaniline",
Analyte	4-Nitrophenol	8270	"4-Nitrophenol",
Analyte	Acenaphthene	8270	"Acenaphthene",
Analyte	Acenaphthylene	8270	"Acenaphthylene",
Analyte	Acetophenone	8270	"Acetophenone",
Analyte	Anthracene	8270	"Anthracene",
Analyte	Atrazine	8270	"Atrazine",
Analyte	Benzaldehyde	8270	"Benzaldehyde",
Analyte	Benzo(a)anthracene	8270	"Benzo(a)anthracene",

Analyte	Benzo(a)pyrene	8270	"Benzo(a)pyrene",
Analyte	Benzo(b)fluoranthene	8270	"Benzo(b)fluoranthene",
Analyte	Benzo(g,h,i)perylene	8270	"Benzo(g,h,i)perylene",
Analyte	Benzo(k)fluoranthene	8270	"Benzo(k)fluoranthene",
Analyte	Bis(2-chloroethoxy)methane	8270	"Bis(2-chloroethoxy)methane",
Analyte	Bis(2-chloroethyl)ether	8270	"Bis(2-chloroethyl)ether",
Analyte	Bis(2-ethylhexyl)phthalate	8270	"Bis(2-ethylhexyl)phthalate",
Analyte	Butylbenzylphthalate	8270	"Butylbenzylphthalate",
Analyte	Caprolactam	8270	"Caprolactam",
Analyte	Carbazole	8270	"Carbazole",
Analyte	Chrysene	8270	"Chrysene",
Analyte	Dibenzo(a,h)anthracene	8270	"Dibenzo(a,h)anthracene",
Analyte	Dibenzofuran	8270	"Dibenzofuran",
Analyte	Diethylphthalate	8270	"Diethylphthalate",
Analyte	Dimethylphthalate	8270	"Dimethylphthalate",
Analyte	Di-n-butylphthalate	8270	"Di-n-butylphthalate",
Analyte	Di-n-octylphthalate	8270	"Di-n-octylphthalate",
Analyte	Fluoranthene	8270	"Fluoranthene",
Analyte	Fluorene	8270	"Fluorene",
Analyte	Hexachlorobenzene	8270	"Hexachlorobenzene",
Analyte	Hexachlorobutadiene	8270	"Hexachlorobutadiene",
Analyte	Hexachlorocyclopentadiene	8270	"Hexachlorocyclopentadiene",
Analyte	Hexachloroethane	8270	"Hexachloroethane",
Analyte	Indeno(1,2,3-cd)pyrene	8270	"Indeno(1,2,3-cd)pyrene",
Analyte	Isophorone	8270	"Isophorone",
Analyte	Naphthalene	8270	"Naphthalene",
Analyte	Nitrobenzene	8270	"Nitrobenzene",
Analyte	N-Nitroso-di-n-propylamine	8270	"N-Nitroso-di-n-propylamine",
Analyte	N-Nitrosodiphenylamine	8270	"N-Nitrosodiphenylamine",
Analyte	Pentachlorophenol	8270	"Pentachlorophenol",
Analyte	Phenanthrene	8270	"Phenanthrene",
Analyte	Phenol	8270	"Phenol",
Analyte	Pyrene	8270	"Pyrene",
Analyte	1,1,1-Trichloroethane	8260	"1,1,1-Trichloroethane",
Analyte	1,1,2,2-Tetrachloroethane	8260	"1,1,2,2-Tetrachloroethane",

Analyte	1,1,2-Trichloro-1,2,2-trifluoroethane	8260	"1,1,2-Trichloro-1,2,2-trifluoroethane",
Analyte	1,1,2-Trichloroethane	8260	"1,1,2-Trichloroethane",
Analyte	1,1-Dichloroethane	8260	"1,1-Dichloroethane",
Analyte	1,1-Dichloroethene	8260	"1,1-Dichloroethene",
Analyte	1,2,3-Trichlorobenzene	8260	"1,2,3-Trichlorobenzene",
Analyte	1,2,4-Trichlorobenzene	8260	"1,2,4-Trichlorobenzene",
Analyte	1,2-Dibromo-3-chloropropane	8260	"1,2-Dibromo-3-chloropropane",
Analyte	1,2-Dibromoethane	8260	"1,2-Dibromoethane",
Analyte	1,2-Dichlorobenzene	8260	"1,2-Dichlorobenzene",
Analyte	1,2-Dichloroethane	8260	"1,2-Dichloroethane",
Analyte	1,2-Dichloropropane	8260	"1,2-Dichloropropane",
Analyte	1,3-Dichlorobenzene	8260	"1,3-Dichlorobenzene",
Analyte	1,4-Dichlorobenzene	8260	"1,4-Dichlorobenzene",
Analyte	2-Butanone	8260	"2-Butanone",
Analyte	2-Hexanone	8260	"2-Hexanone",
Analyte	4-Methyl-2-pentanone	8260	"4-Methyl-2-pentanone",
Analyte	Acetone	8260	"Acetone",
Analyte	Benzene	8260	"Benzene",
Analyte	Bromochloromethane	8260	"Bromochloromethane",
Analyte	Bromodichloromethane	8260	"Bromodichloromethane",
Analyte	Bromoform	8260	"Bromoform",
Analyte	Bromomethane	8260	"Bromomethane",
Analyte	disulfide	8260	"Carbon disulfide",
Analyte	Carbon tetrachloride	8260	"Carbon tetrachloride",
Analyte	Chlorobenzene	8260	"Chlorobenzene",
Analyte	Chloroethane	8260	"Chloroethane",
Analyte	Chloroform	8260	"Chloroform",
Analyte	Chloromethane	8260	"Chloromethane",
Analyte	cis-1,2-Dichloroethene	8260	"cis-1,2-Dichloroethene",
Analyte	cis-1,3-Dichloropropene	8260	"cis-1,3-Dichloropropene",
Analyte	Cyclohexane	8260	"Cyclohexane",
Analyte	Dibromochloromethane	8260	"Dibromochloromethane",

Analyte	Dichlorodifluoromethane	8260	"Dichlorodifluoromethane",
Analyte	Ethylbenzene	8260	"Ethylbenzene",
Analyte	Isopropylbenzene	8260	"Isopropylbenzene",
Analyte	m,p-Xylene	8260	"m,p-Xylene",
Analyte	Methyl Acetate	8260	"Methyl Acetate",
Analyte	Methyl tert-butyl ether	8260	"Methyl tert-butyl ether",
Analyte	Methylcyclohexane	8260	"Methylcyclohexane",
Analyte	Methylene chloride	8260	"Methylene chloride",
Analyte	o-Xylene	8260	"o-Xylene",
Analyte	Styrene	8260	"Styrene",
Analyte	Tetrachloroethene	8260	"Tetrachloroethene",
Analyte	Toluene	8260	"Toluene",
Analyte	trans-1,2-Dichloroethene	8260	"trans-1,2-Dichloroethene",
Analyte	trans-1,3-Dichloropropene	8260	"trans-1,3-Dichloropropene",
Analyte	Trichloroethene	8260	"Trichloroethene",
Analyte	Trichlorofluoromethane	8260	"Trichlorofluoromethane",
Analyte	Vinyl chloride	8260	"Vinyl chloride",
Analyte	Xylene (total)	8260	"Xylene (total)",

Data Element	Valid Value	Comments	Auditor
CAS_NO	92-52-4	8270	"92-52-4",
CAS_NO	95-94-3	8270	"95-94-3",
CAS_NO	123-91-1	8270	"123-91-1",
CAS_NO	108-60-1	8270	"108-60-1",
CAS_NO	58-90-2	8270	"58-90-2",
CAS_NO	95-95-4	8270	"95-95-4",
CAS_NO	88-06-2	8270	"88-06-2",
CAS_NO	120-83-2	8270	"120-83-2",
CAS_NO	105-67-9	8270	"105-67-9",
CAS_NO	51-28-5	8270	"51-28-5",
CAS_NO	121-14-2	8270	"121-14-2",
CAS_NO	606-20-2	8270	"606-20-2",
CAS_NO	91-58-7	8270	"91-58-7",
CAS_NO	95-57-8	8270	"95-57-8",
CAS_NO	91-57-6	8270	"91-57-6",
CAS_NO	95-48-7	8270	"95-48-7",
CAS_NO	108-39-4	8270	"108-39-4",
CAS_NO	88-74-4	8270	"88-74-4",
CAS_NO	88-75-5	8270	"88-75-5",
CAS_NO	91-94-1	8270	"91-94-1",
CAS_NO	99-09-2	8270	"99-09-2",
CAS_NO	534-52-1	8270	"534-52-1",
CAS_NO	101-55-3	8270	"101-55-3",
CAS_NO	59-50-7	8270	"59-50-7",
CAS_NO	106-47-8	8270	"106-47-8",
CAS_NO	7005-72-3	8270	"7005-72-3",
CAS_NO	106-44-5	8270	"106-44-5",
CAS_NO	100-01-6	8270	"100-01-6",
CAS_NO	100-02-7	8270	"100-02-7",
CAS_NO	83-32-9	8270	"83-32-9",
CAS_NO	208-96-8	8270	"208-96-8",
CAS_NO	98-86-2	8270	"98-86-2",
CAS_NO	120-12-7	8270	"120-12-7",
CAS_NO	1912-24-9	8270	"1912-24-9",
CAS_NO	100-52-7	8270	"100-52-7",
CAS_NO	56-55-3	8270	"56-55-3",
CAS_NO	50-32-8	8270	"50-32-8",
CAS_NO	205-99-2	8270	"205-99-2",
CAS_NO	191-24-2	8270	"191-24-2",
CAS_NO	207-08-9	8270	"207-08-9",
CAS_NO	111-91-1	8270	"111-91-1",
CAS_NO	111-44-4	8270	"111-44-4",
CAS_NO	117-81-7	8270	"117-81-7",
CAS_NO	85-68-7	8270	"85-68-7",
CAS_NO	105-60-2	8270	"105-60-2",
CAS_NO	86-74-8	8270	"86-74-8",
CAS_NO	218-01-9	8270	"218-01-9",
CAS_NO	53-70-3	8270	"53-70-3",
CAS_NO	132-64-9	8270	"132-64-9",
CAS_NO	84-66-2	8270	"84-66-2",
CAS_NO	131-11-3	8270	"131-11-3",
CAS_NO	84-74-2	8270	"84-74-2",
CAS_NO	117-84-0	8270	"117-84-0",
CAS_NO	206-44-0	8270	"206-44-0",

CAS_NO	86-73-7	8270	"86-73-7",
CAS_NO	118-74-1	8270	"118-74-1",
CAS_NO	87-68-3	8270	"87-68-3",
CAS_NO	77-47-4	8270	"77-47-4",
CAS_NO	67-72-1	8270	"67-72-1",
CAS_NO	193-39-5	8270	"193-39-5",
CAS_NO	78-59-1	8270	"78-59-1",
CAS_NO	91-20-3	8270	"91-20-3",
CAS_NO	98-95-3	8270	"98-95-3",
CAS_NO	621-64-7	8270	"621-64-7",
CAS_NO	86-30-6	8270	"86-30-6",
CAS_NO	87-86-5	8270	"87-86-5",
CAS_NO	85-01-8	8270	"85-01-8",
CAS_NO	108-95-2	8270	"108-95-2",
CAS_NO	129-00-0	8270	"129-00-0",
CAS_NO	71-55-6	8260	"71-55-6",
CAS_NO	79-34-5	8261	"79-34-5",
CAS_NO	76-13-1	8262	"76-13-1",
CAS_NO	79-00-5	8263	"79-00-5",
CAS_NO	75-34-3	8264	"75-34-3",
CAS_NO	75-35-4	8265	"75-35-4",
CAS_NO	87-61-6	8266	"87-61-6",
CAS_NO	120-82-1	8267	"120-82-1",
CAS_NO	96-12-8	8268	"96-12-8",
CAS_NO	106-93-4	8269	"106-93-4",
CAS_NO	95-50-1	8270	"95-50-1",
CAS_NO	107-06-2	8271	"107-06-2",
CAS_NO	78-87-5	8272	"78-87-5",
CAS_NO	541-73-1	8273	"541-73-1",
CAS_NO	106-46-7	8274	"106-46-7",
CAS_NO	78-93-3	8275	"78-93-3",
CAS_NO	591-78-6	8276	"591-78-6",
CAS_NO	108-10-1	8277	"108-10-1",
CAS_NO	67-64-1	8278	"67-64-1",
CAS_NO	71-43-2	8279	"71-43-2",
CAS_NO	74-97-5	8280	"74-97-5",
CAS_NO	75-27-4	8281	"75-27-4",
CAS_NO	75-25-2	8282	"75-25-2",
CAS_NO	74-83-9	8283	"74-83-9",
CAS_NO	75-15-0	8284	"75-15-0",
CAS_NO	56-23-5	8285	"56-23-5",
CAS_NO	108-90-7	8286	"108-90-7",
CAS_NO	75-00-3	8287	"75-00-3",
CAS_NO	67-66-3	8288	"67-66-3",
CAS_NO	74-87-3	8289	"74-87-3",
CAS_NO	156-59-2	8290	"156-59-2",
CAS_NO	10061-01-5	8291	"10061-01-5",
CAS_NO	110-82-7	8292	"110-82-7",
CAS_NO	124-48-1	8293	"124-48-1",
CAS_NO	75-71-8	8294	"75-71-8",
CAS_NO	100-41-4	8295	"100-41-4",
CAS_NO	98-82-8	8296	"98-82-8",
CAS_NO	179601-23-1	8297	"179601-23-1",

CAS_NO	79-20-9	8298	"79-20-9",
CAS_NO	1634-04-4	8299	"1634-04-4",
CAS_NO	108-87-2	8300	"108-87-2",
CAS_NO	75-09-2	8301	"75-09-2",
CAS_NO	95-47-6	8302	"95-47-6",
CAS_NO	100-42-5	8303	"100-42-5",
CAS_NO	127-18-4	8304	"127-18-4",
CAS_NO	108-88-3	8305	"108-88-3",
CAS_NO	156-60-5	8306	"156-60-5",
CAS_NO	10061-02-6	8307	"10061-02-6",
CAS_NO	79-01-6	8308	"79-01-6",
CAS_NO	75-69-4	8309	"75-69-4",
CAS_NO	75-01-4	8310	"75-01-4",
CAS_NO	1330-20-7	8311	"1330-20-7",

Data Element	Valid Value	Comments	Auditor	Auditor Update
MonitoringResultUnits	ppm	Parts per million	"ppm",	9/1/2017
MonitoringResultUnits	%		"%",	9/1/2017
MonitoringResultUnits	su	standard units for pH	"su",	9/1/2017
SampleCollection	Composite		"Composite",	9/1/2017
SampleCollection	Grab		"Grab",	9/1/2017
SampleDepthUnits	inches		"inches",	9/4/2017
SampleMatrix	Surface Water		"Surface Water",	9/1/2017
SampleMatrix	Soil		"Soil",	9/2/2017
SampleType	Field Duplicate		"Field Duplicate",	9/1/2017
SampleType	Field Blank		"Field Blank",	9/1/2017
SampleType	Lab QC		"Lab QC",	9/1/2017
SampleType	Preservative Blank		"Preservative Blank",	9/1/2017
SampleType	Rinsate Blank		"Rinsate Blank",	9/1/2017
SampleType	Field Sample		"Field Sample",	9/1/2017
SampleType	Spike		"Spike",	9/1/2017
SampleType	Split		"Split",	9/1/2017
SampleType	Trip Blank		"Trip Blank",	9/1/2017
Mon_Parameter	SO2		"SO2",	9/1/2017
Mon_Parameter	OXY		"OXY",	9/1/2017
Mon_Parameter	LEL		"LEL",	9/1/2017
Mon_Parameter	H2S		"H2S",	9/1/2017
Mon_Parameter	pH		"pH",	9/1/2017
Mon_Parameter	VOC		"VOC",	9/1/2017
InstrumentID	Multigas MultiRae Pro		"Multigas MultiRae Pro",	9/4/2017
InstrumentID	AreaRAE		"AreaRAE",	9/1/2017
InstrumentID	pH Meter		"pH Meter",	9/4/2017
InstrumentID	Multigas Instrument		"Multigas Instrument",	9/1/2017
EventID	Arkema		"Arkema",	9/1/2017
EventID	Collection Pad Sampling		"Collection Pad Sampling",	9/1/2017
Result_Units	ug/L		"ug/L",	9/2/2017

UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY
REGION 6
1445 Ross Avenue
Dallas, Texas 75201
OFFICE OF ENVIRONMENTAL CLEANUP
EMERGENCY RESPONSE UNIT

Region 6 Site-Specific Data Management Plan			
Site Name:	Hurricane Harvey Emergency Response	**TDD Number/Site ID**	
Author:	Brad Morgan, Janine Latham	**Company:**	Weston Solutions, Inc.
Date Initiated:	August 28 2017	**Last Updated:**	

This data management plan (DMP) is intended to provide guidance for data collection by field personnel and subsequent data management activities. The data collection and management practices presented in this plan are designed to ensure data integrity and consistency for all data collection personnel and from operational period to the next. Listed in this DMP are data elements, data collection equipment, and data management processes, and end-use products appropriate for supporting the EPA On-Scene Coordinator (OSC). Electronic tools and files used during data management at the site may include a GPS with a data dictionary to gather site specific data, EDD files for laboratory results, an XRF database used to validate the data, field monitoring equipment (such as air monitoring equipment), a SCRIBE database to manage all field data and analytical results, and ArcGIS to manage geospatial data. Manual data entry or Excel spreadsheets will be used to incorporate field notes and historic data when electronic data is not available.

Planning:

DQO	Activity	Action Level	Action	Data Stream	Tool/Instrument
1	Rapid Needs Assessment	N/A	Reconnaissance of extent of damage	GPS locations, Photos, Field Observations	Response Manager - NDOW Mobile
2	ESF-3 Infrastructure Assessment	N/A	Drinking Water and Waste Water facility assessment	Facility Status - See NDOW Website for Field Data Sheet	Response Manager - NDOW Mobile
3	Orphan Container Hazard Evaluation	N/A	Reconnaissance for orphan containers that pose a threat to the environment	GPS, Data, Photos - See NDOW Website for Data Elements	Response Manager - NDOW Mobile
4	Facility Assessment /Spills/Releases	N/A	Reconnaissance of regulated Facilities and Orphaned Spills or Releases	GPS, Data, Photos - See NDOW Website for Data Elements	Response Manager - NDOW Mobile
5	Environmental Sampling	See SSDMP	Sampling	Samples, Lab Results - See QAPP for DQO's and Data Elements	SCRIBE and SCRIBE Mobile

DQO #	Data Stream	Required Data Elements	Processing Instructions	Processing Frequency	Processing Responsibility	Storage Location	Final Output Format
1	Site Documents	Site Files, Logbooks	Load to Response.EPA.GOV	Daily	START/EPA	Response.EPA.GOV	
2	Site Photos	Photo, Photographer, Location and photo metadata	Load to Response Manager in appropriate module for specific Data Stream	Daily	START	Response Manager	
3	Spatial Features	Location Lat/Long	Collect in SCRIBE Mobile or NDOW Mobile and load to SCRIBE/RM which have spatial views to feed appropriate reporting	Daily	START/State of Texas	SCRIBE.NET or Response Manager	

4	Rapid Needs Assessment						
	Drinking Water Facility Assessment	See NDOW SOP/Data Sheet	EPA and State personnel collect with NDOW Field data sheet and enter into Response Manager Drinking Water Module	Daily	START/EPA/State of Texas	Response Manager	
	Waste Water Facility Assessment	See NDOW SOP/Data Sheet	EPA and State personnel Collect with NDOW Field Data Sheet and enter into Response Manager Waste Water Module	Daily	START/EPA/State of Texas	Response Manager	
	Orphan Container Hazard Evaluation	See NDOW SOP/Data Sheet	START personnel collect with NDOW Mobile form in filemaker and data is imported into Response Manager Recon/Hazard Evaluation Module	Daily	START	Response Manager	
	Regulated Facility Assessment	See NDOW SOP/Data Sheet	EPA, USCG, or State Personnel collect with NDOW field data sheet and enter into Response Manager Facilities/Spills Module	Daily	EPA/USCG/State of Texas	Response Manager	
	Spill/releases	See NDOW SOP/Data Sheet	EPA, USCG, or State Personnel collect with NDOW field data sheet and enter into Response Manager Facilities/Spills Module	Daily	EPA/USCG/State of Texas	Response Manager	
	Sampling	See Appendix A, Auditor Rules =R06 Hurricane Harvey	START personnel collect required data elements using SCRIBE Mobile filemaker form and import into SCRIBE and publish to SCRIBE.NET	Daily	START	SCRIBE	
	Lab Results	See Appendix A, Auditor Rules =R06 Hurricane Harvey	START personnel load prelim and validated EDDs into the appropriate branch project and publish to Scribe.NET	Daily	START	Scribe	
	Lab Results	See QASP	START personnel take labatory EDDs and import into SCRIBE and publish to SCRIBE.NET	Daily	START	SCRIBE	
	ASPECT Imagery		CMAD delivers raw files to OEI for processing into a tile service	Daily	CMAD/OEI	Geoplatform	
	TAGA		ERT operators connect TAGA translation software with survey controller	Continuous	ERT	VIPER	

Scribe EventID Definitions

EventID	**Description**
Arkema	Sampling and discrete monitoring related to activity around the Arkema Chemical plant
Collection Pad Sampling	Pre and post sampling related to establishing hazardous waste collection pads
Community Air Monitoring	Discrete air monitoring readings taken in the Manchester area of Houston

Scribe Project Index

Scribe Project Number	Scribe Project Name	Description
3344	R6 Hurricane Harvey Alpha Branch	Sampling and discrete monitoring related to activity around Alpha Branch (Corpus Christi)
3339	R6 Bravo Branch	Sampling and discrete monitoring related to activity around Bravo Branch (Houston) including Arkema facility
3340	R6 Hurricane Harvey EUL Action Levels	Screening levels managed by REOC Environmental Unit
3342	R06 Make Harvey All Combo	Subscription project containing all Harvey Scribe projects, republished as Project 3343– R06 Hurricane Harvey
3344	R6 Hurricane Harvey ALL	Re-published project of all Hurricane Harvey projects.

Viper Deployment Index

DeployID	Name	Description
427	R06 TAGA - HURRICANE HARVEY RAW DATA Deployment	For use only by operations personnel and REOC for near-real-time decisions making
426	R06 TAGA - HURRICANE HARVEY POST-PROCESSED Deployment	TAGA runs adjusted based on end of day calibration process, runs should be used for GIS viewer and any public dissemination needs

Reporting Products

Products	Reporting Period	Time Retrieved	Source	Dissemination Method	Responsibility	Deliverable Format
Resource Table - Incident	24 hr	7pm	WebEOC - PRL	REOC Mgmt Report	REOC	Excel

Resource Table - OPS	24 hr	7pm	WebEOC - PRL	SITREP	REOC	Excel
Drinking Water	24 hr	2:30pm	RM	SITREP	REOC	Excel
Waste Water	24 hr	2:30pm	RM	SITREP	REOC	Excel
Hazard Eval	24 hr	7pm	RM	SITREP	IMT	Excel
Spills & Discharges	24 hr	7pm	RM	SITREP	IMT	Excel
NRC Reports Received	12 hr	1am	WebEOC-Hotline Log	SITREP	REOC	Excel
Sampling Tracking Spreadsheet	To Date	Continuous	Scribe-> Sampling Tracking Spreadsheet	REOC Deliverable	REOC	Excel, Sharepoint
NPL Assessments	To Date	As needed	RPMs->SITL		REOC	NPL Assessment

Geospatial Presentation

Name	Purpose	URL

Spatial Data

Layer	MXD	MXD Location	Mapping Service	Data Location	Related Tables

Document Revision Summary

Revision	Date	Description of change
Initial Release (V 1.0)	8/29/17	Initial Release
V 2.0	9/5/17	Added TAGA, ASPECT, site specific scribe project and viper information

Message

From: Schaefer, Joe [Schaefer.Joe@epa.gov]
Sent: 9/7/2017 2:26:58 PM
To: R6HarveyENVL [R6HarveyENVL@epa.gov]; R6HarveyRICT [R6HarveyRICT@epa.gov]
CC: Delgado, Eric [Delgado.Eric@epa.gov]
Subject: Screening Data from the Manchester Area
Attachments: 3402-8Harvey-Houston Valero-Processed-64MSMS00433.csv; 3402-9 Harvey-Houston Valero-Processed-64MSMS00438 .csv; Manchester community monitoring through 090617.xls

This distribution includes the screening data collected by the roving R6 START monitoring teams as discrete points using multi-gas instruments through last night (from Bravo Branch Scribe project) and the two processed TAGA runs (from Viper) so far.

This data has not yet been fully reviewed and message by the R6 REOC ENVL unit. We are in the process of mapping this data.

Joe Schaefer
Environmental Response Team
US EPA
(c)609-865-8111

Instrument ID	Location	Sub Location	EventID	Mon Date	Mon Time	Parameter	Measurement	Units
AreaRae 904720	BMan101		Manchester	9/4/2017	11:40:00	O2	20.9	%
AreaRae 904720	BMan101		Manchester	9/4/2017	11:40:00	CO	1	ppm
AreaRae 904720	BMan101		Manchester	9/4/2017	11:40:00	VOC	0.2	ppm
AreaRae 904720	BMan101		Manchester	9/4/2017	11:40:00	SO2	0	ppm
AreaRae 904720	BMan101		Manchester	9/4/2017	11:40:00	LEL	0	%
AreaRae 904720	BMan102		Manchester	9/4/2017	11:45:00	SO2	0	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	11:45:00	CO	2	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	11:45:00	LEL	0	%
AreaRae 904720	BMan102		Manchester	9/4/2017	11:45:00	VOC	0.3	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	11:45:00	O2	20.9	%
AreaRae 904720	BMan103		Manchester	9/4/2017	11:48:00	VOC	0.3	ppm
AreaRae 904720	BMan103		Manchester	9/4/2017	11:48:00	SO2	0	ppm
AreaRae 904720	BMan103		Manchester	9/4/2017	11:48:00	O2	20.9	%
AreaRae 904720	BMan103		Manchester	9/4/2017	11:48:00	LEL	0	%
AreaRae 904720	BMan103		Manchester	9/4/2017	11:48:00	CO	1	ppm
AreaRae 904720	BMan104		Manchester	9/4/2017	11:52:00	LEL	0	%
AreaRae 904720	BMan104		Manchester	9/4/2017	11:52:00	O2	20.9	%
AreaRae 904720	BMan104		Manchester	9/4/2017	11:52:00	SO2	0	ppm
AreaRae 904720	BMan104		Manchester	9/4/2017	11:52:00	CO	2	ppm
AreaRae 904720	BMan104		Manchester	9/4/2017	11:52:00	VOC	0.6	ppm
AreaRae 904720	BMan105		Manchester	9/4/2017	11:58:00	LEL	0	%
AreaRae 904720	BMan105		Manchester	9/4/2017	11:58:00	VOC	0.2	ppm
AreaRae 904720	BMan105		Manchester	9/4/2017	11:58:00	SO2	0	ppm
AreaRae 904720	BMan105		Manchester	9/4/2017	11:58:00	O2	20.9	%
AreaRae 904720	BMan105		Manchester	9/4/2017	11:58:00	CO	1	ppm
AreaRae 904720	BMan106		Manchester	9/4/2017	12:20:00	LEL	0	%
AreaRae 904720	BMan106		Manchester	9/4/2017	12:20:00	O2	20.9	%
AreaRae 904720	BMan106		Manchester	9/4/2017	12:20:00	SO2	0	ppm
AreaRae 904720	BMan106		Manchester	9/4/2017	12:20:00	VOC	0.1	ppm
AreaRae 904720	BMan106		Manchester	9/4/2017	12:20:00	CO	3	ppm
AreaRae 904720	BMan107		Manchester	9/4/2017	12:33:00	VOC	0	ppm
AreaRae 904720	BMan107		Manchester	9/4/2017	12:33:00	O2	20.9	%
AreaRae 904720	BMan107		Manchester	9/4/2017	12:33:00	SO2	0	ppm
AreaRae 904720	BMan107		Manchester	9/4/2017	12:33:00	CO	3	ppm
AreaRae 904720	BMan107		Manchester	9/4/2017	12:33:00	LEL	0	%
AreaRae 904720	BMan101		Manchester	9/4/2017	12:54:00	VOC	0.1	ppm
AreaRae 904720	BMan101		Manchester	9/4/2017	12:54:00	SO2	0.2	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	12:54:00	SO2	0	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	12:54:00	VOC	0	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	12:54:00	O2	20.9	%
AreaRae 904720	BMan101		Manchester	9/4/2017	12:54:00	LEL	0	%
AreaRae 904720	BMan101		Manchester	9/4/2017	12:54:00	CO	3	ppm
AreaRae 904720	BMan102		Manchester	9/4/2017	12:54:00	LEL	0	%
AreaRae 904720	BMan101		Manchester	9/4/2017	12:54:00	O2	20.9	%
AreaRae 904720	BMan102		Manchester	9/4/2017	12:54:00	CO	4	ppm
AreaRae 904720	BMan103		Manchester	9/4/2017	13:03:00	CO	4	ppm

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AreaRae 904720	BMan103	Manchester	9/4/2017	13:03:00	VOC	0.1	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	13:03:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	13:03:00	LEL	0	%
AreaRae 904720	BMan103	Manchester	9/4/2017	13:03:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	13:10:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	13:10:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	13:10:00	CO	3	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	13:10:00	SO2	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	13:10:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	13:13:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	13:13:00	CO	3	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	13:13:00	O2	20.9	%
AreaRae 904720	BMan105	Manchester	9/4/2017	13:13:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/4/2017	13:13:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	13:16:00	VOC	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	13:16:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	13:16:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/4/2017	13:16:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/4/2017	13:16:00	CO	4	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	13:20:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/4/2017	13:20:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	13:20:00	O2	20.9	%
AreaRae 904720	BMan107	Manchester	9/4/2017	13:20:00	CO	3	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	13:20:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:27:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:27:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/4/2017	13:27:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:27:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:27:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	13:31:00	O2	20.9	%
AreaRae 904720	BMan102	Manchester	9/4/2017	13:31:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	13:31:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	13:31:00	CO	3	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	13:31:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	13:34:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	13:34:00	VOC	0.1	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	13:34:00	O2	21.3	%
AreaRae 904720	BMan103	Manchester	9/4/2017	13:34:00	CO	3	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	13:34:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	13:39:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	13:39:00	O2	21.3	%
AreaRae 904720	BMan104	Manchester	9/4/2017	13:39:00	SO2	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	13:39:00	VOC	0.5	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	13:39:00	CO	3	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	13:42:00	O2	21.2	%
AreaRae 904720	BMan105	Manchester	9/4/2017	13:42:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	13:42:00	SO2	0	ppm

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AreaRae 904720	BMan105	Manchester	9/4/2017	13:42:00	CO	3	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	13:42:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/4/2017	13:47:00	VOC	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	13:47:00	CO	3	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	13:47:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/4/2017	13:47:00	O2	21.2	%
AreaRae 904720	BMan106	Manchester	9/4/2017	13:47:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	13:50:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	13:50:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	13:50:00	O2	21.2	%
AreaRae 904720	BMan107	Manchester	9/4/2017	13:50:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/4/2017	13:50:00	CO	3	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:55:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:55:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:55:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	13:55:00	O2	21.2	%
AreaRae 904720	BMan101	Manchester	9/4/2017	13:55:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	14:01:00	SO2	0.1	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	14:01:00	O2	21.2	%
AreaRae 904720	BMan102	Manchester	9/4/2017	14:01:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	14:01:00	CO	2	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	14:01:00	VOC	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:08:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:08:00	CO	3	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:08:00	LEL	0	%
AreaRae 904720	BMan103	Manchester	9/4/2017	14:08:00	O2	21.2	%
AreaRae 904720	BMan103	Manchester	9/4/2017	14:08:00	VOC	0.2	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	14:10:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	14:10:00	CO	3	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	14:10:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	14:10:00	SO2	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	14:10:00	VOC	0.7	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:12:00	CO	2	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:12:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/4/2017	14:12:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:12:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:12:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/4/2017	14:14:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	14:14:00	CO	2	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	14:14:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/4/2017	14:14:00	VOC	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	14:14:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/4/2017	14:20:00	O2	20.9	%
AreaRae 904720	BMan107	Manchester	9/4/2017	14:20:00	CO	2	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	14:20:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	14:20:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/4/2017	14:20:00	SO2	0	ppm

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AreaRae 904720	BMan101	Manchester	9/4/2017	14:33:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	14:33:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	14:33:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	14:33:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/4/2017	14:33:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	14:40:00	SO2	0	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	14:40:00	VOC	0.1	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	14:40:00	O2	20.9	%
AreaRae 904720	BMan102	Manchester	9/4/2017	14:40:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	14:40:00	CO	1	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:43:00	CO	1	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:43:00	LEL	0	%
AreaRae 904720	BMan103	Manchester	9/4/2017	14:43:00	VOC	1.1	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:43:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	14:43:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	14:46:00	CO	2	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	14:46:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	14:46:00	SO2	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	14:46:00	VOC	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	14:46:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/4/2017	14:51:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:51:00	CO	2	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:51:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	14:51:00	O2	20.9	%
AreaRae 904720	BMan105	Manchester	9/4/2017	14:51:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/4/2017	14:53:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/4/2017	14:53:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/4/2017	14:53:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	14:53:00	VOC	0.1	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	14:53:00	CO	2	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	14:57:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	14:57:00	O2	20.9	%
AreaRae 904720	BMan107	Manchester	9/4/2017	14:57:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/4/2017	14:57:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	14:57:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	15:04:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/4/2017	15:04:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/4/2017	15:04:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	15:04:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	15:04:00	VOC	0.2	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	15:06:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	15:06:00	CO	2	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	15:06:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	15:06:00	SO2	0	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	15:06:00	O2	20.9	%
AreaRae 904720	BMan108	Manchester	9/4/2017	15:11:00	CO	1	ppm
AreaRae 904720	BMan108	Manchester	9/4/2017	15:11:00	O2	20.9	%

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AreaRae 904720	BMan108	Manchester	9/4/2017	15:11:00	SO2	0	ppm
AreaRae 904720	BMan108	Manchester	9/4/2017	15:11:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/4/2017	15:11:00	VOC	0.2	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	15:13:00	VOC	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	15:13:00	CO	2	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	15:13:00	O2	20.9	%
AreaRae 904720	BMan103	Manchester	9/4/2017	15:13:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	15:13:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	15:15:00	VOC	0.5	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	15:15:00	SO2	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	15:15:00	CO	2	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	15:15:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	15:15:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/4/2017	15:21:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/4/2017	15:21:00	O2	20.9	%
AreaRae 904720	BMan105	Manchester	9/4/2017	15:21:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	15:21:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	15:21:00	CO	2	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	15:23:00	CO	1	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	15:23:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/4/2017	15:23:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/4/2017	15:23:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/4/2017	15:23:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	15:27:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	15:27:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/4/2017	15:27:00	O2	20.9	%
AreaRae 904720	BMan107	Manchester	9/4/2017	15:27:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/4/2017	15:27:00	CO	1	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	16:00:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	16:00:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/4/2017	16:00:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	16:00:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/4/2017	16:00:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	16:10:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	16:10:00	SO2	0	ppm
AreaRae 904720	BMan102	Manchester	9/4/2017	16:10:00	O2	20.9	%
AreaRae 904720	BMan102	Manchester	9/4/2017	16:10:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/4/2017	16:10:00	CO	1	ppm
AreaRae 904720	BMan108	Manchester	9/4/2017	16:14:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/4/2017	16:14:00	O2	20.9	%
AreaRae 904720	BMan108	Manchester	9/4/2017	16:14:00	SO2	0	ppm
AreaRae 904720	BMan108	Manchester	9/4/2017	16:14:00	VOC	0	ppm
AreaRae 904720	BMan108	Manchester	9/4/2017	16:14:00	CO	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	16:17:00	O2	20.9	%
AreaRae 904720	BMan103	Manchester	9/4/2017	16:17:00	SO2	0	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	16:17:00	CO	1	ppm
AreaRae 904720	BMan103	Manchester	9/4/2017	16:17:00	VOC	0	ppm

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AreaRae 904720	BMan103	Manchester	9/4/2017	16:17:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	16:20:00	CO	1	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	16:20:00	SO2	0	ppm
AreaRae 904720	BMan104	Manchester	9/4/2017	16:20:00	LEL	0	%
AreaRae 904720	BMan104	Manchester	9/4/2017	16:20:00	O2	20.9	%
AreaRae 904720	BMan104	Manchester	9/4/2017	16:20:00	VOC	0.1	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	16:24:00	CO	2	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	16:24:00	VOC	0.2	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	16:24:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/4/2017	16:24:00	O2	20.9	%
AreaRae 904720	BMan105	Manchester	9/4/2017	16:24:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	9:29:00	CO	1	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	9:29:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/5/2017	9:29:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	9:29:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	9:29:00	VOC	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	9:34:00	O2	20.9	%
AreaRae 904720	BMan109	Manchester	9/5/2017	9:34:00	SO2	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	9:34:00	CO	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	9:34:00	LEL	0	%
AreaRae 904720	BMan109	Manchester	9/5/2017	9:34:00	VOC	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	9:37:00	LEL	0	%
AreaRae 904720	BMan110	Manchester	9/5/2017	9:37:00	SO2	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	9:37:00	O2	20.9	%
AreaRae 904720	BMan110	Manchester	9/5/2017	9:37:00	VOC	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	9:37:00	CO	2	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	9:40:00	O2	20.9	%
AreaRae 904720	BMan111	Manchester	9/5/2017	9:40:00	VOC	0	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	9:40:00	SO2	0	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	9:40:00	CO	2	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	9:40:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/5/2017	9:43:00	SO2	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	9:43:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	9:43:00	O2	20.9	%
AreaRae 904720	BMan102	Manchester	9/5/2017	9:43:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/5/2017	9:43:00	CO	2	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	9:47:00	VOC	0	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	9:47:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/5/2017	9:47:00	O2	20.9	%
AreaRae 904720	BMan108	Manchester	9/5/2017	9:47:00	SO2	0	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	9:47:00	CO	1	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	9:50:00	LEL	0	%
AreaRae 904720	BMan112	Manchester	9/5/2017	9:50:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	9:50:00	VOC	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	9:50:00	O2	20.7	%
AreaRae 904720	BMan112	Manchester	9/5/2017	9:50:00	CO	1	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	9:55:00	VOC	0	ppm

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Wind N @ <2mph	START Region 6
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no wind	START Region 6
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Wind N @ <2mph	START Region 6
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AreaRae 904720	BMan105	Manchester	9/5/2017	9:55:00	CO	1	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	9:55:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	9:55:00	O2	20.6	%
AreaRae 904720	BMan105	Manchester	9/5/2017	9:55:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/5/2017	9:58:00	VOC	0	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	9:58:00	CO	2	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	9:58:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	9:58:00	O2	20.6	%
AreaRae 904720	BMan106	Manchester	9/5/2017	9:58:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/5/2017	10:04:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	10:04:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	10:04:00	CO	1	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	10:04:00	O2	20.5	%
AreaRae 904720	BMan107	Manchester	9/5/2017	10:04:00	LEL	0	%
AreaRae 904720	BMan113	Manchester	9/5/2017	10:22:00	CO	2	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	10:22:00	SO2	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	10:22:00	LEL	0	%
AreaRae 904720	BMan113	Manchester	9/5/2017	10:22:00	VOC	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	10:22:00	O2	20.6	%
AreaRae 904720	BMan114	Manchester	9/5/2017	10:30:00	O2	20.6	%
AreaRae 904720	BMan114	Manchester	9/5/2017	10:30:00	SO2	0	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	10:30:00	CO	2	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	10:30:00	LEL	0	%
AreaRae 904720	BMan114	Manchester	9/5/2017	10:30:00	VOC	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	10:35:00	CO	2	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	10:35:00	O2	20.6	%
AreaRae 904720	BMan115	Manchester	9/5/2017	10:35:00	VOC	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	10:35:00	SO2	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	10:35:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	10:42:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	10:42:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	10:42:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	10:42:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/5/2017	10:42:00	SO2	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	10:58:00	LEL	0	%
AreaRae 904720	BMan109	Manchester	9/5/2017	10:58:00	VOC	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	10:58:00	SO2	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	10:58:00	O2	20.9	%
AreaRae 904720	BMan109	Manchester	9/5/2017	10:58:00	CO	2	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	11:00:00	O2	20.9	%
AreaRae 904720	BMan110	Manchester	9/5/2017	11:00:00	LEL	0	%
AreaRae 904720	BMan110	Manchester	9/5/2017	11:00:00	CO	3	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	11:00:00	SO2	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	11:00:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	11:18:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	11:18:00	O2	20.9	%
AreaRae 904720	BMan102	Manchester	9/5/2017	11:18:00	SO2	0	ppm

Wind N @ <2mph	START Region 6
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Wind N @ <2mph	START Region 6
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Wind N @ ~4 mph	START Region 6
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Wind N @ ~4 mph	START Region 6

AreaRae 904720	BMan102	Manchester	9/5/2017	11:18:00	CO	2	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	11:18:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/5/2017	11:22:00	VOC	0	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	11:22:00	O2	20.9	%
AreaRae 904720	BMan108	Manchester	9/5/2017	11:22:00	CO	2	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	11:22:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/5/2017	11:22:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	11:28:00	VOC	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	11:28:00	O2	20.9	%
AreaRae 904720	BMan112	Manchester	9/5/2017	11:28:00	CO	2	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	11:28:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	11:28:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/5/2017	11:31:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	11:31:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	11:31:00	CO	2	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	11:31:00	O2	20.9	%
AreaRae 904720	BMan105	Manchester	9/5/2017	11:31:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/5/2017	11:37:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/5/2017	11:37:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/5/2017	11:37:00	VOC	0	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	11:37:00	CO	2	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	11:37:00	SO2	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	11:41:00	O2	20.9	%
AreaRae 904720	BMan113	Manchester	9/5/2017	11:41:00	CO	2	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	11:41:00	SO2	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	11:41:00	VOC	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	11:41:00	LEL	0	%
AreaRae 904720	BMan114	Manchester	9/5/2017	11:43:00	O2	20.9	%
AreaRae 904720	BMan114	Manchester	9/5/2017	11:43:00	SO2	0	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	11:43:00	VOC	0	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	11:43:00	CO	3	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	11:43:00	LEL	0	%
AreaRae 904720	BMan115	Manchester	9/5/2017	11:46:00	CO	3	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	11:46:00	O2	20.9	%
AreaRae 904720	BMan115	Manchester	9/5/2017	11:46:00	SO2	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	11:46:00	LEL	0	%
AreaRae 904720	BMan115	Manchester	9/5/2017	11:46:00	VOC	0	ppm
AreaRae 904720	BMan116	Manchester	9/5/2017	12:48:00	LEL	0	%
AreaRae 904720	BMan116	Manchester	9/5/2017	12:48:00	CO	2	ppm
AreaRae 904720	BMan116	Manchester	9/5/2017	12:48:00	O2	20.9	%
AreaRae 904720	BMan116	Manchester	9/5/2017	12:48:00	SO2	0	ppm
AreaRae 904720	BMan116	Manchester	9/5/2017	12:48:00	VOC	0.1	ppm
AreaRae 904720	BMan117	Manchester	9/5/2017	12:55:00	O2	20.9	%
AreaRae 904720	BMan117	Manchester	9/5/2017	12:55:00	SO2	0	ppm
AreaRae 904720	BMan117	Manchester	9/5/2017	12:55:00	LEL	0	%
AreaRae 904720	BMan117	Manchester	9/5/2017	12:55:00	VOC	0.1	ppm
AreaRae 904720	BMan117	Manchester	9/5/2017	12:55:00	CO	1	ppm

Wind N @ ~4 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ ~2.5 mph	START Region 6
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no wind	START Region 6
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Wind NW @ ~4 mph	START Region 6
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Wind NW @ ~2.5 mph	START Region 6

AreaRae 904720	BMan118	Manchester	9/5/2017	13:04:00	CO	2	ppm
AreaRae 904720	BMan118	Manchester	9/5/2017	13:04:00	LEL	0	%
AreaRae 904720	BMan118	Manchester	9/5/2017	13:04:00	SO2	0	ppm
AreaRae 904720	BMan118	Manchester	9/5/2017	13:04:00	O2	20.9	%
AreaRae 904720	BMan118	Manchester	9/5/2017	13:04:00	VOC	0.1	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	13:15:00	SO2	0	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	13:15:00	VOC	0.3	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	13:15:00	CO	2	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	13:15:00	O2	20.9	%
AreaRae 904720	BMan119	Manchester	9/5/2017	13:15:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	13:36:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	13:36:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	13:36:00	VOC	0.4	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	13:36:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	13:36:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/5/2017	15:18:00	CO	2	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	15:18:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	15:18:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	15:18:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	15:18:00	O2	20.6	%
AreaRae 904720	BMan109	Manchester	9/5/2017	15:21:00	O2	20.9	%
AreaRae 904720	BMan109	Manchester	9/5/2017	15:21:00	CO	1	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	15:21:00	SO2	0.2	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	15:21:00	VOC	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	15:21:00	LEL	0	%
AreaRae 904720	BMan110	Manchester	9/5/2017	15:23:00	O2	20.9	%
AreaRae 904720	BMan110	Manchester	9/5/2017	15:23:00	CO	1	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	15:23:00	SO2	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	15:23:00	VOC	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	15:23:00	LEL	0	%
AreaRae 904720	BMan111	Manchester	9/5/2017	15:26:00	SO2	0	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	15:26:00	O2	20.9	%
AreaRae 904720	BMan111	Manchester	9/5/2017	15:26:00	LEL	0	%
AreaRae 904720	BMan111	Manchester	9/5/2017	15:26:00	VOC	0	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	15:26:00	CO	1	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	15:29:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	15:29:00	O2	20.9	%
AreaRae 904720	BMan102	Manchester	9/5/2017	15:29:00	CO	2	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	15:29:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/5/2017	15:29:00	SO2	0	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	15:31:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/5/2017	15:31:00	VOC	0	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	15:31:00	CO	2	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	15:31:00	O2	20.7	%
AreaRae 904720	BMan108	Manchester	9/5/2017	15:31:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	15:34:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	15:34:00	O2	20.7	%

Wind NW @ ~2.5 mph	START Region 6
Wind NW @ ~2.5 mph	START Region 6
Wind NW @ ~2.5 mph	START Region 6
Wind NW @ ~2.5 mph	START Region 6
Wind NW @ ~2.5 mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
VOC Sensor Failure	START Region 6
VOC Sensor Failure	START Region 6
VOC Sensor Failure	START Region 6
VOC Sensor Failure	START Region 6
VOC Sensor Failure	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
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Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6

AreaRae 904720	BMan112	Manchester	9/5/2017	15:34:00	LEL	0	%
AreaRae 904720	BMan112	Manchester	9/5/2017	15:34:00	VOC	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	15:34:00	CO	1	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	15:39:00	O2	20.7	%
AreaRae 904720	BMan105	Manchester	9/5/2017	15:39:00	CO	2	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	15:39:00	SO2	0	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	15:39:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	15:39:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/5/2017	15:40:00	O2	20.7	%
AreaRae 904720	BMan106	Manchester	9/5/2017	15:40:00	CO	2	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	15:40:00	VOC	0	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	15:40:00	LEL	0	%
AreaRae 904720	BMan106	Manchester	9/5/2017	15:40:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	15:49:00	LEL	0	%
AreaRae 904720	BMan107	Manchester	9/5/2017	15:49:00	SO2	0	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	15:49:00	VOC	0	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	15:49:00	CO	0	ppm
AreaRae 904720	BMan107	Manchester	9/5/2017	15:49:00	O2	20.7	%
AreaRae 904720	BMan113	Manchester	9/5/2017	15:53:00	CO	2	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	15:53:00	LEL	0	%
AreaRae 904720	BMan113	Manchester	9/5/2017	15:53:00	SO2	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	15:53:00	VOC	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	15:53:00	O2	20.9	%
AreaRae 904720	BMan114	Manchester	9/5/2017	16:02:00	LEL	0	%
AreaRae 904720	BMan114	Manchester	9/5/2017	16:02:00	SO2	0	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	16:02:00	CO	1	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	16:02:00	VOC	0	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	16:02:00	O2	20.9	%
AreaRae 904720	BMan115	Manchester	9/5/2017	16:04:00	O2	20.9	%
AreaRae 904720	BMan115	Manchester	9/5/2017	16:04:00	LEL	0	%
AreaRae 904720	BMan115	Manchester	9/5/2017	16:04:00	CO	1	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	16:04:00	VOC	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	16:04:00	SO2	0	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	16:09:00	SO2	0	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	16:09:00	LEL	0	%
AreaRae 904720	BMan119	Manchester	9/5/2017	16:09:00	O2	20.9	%
AreaRae 904720	BMan119	Manchester	9/5/2017	16:09:00	CO	1	ppm
AreaRae 904720	BMan119	Manchester	9/5/2017	16:09:00	VOC	0	ppm
AreaRae 904720	BMan116	Manchester	9/5/2017	16:11:00	SO2	0	ppm
AreaRae 904720	BMan116	Manchester	9/5/2017	16:11:00	LEL	0	%
AreaRae 904720	BMan116	Manchester	9/5/2017	16:11:00	O2	20.9	%
AreaRae 904720	BMan116	Manchester	9/5/2017	16:11:00	CO	1	ppm
AreaRae 904720	BMan116	Manchester	9/5/2017	16:11:00	VOC	0	ppm
AreaRae 904720	BMan117	Manchester	9/5/2017	16:14:00	LEL	0	%
AreaRae 904720	BMan117	Manchester	9/5/2017	16:14:00	CO	1	ppm
AreaRae 904720	BMan117	Manchester	9/5/2017	16:14:00	VOC	0	ppm
AreaRae 904720	BMan117	Manchester	9/5/2017	16:14:00	SO2	0	ppm

Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind N @ ~4.5 mph	START Region 6
Wind N @ ~4.5 mph	START Region 6
Wind N @ ~4.5 mph	START Region 6
Wind N @ ~4.5 mph	START Region 6
Wind N @ ~4.5 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6

AreaRae 904720	BMan117	Manchester	9/5/2017	16:14:00	O2	20.9	%
AreaRae 904720	BMan118	Manchester	9/5/2017	16:17:00	VOC	0	ppm
AreaRae 904720	BMan118	Manchester	9/5/2017	16:17:00	CO	1	ppm
AreaRae 904720	BMan118	Manchester	9/5/2017	16:17:00	LEL	0	%
AreaRae 904720	BMan118	Manchester	9/5/2017	16:17:00	SO2	0	ppm
AreaRae 904720	BMan118	Manchester	9/5/2017	16:17:00	O2	20.9	%
AreaRae 904720	BMan101	Manchester	9/5/2017	16:30:00	VOC	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	16:30:00	SO2	0	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	16:30:00	LEL	0	%
AreaRae 904720	BMan101	Manchester	9/5/2017	16:30:00	CO	1	ppm
AreaRae 904720	BMan101	Manchester	9/5/2017	16:30:00	O2	20.9	%
AreaRae 904720	BMan109	Manchester	9/5/2017	16:33:00	VOC	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	16:33:00	SO2	0	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	16:33:00	LEL	0	%
AreaRae 904720	BMan109	Manchester	9/5/2017	16:33:00	CO	2	ppm
AreaRae 904720	BMan109	Manchester	9/5/2017	16:33:00	O2	20.9	%
AreaRae 904720	BMan110	Manchester	9/5/2017	16:35:00	CO	1	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	16:35:00	SO2	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	16:35:00	LEL	0	%
AreaRae 904720	BMan110	Manchester	9/5/2017	16:35:00	VOC	0	ppm
AreaRae 904720	BMan110	Manchester	9/5/2017	16:35:00	O2	20.9	%
AreaRae 904720	BMan111	Manchester	9/5/2017	16:37:00	CO	1	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	16:37:00	SO2	0	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	16:37:00	VOC	0	ppm
AreaRae 904720	BMan111	Manchester	9/5/2017	16:37:00	O2	20.9	%
AreaRae 904720	BMan111	Manchester	9/5/2017	16:37:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/5/2017	16:41:00	SO2	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	16:41:00	CO	1	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	16:41:00	VOC	0	ppm
AreaRae 904720	BMan102	Manchester	9/5/2017	16:41:00	LEL	0	%
AreaRae 904720	BMan102	Manchester	9/5/2017	16:41:00	O2	20.9	%
AreaRae 904720	BMan108	Manchester	9/5/2017	16:46:00	CO	1	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	16:46:00	VOC	0	ppm
AreaRae 904720	BMan108	Manchester	9/5/2017	16:46:00	O2	20.9	%
AreaRae 904720	BMan108	Manchester	9/5/2017	16:46:00	LEL	0	%
AreaRae 904720	BMan108	Manchester	9/5/2017	16:46:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	16:48:00	O2	20.9	%
AreaRae 904720	BMan112	Manchester	9/5/2017	16:48:00	SO2	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	16:48:00	VOC	0	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	16:48:00	CO	1	ppm
AreaRae 904720	BMan112	Manchester	9/5/2017	16:48:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/5/2017	16:50:00	CO	1	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	16:50:00	LEL	0	%
AreaRae 904720	BMan105	Manchester	9/5/2017	16:50:00	O2	20.9	%
AreaRae 904720	BMan105	Manchester	9/5/2017	16:50:00	VOC	0	ppm
AreaRae 904720	BMan105	Manchester	9/5/2017	16:50:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	16:53:00	LEL	0	%

Wind N @ <2mph	START Region 6
Wind N @ ~7 mph	START Region 6
Wind N @ ~7 mph	START Region 6
Wind N @ ~7 mph	START Region 6
Wind N @ ~7 mph	START Region 6
Wind N @ ~7 mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ ~2mph	START Region 6
Wind NNE @ ~2mph	START Region 6
Wind NNE @ ~2mph	START Region 6
Wind NNE @ ~2mph	START Region 6
Wind NNE @ ~2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
no wind	START Region 6
Wind NNE @ <2mph	START Region 6

AreaRae 904720	BMan106	Manchester	9/5/2017	16:53:00	SO2	0	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	16:53:00	O2	20.9	%
AreaRae 904720	BMan106	Manchester	9/5/2017	16:53:00	CO	2	ppm
AreaRae 904720	BMan106	Manchester	9/5/2017	16:53:00	VOC	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	16:56:00	O2	20.9	%
AreaRae 904720	BMan113	Manchester	9/5/2017	16:56:00	VOC	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	16:56:00	SO2	0	ppm
AreaRae 904720	BMan113	Manchester	9/5/2017	16:56:00	LEL	0	%
AreaRae 904720	BMan113	Manchester	9/5/2017	16:56:00	CO	1	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	16:59:00	O2	20.9	%
AreaRae 904720	BMan114	Manchester	9/5/2017	16:59:00	LEL	0	%
AreaRae 904720	BMan114	Manchester	9/5/2017	16:59:00	SO2	0	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	16:59:00	CO	1	ppm
AreaRae 904720	BMan114	Manchester	9/5/2017	16:59:00	VOC	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	17:00:00	CO	1	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	17:00:00	O2	20.9	%
AreaRae 904720	BMan115	Manchester	9/5/2017	17:00:00	SO2	0	ppm
AreaRae 904720	BMan115	Manchester	9/5/2017	17:00:00	LEL	0	%
AreaRae 904720	BMan115	Manchester	9/5/2017	17:00:00	VOC	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	8:25:00	O2	20.9	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	8:25:00	CO	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	8:25:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	8:25:00	VOC	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	8:25:00	H2S	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	8:27:00	VOC	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	8:27:00	O2	20.9	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	8:27:00	LEL	0	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	8:27:00	H2S	1	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	8:27:00	CO	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	8:30:00	VOC	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	8:30:00	O2	20.9	%
AreaRae NID 438	BMan104	Manchester	9/6/2017	8:30:00	LEL	0	%
AreaRae NID 438	BMan104	Manchester	9/6/2017	8:30:00	H2S	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	8:30:00	CO	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	8:35:00	LEL	0	%
AreaRae NID 438	BMan103	Manchester	9/6/2017	8:35:00	VOC	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	8:35:00	O2	20.9	%
AreaRae NID 438	BMan103	Manchester	9/6/2017	8:35:00	H2S	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	8:35:00	CO	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	8:40:00	CO	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	8:40:00	VOC	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	8:40:00	O2	20.9	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	8:40:00	H2S	1	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	8:40:00	LEL	0	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	8:45:00	LEL	0	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	8:45:00	O2	20.9	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	8:45:00	VOC	0	ppm

Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
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AreaRae NID 438	BMan209	Manchester	9/6/2017	8:45:00	H2S	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	8:45:00	CO	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	8:49:00	LEL	0	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	8:49:00	CO	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	8:49:00	O2	20.9	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	8:49:00	VOC	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	8:49:00	H2S	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	9:00:00	VOC	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	9:00:00	O2	20.9	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	9:00:00	LEL	0	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	9:00:00	CO	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	9:00:00	H2S	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	9:16:00	VOC	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	9:16:00	CO	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	9:16:00	H2S	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	9:16:00	O2	20.9	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	9:16:00	LEL	0	%
AreaRae NID 438	BMan213	Manchester	9/6/2017	9:24:00	CO	0	ppm
AreaRae NID 438	BMan213	Manchester	9/6/2017	9:24:00	O2	20.9	%
AreaRae NID 438	BMan213	Manchester	9/6/2017	9:24:00	VOC	0	ppm
AreaRae NID 438	BMan213	Manchester	9/6/2017	9:24:00	LEL	0	%
AreaRae NID 438	BMan213	Manchester	9/6/2017	9:24:00	H2S	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	9:29:00	O2	20.9	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	9:29:00	CO	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	9:29:00	H2S	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	9:29:00	VOC	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	9:29:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	9:38:00	CO	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	9:38:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	9:38:00	H2S	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	9:38:00	O2	20.9	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	9:38:00	VOC	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	9:42:00	VOC	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	9:42:00	H2S	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	9:42:00	O2	20.9	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	9:42:00	LEL	0	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	9:42:00	CO	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	9:48:00	CO	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	9:48:00	LEL	0	%
AreaRae NID 438	BMan104	Manchester	9/6/2017	9:48:00	O2	20.9	%
AreaRae NID 438	BMan104	Manchester	9/6/2017	9:48:00	VOC	0.1	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	9:48:00	H2S	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	10:11:00	VOC	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	10:11:00	CO	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	10:11:00	O2	20.9	%
AreaRae NID 438	BMan103	Manchester	9/6/2017	10:11:00	H2S	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	10:11:00	LEL	0	%

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AreaRae NID 438	BMan208	Manchester	9/6/2017	10:17:00	O2	20.9	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	10:17:00	VOC	0.2	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	10:17:00	H2S	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	10:17:00	LEL	0	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	10:17:00	CO	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	10:29:00	H2S	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	10:29:00	CO	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	10:29:00	O2	20.9	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	10:29:00	VOC	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	10:29:00	LEL	0	%
AreaRae NID 438	BMan102	Manchester	9/6/2017	10:33:00	H2S	0	ppm
AreaRae NID 438	BMan102	Manchester	9/6/2017	10:33:00	CO	2	ppm
AreaRae NID 438	BMan102	Manchester	9/6/2017	10:33:00	O2	20.9	%
AreaRae NID 438	BMan102	Manchester	9/6/2017	10:33:00	LEL	0	%
AreaRae NID 438	BMan102	Manchester	9/6/2017	10:33:00	VOC	0	ppm
AreaRae NID 438	BMan110	Manchester	9/6/2017	10:39:00	CO	1	ppm
AreaRae NID 438	BMan110	Manchester	9/6/2017	10:39:00	VOC	0	ppm
AreaRae NID 438	BMan110	Manchester	9/6/2017	10:39:00	LEL	0	%
AreaRae NID 438	BMan110	Manchester	9/6/2017	10:39:00	O2	20.9	%
AreaRae NID 438	BMan110	Manchester	9/6/2017	10:39:00	H2S	0	ppm
AreaRae NID 438	BMan109	Manchester	9/6/2017	10:43:00	H2S	0	ppm
AreaRae NID 438	BMan109	Manchester	9/6/2017	10:43:00	VOC	0	ppm
AreaRae NID 438	BMan109	Manchester	9/6/2017	10:43:00	LEL	0	%
AreaRae NID 438	BMan109	Manchester	9/6/2017	10:43:00	CO	2	ppm
AreaRae NID 438	BMan109	Manchester	9/6/2017	10:43:00	O2	20.9	%
AreaRae NID 438	BMan106	Manchester	9/6/2017	10:52:00	LEL	0	%
AreaRae NID 438	BMan106	Manchester	9/6/2017	10:52:00	O2	20.9	%
AreaRae NID 438	BMan106	Manchester	9/6/2017	10:52:00	H2S	0	ppm
AreaRae NID 438	BMan106	Manchester	9/6/2017	10:52:00	VOC	0	ppm
AreaRae NID 438	BMan106	Manchester	9/6/2017	10:52:00	CO	0	ppm
AreaRae NID 438	BMan101	Manchester	9/6/2017	11:00:00	CO	0	ppm
AreaRae NID 438	BMan101	Manchester	9/6/2017	11:00:00	VOC	0	ppm
AreaRae NID 438	BMan101	Manchester	9/6/2017	11:00:00	H2S	0	ppm
AreaRae NID 438	BMan101	Manchester	9/6/2017	11:00:00	LEL	0	%
AreaRae NID 438	BMan101	Manchester	9/6/2017	11:00:00	O2	20.9	%
AreaRae NID 438	BMan111	Manchester	9/6/2017	11:10:00	H2S	0	ppm
AreaRae NID 438	BMan111	Manchester	9/6/2017	11:10:00	CO	2	ppm
AreaRae NID 438	BMan111	Manchester	9/6/2017	11:10:00	VOC	0.1	ppm
AreaRae NID 438	BMan111	Manchester	9/6/2017	11:10:00	O2	20.9	%
AreaRae NID 438	BMan111	Manchester	9/6/2017	11:10:00	LEL	0	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	11:27:00	O2	20.9	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	11:27:00	VOC	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	11:27:00	CO	4	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	11:27:00	H2S	0.1	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	11:27:00	LEL	0	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	11:33:00	O2	20.9	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	11:33:00	CO	4	ppm

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AreaRae NID 438	BMan211	Manchester	9/6/2017	11:33:00	H2S	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	11:33:00	VOC	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	11:33:00	LEL	0	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	11:44:00	H2S	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	11:44:00	LEL	0	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	11:44:00	O2	20.9	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	11:44:00	VOC	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	11:44:00	CO	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	11:50:00	CO	2	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	11:50:00	H2S	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	11:50:00	O2	20.9	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	11:50:00	VOC	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	11:50:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	12:00:00	O2	20.9	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	12:00:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	12:00:00	VOC	0.1	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	12:00:00	H2S	1	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	12:00:00	CO	4	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	13:15:00	O2	20.9	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	13:15:00	LEL	0	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	13:15:00	CO	3	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	13:15:00	VOC	0.6	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	13:15:00	H2S	0	ppm
AreaRae NID 438	BMan213	Manchester	9/6/2017	13:30:00	O2	20.9	%
AreaRae NID 438	BMan213	Manchester	9/6/2017	13:30:00	CO	0	ppm
AreaRae NID 438	BMan213	Manchester	9/6/2017	13:30:00	H2S	0	ppm
AreaRae NID 438	BMan213	Manchester	9/6/2017	13:30:00	VOC	0	ppm
AreaRae NID 438	BMan213	Manchester	9/6/2017	13:30:00	LEL	0	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	13:47:00	CO	3	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	13:47:00	H2S	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	13:47:00	LEL	0	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	13:47:00	O2	20.9	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	13:47:00	VOC	0.1	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	13:50:00	VOC	0.1	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	13:50:00	LEL	0	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	13:50:00	CO	1	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	13:50:00	H2S	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	13:50:00	O2	20.9	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	13:58:00	O2	20.9	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	13:58:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	13:58:00	H2S	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	13:58:00	CO	3	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	13:58:00	VOC	0.2	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	14:01:00	LEL	0	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	14:01:00	VOC	0.3	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	14:01:00	O2	20.9	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	14:01:00	H2S	0	ppm

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AreaRae NID 438	BMan215	Manchester	9/6/2017	14:01:00	CO	2	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	14:04:00	O2	20.9	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	14:04:00	LEL	0	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	14:04:00	H2S	0	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	14:04:00	CO	3	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	14:04:00	VOC	0.2	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	14:18:00	O2	20.9	%
AreaRae NID 438	BMan103	Manchester	9/6/2017	14:18:00	CO	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	14:18:00	LEL	0	%
AreaRae NID 438	BMan103	Manchester	9/6/2017	14:18:00	VOC	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	14:18:00	H2S	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	14:33:00	O2	20.9	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	14:33:00	CO	4	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	14:33:00	H2S	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	14:33:00	LEL	0	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	14:33:00	VOC	0.2	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	14:36:00	H2S	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	14:36:00	CO	2	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	14:36:00	VOC	0.1	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	14:36:00	O2	20.9	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	14:36:00	LEL	0	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	14:41:00	LEL	0	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	14:41:00	VOC	0.1	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	14:41:00	H2S	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	14:41:00	O2	20.9	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	14:41:00	CO	3	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	14:46:00	O2	20.9	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	14:46:00	LEL	0	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	14:46:00	H2S	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	14:46:00	CO	2	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	14:46:00	VOC	0.1	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	14:58:00	CO	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	14:58:00	H2S	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	14:58:00	LEL	0	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	14:58:00	O2	20.9	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	14:58:00	VOC	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	15:06:00	O2	20.9	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	15:06:00	VOC	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	15:06:00	CO	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	15:06:00	LEL	0	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	15:06:00	H2S	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	15:15:00	O2	20.9	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	15:15:00	CO	2	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	15:15:00	LEL	0	%
AreaRae NID 438	BMan207	Manchester	9/6/2017	15:15:00	VOC	0	ppm
AreaRae NID 438	BMan207	Manchester	9/6/2017	15:15:00	H2S	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	15:18:00	H2S	0	ppm

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AreaRae NID 438	BMan215	Manchester	9/6/2017	15:18:00	CO	0	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	15:18:00	VOC	0.1	ppm
AreaRae NID 438	BMan215	Manchester	9/6/2017	15:18:00	LEL	0	%
AreaRae NID 438	BMan215	Manchester	9/6/2017	15:18:00	O2	20.9	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	15:23:00	O2	20.9	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	15:23:00	CO	2	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	15:23:00	H2S	0	ppm
AreaRae NID 438	BMan216	Manchester	9/6/2017	15:23:00	LEL	0	%
AreaRae NID 438	BMan216	Manchester	9/6/2017	15:23:00	VOC	0.1	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	15:27:00	LEL	0	%
AreaRae NID 438	BMan103	Manchester	9/6/2017	15:27:00	H2S	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	15:27:00	CO	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	15:27:00	VOC	0	ppm
AreaRae NID 438	BMan103	Manchester	9/6/2017	15:27:00	O2	20.9	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	15:28:00	O2	20.9	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	15:28:00	VOC	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	15:28:00	LEL	0	%
AreaRae NID 438	BMan209	Manchester	9/6/2017	15:28:00	H2S	0	ppm
AreaRae NID 438	BMan209	Manchester	9/6/2017	15:28:00	CO	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	15:29:00	VOC	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	15:29:00	O2	20.9	%
AreaRae NID 438	BMan104	Manchester	9/6/2017	15:29:00	CO	1	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	15:29:00	H2S	0	ppm
AreaRae NID 438	BMan104	Manchester	9/6/2017	15:29:00	LEL	0	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	15:43:00	VOC	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	15:43:00	O2	20.9	%
AreaRae NID 438	BMan208	Manchester	9/6/2017	15:43:00	H2S	0	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	15:43:00	CO	1	ppm
AreaRae NID 438	BMan208	Manchester	9/6/2017	15:43:00	LEL	0	%
AreaRae NID 438	BMan108	Manchester	9/6/2017	15:53:00	H2S	0	ppm
AreaRae NID 438	BMan108	Manchester	9/6/2017	15:53:00	CO	2	ppm
AreaRae NID 438	BMan108	Manchester	9/6/2017	15:53:00	VOC	0	ppm
AreaRae NID 438	BMan108	Manchester	9/6/2017	15:53:00	LEL	0	%
AreaRae NID 438	BMan108	Manchester	9/6/2017	15:53:00	O2	20.9	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	15:58:00	H2S	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	15:58:00	CO	1	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	15:58:00	VOC	0	ppm
AreaRae NID 438	BMan210	Manchester	9/6/2017	15:58:00	LEL	0	%
AreaRae NID 438	BMan210	Manchester	9/6/2017	15:58:00	O2	20.9	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	16:01:00	H2S	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	16:01:00	CO	0	ppm
AreaRae NID 438	BMan211	Manchester	9/6/2017	16:01:00	LEL	0	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	16:01:00	O2	20.9	%
AreaRae NID 438	BMan211	Manchester	9/6/2017	16:01:00	VOC	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:11:00	O2	20.9	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:11:00	VOC	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:11:00	CO	0	ppm

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AreaRae NID 438	BMan212	Manchester	9/6/2017	16:11:00	H2S	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:11:00	LEL	0	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	16:22:00	LEL	0	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	16:22:00	H2S	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	16:22:00	O2	20.9	%
AreaRae NID 438	BMan214	Manchester	9/6/2017	16:22:00	VOC	0	ppm
AreaRae NID 438	BMan214	Manchester	9/6/2017	16:22:00	CO	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:32:00	O2	20.9	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:32:00	LEL	0	%
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:32:00	VOC	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:32:00	CO	0	ppm
AreaRae NID 438	BMan212	Manchester	9/6/2017	16:32:00	H2S	0	ppm
Multigas MultiRae Pro	BMan101	Manchester	9/3/2017	16:32:00	SO2	0	ppm
Multigas MultiRae Pro	BMan101	Manchester	9/3/2017	16:32:00	VOC	0	ppm
Multigas MultiRae Pro	BMan101	Manchester	9/3/2017	16:32:00	H2S	0	ppm
Multigas MultiRae Pro	BMan101	Manchester	9/3/2017	16:32:00	CO	0	ppm
Multigas MultiRae Pro	BMan101	Manchester	9/3/2017	16:32:00	LEL	0	%
Multigas MultiRae Pro	BMan101	Manchester	9/3/2017	16:32:00	O2	21.3	%
Multigas MultiRae Pro	BMan102	Manchester	9/3/2017	16:33:00	VOC	0	ppm
Multigas MultiRae Pro	BMan102	Manchester	9/3/2017	16:33:00	H2S	0	ppm
Multigas MultiRae Pro	BMan102	Manchester	9/3/2017	16:33:00	CO	0	ppm
Multigas MultiRae Pro	BMan102	Manchester	9/3/2017	16:33:00	LEL	0	%
Multigas MultiRae Pro	BMan102	Manchester	9/3/2017	16:33:00	O2	21.3	%
Multigas MultiRae Pro	BMan102	Manchester	9/3/2017	16:33:00	SO2	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/3/2017	16:42:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/3/2017	16:42:00	VOC	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/3/2017	16:42:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/3/2017	16:42:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/3/2017	16:42:00	O2	21.3	%
Multigas MultiRae Pro	BMan103	Manchester	9/3/2017	16:42:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/3/2017	17:01:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/3/2017	17:01:00	VOC	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/3/2017	17:01:00	H2S	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/3/2017	17:01:00	CO	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/3/2017	17:01:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/3/2017	17:01:00	O2	21.4	%
Multigas MultiRae Pro	BMan105	Manchester	9/3/2017	17:08:00	VOC	0	ppm
Multigas MultiRae Pro	BMan105	Manchester	9/3/2017	17:08:00	CO	0	ppm
Multigas MultiRae Pro	BMan105	Manchester	9/3/2017	17:08:00	LEL	0	%
Multigas MultiRae Pro	BMan105	Manchester	9/3/2017	17:08:00	H2S	0	ppm
Multigas MultiRae Pro	BMan105	Manchester	9/3/2017	17:08:00	SO2	0	ppm
Multigas MultiRae Pro	BMan105	Manchester	9/3/2017	17:08:00	O2	21.3	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:37:00	SO2	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:37:00	O2	21.4	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:37:00	LEL	0	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:37:00	CO	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:37:00	VOC	0	ppm

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Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:37:00	H2S	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:40:00	SO2	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:40:00	O2	21.4	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:40:00	LEL	0	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:40:00	CO	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:40:00	H2S	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	17:40:00	VOC	0.04	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	18:14:00	H2S	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	18:14:00	O2	21.4	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	18:14:00	LEL	0	%
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	18:14:00	SO2	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	18:14:00	CO	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/3/2017	18:14:00	VOC	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/3/2017	18:35:00	SO2	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/3/2017	18:35:00	VOC	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/3/2017	18:35:00	CO	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/3/2017	18:35:00	O2	21.3	%
Multigas MultiRae Pro	BMan107	Manchester	9/3/2017	18:35:00	H2S	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/3/2017	18:35:00	LEL	0	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	12:39:00	VOC	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	12:39:00	O2	20.9	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	12:39:00	SO2	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	12:39:00	H2S	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	12:39:00	CO	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	12:39:00	LEL	0	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	12:49:00	VOC	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	12:49:00	O2	20.9	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	12:49:00	SO2	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	12:49:00	LEL	0	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	12:49:00	H2S	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	12:49:00	CO	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	13:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	13:04:00	VOC	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	13:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	13:04:00	O2	20.9	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	13:04:00	LEL	0	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	13:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	13:38:00	VOC	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	13:38:00	SO2	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	13:38:00	O2	21.3	%
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	13:38:00	LEL	0	%
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	13:38:00	H2S	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	13:38:00	CO	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	13:46:00	CO	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	13:46:00	VOC	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	13:46:00	SO2	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	13:46:00	O2	21.2	%

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Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	13:46:00	LEL	0	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	13:46:00	H2S	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	13:54:00	SO2	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	13:54:00	CO	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	13:54:00	H2S	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	13:54:00	O2	21.2	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	13:54:00	LEL	0	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	13:54:00	VOC	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	14:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	14:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	14:04:00	LEL	0	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	14:04:00	O2	21.4	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	14:04:00	VOC	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	14:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	14:14:00	VOC	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	14:14:00	H2S	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	14:14:00	SO2	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	14:14:00	LEL	0	%
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	14:14:00	O2	21.4	%
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	14:14:00	CO	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	14:26:00	VOC	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	14:26:00	SO2	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	14:26:00	O2	21.4	%
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	14:26:00	LEL	0	%
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	14:26:00	CO	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	14:26:00	H2S	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	14:56:00	O2	21.2	%
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	14:56:00	SO2	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	14:56:00	VOC	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	14:56:00	H2S	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	14:56:00	LEL	0	%
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	14:56:00	CO	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	15:03:00	H2S	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	15:03:00	O2	21.4	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	15:03:00	CO	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	15:03:00	SO2	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	15:03:00	VOC	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	15:03:00	LEL	0	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	15:18:00	O2	21.6	%
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	15:18:00	H2S	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	15:18:00	CO	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	15:18:00	VOC	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	15:18:00	SO2	0	ppm
Multigas MultiRae Pro	BMan202	Manchester	9/4/2017	15:18:00	LEL	0	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	15:27:00	LEL	0	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	15:27:00	H2S	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	15:27:00	CO	0	ppm

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Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	15:27:00	VOC	0	ppm
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	15:27:00	O2	21.6	%
Multigas MultiRae Pro	BMan203	Manchester	9/4/2017	15:27:00	SO2	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	15:35:00	VOC	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	15:35:00	LEL	0	%
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	15:35:00	O2	21.6	%
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	15:35:00	H2S	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	15:35:00	CO	0	ppm
Multigas MultiRae Pro	BMan204	Manchester	9/4/2017	15:35:00	SO2	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	15:42:00	O2	21.7	%
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	15:42:00	LEL	0	%
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	15:42:00	SO2	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	15:42:00	VOC	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	15:42:00	CO	0	ppm
Multigas MultiRae Pro	BMan205	Manchester	9/4/2017	15:42:00	H2S	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	15:50:00	VOC	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	15:50:00	LEL	0	%
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	15:50:00	SO2	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	15:50:00	H2S	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	15:50:00	CO	0	ppm
Multigas MultiRae Pro	BMan206	Manchester	9/4/2017	15:50:00	O2	21.6	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	16:01:00	LEL	0	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	16:01:00	O2	21.6	%
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	16:01:00	SO2	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	16:01:00	H2S	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	16:01:00	CO	0	ppm
Multigas MultiRae Pro	BMan201	Manchester	9/4/2017	16:01:00	VOC	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/4/2017	16:11:00	LEL	0	%
Multigas MultiRae Pro	BMan106	Manchester	9/4/2017	16:11:00	VOC	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/4/2017	16:11:00	SO2	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/4/2017	16:11:00	O2	21.5	%
Multigas MultiRae Pro	BMan106	Manchester	9/4/2017	16:11:00	H2S	0	ppm
Multigas MultiRae Pro	BMan106	Manchester	9/4/2017	16:11:00	CO	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/4/2017	16:17:00	LEL	0	%
Multigas MultiRae Pro	BMan107	Manchester	9/4/2017	16:17:00	O2	21.6	%
Multigas MultiRae Pro	BMan107	Manchester	9/4/2017	16:17:00	SO2	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/4/2017	16:17:00	VOC	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/4/2017	16:17:00	H2S	0	ppm
Multigas MultiRae Pro	BMan107	Manchester	9/4/2017	16:17:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	9:37:00	VOC	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	9:37:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	9:37:00	O2	20.9	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	9:37:00	LEL	0	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	9:37:00	SO2	0.1	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	9:37:00	H2S	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	9:43:00	VOC	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	9:43:00	H2S	0	ppm

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Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	9:43:00	O2	20.9	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	9:43:00	CO	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	9:43:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	9:43:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	9:51:00	SO2	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	9:51:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	9:51:00	O2	20.9	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	9:51:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	9:51:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	9:51:00	VOC	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	10:00:00	SO2	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	10:00:00	H2S	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	10:00:00	VOC	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	10:00:00	CO	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	10:00:00	O2	20.9	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	10:00:00	LEL	0	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	10:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	10:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	10:04:00	LEL	0	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	10:04:00	VOC	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	10:04:00	O2	20.9	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	10:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	10:11:00	O2	20.9	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	10:11:00	H2S	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	10:11:00	CO	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	10:11:00	SO2	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	10:11:00	VOC	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	10:11:00	LEL	0	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	10:29:00	H2S	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	10:29:00	CO	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	10:29:00	O2	20.9	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	10:29:00	SO2	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	10:29:00	VOC	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	10:29:00	LEL	0	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	10:37:00	O2	20.9	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	10:37:00	H2S	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	10:37:00	VOC	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	10:37:00	CO	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	10:37:00	SO2	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	10:37:00	LEL	0	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	10:46:00	VOC	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	10:46:00	O2	20.9	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	10:46:00	LEL	0	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	10:46:00	CO	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	10:46:00	SO2	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	10:46:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	10:55:00	SO2	0	ppm

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Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	10:55:00	VOC	0.08	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	11:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	11:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	11:04:00	O2	20.9	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	11:04:00	VOC	0.08	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	11:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	11:04:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	11:13:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	11:13:00	CO	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	11:13:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	11:13:00	VOC	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	11:13:00	H2S	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	11:13:00	O2	20.9	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	11:17:00	O2	20.9	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	11:17:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	11:17:00	SO2	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	11:17:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	11:17:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	11:17:00	VOC	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	11:22:00	VOC	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	11:22:00	LEL	0	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	11:22:00	CO	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	11:22:00	H2S	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	11:22:00	SO2	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	11:22:00	O2	20.9	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	11:30:00	LEL	0	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	11:30:00	SO2	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	11:30:00	H2S	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	11:30:00	O2	20.9	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	11:30:00	VOC	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	11:30:00	CO	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	11:34:00	VOC	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	11:34:00	H2S	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	11:34:00	LEL	0	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	11:34:00	SO2	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	11:34:00	O2	20.9	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	11:34:00	CO	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	11:39:00	SO2	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	11:39:00	O2	20.9	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	11:39:00	H2S	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	11:39:00	VOC	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	11:39:00	LEL	0	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	11:39:00	CO	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	11:44:00	LEL	0	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	11:44:00	CO	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	11:44:00	H2S	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	11:44:00	SO2	0	ppm

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Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	11:44:00	VOC	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	11:44:00	O2	21.2	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	11:59:00	SO2	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	11:59:00	CO	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	11:59:00	LEL	0	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	11:59:00	O2	20.9	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	11:59:00	H2S	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	11:59:00	VOC	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	12:05:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	12:05:00	O2	20.9	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	12:05:00	SO2	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	12:05:00	VOC	0.05	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	12:05:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	12:05:00	LEL	0	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:36:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:36:00	O2	20.9	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:36:00	VOC	0.06	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:36:00	LEL	0	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:36:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:36:00	SO2	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	13:45:00	H2S	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	13:45:00	CO	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	13:45:00	LEL	0	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	13:45:00	VOC	0.03	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	13:45:00	O2	20.9	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	13:45:00	SO2	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:50:00	SO2	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:50:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:50:00	O2	20.9	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:50:00	VOC	0.1	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:50:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	13:50:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	13:55:00	VOC	0.03	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	13:55:00	H2S	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	13:55:00	CO	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	13:55:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	13:55:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	13:55:00	O2	20.9	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:04:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:04:00	VOC	0.2	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:04:00	O2	20.9	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:08:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:08:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:08:00	SO2	0	ppm

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Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:08:00	VOC	0.3	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:08:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	14:08:00	O2	20.9	%
Multigas MultiRae Pro	BMan215	Manchester	9/5/2017	14:10:00	VOC	0.33	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	14:12:00	LEL	0	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	14:12:00	O2	20.9	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	14:12:00	SO2	0.1	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	14:12:00	H2S	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	14:12:00	CO	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	14:12:00	VOC	0.1	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	14:15:00	O2	20.9	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	14:15:00	CO	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	14:15:00	VOC	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	14:15:00	H2S	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	14:15:00	SO2	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	14:15:00	LEL	0	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	14:20:00	SO2	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	14:20:00	O2	20.9	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	14:20:00	H2S	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	14:20:00	CO	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	14:20:00	VOC	0.02	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	14:20:00	LEL	0	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	14:24:00	CO	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	14:24:00	LEL	0	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	14:24:00	VOC	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	14:24:00	H2S	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	14:24:00	SO2	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	14:24:00	O2	20.9	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	14:29:00	H2S	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	14:29:00	LEL	0	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	14:29:00	CO	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	14:29:00	SO2	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	14:29:00	O2	20.9	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	14:29:00	VOC	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	14:31:00	VOC	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	14:31:00	CO	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	14:31:00	H2S	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	14:31:00	LEL	0	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	14:31:00	O2	20.9	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	14:31:00	SO2	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	14:41:00	O2	20.9	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	14:41:00	VOC	0.01	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	14:41:00	SO2	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	14:41:00	H2S	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	14:41:00	CO	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	14:41:00	LEL	0	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	14:46:00	VOC	0.06	ppm

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Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	14:46:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	14:46:00	SO2	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	14:46:00	LEL	0	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	14:46:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	14:46:00	O2	20.9	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	14:56:00	CO	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	14:56:00	O2	20.9	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	14:56:00	VOC	0.11	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	14:56:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	14:56:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	14:56:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	15:00:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	15:00:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	15:00:00	VOC	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	15:00:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	15:00:00	SO2	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	15:00:00	O2	20.9	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	15:04:00	O2	20.9	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	15:04:00	VOC	0.02	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	15:04:00	LEL	0	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	15:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	15:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	15:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	15:11:00	CO	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	15:11:00	LEL	0	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	15:11:00	VOC	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	15:11:00	O2	20.9	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	15:11:00	H2S	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	15:11:00	SO2	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	15:14:00	O2	20.9	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	15:14:00	SO2	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	15:14:00	H2S	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	15:14:00	LEL	0	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	15:14:00	VOC	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	15:14:00	CO	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	15:20:00	CO	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	15:20:00	O2	20.9	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	15:20:00	H2S	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	15:20:00	VOC	0.01	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	15:20:00	LEL	0	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	15:20:00	SO2	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	15:25:00	SO2	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	15:25:00	H2S	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	15:25:00	O2	20.9	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	15:25:00	LEL	0	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	15:25:00	CO	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	15:25:00	VOC	0.01	ppm

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Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	15:26:00	VOC	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	15:26:00	CO	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	15:26:00	LEL	0	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	15:26:00	SO2	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	15:26:00	H2S	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	15:26:00	O2	20.9	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	15:35:00	VOC	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	15:35:00	O2	20.9	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	15:35:00	LEL	0	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	15:35:00	SO2	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	15:35:00	H2S	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	15:35:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	15:48:00	VOC	0.02	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	15:48:00	SO2	0.1	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	15:48:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	15:48:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	15:48:00	O2	20.9	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	15:48:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	15:57:00	LEL	0	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	15:57:00	O2	20.9	%
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	15:57:00	H2S	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	15:57:00	CO	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	15:57:00	SO2	0	ppm
Multigas MultiRae Pro	BMan104	Manchester	9/5/2017	15:57:00	VOC	0.28	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	16:10:00	SO2	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	16:10:00	O2	20.9	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	16:10:00	CO	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	16:10:00	H2S	0	ppm
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	16:10:00	LEL	0	%
Multigas MultiRae Pro	BMan103	Manchester	9/5/2017	16:10:00	VOC	0.02	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	16:15:00	SO2	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	16:15:00	CO	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	16:15:00	H2S	0	ppm
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	16:15:00	O2	20.9	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	16:15:00	LEL	0	%
Multigas MultiRae Pro	BMan208	Manchester	9/5/2017	16:15:00	VOC	0.02	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	16:18:00	O2	20.9	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	16:18:00	VOC	0.01	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	16:18:00	H2S	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	16:18:00	LEL	0	%
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	16:18:00	SO2	0	ppm
Multigas MultiRae Pro	BMan209	Manchester	9/5/2017	16:18:00	CO	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	16:26:00	SO2	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	16:26:00	CO	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	16:26:00	H2S	0	ppm
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	16:26:00	LEL	0	%
Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	16:26:00	VOC	0.02	ppm

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Multigas MultiRae Pro	BMan210	Manchester	9/5/2017	16:26:00	O2	20.9	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	16:37:00	O2	20.9	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	16:37:00	LEL	0	%
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	16:37:00	VOC	0.01	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	16:37:00	CO	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	16:37:00	H2S	0	ppm
Multigas MultiRae Pro	BMan211	Manchester	9/5/2017	16:37:00	SO2	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	16:46:00	SO2	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	16:46:00	H2S	0	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	16:46:00	LEL	0	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	16:46:00	O2	20.9	%
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	16:46:00	VOC	0.01	ppm
Multigas MultiRae Pro	BMan212	Manchester	9/5/2017	16:46:00	CO	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	16:50:00	O2	20.9	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	16:50:00	SO2	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	16:50:00	CO	0	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	16:50:00	VOC	0.01	ppm
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	16:50:00	LEL	0	%
Multigas MultiRae Pro	BMan213	Manchester	9/5/2017	16:50:00	H2S	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	17:04:00	H2S	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	17:04:00	LEL	0	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	17:04:00	CO	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	17:04:00	SO2	0	ppm
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	17:04:00	O2	20.9	%
Multigas MultiRae Pro	BMan214	Manchester	9/5/2017	17:04:00	VOC	0.03	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	17:12:00	VOC	0.02	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	17:12:00	CO	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	17:12:00	LEL	0	%
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	17:12:00	SO2	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	17:12:00	H2S	0	ppm
Multigas MultiRae Pro	BMan207	Manchester	9/5/2017	17:12:00	O2	20.9	%
RFW23821	BMan119	Manchester	9/5/2017	13:23:00	Benzene	0	ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	11:40:00	H2S	0	ppm
ToxiRae 503062	BMan102	Manchester	9/4/2017	11:45:00	H2S	0	ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	11:48:00	H2S	0	ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	11:52:00	H2S	0	ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	11:58:00	H2S	0	ppm
ToxiRae 503062	BMan106	Manchester	9/4/2017	12:20:00	H2S	0	ppm
ToxiRae 503062	BMan107	Manchester	9/4/2017	12:33:00	H2S	0	ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	12:54:00	H2S	0	ppm
ToxiRae 503062	BMan102	Manchester	9/4/2017	12:54:00	H2S	0	ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	13:03:00	H2S	0	ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	13:10:00	H2S	0	ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	13:13:00	H2S	0	ppm
ToxiRae 503062	BMan106	Manchester	9/4/2017	13:16:00	H2S	0	ppm
ToxiRae 503062	BMan107	Manchester	9/4/2017	13:20:00	H2S	0	ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	13:27:00	H2S	0	ppm

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ToxiRae 503062	BMan102	Manchester	9/4/2017	13:31:00	H2S	0 ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	13:34:00	H2S	0 ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	13:39:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	13:42:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/4/2017	13:47:00	H2S	0 ppm
ToxiRae 503062	BMan107	Manchester	9/4/2017	13:50:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	13:55:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/4/2017	14:01:00	H2S	0 ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	14:08:00	H2S	0 ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	14:10:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	14:12:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/4/2017	14:14:00	H2S	0 ppm
ToxiRae 503062	BMan107	Manchester	9/4/2017	14:20:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	14:33:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/4/2017	14:40:00	H2S	0 ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	14:43:00	H2S	0 ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	14:46:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	14:51:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/4/2017	14:53:00	H2S	0 ppm
ToxiRae 503062	BMan107	Manchester	9/4/2017	14:57:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	15:04:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/4/2017	15:06:00	H2S	0 ppm
ToxiRae 503062	BMan108	Manchester	9/4/2017	15:11:00	H2S	0 ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	15:13:00	H2S	0 ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	15:15:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	15:21:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/4/2017	15:23:00	H2S	0 ppm
ToxiRae 503062	BMan107	Manchester	9/4/2017	15:27:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/4/2017	16:00:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/4/2017	16:10:00	H2S	0.1 ppm
ToxiRae 503062	BMan108	Manchester	9/4/2017	16:14:00	H2S	0 ppm
ToxiRae 503062	BMan103	Manchester	9/4/2017	16:17:00	H2S	0 ppm
ToxiRae 503062	BMan104	Manchester	9/4/2017	16:20:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/4/2017	16:24:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/5/2017	9:29:00	H2S	0 ppm
ToxiRae 503062	BMan109	Manchester	9/5/2017	9:34:00	H2S	0 ppm
ToxiRae 503062	BMan110	Manchester	9/5/2017	9:37:00	H2S	0 ppm
ToxiRae 503062	BMan111	Manchester	9/5/2017	9:40:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/5/2017	9:43:00	H2S	0 ppm
ToxiRae 503062	BMan108	Manchester	9/5/2017	9:47:00	H2S	0 ppm
ToxiRae 503062	BMan112	Manchester	9/5/2017	9:50:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/5/2017	9:55:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/5/2017	9:58:00	H2S	0 ppm
ToxiRae 503062	BMan107	Manchester	9/5/2017	10:04:00	H2S	0 ppm
ToxiRae 503062	BMan113	Manchester	9/5/2017	10:22:00	H2S	0 ppm
ToxiRae 503062	BMan114	Manchester	9/5/2017	10:30:00	H2S	0 ppm
ToxiRae 503062	BMan115	Manchester	9/5/2017	10:35:00	H2S	0 ppm

	START Region 6
	START Region 6
gasoline odor	START Region 6
	START Region 6
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	START Region 6
gasoline odor	START Region 6
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	START Region 6
	START Region 6
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gasoline odor	START Region 6
no odor	START Region 6
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	START Region 6
gasoline odor	START Region 6
	START Region 6
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	START Region 6
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	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
no wind	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind NNW @ <2mph	START Region 6

ToxiRae 503062	BMan101	Manchester	9/5/2017	10:42:00	H2S	0 ppm
ToxiRae 503062	BMan109	Manchester	9/5/2017	10:58:00	H2S	0 ppm
ToxiRae 503062	BMan110	Manchester	9/5/2017	11:00:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/5/2017	11:18:00	H2S	0 ppm
ToxiRae 503062	BMan108	Manchester	9/5/2017	11:22:00	H2S	0 ppm
ToxiRae 503062	BMan112	Manchester	9/5/2017	11:28:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/5/2017	11:31:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/5/2017	11:37:00	H2S	0 ppm
ToxiRae 503062	BMan113	Manchester	9/5/2017	11:41:00	H2S	0 ppm
ToxiRae 503062	BMan114	Manchester	9/5/2017	11:43:00	H2S	0 ppm
ToxiRae 503062	BMan115	Manchester	9/5/2017	11:46:00	H2S	0 ppm
ToxiRae 503062	BMan116	Manchester	9/5/2017	12:48:00	H2S	0 ppm
ToxiRae 503062	BMan117	Manchester	9/5/2017	12:55:00	H2S	0 ppm
ToxiRae 503062	BMan118	Manchester	9/5/2017	13:04:00	H2S	0 ppm
ToxiRae 503062	BMan119	Manchester	9/5/2017	13:15:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/5/2017	13:36:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/5/2017	15:18:00	H2S	0 ppm
ToxiRae 503062	BMan109	Manchester	9/5/2017	15:21:00	H2S	0 ppm
ToxiRae 503062	BMan110	Manchester	9/5/2017	15:23:00	H2S	0 ppm
ToxiRae 503062	BMan111	Manchester	9/5/2017	15:26:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/5/2017	15:29:00	H2S	0 ppm
ToxiRae 503062	BMan108	Manchester	9/5/2017	15:31:00	H2S	0 ppm
ToxiRae 503062	BMan112	Manchester	9/5/2017	15:34:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/5/2017	15:39:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/5/2017	15:40:00	H2S	0 ppm
ToxiRae 503062	BMan107	Manchester	9/5/2017	15:49:00	H2S	0 ppm
ToxiRae 503062	BMan113	Manchester	9/5/2017	15:53:00	H2S	0 ppm
ToxiRae 503062	BMan114	Manchester	9/5/2017	16:02:00	H2S	0 ppm
ToxiRae 503062	BMan115	Manchester	9/5/2017	16:04:00	H2S	0 ppm
ToxiRae 503062	BMan119	Manchester	9/5/2017	16:09:00	H2S	0 ppm
ToxiRae 503062	BMan116	Manchester	9/5/2017	16:11:00	H2S	0 ppm
ToxiRae 503062	BMan117	Manchester	9/5/2017	16:14:00	H2S	0 ppm
ToxiRae 503062	BMan118	Manchester	9/5/2017	16:17:00	H2S	0 ppm
ToxiRae 503062	BMan101	Manchester	9/5/2017	16:30:00	H2S	0 ppm
ToxiRae 503062	BMan109	Manchester	9/5/2017	16:33:00	H2S	0 ppm
ToxiRae 503062	BMan110	Manchester	9/5/2017	16:35:00	H2S	0 ppm
ToxiRae 503062	BMan111	Manchester	9/5/2017	16:37:00	H2S	0 ppm
ToxiRae 503062	BMan102	Manchester	9/5/2017	16:41:00	H2S	0 ppm
ToxiRae 503062	BMan108	Manchester	9/5/2017	16:46:00	H2S	0 ppm
ToxiRae 503062	BMan112	Manchester	9/5/2017	16:48:00	H2S	0 ppm
ToxiRae 503062	BMan105	Manchester	9/5/2017	16:50:00	H2S	0 ppm
ToxiRae 503062	BMan106	Manchester	9/5/2017	16:53:00	H2S	0 ppm
ToxiRae 503062	BMan113	Manchester	9/5/2017	16:56:00	H2S	0 ppm
ToxiRae 503062	BMan114	Manchester	9/5/2017	16:59:00	H2S	0 ppm
ToxiRae 503062	BMan115	Manchester	9/5/2017	17:00:00	H2S	0 ppm
ToxiRae 503062	BMan207	Manchester	9/6/2017	8:25:00	SO2	0 ppm
ToxiRae 503062	BMan215	Manchester	9/6/2017	8:27:00	SO2	0 ppm

Wind NNW @ <2mph	START Region 6
Wind NNW ~2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ ~2.5 mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
no wind	START Region 6
Wind NW @ ~4 mph	START Region 6
Wind NW @ ~2.5 mph	START Region 6
Wind NW @ ~2.5 mph	START Region 6
Wind N @ <2mph	START Region 6
VOC Sensor Failure	START Region 6
Wind NW @ <2mph	START Region 6
Wind NW @ <2mph	START Region 6
no wind	START Region 6
no wind	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind NE @ <2mph	START Region 6
Wind N @ ~4.5 mph	START Region 6
Wind N @ ~4 mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ ~2mph	START Region 6
Wind N @ ~2mph	START Region 6
no wind	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ <2mph	START Region 6
Wind N @ ~7 mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ ~2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
no wind	START Region 6
Wind NNE @ <2mph	START Region 6
no wind	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ <2mph	START Region 6
Wind NNE @ ~3mph	START Region 6
	START Region 6
	START Region 6

ToxiRae 503062	BMan104	Manchester	9/6/2017	8:30:00	SO2	0 ppm
ToxiRae 503062	BMan103	Manchester	9/6/2017	8:35:00	SO2	0 ppm
ToxiRae 503062	BMan208	Manchester	9/6/2017	8:40:00	SO2	0 ppm
ToxiRae 503062	BMan209	Manchester	9/6/2017	8:45:00	SO2	0 ppm
ToxiRae 503062	BMan210	Manchester	9/6/2017	8:49:00	SO2	0 ppm
ToxiRae 503062	BMan211	Manchester	9/6/2017	9:00:00	SO2	0 ppm
ToxiRae 503062	BMan212	Manchester	9/6/2017	9:16:00	SO2	0 ppm
ToxiRae 503062	BMan213	Manchester	9/6/2017	9:24:00	SO2	0 ppm
ToxiRae 503062	BMan214	Manchester	9/6/2017	9:29:00	SO2	0 ppm
ToxiRae 503062	BMan207	Manchester	9/6/2017	9:38:00	SO2	0 ppm
ToxiRae 503062	BMan215	Manchester	9/6/2017	9:42:00	SO2	0 ppm
ToxiRae 503062	BMan104	Manchester	9/6/2017	9:48:00	SO2	0 ppm
ToxiRae 503062	BMan103	Manchester	9/6/2017	10:11:00	SO2	0 ppm
ToxiRae 503062	BMan208	Manchester	9/6/2017	10:17:00	SO2	0 ppm
ToxiRae 503062	BMan209	Manchester	9/6/2017	10:29:00	SO2	0 ppm
ToxiRae 503062	BMan102	Manchester	9/6/2017	10:33:00	SO2	0 ppm
ToxiRae 503062	BMan110	Manchester	9/6/2017	10:39:00	SO2	0 ppm
ToxiRae 503062	BMan109	Manchester	9/6/2017	10:43:00	SO2	0 ppm
ToxiRae 503062	BMan106	Manchester	9/6/2017	10:52:00	SO2	0 ppm
ToxiRae 503062	BMan101	Manchester	9/6/2017	11:00:00	SO2	0 ppm
ToxiRae 503062	BMan111	Manchester	9/6/2017	11:10:00	SO2	0 ppm
ToxiRae 503062	BMan210	Manchester	9/6/2017	11:27:00	SO2	0 ppm
ToxiRae 503062	BMan211	Manchester	9/6/2017	11:33:00	SO2	0 ppm
ToxiRae 503062	BMan212	Manchester	9/6/2017	11:44:00	SO2	0 ppm
ToxiRae 503062	BMan214	Manchester	9/6/2017	11:50:00	SO2	0 ppm
ToxiRae 503062	BMan207	Manchester	9/6/2017	12:00:00	SO2	0 ppm
ToxiRae 503062	BMan216	Manchester	9/6/2017	13:15:00	SO2	0 ppm
ToxiRae 503062	BMan213	Manchester	9/6/2017	13:30:00	SO2	0 ppm
ToxiRae 503062	BMan212	Manchester	9/6/2017	13:47:00	SO2	0 ppm
ToxiRae 503062	BMan214	Manchester	9/6/2017	13:50:00	SO2	0 ppm
ToxiRae 503062	BMan207	Manchester	9/6/2017	13:58:00	SO2	0 ppm
ToxiRae 503062	BMan215	Manchester	9/6/2017	14:01:00	SO2	0 ppm
ToxiRae 503062	BMan216	Manchester	9/6/2017	14:04:00	SO2	0 ppm
ToxiRae 503062	BMan103	Manchester	9/6/2017	14:18:00	SO2	0 ppm
ToxiRae 503062	BMan208	Manchester	9/6/2017	14:33:00	SO2	0 ppm
ToxiRae 503062	BMan209	Manchester	9/6/2017	14:36:00	SO2	0 ppm
ToxiRae 503062	BMan210	Manchester	9/6/2017	14:41:00	SO2	0 ppm
ToxiRae 503062	BMan211	Manchester	9/6/2017	14:46:00	SO2	0 ppm
ToxiRae 503062	BMan212	Manchester	9/6/2017	14:58:00	SO2	0 ppm
ToxiRae 503062	BMan214	Manchester	9/6/2017	15:06:00	SO2	0 ppm
ToxiRae 503062	BMan207	Manchester	9/6/2017	15:15:00	SO2	0 ppm
ToxiRae 503062	BMan215	Manchester	9/6/2017	15:18:00	SO2	0 ppm
ToxiRae 503062	BMan216	Manchester	9/6/2017	15:23:00	SO2	0 ppm
ToxiRae 503062	BMan103	Manchester	9/6/2017	15:27:00	SO2	0 ppm
ToxiRae 503062	BMan209	Manchester	9/6/2017	15:28:00	SO2	0 ppm
ToxiRae 503062	BMan104	Manchester	9/6/2017	15:29:00	SO2	0 ppm
ToxiRae 503062	BMan208	Manchester	9/6/2017	15:43:00	SO2	0 ppm

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	START Region 6
	START Region 6
generator running nearby	START Region 6
Under freeway 610	START Region 6
	START Region 6
	START Region 6
	START Region 6
Valero security observing	START Region 6
	START Region 6
	START Region 6
	START Region 6
Asked to move and find hole in fenceline	START Region 6
new location	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
14:20 picked by Valero security for 10 minutes	START Region 6
	START Region 6
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	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6

ToxiRae 503062	BMan108	Manchester	9/6/2017	15:53:00	SO2	0 ppm
ToxiRae 503062	BMan210	Manchester	9/6/2017	15:58:00	SO2	0 ppm
ToxiRae 503062	BMan211	Manchester	9/6/2017	16:01:00	SO2	0 ppm
ToxiRae 503062	BMan212	Manchester	9/6/2017	16:11:00	SO2	0 ppm
ToxiRae 503062	BMan214	Manchester	9/6/2017	16:22:00	SO2	0 ppm
ToxiRae 503062	BMan212	Manchester	9/6/2017	16:32:00	SO2	0 ppm
UltraRae 2	BMan207	Manchester	9/5/2017	13:50:00	Benzene	0 ppm
UltraRae 2	BMan103	Manchester	9/5/2017	14:04:00	Benzene	0 ppm
UltraRae 2	BMan103	Manchester	9/5/2017	14:08:00	Benzene	0 ppm
UltraRae 2	BMan215	Manchester	9/5/2017	14:10:00	Benzene	0 ppm
UltraRae 2	BMan104	Manchester	9/5/2017	14:56:00	Benzene	0 ppm
UltraRae 2	BMan104	Manchester	9/5/2017	15:57:00	Benzene	0 ppm
UltraRae RFW21474	BMan104	Manchester	9/6/2017	9:48:00	Benzene	0 ppm
UltraRae RFW21474	BMan208	Manchester	9/6/2017	10:17:00	Benzene	0 ppm
UltraRae RFW21474	BMan216	Manchester	9/6/2017	13:15:00	Benzene	0 ppm
UltraRae RFW21474	BMan212	Manchester	9/6/2017	13:47:00	Benzene	0 ppm
UltraRae RFW21474	BMan214	Manchester	9/6/2017	13:50:00	Benzene	0 ppm
UltraRae RFW21474	BMan207	Manchester	9/6/2017	13:58:00	Benzene	0 ppm
UltraRae RFW21474	BMan215	Manchester	9/6/2017	14:01:00	Benzene	0 ppm
UltraRae RFW21474	BMan216	Manchester	9/6/2017	14:04:00	Benzene	0 ppm
UltraRae RFW21474	BMan208	Manchester	9/6/2017	14:33:00	Benzene	0 ppm
UltraRae RFW21474	BMan209	Manchester	9/6/2017	14:36:00	Benzene	0 ppm
UltraRae RFW21474	BMan210	Manchester	9/6/2017	14:41:00	Benzene	0 ppm
UltraRae RFW21474	BMan211	Manchester	9/6/2017	14:46:00	Benzene	0 ppm
UltraRae RFW21474	BMan215	Manchester	9/6/2017	15:18:00	Benzene	0 ppm
UltraRae RFW21474	BMan216	Manchester	9/6/2017	15:23:00	Benzene	0 ppm

	START Region 6
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	START Region 6
	START Region 6
	START Region 6
Strong odor	START Region 6
single VOC and benzene measurement	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
new location	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6
	START Region 6

Message

From: Schaefer, Joe [Schaefer.Joe@epa.gov]
Sent: 9/9/2017 9:30:41 PM
To: Jose Ojeda [Jose.Ojeda@WestonSolutions.com]; t.a.walzer@westonsolutions.com; Cook, David [David.Cook@WestonSolutions.com]
CC: Thumma, Janelle [Janelle.Thumma@WestonSolutions.com]; Delgado, Eric [Delgado.Eric@epa.gov]
Subject: FW: Viper Export for Manchester Bravo Air Monitoring
Attachments: VIPER - [428]R06 Harvey -Manchester Bravo Air Monitoring Deployment - 9-9-2017 1102.piz

Here is all the Viper Monitoring the Bravo mobile teams have collected to date. We were going to map these tonight, but I know the OSC had some additional things she was looking, if you had better awareness of those requirements and wanted to take this on that's fine to. Just let us know and Janelle can pass along the process she's been using to map the TAGA data which will the same steps for this.

Joe Schaefer
Environmental Response Team
US EPA
(c)609-865-8111

From: ERT Support
Sent: Saturday, September 09, 2017 11:08 AM
To: Schaefer, Joe <Schaefer.Joe@epa.gov>
Cc: Campbell, John <CAMPBELL.JOHN@EPA.GOV>
Subject: Re: Viper Export for Manchester Bravo Air Monitoring

Joe,

Attached is the Viper Bravo Air Monitoring data through yesterday (rename to .zip). I'll run another export tonight for today's data and ditto tomorrow. Should I include anyone else on the e-mail when I send those other exports?

For Additional Information Please Contact
ERT Software Support
1-800-999-6990
1-732-321-6724 (fax)
ertsupport@epa.gov
www.ertsupport.org

From: Schaefer, Joe
Sent: Saturday, September 9, 2017 9:16 AM
To: ERT Support
Cc: Campbell, John
Subject: Re: Viper Export for Manchester Bravo Air Monitoring

The dump is fine for now. I just to catch us up.

Joe Schaefer
Environmental Response Team
(c) 609-865-8111

On Sep 9, 2017, at 7:49 AM, ERT Support <ERTSupport@epa.gov> wrote:

> Joe,
>
> I can do the data dump but I can't do the automated export without the instructions - which are on our GD Server and I don't have remote access to that. John, if you can send the notes, I can take care of it later this morning or I can just do a dump tonight and tomorrow and configure the automated one on Monday.
>
> - Melissa
>
> For Additional Information Please Contact
> ERT Software Support
> 1-800-999-6990
> 1-732-321-6724 (fax)
> ertsupport@epa.gov
> www.ertsupport.org

From: Schaefer, Joe
Sent: Saturday, September 9, 2017 8:33 AM
To: ERT Support; Campbell, John
Subject: Viper Export for Manchester Bravo Air Monitoring

Can I get an export of data to date in the Manchester Bravo Air monitoring deployment and then a recurring 7pm eastern export?

Joe Schaefer
Environmental Response Team
US EPA
(c)609-865-8111

Message

From: Kaelin, Lawrence [Kaelin.Lawrence@epa.gov]
Sent: 9/1/2017 11:00:28 PM
To: Delgado, Eric [Delgado.Eric@epa.gov]
Subject: PHILIS analytical info
Attachments: Hurricane Harvey Response Effort_QAPP 090117.docx

Eric attached is the PHILIS analytical info you may need for the site QAPP.

Lawrence (Larry) Kaelin
US EPA/OSWER OEM/CBRN CMAT
2890 Woodbridge Avenue
Edison, NJ 08837
732-321-6625 (office)
513-675-4751 (cell)
Kaelin.Lawrence@epa.gov

REGION 6
DELIVERABLE SIGN-OFF SHEET

TDD No.: TO-
TASK No.:
TASK/SITE: Site-Specific UFP QAPP – Hurricane Harvey Response Action Site
DCN: USEPA Region 6 RSTxxxxx

Principal Author(s)

_____ _____
xxxxxxxx Date

Technical Editor/ Peer Review

_____ _____
xxxxxxxx Date

Approval (QA/QC Specialist)

_____ _____
xxxxxxxx Date

August 31, 2017

Eric Delgado, On-Scene Coordinator
U.S. Environmental Protection Agency, Region 6
Response and Prevention Branch
TX

EPA CONTRACT NO:
TDD NO: TO-
DOCUMENT CONTROL NO:
SUBJECT: SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN– HURRICANE HARVEY RESPONSE ACTION SITE, 10625 Fallstone Rd., HARRIS COUNTY, HOUSTON, TEXAS

Dear Mr.

Enclosed please find the Site-Specific Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP) for the soil and water sampling event to be conducted at the Hurricane Harvey Response Effort Site located in, Harris County, Houston, Texas beginning on August 31, 2017.

If you have any questions or comments, please do not hesitate to contact me at (xxx) xxx-xxxx.

Sincerely,

xxxxxxxxxxxx

xxxxxxxxx
xxxxxxxx Project Manager

Enclosure
cc: TDD File No.: TO-

SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN

HURRICANE HARVEY RESPONSE ACTION SITE
10625 Fallstone Rd, Harris County, Houston, Texas 77099
SSID No: xxxx

Prepared By:

DC No.: EPA Region 6 RST
TDD No.: TO-
EPA Contract No.: EP-

August 2017

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LIST OF ATTACHMENTS

ATTACHMENT A: Figure 1 - Site Location Map

ATTACHMENT B: Sampling SOPs
EPA ERT SOP # 2001: General Field Sampling Guidelines
EPA ERT SOP # 2012: Soil Sampling

ATTACHMENT C:

LIST OF ACRONYMS

ADR	Automated Data Review
ANSETS	Analytical Services Tracking System
AOC	Acknowledgment of Completion
ASTM	American Society for Testing and Materials
CEO	Chief Executive Officer
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
CFM	Contract Financial Manager
CO	Contract Officer
COI	Conflict of Interest
COO	Chief Operations Officer
CRDL	Contract Required Detection Limit
CRTL	Core Response Team Leader
CRQL	Contract Required Quantitation Limit
CQLOSS	Corporate Quality Leadership and Operations Support Services
CWA	Clean Water Act
DCN	Document Control Number
DESA	Division of Environmental Science and Assessment
DI	Deionized Water
DPO	Deputy Project Officer
DQI	Data Quality Indicator
DQO	Data Quality Objective
EM	Equipment Manager
EDD	Electronic Data deliverable
ENVL	Environmental Unit Leader
EPA	Environmental Protection Agency
ERT	Environmental Response Team
FASTAC	Field and Analytical Services Teaming Advisory Committee
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatography/Mass Spectrometry
HASP	Health and Safety Plan
HRS	Hazard Ranking System
HSO	Health and Safety Officer
ITM	Information Technology Manager
LEL	Lower Explosive Limit
MSA	Mine Safety Appliances
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration

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LIST OF ACRONYMS (Concluded)

OSWER	Office of Solid Waste and Emergency Response
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, Sensitivity
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PIO	Public Information Officer
PM	Program Manager
PO	Project Officer
PRP	Potentially Responsible Party
PT	Proficiency Testing
QA	Quality Assurance
QAL	Quality Assurance Leader
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RC	Readiness Coordinator
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSCC	Regional Sample Control Coordinator
RST	Removal Support Team
SARA	Superfund Amendments and Reauthorization Act
SEDD	Staged Electronic Data Deliverable
SOP	Standard Operating Practice
SOW	Statement of Work
SPM	Site Project Manager
START	Superfund Technical Assessment and Response Team
STR	Sampling Trip Report
TAL	Target Analyte List
TCL	Total Compound List
TDD	Technical Direction Document
TDL	Technical Direction Letter
TO	Task Order
TQM	Total Quality Management
TSCA	Toxic Substances Control Act
UFP	Uniform Federal Policy
VOA	Volatile Organic Analysis

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CROSSWALK

The following table provides a "cross-walk" between the QAPP elements outlined in the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP Manual), the necessary information, and the location of the information within the text document and corresponding QAPP Worksheet. Any QAPP elements and required information that are not applicable to the project are circled.

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual		Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Project Management and Objectives				
2.1	Title and Approval Page	- Title and Approval Page	Approval Page	1
2.2	Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	TOC Approval Page	2
2.3	Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	Approval Page	3 4
2.4	Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications - Special Personnel Training Requirements	2	5 6 7 8
2.5	Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	1	9 10
2.6	Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria	3	11 12
2.7	Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations	1 2	13

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QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	- Summary of Project Tasks - Reference Limits and Evaluation - Project Schedule/Timeline	4	14 15 16
Measurement/Data Acquisition			
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/SOP Requirements - Analytical Methods/SOP Requirements - Field Quality Control Sample Summary - Sampling SOPs - Project Sampling SOP References - Field Equipment Calibration, Maintenance, Testing, and Inspection	5	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	- Analytical SOPs - Analytical SOP References - Analytical Instrument Calibration - Analytical Instrument and Equipment Maintenance, Testing, and Inspection	6	23 24 25
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	7	26 27

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples - Screening/Confirmatory Analysis Decision Tree	5	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records - Analytical Services - Data Management SOPs	6	29 30
Assessment/Oversight			
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments - Audit Checklists - Assessment Findings and Corrective Action Responses	8	31 32
4.2 QA Management Reports	- QA Management Reports		33
4.3 Final Project Report	- Final Report(s)		
Data Review			
5.1 Overview			
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	- Verification (Step I) Process - Validation (Steps IIa and IIb) Process - Validation (Steps IIa and IIb) Summary - Usability Assessment	9	34 35 36 37

QAPP Worksheet #1: Title and Approval Page

Title: Site-Specific UFP Quality Assurance Project Plan
Site Name/Project Name: Hurricane Harvey Response Action Site
Site Location: 10625 Fallstone Rd., Harris County, Houston, Texas 77099
Revision Number: 00
Revision Date: Not Applicable

Lead Organization

Eric Delgado
Federal On Scene Coordinator
USEPA Region 6
214.437.9809
[HYPERLINK "mailto:Delgado.Eric@epa.gov"]

Preparer's Name and Organizational Affiliation

31 August 2017

Preparation Date (Day/Month/Year)

Site Project Manager: _____
Signature

Printed Name/Organization/Date

QA Officer/Technical Reviewer: _____
Signature

Printed Name/Organization/Date

EPA, Region 6 On-Scene Coordinator (OSC): _____
Signature

xxxxxxxx/EPA, Region 6

Printed Name/Organization/Date

EPA, Region 6 Quality Assurance Officer QAO): _____
Signature

Printed Name/Organization/Date

Document Control Number:

QAPP Worksheet #2: QAPP Identifying Information

Site Name/Project Name: Hurricane Harvey Response Action Site
Site Location: 10625 Fallstone Rd., Harris County, Houston, Texas 77099
Operable Unit: 00
Title: Site-Specific UFP Quality Assurance Project Plan
Revision Number: 00
Revision Date: Not Applicable

1. **Identify guidance used to prepare QAPP:**
   Uniform Federal Policy for Quality Assurance Project Plans and SW-846 Method 8260C and Method 8270D.

2. **Identify regulatory program:** USEPA, Region 6

3. **Identify approval entity:** USEPA, Region 6

4. **Indicate whether the QAPP is a generic or a site-specific QAPP:** Site Specific

5. **List dates of scoping sessions that were held:** August ?, 2017

6. **List dates and titles of QAPP documents written for previous site work, if applicable:**

   Site-Specific UFP QAPP

7. **List organizational partners (stakeholders) and connection with lead organization:**

   None

8. **List data users:** USEPA, Region 6 (see Worksheet #4 for individuals)

9. **If any required QAPP elements and required information are not applicable to the project, then provide an explanation for their exclusion below:**

   None

10. **Document Control Number:**

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QAPP Worksheet #3: Distribution List

[List those entities to which copies of the approved site-specific QAPP, subsequent QAPP revisions, addenda, and amendments are sent]

QAPP Recipient	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Eric Delgado	OSC	EPA, Region 6	214.437.9809		[HYPERLINK "mailto:Delgado.Eric@epa.gov"]	

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QAPP Worksheet #4: Project Personnel Sign-Off Sheet

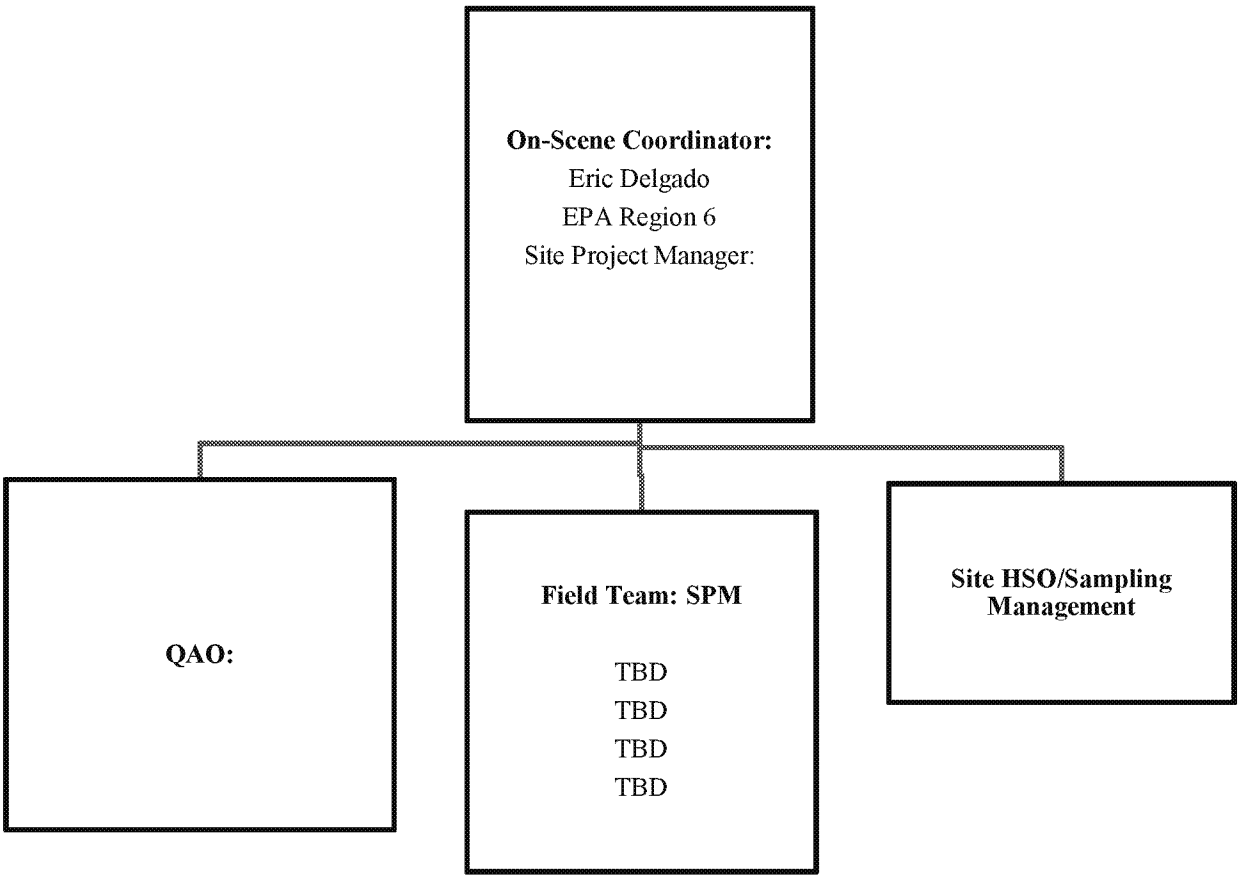
[Copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the site-specific QAPP and will perform the tasks as described; add additional sheets as required. Ask each organization to forward signed sheets to the central project file.]

Organization: xxxxxxxxx

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Eric Delgado	EPA, Region 6, OSC	(214) 437-9809		

QAPP Worksheet #5: Project Organizational Chart

Identify reporting relationship between all organizations involved in the project, including the lead organization and all contractor and subcontractor organizations. Identify the organizations providing field sampling, on-site and off-site analysis, and data review services, including the names and telephone numbers of all project managers, project team members, and/or project contacts for each organization.



Acronyms:

EPA – U.S. Environmental Protection Agency
HSO – Health & Safety Officer
OSC – On-Scene Coordinator
TBD – To Be Determined
QAO – Quality Assurance Officer
RST 3 – Removal Support Team 3
SPM – Site Project Manager
ESAT- Environmental Services Assistant Team

QAPP Worksheet #6: Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Point of contact with EPA OSC				All technical, QA and decision-making matters in regard to the project (verbal, written or electronic)
Adjustments to QAPP				QAPP approval dialogue
Health and Safety On-Site Meeting				Explain/review site hazards, personnel protective equipment, hospital location, etc.

EPA – U.S. Environmental Protection Agency
HSO – Health and Safety Officer
OSC – On-Scene Coordinator
QA – Quality Assurance
QAPP – Quality Assurance Project Plan
SPM – Site Project Manager

QAPP Worksheet #7: Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Eric Delgado	USEPA OSC	EPA, Region 6	All project coordination, direction and decision making.	Not Applicable
TBD				
TBD				
TBD				
TBD				

TBD – To Be Determined

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QAPP Worksheet #8: Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates[1]
[Specify location of training records and certificates for samplers]						
QAPP Training	This training is presented to all RST 3 personnel to introduce the provisions, requirements, and responsibilities detailed in the UFP QAPP. The training presents the relationship between the site-specific QAPPs, SOPs, work plans, and the Generic QAPP. QAPP refresher training will be presented to all employees following a major QAPP revision.		As needed	All RST 3 field personnel upon initial employment and as refresher training		
Health and Safety Training	Health and safety training will be provided to ensure compliance with Occupational Safety and Health Administration (OSHA) as established in 29 CFR 1910.120.		Yearly at a minimum	All Employees upon initial employment and as refresher training every year		
Others	Scribe, ICS 100 and 200, and Air Monitoring Equipment Trainings provided to all employees		Upon initial employment and as needed			
	Dangerous Goods Shipping		Every 2 years			

All team members are trained in the concepts and procedures in recognizing opportunities for continual improvement, and the approaches required to improve procedures while maintaining conformance with legal, technical, and contractual obligations.

[1] All RST 3 members, including subcontractor's, certifications are in possession of the RST 3 HSO.

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QAPP Worksheet #9: Project Scoping Session Participants Sheet

Site Name/Project Name: Hurricane Harvey Response Action Site
Site Location: 10625 Fallstone Rd., Harris County, Houston, Texas 77099
Operable Unit: 00
Date of Sessions: August, 2017
Scoping Session Purpose: To discuss questions, comments, and assumptions regarding technical issues involved with the Removal Action sampling activities for the Site.

Name	Title	Affiliation	Phone #	E-mail Address	*Project Role
Eric Delgado	EPA OSC	EPA, Region 6	(214)-437-9809	Delgado.Eric@epa.gov	OSC

Comments/Decisions:

Action Items: The soil and water samples are being analyzed by EPA's Portable High Throughput Integrated Laboratory Identification System (PHILIS) laboratory and no request form is necessary.

Consensus Decisions: The sampling activities will begin on September 1, 2017 and will conclude at a time to be determined later.

QAPP Worksheet #10: Problem Definition

PROBLEM DEFINITION

xxxxxxxxxxxxxxxxxxxxx

SITE HISTORY/CONDITIONS

xxxxxxxxxxxxxxxxxxxxxxxxx

PROJECT DESCRIPTION

xxxxxxxxxxxxxxxxxxxxxxxxx

PROJECT DECISION STATEMENTS

xxxxxxxxxxxxxxxxxxxxxxxxx

QAPP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statement

Overall project objectives include: Take samples and submit to the laboratory to locate contaminated locations.

Who will use the data? Data will be used by the EPA OSC.

What will the data be used for? The data will be used to characterize current soil conditions on-site and to evaluate the suitability for residential or business use.

What types of data are needed?

Matrix:	Soil and Water
Type of Data:	Definitive Data
Analytical Techniques:	On-site laboratory analyses
Parameters:	SW846 Method 8260C VOCs and Method 8270D SVOCs.
Type of Sampling Equip.:	EnCore Samplers (5 gram), 4 oz. glass jars for % moisture for soil samples, water samples will be taken in 40 ml volatile vials. Semivolatiles will be taken in 8 oz glass jars for the moisture and analysis. Water samples will be taken in 500 mL or 1 L amber bottles with Teflon lids.

Access Agreement: Obtained by EPA OSC.
Sampling locations: Sample locations will be identified by the EPA OSC.

How much data are needed?
Soil and water samples will be collected from various locations as directed by the OSC.

How "good" does the data need to be in order to support the environmental decision?
Sampling/analytical measurement performance criteria for Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) parameters will be established. Soil samples will be collected for definitive data, MS/MSD and field duplicate will be collected at 1 per 20 samples.

Where, when, and how should the data be collected/generated?

The subsurface soil samples will be collected from the surface and various depths at the Site as directed by the EPA OSC; exact borehole locations to be determined in the field. Water samples will be taken as directed by the EPA OSC>

Who will collect and generate the data?

RST 3 personnel will collect the soil and water samples. The samples will be submitted to EPA's Portable High Throughput Integrated Laboratory Identification System (PHILIS) laboratory for VOC by 8260C and SVOC by 8270D analysis.

QAPP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statement (Continued)

How will the data be reported?
All data will be reported by the PHILIS laboratory (Preliminary and Electronic).The Site Project Manager will provide a chronology of events, photolog, Status Reports, Maps/Figures including private Mark-Out below grade utility location map, Analytical Report, and Data Validation Report to the EPA OSC.

How will the data be archived? Electronic data deliverables will be archived in the Scribe database.

QAPP Worksheet #12: Measurement Performance Criteria Table
Worksheet # 12A: Volatiles - Organics/SW 846, Method 8260C

Matrix	Aqueous/Soil
Analytical Group	VOA
Concentration Level	Low/Medium/High

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
	SW846, Method 8260C SOP L-A-101 Rev 7 and SW846, Method 8270D SOP L-A-201 Rev 7	Precision Accuracy	% RPD <30 Average Recovery 50-140% Acceptance criteria in LIMS	LCS	A
		Accuracy	Factor of two(-50% to + 100%) from the initial/continuing calibration	Internal standards	A
		Accuracy Precision	Compound Specific average range: 50 - 140% % RPD < 30	Matrix spike/Matrix Spike Duplicate RPD	A
		Accuracy	Limits 30%-140%(Aqueous); 70%-140% (soil/sediment) Acceptance criteria in LIMS	Surrogate Compounds	A
		Precision	% RPD < 30 (water) <50 (soil)	Field Duplicate	A
		Accuracy	< RL	Method Blank	A

All aqueous samples will be rinse blank samples

1 Reference number from QAPP Worksheet #21

2 Reference number from QAPP Worksheet #23 and #28

* Reference SW846 Method 8260C/VOA Analysis by Gas Chromatography/Mass Spectrometry SW-846 Method 8260C

Refer to SW 846 methods on [HYPERLINK "http://www.epa.gov/waste/hazard/testmethods/sw846/online/index.htm"]

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QAPP Worksheet #12B: Measurement Performance Criteria Table

(UFP-QAPP Manual Section 2.6.2)
Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQI), measurement performance criteria (MPC) and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

Matrix	Air
Analytical Group	
Concentration Level	

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
		Precision (field)	±30% D*	Field Duplicate -	S & A
		Accuracy (field)	No analyte > CRQL*	Field Blank	S & A
		Precision (laboratory)	±30% D*	Laboratory Replicate Sample	A
		Accuracy (laboratory)	Acceptance criteria in LIMS %R*	Laboratory Audit Standard	A
		Accuracy (laboratory)	No analyte > CRQL*	Laboratory Method Blank	A

[1]Reference number from QAPP Worksheet #21.
[2]Reference number from QAPP Worksheet #23.

QAPP Worksheet #13: Secondary Data Criteria and Limitations Table

Any data needed for project implementation or decision making that are obtained from non-direct measurement sources such as computer databases, background information, technologies and methods, environmental indicator data, publications, photographs, topographical maps, literature files and historical data bases will be compared to the DQOs for the project to determine the acceptability of the data. Thus, for example, analytical data from historical surveys will be evaluated to determine whether they satisfy the validation criteria for the project and to determine whether sufficient data was provided to allow an appropriate validation to be done. If not, then a decision to conduct additional sampling for the site may be necessary.

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data May Be Used (if deemed usable during data assessment stage)	Limitations on Data Use

QAPP Worksheet #14: Summary of Project Tasks

Sampling Tasks:

Soil, sediment, and water samples will be collected from multiple locations. Sample will be collected from each location using standard field protocol.

Analysis Tasks:

VOCs– Soil and aqueous (rinse blank and trip blank)– EPA SW846 Method 8260C
Percent Moisture - soil

Quality Control Tasks:

QA/QC samples will include the collection of one duplicate soil sample at the ratio of 1 per 20 samples, one aqueous rinsate blank per day, and one trip blank per day.

Data Management Tasks:

Activities under this project will be reported in status and reports and other deliverables (*e.g.*, analytical reports, final reports) described herein. Activities will also be summarized in appropriate format for inclusion in monthly and annual reports.

The following deliverables will be provided under this project:

Report: Report will be submitted to the EPA OSC within two weeks of receiving analytical data.

Maps/Figures: Maps depicting site layout and sample locations will be included in the trip report, as appropriate.

Documentation and Records:

All sample documents will be completed legibly, in ink. Any corrections or revisions will be made by lining through the incorrect entry and by initialing the error.

Field Logbook: The field logbook is essentially a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. Field logbook will be bound and paginated. All entries will be dated and signed by the individuals making the entries, and should include (at a minimum) the following:

1. Site name and project number
2. Name(s) of personnel on-site
3. Dates and times of all entries (military time preferred)
4. Descriptions of all site activities, site entry and exit times
5. Noteworthy events and discussions

Q

QAPP Worksheet #14: Summary of Project Tasks (Continued)

6. Weather conditions

7. Site observations
8. Sample and sample location identification and description*
9. Subcontractor information and names of on-site personnel
10. Date and time of sample collections, along with COC information
11. Record of photographs
12. Site sketches
13. GPS Coordinates for each sample location

* The description of the sample location will be noted in such a manner as to allow the reader to reproduce the location in the field at a later date.

Sample Labels: Sample labels will clearly identify the particular sample, and should include the following:

1. Site/project number.
2. Sample identification number.
3. Sample collection date and time.
4. Designation of sample (grab or composite).
5. Sample preservation.
6. Analytical parameters.
7. Name of sampler.

Sample labels will be written in indelible ink and securely affixed to the sample container. Tie-on labels can be used if properly secured.

Custody Seals: Custody seals demonstrate that a sample container has not been tampered with or opened. The individual in possession of the sample(s) will sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, will be noted in the field logbook.

Assessment/Audit Tasks: No performance audit of field operations is anticipated at this time. If conducted, performance and system audit will be in accordance with the project plan.

Data Review Tasks: Soil and aqueous data will be validated by Weston Solutions, Inc. data validation personnel. Soil Data will be verified by RST 3 data validation personnel and air data will be validated by ESAT data validators.

Definitive data projects: The data generated under this QA/QC Sampling Plan will be evaluated according to guidance in the Uniform Federal Policy for Implementing Environmental Quality Systems: Evaluating, Assessing and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP (EPA-505-B-04-900A, March 2005); Part 2B: Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities (EPA-505-B-04-900B, March 2005).

QAPP Worksheet #14: Summary of Project Tasks (Continued)

Laboratory analytical results will be assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity

QAPP Worksheet #15A: Reference Limits and Evaluation Table

Matrix: Soil and Water
Analytical Group: Compound List Volatile Organic Compounds
Concentration Level: Low Level

Analyte	CAS Number	Project Action Limits*	Project Quantitation Limit	Method 8260C Soil Low Quantitation Level mg/kg	Method 8260C Water Low Quantitation Level mg/L
Dichlorodifluoromethane	75-71-8	EPA Removal Management Levels (RMLs) for Industrial Soil See Attachment D	NS	0.005	0.002
Chloromethane	74-87-3		NS	0.005	0.002
Vinyl Chloride	75-01-4		NS	0.005	0.002
Bromomethane	74-83-9		NS	0.010	0.002
Chloroethane	75-00-3		NS	0.005	0.002
Trichlorofluoromethane	75-69-4		NS	0.005	0.002
Acetone	67-64-1		NS	0.025	0.010
1,1-Dichloroethene	75-35-4		NS	0.005	0.002
t-Butyl alcohol	75-65-0		NS	0.025	0.010
Methylene chloride	75-09-2		NS	0.010	0.004
Methyl tert-butyl ether	1634-04-4		NS	0.005	0.002
trans-1,2-Dichloroethene	156-60-5		NS	0.005	0.002
Diisopropyl ether	108-20-3		NS	0.005	0.002
2-Butanone	78-93-3		NS	0.025	0.010
Ethyl tert-butyl ether	637-92-3		NS	0.005	0.002
1,1-Dichloroethane	75-34-3		NS	0.005	0.002
cis-1,2-Dichloroethene	156-59-2		NS	0.005	0.002
2,2-Dichloropropane	594-20-7		NS	0.005	0.002
Bromochloromethane	74-97-5		NS	0.005	0.002
Chloroform	67-66-3		NS	0.005	0.002
1,1,1-Trichloroethane	71-55-6		NS	0.005	0.002
1,1-Dichloropropene	563-58-6		NS	0.005	0.002
Carbon tetrachloride	56-23-5		NS	0.005	0.002
tert-Amyl methyl ether	994-05-8		NS	0.005	0.002
Benzene	71-43-2		NS	0.005	0.002
Trichloroethene	79-01-6		NS	0.005	0.002
1,2-Dichloropropane	78-87-5		NS	0.005	0.002
Dibromomethane	74-95-3		NS	0.005	0.002
Bromodichloromethane	75-27-4		NS	0.005	0.002

QAPP Worksheet #15A: Reference Limits and Evaluation Table

Matrix: Soil and Water
Analytical Group: 8260C Volatile List Organic Compounds
Concentration Level: Low Levels

Analyte	CAS Number	Project Action Limits*	Project Quantitation Limit (mg/kg)	Analytical Method 8260C (Low) Quantitation Limits (mg/kg)	Analytical Method – 8260C (Medium) Quantitation Limits (mg/L)
4-Methyl-2-Pentanone	108-10-1	EPA Removal Management Levels (RMLs) for Industrial Soil See Attachment D	NS	0.025	0.010
cis-1,3-Dichloropropene	10061-01-5		NS	0.005	0.002
Toluene	108-88-3		NS	0.005	0.002
trans-1,3-Dichloropropene	10061-02-6		NS	0.01	0.002
1,1,2-Trichloroethane	79-00-5		NS	0.005	0.002
2-Hexanone	591-78-6		NS	0.025	0.010
1,3-Dichloropropane	142-28-9		NS	0.005	0.002
Tetrachloroethene	127-18-4		NS	0.005	0.002
Dibromochloromethane	124-48-1		NS	0.005	0.002
1,2-Dibromoethane	106-93-4		NS	0.005	0.002
Chlorobenzene	108-90-7		NS	0.005	0.002
1,1,1,2-Tetrachloroethane	630-20-6		NS	0.005	0.002
Ethyl benzene	100-41-4		NS	0.005	0.002
m,p-Xylenes	108-38-3		NS	0.010	0.004
o-Xylene	95-47-6		NS	0.005	0.002
Xylenes, Total			NS	0.015	0.006
Styrene	100-42-5		NS	0.005	0.002
Bromoform	75-25-2		NS	0.005	0.002
Isopropylbenzene	98-82-8		NS	0.005	0.002
1,1,2,2-Tetrachloroethane	96-18-4		NS	0.005	0.002
1,2,3-Trichloropropane	96-18-4		NS	0.005	0.002
Bromobenzene	108-86-1		NS	0.005	0.002
n-Propylbenzene	103-65-1		NS	0.005	0.002
2-Chlorotoluene	106-43-4		NS	0.005	0.002
1,3,5-Trimethylbenzene	108-67-8		NS	0.005	0.002
4-Chlorotoluene	106-43-4		NS	0.005	0.002
tert-Butylbenzene	98-06-6		NS	0.005	0.002
1,2,4-Trimethylbenzene	95-63-6		NS	0.005	0.002
sec-Butylbenzene	135-98-8		NS	0.005	0.002
p-Isopropyltoluene	99-87-6		NS	0.005	0.002
1,3-Dichlorobenzene	541-73-1		NS	0.005	0.002
1,4-Dichlorobenzene	106-46-7		NS	0.005	0.002
Butylbenzene	104-51-8		NS	0.005	0.002
1,2-Dichlorobenzene	95-50-1		NS	0.005	0.002
1,2-Dibromo-3-chloropropane	96-12-8		NS	0.005	0.002
1,2,4-Trichlorobenzene	120-82-1		NS	0.005	0.002
Hexachlorobutadiene	87-68-3		NS	0.005	0.002
Naphthalene	91-20-3		NS	0.005	0.002
1,2,3-Trichlorobenzene	87-61-6		NS	0.005	0.002

**Reference Source* NS – Not Specified

QAPP Worksheet #15B: Reference Limits and Evaluation Table

Matrix: Soil and Water
Analytical Group: Compound List Semi-Volatile Organic Compounds
Concentration Level: Low Level Soil Medium Level Water

Analyte	CAS Number	Project Action Limits*	Project Quantitation Limit	Method 8270D Soil Low Quantitation Level mg/kg	Method 8270D Water Low Quantitation Level mg/L
1,2,4-Trichlorobenzene	120-82-1	EPA Removal Management Levels (RMLs) for Industrial Soil See Attachment D	NS	0.083	0.025
1,2-Dichlorobenzene	95-50-1		NS	0.083	0.025
1,3-Dichlorobenzene	541-73-1		NS	0.083	0.025
1,4-Dichlorobenzene	106-46-7		NS	0.083	0.025
1-Methylnaphthalene	90-12-0		NS	0.083	0.025
2,4,5-Trichlorophenol	95-95-4		NS	0.083	0.025
2,4,6-Trichlorophenol	88-06-2		NS	0.083	0.025
2,4-Dichlorophenol	120-83-2		NS	0.083	0.025
2,4-Dimethylphenol	105-67-9		NS	0.083	0.025
2,4-Dinitrophenol	51-28-5		NS	0.167	0.050
2,4-Dinitrotoluene	121-14-2		NS	0.083	0.025
2,6-Dinitrotoluene	606-20-2		NS	0.083	0.025
2-Chloronaphthalene	91-58-7		NS	0.083	0.025
2-Chlorophenol	95-57-8		NS	0.083	0.025
2-Methyl-4,6-dinitrophenol	534-52-1		NS	0.083	0.025
2-Methylnaphthalene	91-57-6		NS	0.083	0.025
2-Methylphenol	95-48-7		NS	0.083	0.025
2-Nitroaniline	88-74-4		NS	0.083	0.025
2-Nitrophenol	88-75-5		NS	0.083	0.025
3/4-Methylphenol	106-44-5		NS	0.083	0.025
3-Nitroaniline	99-09-2		NS	0.083	0.025
4-Bromophenyl phenyl ether	101-55-3		NS	0.083	0.025
4-Chloro-3-methylphenol	59-50-7		NS	0.083	0.025
4-Chloroaniline	106-47-8		NS	0.083	0.025
4-Chlorophenyl phenyl ether	7005-72-3		NS	0.083	0.025
Trichloroethene	79-01-6		NS	0.083	0.025
1,2-Dichloropropane	78-87-5		NS	0.083	0.025
Dibromomethane	74-95-3		NS	0.083	0.025
Bromodichloromethane	75-27-4		NS	0.083	0.025
4-Nitroaniline	100-01-6		NS	0.083	0.025
4-Nitrophenol	100-02-7		NS	0.167	0.050
Acenaphthene	83-32-9		NS	0.083	0.025
Acenaphthylene	208-96-8		NS	0.083	0.025

QAPP Worksheet #15B: Reference Limits and Evaluation Table

Matrix: Soil and Water
Analytical Group: Compound List Semi-Volatile Organic Compounds
Concentration Level: Low Level Soil Medium Level Water

Analyte	CAS Number	Project Action Limits*	Project Quantitation Limit	Method 8270D Soil Low Quantitation Level mg/kg	Method 8270D Water Low Quantitation Level mg/L
Aniline	62-53-3	EPA Removal Management Levels (RMLs) for Industrial Soil See Attachment D	NS	0.083	0.025
Anthracene	120-12-7		NS	0.083	0.025
Benzo(a)anthracene	56-55-3		NS	0.083	0.025
Benzo(a)pyrene	50-32-8		NS	0.083	0.025
Benzo(b)fluoranthene	205-99-2		NS	0.083	0.025
Benzo(g,h,i)perylene	191-24-2		NS	0.083	0.025
Benzo(k)fluoranthene	207-08-9		NS	0.083	0.025
Benzyl alcohol	100-51-6		NS	0.083	0.025
Bis(2-chloroethoxy) methane	111-91-1		NS	0.083	0.025
Bis(2-chloroethyl) ether	111-44-4		NS	0.083	0.025
Bis(2-chloroisopropyl) ether	108-60-1		NS	0.083	0.025
Bis(2-ethylhexyl) phthalate	117-81-7		NS	0.167	0.050
Butyl benzyl phthalate	85-68-7		NS	0.083	0.025
Carbazole	86-74-8		NS	0.083	0.025
Chrysene	218-01-9		NS	0.083	0.025
Dibenz(a,h)anthracene	53-70-3		NS	0.083	0.025
Dibenzofuran	132-64-9		NS	0.083	0.025
Diethyl phthalate	84-66-2		NS	0.083	0.025
Dimethyl phthalate	131-11-3		NS	0.083	0.025
Di-n-butyl phthalate	84-74-2		NS	0.083	0.025
Di-n-octyl phthalate	117-84-0		NS	0.167	0.050
Fluoranthene	206-44-0		NS	0.083	0.025
Fluorene	86-73-7		NS	0.083	0.025
Hexachlorobenzene	118-74-1		NS	0.083	0.025
Hexachlorobutadiene	87-68-3		NS	0.083	0.025
Hexachlorocyclopentadiene	77-47-4		NS	0.083	0.025
Hexachloroethane	67-72-1		NS	0.083	0.025
Indeno(1,2,3-cd)pyrene	193-39-5		NS	0.083	0.025
Isophorone	78-59-1		NS	0.083	0.025
Naphthalene	91-20-3		NS	0.083	0.025
Nitrobenzene	98-95-3		NS	0.083	0.025
N-Nitrosodi-n-propylamine	621-64-7		NS	0.083	0.025
Pentachlorophenol	87-86-5		NS	0.083	0.025
Phenanthrene	85-01-8		NS	0.083	0.025
Phenol	108-95-2		NS	0.083	0.025
Pyrene	129-00-0		NS	0.083	0.025

QAPP Worksheet #16: Project Schedule/Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	RST 3 Contractor SPM	*Prior to sampling date	8/25/17	QAPP	9/01/17
Review of QAPP	RST 3 Contractor QAO and/or Group Leader	Prior to sampling date	8/26/17	Approved QAPP	TBD
Preparation of HASP	RST 3 Contractor SPM	Prior to sampling date	8/30/17	HASP	8/30/17
Procurement of Field Equipment	RST 3 Contractor SPM and/or Equipment Officer	Prior to sampling date	8/25/17	NA	NA
Laboratory Request	Not Applicable	Prior to sampling date	8/22/17	CLP Request Form	NA
Field Reconnaissance/Access	RST 3 Contractor SPM; or EPA Region II OSC	NA	NA	NA	NA
Collection of Field Samples	RST 3 Contractor SPM	9/6/17	9/8/17	NA	NA
Laboratory Electronic Data Received	PHILIS Laboratory	7 days from receipt of samples	7 days from receipt of samples	Preliminary Data	--
Laboratory Package Received	CLP Laboratory (Air)	14 days from receipt of samples	14 days from receipt of samples	Hard Copy Data Package	--
Validation of Laboratory Results	Non-CLP Laboratory	TBD	TBD	NA	--
Data Evaluation/ Preparation of Final Report	RST 3 Contractor SPM	TBD	TBD	Final Report	9/30/17

NA – Not Applicable

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QAPP Worksheet #17: Sampling Design and Rationale

Sampling Tasks:

RST 3 is tasked with collecting up to 40 subsurface soil samples, including QA/QC, at depths 5 to 14 feet below ground surface. Eight air samples will be collected, seven from the SVE system (including one duplicate) and one ambient air sample. The soil samples will be collected for Method 8260C VOCs analysis including 1,2,3-TCP. The air samples will be collected for TO-15 + 1,2,3-TCP analysis.

Soil sampling activities will be conducted in accordance with guidelines outlined in EPA/ERT Soil Sampling SOP #2012. Soil samples will be collected at up to 40 locations on Site. RST 3 will procure the services of a Geoprobe®, to advance up to 40 borings on-site with samples being taken at depths determined by the OSC during the field work. Method 8260C-VOCs including 1,2,3-TCP samples will be immediately collected utilizing Encore samplers. Samples must be shipped to the laboratory at the end of each day to meet the required holding time for Encore® samples.

Air samples will be collected in accordance with guidelines outline in EPA/ERT # 1704, Summa Canister Sampling

All stainless-steel equipment and the Geoprobe® shoe involved in field-sampling activities will be decontaminated in accordance to EPA/ERT SOP #2006 prior to and subsequent to sampling. Decontamination of sampling equipment will be conducted as follows:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Deionized water rinse.
4. 10% Nitric Acid rinse.
5. Deionized water rinse.
6. A hexane rinse (pesticide-grade or better).
7. Air dry (sufficient time will be allowed for the equipment to completely dry).
8. Deionized water rinse and air dry.
9. Wrap or cover exposed ends of sampling equipment with aluminum foil (shiny side out) for transport and handling.

Rinsate blank samples will be collected at a rate of one per day by pouring deionized water over the Geoprobe® shoe and then collected in 40 mL VOA vials. Trip Blanks will be provided by the laboratory and returned at a rate of one per day.

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QAPP Worksheet #17: Sampling Design and Rationale (Continued)

The following laboratories will provide the analyses indicated:

Lab Name/Location	Sample Type	Parameters
PHILIS Laboratory	Water and Soil	Method 8260C VOCs Method 8270D

Lab Name/Location	Sample Type	Parameters
TBD	Air	TBD

QAPP Worksheet #18: Sampling Locations and Methods/SOP Requirements Table

Matrix	Sampling Location(s)	Units	Analytical Group(s)	Concentration Level	No. of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Soil	TBD	µg/Kg or mg/Kg	Method 8260C VOC Method 8270D SVOC	Low/Medium	TBD	EPA ERT SOP #: 2001, 2012,	Site Contamination Investigation; Clean Confirmation
Air	TBD	ppbv or mg/m3	TO-15 + 1,2,3-Trichloropropane	Medium/High	8	EPA ERT SOP #: 1704	Evaluation of SVE system performance
Aqueous[1]	TBD	µg/Kg	Method 8260C Method 8270D	Low	TBD	EPA ERT SOP#: 2005	Adequacy of decontamination procedures

Aqueous[1] samples are rinse blank samples and trip blank samples
NA – Not applicable
The website for EPA ERT SOPs is: [HYPERLINK "http://www.ert.org/mainContent.asp?section=Products&subsection=List"]

QAPP Worksheet #19: Analytical SOP Requirements Table

Matrix	Number of Samples	Analytical Group [Lab Assignment]	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time (preparation/ analysis)
Soil	TBD	VOCs SVOCs	Low/Medium	EPA SW846 Method 8260C EPA SW846 Method 8270D	30 grams	3- 120 ml jars	Cool to 4°C	7 days
Air	TBD	TO-15	Low/Medium	TO-15 SIM	6 liters	Summa canister	NA	30 days
Aqueous[1]	TBD	VOCs SVOCs	Low/Medium	EPA SW846 Method 8260C EPA SW846 Method 8270D	120 ml	3-40 ml VOA	HCL + Cool to 4°C	14 days

[1]Aqueous samples are rinse blank samples and Trip Blank samples.

QAPP Worksheet #20: Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of Extra Volume Laboratory QC (e.g., MS/MSD) Samples[1]	No. of Rinsate Blanks	No. of Trip. Blanks	No of PE Samples	Total No. of Samples to Lab
Soil	VOCs SVOCs	Low/Medium	SW846 Method 8260C SW846 Method 8270D	TBD	1 per 20 samples	1 per 20 samples	0	1	NR	42
Air	TO-15	Low/Medium	TO-15 SIM	TBD	1	NR	NR	NR	NR	8
Aqueous	VOCs SVOCs	Low/Medium	SW846 Method 8260C SW846 Method 8270D	TBD	1 per 20 samples	1 per 20	NR	NR	NR	3

NR – Not required
Aqueous samples are rinse blank samples

QAPP Worksheet #21: Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP#2001	General Field Sampling Guidelines (all media); Rev. 0.0 August 1994	EPA/OSWER/ERT	Site-Specific	N	None
SOP #:1704	Summa Canister Sampling, Revision 1.0, 12/21/2015	EPA/OSWER/ERT	SUMMA Canister with pressure gauge, wrench, Teflon tubing	N	None
SOP #2012	Soil Sampling, Rev 1.0, July 2001	EPA/OSWER/ERT	Site-Specific	N	None
SOP #2005	Quality Assurance/Quality Control Samples	EPA/OSWER/ERT	Site-Specific	N	None
SOP #2006	Sampling Equipment Decontamination (all media); Rev 0.0 August 1994	EPA/OSWER/ERT	Non-phosphate Detergent, Tap Water. Distilled/Deionized Water, 10% Nitric Acid, Solvent Rinse (Pesticide Grade)	N	N

See Attachment B for EPA ERT SOPs.

Note: The website for EPA ERT SOPs is: [HYPERLINK "http://www.ert.org/mainContent.asp?section=Products&subsection=List"]

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
MultiRAE Plus Incl. PID	Calibrate with Zero Air; LEL: 2.5% (50% LEL) O_2: 18% H_2S: 10 ppm CO: 50 ppm PID: 100 ppm Isobutylene	Check/ replace battery/ Clean tip or bulb if necessary	Bump Test	Prior to day's activities; anytime anomaly suspected	LEL: 48-52% LEL (2% LEL) O_2: 17-19% (1%) H_2S: 9-11 ppm (1 ppm) CO: 48-52 ppm (2 ppm) PID: 95-105 ppm Isobutylene (5 ppm)	Replace battery or Replace Unit	Equipment Vendor	--
[HYPERLINK "file:///\\\\fsed2data1\\PublicShare\\Smita%20Sumbaly\\Chemical_QAPP\\Field%20Equipment%20SOPs\\micro_FID_opsref.pdf"]	Calibrate with zero air, then span gas of 100 ppm methane	Check hydrogen remaining Check Internal Filter	Bump Test	Prior to day's activities; anytime anomaly suspected	+/- 5%	Refill Hydrogen canister or Replace Unit	Equipment Vendor	--
[HYPERLINK "file:///\\\\fsed2data1\\PublicShare\\Smita%20Sumbaly\\Chemical_QAPP\\Field%20Equipment%20SOPs\\Trimble%20-%20GeoXT%20Handheld.htm"]								

QAPP Worksheet #23: Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)*
[HYPERLINK "file:///C:\\Users\\jtravis\\AppData\\Local\\Microsoft\\Windows\\Temporary%20Internet%20Files\\Content.Outlook\\Chemical_QAPP\\Analytical%20Mehods\\TO-15.pdf"]	Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)	Definitive	Gases	GC/MS	National Non-RAS Laboratory	N
L-A-101 Rev 7	[SEQ CHAPTER \h \r 1]Volatile Organics by Method 8260C	Definitive	Soil and Aqueous	GC/MS	PHILIS Laboratory	N
L-A-201 Rev 7	Semivolatile Organics by Method 8270D	Definitive	Soil and Aqueous	GC/MS	PHILIS Laboratory	N

QAPP Worksheet #24: Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	See TO-15	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have not been met.	Initial calibration/ Continuing calibration: relative response factor (RRF) greater than or equal to minimum acceptable response factor listed in Table 5 of procedure; %RSD must be less than or equal to value listed in Table 5 of procedure. GC/MS Tuning: See ion abundance table in TO-15. Retention Time Evaluation: +/- 0.50 minute of the internal standard retention time in the associated calibration check verification	Initial calibration: inspect system for problems (e.g., clean ion source, change the column, service the purge and trap device), correct problem, re-calibrate. Continuing calibration: inspect system, recalibrate the instrument, reanalyze samples. GC/MS Tuning: inspect the system, identify problem. MS tune criteria must be met before calibration Retention time evaluation: re-calibrate and verify, re-analyze samples back to the last good calibration check verification	GC/MS Technician; Subcontractor Laboratory GC/MS Technician	TO-15

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	See 8260C	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have not been met.	GC/MS See SOP L-A-101 Rev 7	See SOP L-A-101 Rev 7	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have not been met.	GC/MS
GC/MS	See 8270C	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have not been met.	GC/MS	GC/MS	See 8270D	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
						not been met.

QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS	See SOP L-A-101 Rev 7 or as per instrument manufacturer's recommendations	See SOP L-A-101 Rev 7 or as per instrument manufacturer's recommendations	See SOP L-A-101 Rev 7 or as per instrument manufacturer's recommendations	See SOP L-A-101 Rev 7	See SOP L-A-101 Rev 7	EPA CLP RAS Laboratory GC/MS Lead Chemist	SOP L-A-101 Rev 7
GC/MS	See TO-15; as per instrument manufacturer's recommendations	See TO-15; as per instrument manufacturer's recommendations	See TO-15; as per instrument manufacturer's recommendations	Acceptable re-calibration; see TO-15	Inspect the system, correct problem, re-calibrate and/or reanalyze samples.	EPA National Non-RAS Laboratory GC/MS Technician	TO-15

QAPP Worksheet #26: Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): RST 3 Site Project Manager, Weston Solutions, Inc., Region II
Sample Packaging (Personnel/Organization): RST 3 Site Project Manager, Weston Solutions, Inc., Region II
Coordination of Shipment (Personnel/Organization): RST 3 Site Project Manager, Weston Solutions, Inc., Region II
Type of Shipment/Carrier: FedEx, Courier, and/or Hand-Delivered
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): PHILIS Laboratory and CLP RAS Laboratory
Sample Custody and Storage (Personnel/Organization): PHILIS Laboratory and CLP RAS Laboratory
Sample Preparation (Personnel/Organization): PHILIS Laboratory and CLP RAS Laboratory
Sample Determinative Analysis (Personnel/Organization): PHILIS Laboratory and CLP RAS Laboratory
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): All samples will be shipped same day or within 24 hours of collection
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; see Worksheet #19
SAMPLE DISPOSAL
Personnel/Organization: PHILIS Laboratory and CLP RAS Laboratory
Number of Days from Analysis: Up to 60 days; Until analysis and QA/QC checks are completed; as per analytical methodology; see Worksheet #19.

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QAPP Worksheet #27: Sample Custody Requirements

Sample Identification Procedures: Each sample will be labeled with the site identification code and a sample type letter code and number that depicts a specific location. Additional information such as depth, sampling round, date, etc. will be added. Examples of matrices are: SS=Soil Sample and LW= Liquid Waste.

Example sample locations:

1) Soil samples will be designated as: P001-SS01-0024-01 (Property P001, Soil Sample collected from location 01, Sample collected from 0 inches to 24 inches below ground surface (bgs), Sample number 01).
2) Air samples will be designated P001-SVEX-9-8-17-01 (Property P001, Sample collected from SVE port X, date, sample number 1

Location of the sample collected will be recorded in the project database and site logbook. Depending on the type of sample, additional information such as sampling round, date, time etc. will be added.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be individually identified and labeled after collection, then sealed with custody seals and enclosed in a plastic cooler. The sample information will be recorded on chain-of custody (COC) forms, and the samples shipped to the appropriate laboratory via overnight delivery service or courier. Chain-of-custody records must be prepared in Scribe to accompany samples from the time of collection and throughout the shipping process. Each individual in possession of the samples must sign and date the sample COC Record. The chain-of-custody record will be considered completed upon receipt at the laboratory. A traffic report and chain-of-custody record will be maintained from the time the sample is taken to its final deposition. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal. Specific information regarding custody of the samples projected to be collected on the weekend will be noted in the field logbook. The chain-of-custody record should include (at minimum) the following: 1) Sample identification number; 2) Sample information; 3) Sample location; 4) Sample date; 5) Sample Time; 6) Sample Type Matrix; 7) Sample Container Type; 8) Sample Analysis Requested; 9) Name(s) and signature(s) of sampler(s); and 10) Signature(s) of any individual(s) with custody of samples.

Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): A sample custodian at the laboratory will accept custody of the shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory. Disposal of the samples will occur only after analyses and QA/QC checks are completed.

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QAPP Worksheet #28: QC Samples Table
Worksheet # 28A: Volatile – Organics/SW 846 Method 8260B

(UFP-QAPP Manual Section 3.4)
Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limit exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

Matrix	Soil
Analytical Group	Target Compound List Volatile Organics
Concentration Level	Low/Medium/High (mg/kg)
Sampling SOP(s)	2012
Analytical Method/SOP Reference	SW 846 Method 8260C/[HYPERLINK "file:///C:\\Users\\sumbalys\\AppData\\Roaming\\Microsoft\\Word\\Data%20Validation%20SOPs\\SOP%20HW24%20FINAL%]
Sampler's Name	
Field Sampling Organization	TBD
Analytical Organization	PHILIS
No. of Sample Locations	TBD

/	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicato (DQI)
	No analyte > CRQL*		Suspend analysis unit source recertified	PHILIS Analyst	Accurac
	Analyte List	Historical data is stored in LIMS	Flag outliers, conjunction with other QC criteria.	PHILIS Analyst	Accurac
	Analyte List	Historical data is stored in LIMS	Flag outliers, conjunction with other QC criteria.	PHILIS Analyst	Precisio
	4-Bromofluorobenzene Toluene-d8 1,2-Dichloroethane-d4	Historical data is stored in LIMS	Check calculations and instruments, reanalyze affected samples	PHILIS Analyst	Accurac

* Laboratory spike entire list of compounds, but at the minimum, above compounds are require. For MS/MSD and LCS [SEQ CHAPTER \h \r 1]Laboratory can also use in house performance criteria

QAPP Worksheet #28: QC Samples Table – Continued
Worksheet # 28A: Volatile – Organics/SW 846 Method 8260B [cont'd]

Matrix	Soil
Analytical Group	Target Compound List Volatile Organics (cont'd)
Concentration Level	Low/Medium/High (mg/kg)
Sampling SOP(s)	2012
Analytical Method/SOP Reference	SW 846 Method 8260C/SOP# L-A-101
Sampler's Name	
Field Sampling Organization	TBD
Analytical Organization	PHILIS
No. of Sample Locations	TBD

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standards	all samples	50-100% of area, ± 30 sec retention time shift	Check calculations and instruments, reanalyze affected samples.	PHILIS Analyst	Accuracy	50-100% of area, ± 30 sec retention time shift
LCS	1 per ≤ 20 samples; if requested	Historical data stored in LIMS %RPD < 30	Flag outliers if not possible to reanalyze.	PHILIS Analyst	Accuracy Precision	Historical data stored in LIMS %RPD < 30
Field Duplicate	1 per ≤ 20 samples; if requested	%RPD < 30 (aqueous) %RPD < 50 (soil)	Check calculation, and Flag outliers	PHILIS Analyst	Accuracy	% RPD < 30 (aqueous) % RPD < 50 (soil)

* Laboratory spike entire list of compounds, but at the minimum, above compounds are require. FOR MS/MSD and LCS [SEQ CHAPTER \h \r 1]Laboratory can also use in house performance criteria

QAPP Worksheet #28: QC Samples Table
Worksheet # 28A: Volatile – Organics/SW 846 Method 8260C [cont'd]

Matrix	Water (includes Rinsate Blank or Trip Blank)
Analytical Group	Table 15 Lists Volatile Organics
Concentration Level	Low/Medium (mg/L)
Sampling SOP(s)	2006
Analytical Method/SOP Reference	SW 846 Method 8260C/SOP# L-A-101
Sampler's Name	
Field Sampling Organization	TBD
Analytical Organization	PHILIS
No. of Sample Locations	TBD

Lab QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**		**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**	
[SEQ CHAPTER \h \r 1]Method Blank	1 every 12 hours	No analyte > CRQL*		Suspend analysis unit source recertified	PHILIS Analyst	Accuracy	No analyte > CRQL*	
* Matrix Spike and Laboratory Control Sample/ (Not Required)	1 per ≤ 20 samples; if requested	Analyte List	Historical data is stored in LIMS	Flag outliers, conjunction with other QC criteria.	PHILIS Analyst	Accuracy	Analyte List	Historical data is stored in LIMS
* Matrix Spike Duplicate/Laboratory Control Sample (Not Required)	1 per ≤ 20 samples; if requested	Analyte List	Historical data is stored in LIMS	Flag outliers, conjunction with other QC criteria.	PHILIS Analyst	Precision	Analyte List	Historical data is stored in LIMS

QAPP Worksheet #28: QC Samples Table – Continued
Worksheet # 28A: Volatile – Organics/SW 846 Method 8260C [cont'd]

Matrix	Water (Rinsate Blank or Trip Blank)
Analytical Group	Table 15 Lists Volatile Organics (cont'd)
Concentration Level	Low/Medium (mg/L)
Sampling SOP(s)	2006
Analytical Method/SOP Reference	SW 846 Method 8260C/SOP# L-A-101 Rev 7
Sampler's Name	
Field Sampling Organization	Weston Solutions, Inc.
Analytical Organization	Subcontracted NELAC Laboratory
No. of Sample Locations	

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Surrogate Recovery	All Samples	4-Bromofluorobenzene Toluene-d8 1,2-Dichloroethane-d4	Historical data is stored in LIMS	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet necessary limits (follow SOP: HW-24 for qualifications)	PHILIS Analyst	Accuracy	4-Bromofluorobenzene Toluene-d8 1,2-Dichloroethane-d4	Historical data is stored in LIMS
Internal Standards	all samples	50-200% of area, ± 30 sec retention time shift		Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet necessary limits (Section 11.3.4, Page D45/VOC of SOM01.2)	PHILIS Analyst	Accuracy	50-100% of area, ± 30 sec retention time shift	

* Laboratory spike entire list of compounds, but at the minimum, above compounds are require. FOR MS/MSD and LCS [SEQ CHAPTER \h \r 1]Laboratory can also use in house performance criteria.

Worksheet # 28B: Semivolatile – Organics/SW846 8270D

(UFP-QAPP Manual Section 3.4)
Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limit exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

Matrix	
Analytical Group	Volatile Compounds
Concentration Level	Low (ppbv)
Sampling SOP(s)	
Analytical Method/SOP Reference	TO-15
Sampler's Name	
Field Sampling Organization	Weston Solutions, Inc.
Analytical Organization	
No. of Sample Locations	

Lab QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**
Laboratory Method Blank[SEQ CHAPTER \h \r 1]	1 per ≤ 20 samples	No analyte >CRQL	Suspend analysis unit source recertified	PHILIS Analyst	Accuracy	No analyte > CRQL
Laboratory Replicate Sample	1 per ≤ 20 samples	± 25%D	± 25%D	PHILIS Analyst	Precision	± 25%RPD
Laboratory Control Sample	1 per ≤ 20 samples	±30% R	Flag outliers	PHILIS Analyst	Accuracy	±30% R
Trip Blank[SEQ CHAPTER \h \r 1]	1 per ≤ 20 samples	No analyte >CRQL	Suspend analysis unit source recertified	PHILIS Analyst	Accuracy	No analyte > CRQL

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicate	1 per ≤ 20 samples	± 25%D	± 30 %D (water) 50% (soil)	TBD	Precision	± 30% RPD (water) ± 50% RPD (water)

QAPP Worksheet #29: Project Documents and Records Table

Sample Collection Documents and Records	Analysis Documents and Records	Data Assessment Documents and Records	Other
• Site and field logbooks • COC forms • Field Data Sheets • GIS map for sampling locations • Photographs	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Laboratory Audit checklist (if performed) • Review forms for electronic entry of data into database • Corrective action documentation • Laboratory Final Data	Project Analysis Form

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QAPP Worksheet #30: Analytical Services Table

Matrix	Analytical Group	Concentration Level	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/ Organization (Name and Address, Contact Person and Telephone Number)
Soil	VOCs SVOCs	Low/Medium	L-A- 101 L-A-201	24 hours preliminary / 3 weeks Hard copy data package	PHILIS	NA
Water (samples, Rinsate Blank or Trip Blank)	VOCs SVOCs	Low	L-A-101 L-A-201	TBD	PHILIS	NA

NA – Not Applicable
TBD – To Be Determined

QAPP Worksheet #31: Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions (Title and Organizational Affiliation)
Laboratory Technical Systems	Every Year	External	Regulatory Agency	Regulatory Agency	PHILIS Project Manager	PHILIS Project Manager	EPA or other Regulatory Agency
Performance Evaluation Samples**	NA	External	Regulatory Agency	Regulatory Agency			
Peer Review	Each Deliverable	Internal	Weston Solutions, Inc.	QAO, Group Leader, and Readiness Coordinator	TBD	TBD	EPA OSC and/or EPA QAO

Note: Weston use all subcontracted laboratories participated in nationally accepted accreditation program.
** Weston Solutions, Inc., RST 3 office does not supply the PE samples.

QAPP Worksheet #32: Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Project Readiness Review	Checklist or logbook entry	TBD	Immediately to within 24 hours of review	Checklist or logbook entry	RST 3 SPM	Immediately to within 24 hours of review
Field Observations/ Deviations from Work Plan	Logbook	TBD	Immediately to within 24 hours of deviation	Logbook	RST 3 SPM and EPA OSC	Immediately to within 24 hours of deviation
Laboratory Technical Systems/ Performance Audits	Written Report	PHILIS Project Manager	30 days	Letter	CLP and Non-CLP Laboratory	14 days
On-Site Field Inspection	Written Report	TBD	7 calendar days after completion of the audit	Letter/Internal Memorandum	Contractor regional QAO and/or EPA OSC	To be identified in the cover letter of the report
Performance Evaluation Samples	Electronic Report	PHILIS Project Manager	30 days	Letter or Written Report	CLP and Non-CLP /RST 3-Procured Laboratories	14 days
Peer Review	Deliverables	TBD	Prior to deliverable due date	Comments directly on deliverable	SPM, Weston Solutions, Inc.	Prior to deliverable due date

QAPP Worksheet #33: QA Management Reports Table

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
CLP and Non-CLP/RST 3-procured laboratories data (preliminary)	As performed	24 hours for sampling data	CLP and Non-CLP/RST 3-procured laboratories; RST 3 Data Validators	Site Project Manager
Non-CLP/RST 3-procured laboratories data (unvalidated)	As performed	Up to 21 days after receipt of unvalidated data	Non-CLP and RST 3-procured laboratories; RST 3 Data Validators	Site Project Manager
Laboratory Technical Systems/ Performance Audits	As performed	Unknown	EPA or other Regulatory Agency	Lab QA Manager
On-Site Field Inspection	As performed	7 calendar days after completion of the inspection	Site Project Manager, Weston Solutions, Inc.	Site Project Manager
Field Change Request	As required per field change	Three days after identification of need for field change	Site Project Manager, Weston Solutions, Inc.	EPA OSC
Final Report	As performed	2 to 4 weeks after receipt of EPA approval of data package	Site Project Manager, Weston Solutions, Inc.	EPA OSC

QAPP Worksheet #34: Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Site/field logbooks	Field notes will be prepared daily by the RST 3 Site Project Manager and will be complete, appropriate, legible and pertinent. Upon completion of field work, logbooks will be placed in the project files.	I	Site Project Manager
Chains of custody	COC forms will be reviewed against the samples packed in the specific cooler prior to shipment. The reviewer will initial the form. An original COC will be sent with the samples to the laboratory, while copies are retained for (1) the Sampling Trip Report and (2) the project files.	I	Site Project Manager
Sampling Trip Reports	STRs will be prepared for each week of field sampling [for which samples are sent to an EPA CLP RAS laboratory.] Information in the STR will be reviewed against the COC forms, and potential discrepancies will be discussed with field personnel to verify locations, dates, etc.	I	Site Project Manager
Laboratory Preliminary Data	Preliminary data – limited review for either contract compliance or technical compliance.	E	PHILIS Project Manager
Laboratory analytical data package	Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	E	PHILIS Project Manager
Laboratory analytical data package	Data packages will be reviewed as to content and sample information upon receipt by EPA.	I/E	Data Validation Personnel
Final Sample Report	The project data results will be compiled in a sample report for the project. Entries will be reviewed/verified against hardcopy information.	I	Site Project Manager

QAPP Worksheet #35: Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in QAPP were followed, and that any deviations were noted/approved.	Site Project Manager
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to PQOs.	Site Project Manager
IIa	Chains of custody	Examine COC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).	TBD
IIa	Laboratory data package	Examine packages against QAPP and laboratory contract requirements, and against COC forms (e.g., holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	TBD
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).	TBD
IIb	Field duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria	TBD

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QAPP Worksheet #36: Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa / IIb	Soil/Sediment/ Aqueous	VOCs SVOCs	Trace	Data Validation SOP for Organic Analysis of Trace Concentration VOCs under SOW SOM01.2	TBD
IIa / IIb	Soil/Sediment/ Aqueous	VOCs SVOCs	Low and Medium	Data Validation SOP for Organic Analysis of Low/Medium Concentration VOCs under SOW SOM01.2	TBD

Note: All aqueous samples are rinse blank samples. MS/MSD and field duplicate samples will not be collected.

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QAPP Worksheet #37: Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: Data, whether generated in the field or by the laboratory, are tabulated and reviewed for Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCCS) by the SPM for field data or the data validator for laboratory data. The review of the PARCC Data Quality Indicators (DQI) will compare with the DQO detailed in the site-specific QAPP, the analytical methods used and impact of any qualitative and quantitative trends will be examined to determine if bias exists. A hard copy of field data is maintained in a designated field or site logbook. Laboratory data packages are validated, and final data reports are generated. All documents and logbooks are assigned unique and specific control numbers to allow tracking and management.

Where applicable, the following documents will be followed to evaluate data for fitness in decision making: EPA QA/G-4, *Guidance on Systematic Planning using the Data Quality Objectives Process,* EPA/240/B-06/001, February 2006, and EPA QA/G-9R, *Guidance for Data Quality Assessment*, A reviewer's Guide EPA/240/B-06/002, February 2006.

Describe the evaluative procedures used to assess overall measurement error associated with the project:
As delineated in the ***Uniform Federal Policy for Implementing Environmental Quality Systems: Evaluating, Assessing and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP (EPA-505-B-04-900A, March 2005); Part 2A: UFP-QAPP Workbook (EPA-505-B-04-900C, March 2005); Part 2B: Quality Assurance/Quality Control Compendium: Non-Time Critical QA/QC Activities (EPA-505-B-04-900B, March 2005);*** "Graded Approach" will be implemented for data collection activities that are either exploratory or where specific decisions cannot be identified, since this guidance indicates that the formal DQO process is not necessary.

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QAPP Worksheet #37: Usability Assessment- (Concluded)

The analytical results from the soil sampling event will be utilized by EPA in verifying if subsurface soil is contaminated with site related contaminants and if so, determine additional removal action scope of work to address the contamination. Analytical results from air samples will be used to determine efficiency of SVE system.

Identify the personnel responsible for performing the usability assessment: Site Project Management Team, Data Validation Personnel, and EPA Region 2 OSC

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

A copy of the most current approved QAPP, including any graphs, maps and text reports developed will be provided to all personnel identified on the distribution list.

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ATTACHMENT A

Figure 1: Site Location Map

ATTACHMENT B

Sampling SOPs

EPA ERT SOP # 2001: General Field Sampling Guidelines
EPA ERT SOP # 2009: Drum Sampling
EPA ERT SOP # 2010: Tank Sampling
EPA ERT SOP # 2012: Soil Sampling

ATTACHMENT C

EPA Regional Removal Management Level (RML) Summary Table, 2016

Message

From: Schaefer, Joe [Schaefer.Joe@epa.gov]
Sent: 9/9/2017 4:22:46 PM
To: Thumma, Janelle [Janelle.Thumma@WestonSolutions.com]
CC: Delgado, Eric [Delgado.Eric@epa.gov]
Subject: FW: Viper Export for Manchester Bravo Air Monitoring
Attachments: VIPER - [428]R06 Harvey -Manchester Bravo Air Monitoring Deployment - 9-9-2017 1102.piz

1 map per day of VOC locations

Title Manchester Community Health & Safety Monitoring Locations on [date]

Joe Schaefer
Environmental Response Team
US EPA
(c)609-865-8111

From: ERT Support
Sent: Saturday, September 09, 2017 11:08 AM
To: Schaefer, Joe <Schaefer.Joe@epa.gov>
Cc: Campbell, John <CAMPBELL.JOHN@EPA.GOV>
Subject: Re: Viper Export for Manchester Bravo Air Monitoring

Joe,

Attached is the Viper Bravo Air Monitoring data through yesterday (rename to .zip). I'll run another export tonight for today's data and ditto tomorrow. Should I include anyone else on the e-mail when I send those other exports?

For Additional Information Please Contact
ERT Software Support
1-800-999-6990
1-732-321-6724 (fax)
ertsupport@epa.gov
www.ertsupport.org

From: Schaefer, Joe
Sent: Saturday, September 9, 2017 9:16 AM
To: ERT Support
Cc: Campbell, John
Subject: Re: Viper Export for Manchester Bravo Air Monitoring

The dump is fine for now. I just to catch us up.

Joe Schaefer
Environmental Response Team
(c) 609-865-8111

On Sep 9, 2017, at 7:49 AM, ERT Support <ERTSupport@epa.gov> wrote:

> Joe,
>
> I can do the data dump but I can't do the automated export without the instructions - which are on our GD Server and I don't have remote access to that. John, if you can send the notes, I can take care of it later this morning or I can just do a dump tonight and tomorrow and configure the automated one on Monday.
>
> - Melissa
>
> For Additional Information Please Contact
> ERT Software Support
> 1-800-999-6990
> 1-732-321-6724 (fax)
> ertsupport@epa.gov
> www.ertsupport.org

From: Schaefer, Joe
Sent: Saturday, September 9, 2017 8:33 AM
To: ERT Support; Campbell, John
Subject: Viper Export for Manchester Bravo Air Monitoring

Can I get an export of data to date in the Manchester Bravo Air monitoring deployment and then a recurring 7pm eastern export?

Joe Schaefer
Environmental Response Team
US EPA
(c)609-865-8111

Message

From: Delgado, Eric [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=C0A5D54D3C8645CA8B12882026B3FBA3-DELGADO, ERIC]
Sent: 9/2/2017 12:39:04 AM
To: Rauscher, Jon [Rauscher.Jon@epa.gov]; Leonova, Larisa [leonova.larisa@epa.gov]
CC: Michelle Brown [Michelle.Brown@WestonSolutions.com]; Schaefer, Joe [Schaefer.Joe@epa.gov]
Subject: Fwd: PHILIS analytical info
Attachments: Hurricane Harvey Response Effort_QAPP 090117.docx; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Kaelin, Lawrence" <Kaelin.Lawrence@epa.gov>
> **To:** "Delgado, Eric" <Delgado.Eric@epa.gov>
> **Subject: PHILIS analytical info**
>
> Eric attached is the PHILIS analytical info you may need for the site QAPP.
>
> Lawrence (Larry) Kaelin
> US EPA/OSWER OEM/CBRN CMAT
> 2890 Woodbridge Avenue
> Edison, NJ 08837
> 732-321-6625 (office)
> 513-675-4751 (cell)
> Kaelin.Lawrence@epa.gov

Message

From: Ashley K. Wadick [Ashley.K.Wadick@tceq.texas.gov]
Sent: 9/2/2017 9:24:24 PM
To: Lori Wilson [Lori.Wilson@tceq.texas.gov]; Emily Lindley [Emily.Lindley@tceq.texas.gov]; Ramiro Garcia [ramiro.garcia@tceq.texas.gov]; Tracy Miller [tracy.miller@tceq.texas.gov]; Susan Johnson [susan.johnson@tceq.texas.gov]; Jonathan Walling [jonathan.walling@tceq.texas.gov]; Kelly Cook [kelly.cook@tceq.texas.gov]; Melinda Johnston [melinda.johnston@tceq.texas.gov]; Melinda Torres [Melinda.Torres@tceq.texas.gov]; Michelle Havelka [michelle.havelka@tceq.texas.gov]; Michael Honeycutt [Michael.honeycutt@tceq.texas.gov]; Ryan Vise [Ryan.Vise@Tceq.Texas.Gov]; Sam Gammage [Sam.Gammage@Tceq.Texas.Gov]; Jason Ybarra [Jason.Ybarra@tceq.texas.gov]; Todd Thompson [Todd.Thompson@tceq.texas.gov]; Guadalupe Quiroz [guadalupe.quiroz@tceq.texas.gov]; Andy Goodridge [Andy.Goodridge@tceq.texas.gov]; Nicole Bealle [Nicole.Bealle@tceq.texas.gov]; La'Trenda McClellan [LaTrenda.McClellan@tceq.texas.gov]; Sabine Lange [Sabine.Lange@tceq.texas.gov]; Richard Chism [Richard.Chism@tceq.texas.gov]
CC: Coleman, Sam [Coleman.Sam@epa.gov]; Gray, David [gray.david@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]; 'bob.allen@pcs.hctx.net' [bob.allen@pcs.hctx.net]; Michelle Brown [Michelle.Brown@WestonSolutions.com]
Subject: Arkema - FW: Confidential - BV/CTEH Monitoring reports
Attachments: Arkema Crosby Sep 2 AM daily report.pdf; 109489 - Arkema Draft CTEH Air Monitoring Summary_09.02.2017_AM_rev1.pdf; 109489_Arkema Air SAP v1.1 9.1.2017.pdf

Please see attached. Thank you.

Ashley

From: CENCETTI Jean-Marie [mailto:jeanmarie.cencetti@arkema.com]
Sent: Saturday, September 02, 2017 4:15 PM
To: Ashley K. Wadick <Ashley.K.Wadick@tceq.texas.gov>
Subject: FW: Confidential - BV/CTEH Monitoring reports

fyi

JeanMarie CENCETTI
Director of Environment and Sustainable Development
Arkema Inc
900 First Ave
King of Prussia, PA 19406
Office 610-878-6632 Cell 215-272-1005
jeanmarie.cencetti@arkema.com

From: YEKEL Harry
Sent: Saturday, September 02, 2017 5:10 PM
To: CENCETTI Jean-Marie <jeanmarie.cencetti@arkema.com>
Cc: BECKER Andrew <andy.becker@arkema.com>; KNOTTS Kim <kim.knotts@arkema.com>
Subject: Confidential - BV/CTEH Monitoring reports

Reports to date: last 2 days (CTEH and BV). CTEH and BV will issue a new report each day, with any new data included.

Harry Yekel
Senior Principal Environmental Engineer
Arkema Inc.
900 First Avenue
King of Prussia, PA 19406
610-878-6982
215-519-8382 (cell)
harry.yekel@arkema.com

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Arkema Inc. Crosby Plant

Response to Hurricane Harvey
Daily Summary Report

Completed At:

Emergency Operations Center
Crosby Fire Department Station #2
123 S. Diamondhead Rd
Crosby, Texas

BVNA Project No. 02017-000555.00

Report Date: September 2, 2017

Prepared For: Mr. Harry J. Yekel, P.E.
Sr. Principle Engineer
harry.yekel@arkema.com

Prepared By: Karen Jones, CIH
Sr. Director of Operations Gulf Coast, IH
Client Manager
Houston, Texas
karen.jones@us.bureauveritas.com

DAILY REPORT

BUREAU VERITAS

Move Forward with Confidence

This purpose of this Industrial Hygiene assessment and report is to assist you, the client, in your responsibility to establish and maintain a loss control program to prevent illness and injury to your employees and others. Our activities and recommendations are a supplement to and not a substitute for, any part of your own responsibilities and activities. These services are based upon information supplied by client management and conditions that are readily observable, and should not be relied upon exclusively to prevent all possible illnesses, injuries or losses.

Table of Contents

1.0 INTRODUCTION 2
2.0 Real Time Air Monitoring 2
3.0 Analytical Air Sampling 2

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1.0 Introduction

This Arkema Inc. facility located in Crosby, Texas produces organic peroxides. Hurricane Harvey produced flooding of the facility which created a power failure to the refrigeration of the manufacturing and storage units. The loss of refrigeration increased the temperature of the organic peroxides creating a potential health and fire hazard. As a precautionary measure local authorities established a 1.5-mile radius mandatory evacuation zone around the facility.

On Wednesday August 30, 2017 Bureau Veritas North America, Inc. (BVNA) was retained by Arkema Inc.to collect perimeter air monitoring and sampling measurements. This report summarizes the sampling conducted from August 31 to the morning of September 2, 2017. Mapping of the locations are noted below.

2.0 Real Time Air Monitoring

All monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring.

Handheld, real-time air monitoring was conducted for volatile organic compounds (VOCs) and benzene using RAE Systems UltraRAE instruments (see Table 1). Additionally, levels of particulate matter ($PM_{10\mu m}$) were monitored using TSI Dustrak monitors. Sampling locations are shown in Attachment A.

Table 1 Real-time Handheld Air Monitoring Readings
August 31, 2017 - September 2, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections
Benzene	UltraRAE	564	2*	< 1.0 ppm
VOC	UltraRAE	564	6	< 1.0 ppm

*Occurred while changing filters. Values were 0.075 ppm.

3.0 Analytical Air Sampling

In addition to the real time monitoring discussed above, BVNA placed 1 liter Evacuated Canister (Minican™) samplers around the perimeter in order to collect air evenly over a 4 hour period. During the event yesterday, four samplers were running with two located downwind of the smoke cloud. Immediately after the event BVNA gathered four 1 liter Evacuated Canister (TO-Can) over a 10 minute period within the Newport neighborhood. Analytical air samples collected during and immediately following the event duration have been submitted to AB Labs, an AIHA-accredited laboratory for analysis using EPA Method TO-15 as well as analyzing for cumene. All other analytical air samples not collected during events were and will be submitted to SGS Galson Laboratories – an AIHA-accredited laboratory. Analytical air sampling receipts will be reported as soon as they are received from the laboratory.

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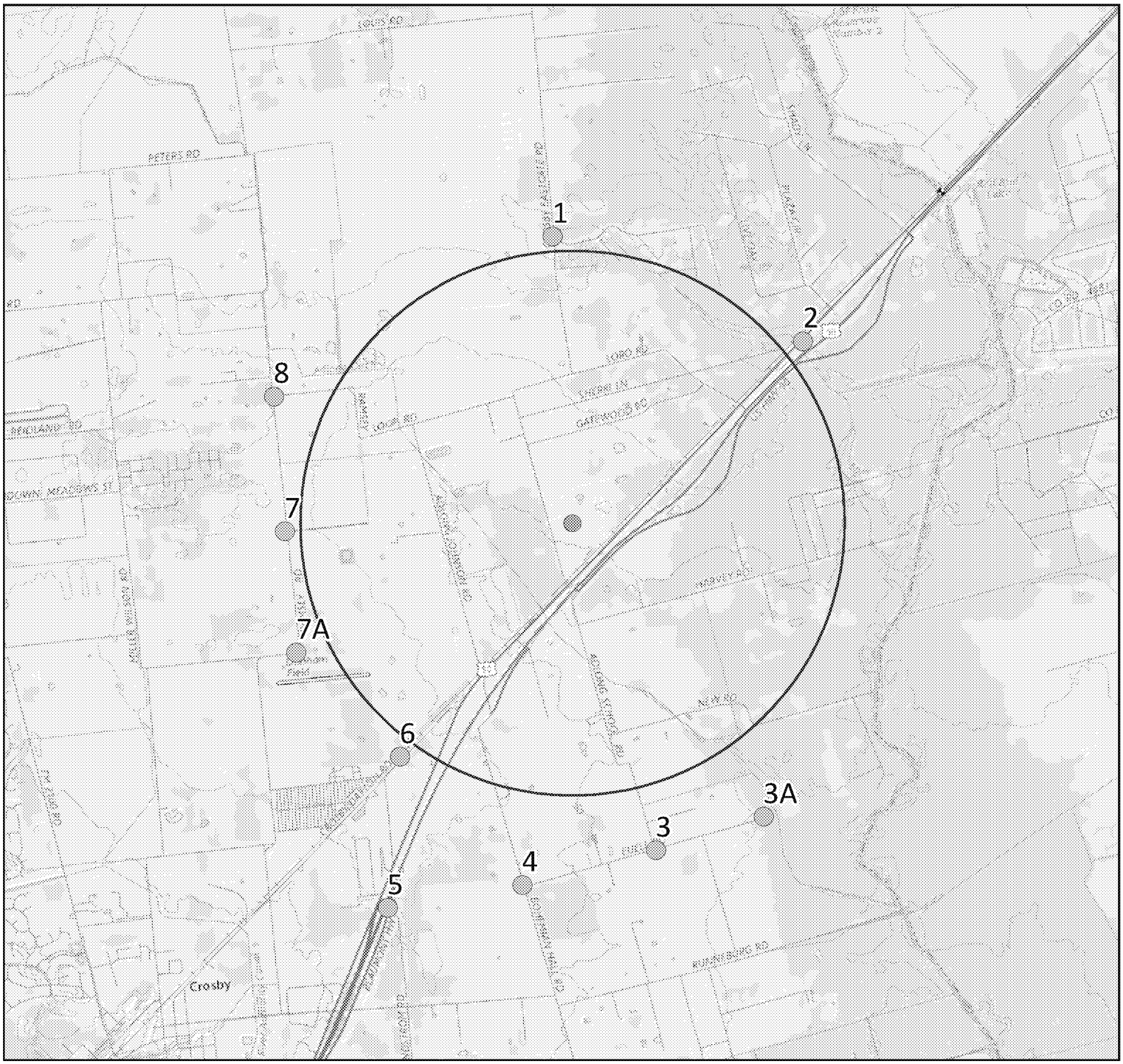
Attachment A

Site Location Map

ED_004141_00000514-00004



LOCATION

Scale: 1: 50,000

0 0.75 1.5 3 Miles

Legend

- Arkema Plant
- Sampling Locations
- 1.50 Mile Evac Zone

CHECKED BY:	MM
DRAWN BY:	TS
DATE:	9/02/2017
SCALE:	AS SHOWN
CAD NO:	NA
PROJ NO:	02017000555

AIR QUALITY MONITORING
ARKEMA CHEMICAL COMPANY
CROSBY, TX

BUREAU VERITAS

Figure 1

Message

From: Smith, Monica [smith.monica@epa.gov]
Sent: 9/4/2017 4:24:22 PM
To: Peterson, Mary [Peterson.Mary@epa.gov]
CC: Carroll, Craig [Carroll.Craig@epa.gov]; Rauscher, Jon [Rauscher.Jon@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]
Subject: RE: Manchester air monitoring - update
Attachments: Manchester Air Monitoring_20170903_1857CT.CSV

From: Peterson, Mary
Sent: Monday, September 04, 2017 11:20 AM
To: Smith, Monica <smith.monica@epa.gov>
Cc: Carroll, Craig <Carroll.Craig@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Smalley, Bryant <smalley.bryant@epa.gov>
Subject: RE: Manchester air monitoring - update

Can you send the attachment?

Mary P. Peterson, Director

Superfund Division
EPA Region 7 | 11201 Renner Blvd | Lenexa, KS 66219
913-551-7882 (o) | 816-398-3945 (c) | peterson.mary@epa.gov

Cleaning Up & Restoring the Heartland

Under the foundational principles of integrity, sound science, & rule of law, we value: *Accountability* * *Teamwork* * *Service* * *Respect*

From: Smith, Monica
Sent: Monday, September 04, 2017 11:06 AM
To: Peterson, Mary <Peterson.Mary@epa.gov>
Cc: Carroll, Craig <Carroll.Craig@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Smalley, Bryant <smalley.bryant@epa.gov>
Subject: FW: Manchester air monitoring - update

From: Crow, David [mailto:David.Crow@WestonSolutions.com]
Sent: Sunday, September 03, 2017 7:41 PM
To: Foster, Althea <Foster.Althea@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Smith, Monica <smith.monica@epa.gov>; Enders, Jhana <Enders.Jhana@epa.gov>
Subject: Manchester air monitoring - update

Attached is a revised spreadsheet with one additional location, J. Harris School.

All monitoring results were at background conditions, except one reading (VOCs: 40 ppb) at the Saint Alphonsus Church. The Environmental Unit recommends periodic monitoring of this area to assess if a detection is experienced again.

Monitoring activities have ended for the evening. START will seek direction from OSC Enders regarding monitoring locations on Monday morning.

From: Crow, David
Sent: Sunday, September 03, 2017 5:33 PM
To: foster.althea@epa.gov; crossland.ronnie@epa.gov; smith.monica@epa.gov
Subject: Manchester air monitoring

Today an EPA Team began mobile air monitoring in the Manchester community located in the NE quadrant of Interstate Highway 610 (I-610) and State Highway 225 in Houston, Harris County, Texas

Operations began at approximately 1630 hours on 3 September 2017

As of this reporting, 6 monitoring locations:

- 3 monitoring location adjacent to the Manchester Community Center
- 2 monitoring locations adjacent to the Manchester Baptist Church
- 1 monitoring location adjacent to the St. Alphonsus Catholic Church

All monitoring results were at background conditions.

Instrument utilized - MultiRAE multi-gas monitor

Time duration at each monitoring location was 3 – 5 minutes.

Monitoring parameters:

- Oxygen (%)
- SO2 (ppm)
- CO (ppm)
- LEL (%)
- H2S (ppm)
- VOCs (ppm)

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Message

From: Lyssy, Gregory [lyssy.gregory@epa.gov]
Sent: 9/6/2017 12:51:11 PM
To: Webster, Susan [webster.susan@epa.gov]; Crossland, Ronnie [Crossland.Ronnie@epa.gov]
CC: Smith, Monica [smith.monica@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]; McAteer, Mike [mcateer.mike@epa.gov]; R6HarveyInfo [R6HarveyInfo@epa.gov]
Subject: RE: Valero Manchester Refinery Update

Revised using info from this morning's 7:00 Update report.

- EPA continues to respond to concerns about air quality associated with emissions from the Valero Houston Refinery
- On the date of the incident (08.27.17), Valero notified the NRC (#1188510 at 1156 hrs), the R6 hotline, the General Land Office (GLO), City of Houston (Bureau of Pollution Control & Prevention), Galena Park LEPC, and the CAER Line Messaging center which provides a recorded message of incident. Other calls included; 1) Harris County (left message), 2) Houston LEPC (no answer), Pasadena LEPC (no answer). Valero was also contacted by PHMSA.
- The EPA OSC conducted an assessment of the damaged tank at the Valero refinery located at 9701 Manchester Road, Houston, Tx. The #3 tank was damaged during the storm and flooding but the leak has been repaired.
- Air monitoring has been conducted north of 225 and west of 610 in the vicinity of the Valero Manchester Refinery.
- EPA teams are utilizing a multiRae and a multiRae pro. Air monitoring was conducted for VOCs, CO, H2S, SO2, O2, and LEL with an UltraRae configured for benzene detection. The highest reading detected for VOCs was 0.33 ppm. Benzene was not detected using the multiRae or multiRae pro.
- EPA's Trace Atmospheric Gas Analyzer (TAGA) conducted air monitoring in southeast Houston around the Valero Refinery. The TAGA detected benzene below the TCEQ Short term ESL of 53 ppb. The Houston Health Department (HDD) has been utilizing TCEQ Short Term ESL numbers for air monitoring.
- EPA air enforcement and TCEQ are having regular calls with Valero regarding the repair and status of the facility.
- Late last night, the City of Houston reported their mobile MAAML found benzene at 5.23 ppb and a summa canister reading for benzene at 334 ppb.
- EPA is sending letters to facilities in the Manchester neighborhood of Houston, encouraging the facilities to conduct surveys and monitoring to identify and address any unauthorized sources of VOCs.

Greg J. Lyssy
U.S. EPA
Senior Project Manager
RCRA Corrective Action (6MM-RC)
1445 Ross Avenue
Dallas, TX 75202
Phone - 214.665.8317
Cell Phone - 214.543.4415
lyssy.gregory@epa.gov

From: Lyssy, Gregory
Sent: Wednesday, September 06, 2017 7:09 AM
To: Webster, Susan <webster.susan@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>
Cc: Smith, Monica <smith.monica@epa.gov>; Smalley, Bryant <smalley.bryant@epa.gov>; McAteer, Mike <mcateer.mike@epa.gov>; R6HarveyInfo <R6HarveyInfo@epa.gov>
Subject: Valero Manchester Refinery Update

Good Morning REOC:

This is the information I will forward to FEMA, unless something else is preferred. Please respond if edits are requested.

- On the date of the incident (08.27.17), Valero notified the NRC (#1188510 at 1156 hrs), the R6 hotline, the General Land Office (GLO), City of Houston (Bureau of Pollution Control & Prevention), Galena Park LEPC, and the CAER Line Messaging center which provides a recorded message of incident. Other calls included; 1) Harris County (left message), 2) Houston LEPC (no answer), Pasadena LEPC (no answer). Valero was also contacted by PHMSA.
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- The EPA TAGA was also monitoring in the area. The TAGA detected benzene below the TCEQ Short term ESL of 53 ppb. The Houston Health Department (HDD) has been utilizing TCEQ Short Term ESL numbers for air monitoring.
- The EPA OSC conducted an assessment of the damaged tank at the Valero refinery located at 9701 Manchester Road, Houston, Tx. The #3 tank was damaged during the storm and flooding but the leak has been repaired.
- EPA air enforcement and TCEQ are having regular calls with Valero regarding the repair and status of the facility.

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Senior Project Manager
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1445 Ross Avenue
Dallas, TX 75202
Phone - 214.665.8317
Cell Phone - 214.543.4415
lyssy.gregory@epa.gov

Message

From: Lyssy, Gregory [lyssy.gregory@epa.gov]
Sent: 9/6/2017 12:08:47 PM
To: Webster, Susan [webster.susan@epa.gov]; Crossland, Ronnie [Crossland.Ronnie@epa.gov]
CC: Smith, Monica [smith.monica@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]; McAteer, Mike [mcateer.mike@epa.gov]; R6HarveyInfo [R6HarveyInfo@epa.gov]
Subject: Valero Manchester Refinery Update

Good Morning REOC:

This is the information I will forward to FEMA, unless something else is preferred. Please respond if edits are requested.

- On the date of the incident (08.27.17), Valero notified the NRC (#1188510 at 1156 hrs), the R6 hotline, the General Land Office (GLO), City of Houston (Bureau of Pollution Control & Prevention), Galena Park LEPC, and the CAER Line Messaging center which provides a recorded message of incident. Other calls included; 1) Harris County (left message), 2) Houston LEPC (no answer), Pasadena LEPC (no answer). Valero was also contacted by PHMSA.
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Greg J. Lyssy
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1445 Ross Avenue
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Phone - 214.665.8317
Cell Phone - 214.543.4415
lyssy.gregory@epa.gov

Message

From: Lyssy, Gregory [lyssy.gregory@epa.gov]
Sent: 9/6/2017 11:23:02 AM
To: Webster, Susan [webster.susan@epa.gov]; Crossland, Ronnie [Crossland.Ronnie@epa.gov]
CC: Smith, Monica [smith.monica@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]; McAteer, Mike [mcateer.mike@epa.gov]
Subject: RE: Daily Update 09.05.17

Thank you for the update. We will pass along information to FEMA.

Greg J. Lyssy
U.S. EPA
Senior Project Manager
RCRA Corrective Action (6MM-RC)
1445 Ross Avenue
Dallas, TX 75202
Phone - 214.665.8317
Cell Phone - 214.543.4415
lyssy.gregory@epa.gov

From: Webster, Susan
Sent: Tuesday, September 05, 2017 10:04 PM
To: Crossland, Ronnie <Crossland.Ronnie@epa.gov>
Cc: Lyssy, Gregory <lyssy.gregory@epa.gov>; Smith, Monica <smith.monica@epa.gov>; Smalley, Bryant <smalley.bryant@epa.gov>; McAteer, Mike <mcateer.mike@epa.gov>
Subject: FW: Daily Update 09.05.17

Below is tonight's update. Tx susan

From: Enders, Jhana
Sent: Tuesday, September 05, 2017 9:08 PM
To: R6HarveySITL <R6HarveySITL@epa.gov>; Webster, Susan <webster.susan@epa.gov>; Carroll, Craig <Carroll.Craig@epa.gov>; Zehner, Warren <zehner.warren@epa.gov>
Subject: Daily Update 09.05.17

Two START teams conducted air monitoring north of 225 and west of 610 in the vicinity of the Valero Refinery. The teams are utilizing a multiRae and a multiRae pro. Air monitoring was conducted for VOCs, CO, H2S, SO2, O2, and LEL with an UltraRae configured for benzene detection. The highest reading detected for VOCs was 0.33 ppm. No benzene was detected by START. TAGA detected benzene below the TCEQ Short term ESL of 53 ppb. The Houston Health Department (HDD) has been utilizing TCEQ Short Term ESL numbers for air monitoring. Further discussions are needed with Jon Rauscher to verify reference numbers for benzene, toluene and other chemicals of concern.

OSC Enders conducted an assessment of the damaged tank at the Valero refinery located at 9701 Manchester Road, Houston, Tx. The #3 tank was damaged during the storm and flooding but the leak has been repaired. EPA air enforcement and TCEQ are having regular calls with Valero regarding the repair and status of the facility. On the date of the incident (08.27.17), Valero notified the NRC (#1188510 at 1156 hrs), the R6 hotline, the General Land Office (GLO), City of Houston (Bureau of Pollution Control & Prevention), Galena Park LEPC, and the CAER Line Messaging center which provides a recorded message of incident. Other calls included; 1) Harris County (left message), 2) Houston LEPC (no answer), Pasadena LEPC (no answer). Valero was also contacted by PHMSA.

Jhana Enders
Federal On-Scene Coordinator (FOSC)
US EPA

Readiness & Emergency Response Team (6SF-ER)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202
214-789-9654 (Mobile)

Message

From: Webster, Susan [webster.susan@epa.gov]
Sent: 9/6/2017 3:03:48 AM
To: Crossland, Ronnie [Crossland.Ronnie@epa.gov]
CC: Lyssy, Gregory [lyssy.gregory@epa.gov]; Smith, Monica [smith.monica@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]; McAteer, Mike [mcateer.mike@epa.gov]
Subject: FW: Daily Update 09.05.17

Below is tonight's update. Tx susan

From: Enders, Jhana
Sent: Tuesday, September 05, 2017 9:08 PM
To: R6HarveySITL <R6HarveySITL@epa.gov>; Webster, Susan <webster.susan@epa.gov>; Carroll, Craig <Carroll.Craig@epa.gov>; Zehner, Warren <zehner.warren@epa.gov>
Subject: Daily Update 09.05.17

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Jhana Enders
Federal On-Scene Coordinator (FOSC)
US EPA
Readiness & Emergency Response Team (6SF-ER)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202
214-789-9654 (Mobile)

Message

From: R6HarveySITL [R6HarveySITL@epa.gov]
Sent: 9/11/2017 8:47:35 PM
To: Smalley, Bryant [smalley.bryant@epa.gov]
Subject: Jhana Enders summary
Attachments: Jhana Enders daily summary.docx

Jhana Enders daily summary

Continued to conduct air monitoring near the Valero Refinery in areas north and south of the intersection of 225 and 610. Additional sampling locations were added to include a number of schools and parks. The data results and locations were provided to the REOC earlier today. Contacted Randy Gee to discuss the Houston Health Department (HHD) concerns he received regarding elevated benzene and toluene levels detected in the neighborhood next to Valero. Randy provided contact information and OSC Enders contacted Loren Raun. Ms. Raun was pleased to hear the EPA was onsite and conducting air monitoring and also provided a status update. HHD is currently conducting air monitoring from a mobile laboratory as well as with additional ground support. Elevated readings were detected on Saturday (09/02/17) from 4000-15,000 ppb and sampling was conducted with summa canisters. The summa canister data will be available tomorrow. Additional summa canister sampling was also taken after the Saturday event. HHD engineers are scheduled to visit Valero tomorrow as Valero would not give them information previously. HDD has a meeting every morning at 0900 hrs with the mobile laboratory and ground crew to discuss air monitoring plans and requested EPA to be present on 09.05.17. They expressed an interest in EPA possibly taking over the air monitoring in the future so they could continue to address the growing number of locations in the Houston area.

Two START teams conducted air monitoring north of 225 and west of 610 in the vicinity of the Valero Refinery. The teams are utilizing a multiRae and a multiRae pro. Air monitoring was conducted for VOCs, CO, H2S, SO2, O2, and LEL with an UltraRae configured for benzene detection. The highest reading detected for VOCs was 0.33 ppm. No benzene was detected by START. TAGA detected benzene below the TCEQ Short term ESL of 53 ppb. The Houston Health Department (HDD) has been utilizing TCEQ Short Term ESL numbers for air monitoring. Further discussions are needed with Jon Rauscher to verify reference numbers for benzene, toluene and other chemicals of concern.

OSC Enders conducted an assessment of the damaged tank at the Valero refinery located at 9701 Manchester Road, Houston, Tx. The #3 tank was damaged during the storm and flooding but the leak has been repaired. EPA air enforcement and TCEQ are having regular calls with Valero regarding the repair and status of the facility. On the date of the incident (08.27.17), Valero notified the NRC (#1188510 at 1156 hrs), the R6 hotline, the General Land Office (GLO), City of Houston (Bureau of Pollution Control & Prevention), Galena Park LEPC, and the CAER Line Messaging center which provides a recorded message of incident. Other calls included; 1) Harris County (left message), 2) Houston LEPC (no answer), Pasadena LEPC (no answer). Valero was also contacted by PHMSA.
Typically, two START teams are available for air monitoring but one team was deployed today to do soil sampling at the new pad site located at Clinton Drive at Dorsett Street. The other START team conducted air monitoring along Valero's facility perimeter for VOCs, CO, H2S, SO2, O2, and LEL with an Ultra Rae configured for benzene detection. The highest VOC reading was 0.6 ppm and no benzene was detected above the instrument's detection limit of 10ppb.

Two Viper systems are now up and running and available for deployment. The Viper system with the Ultra Rae with a lower detection limit (10ppb) will be deployed tomorrow at the Valero fence line near Tank #3 which was damaged in the storm (now repaired). Two additional Viper systems will be sent from Addition for a total of four. Three will have detection limits of 10ppb and one will have a detection limit of 100 ppb.

The TAGA conducted air monitoring throughout the Manchester neighborhood and around the Valero facility with no levels of concern detected. Dave Mickunas will provide more detailed information in a separate email.

TCEQ and the City of Houston were out conducting air monitoring and Flir thermal imaging. No elevated readings had been detected.

A New York Times article on the Manchester area which was initiated by the Houston Health Department with mention of EPA and can be located at;
[HYPERLINK "https://mobile.nytimes.com/2017/09/06/us/harvey-houston-valero-benzene.html?referer=https://www.google.com/"]

Two START teams monitored in the vicinity of 225 and 610. Wind directions were largely from the east to the west today. The data was collected using Viper with paper logs used only during adjustments to VIPER. The highest reading recorded was 290 ppb VOCs. No benzene tests were performed due to no VOCs detections above 500 ppb. The highest reading was detected at BMan217 (latitude 29.712925 and Longitude -95.255883) by Team 2. Team 2 monitored in the Manchester area. Team 1 monitored along Lawndale and did not report any detections.

The ERT's mobile TAGA tandem mass spectrometer system experienced a vacuum issue in the afternoon Thursday, 09/07/2017. The lab was returned to the Houston lab to affect repairs. The electrical connection on the bayard-alpert gauge connection was tightened, the nitrogen line was replaced, and the curtain gas pressure was increased. These measures appeared to have rectified the issue. The TAGA laboratory was road tested afterwards and no problems were observed. On Friday, 09/08/2017, the TAGA was calibrated and mobilized to the Manchester Street neighborhood to commence monitoring operations. On the way to the above location, the vacuum system failed again. However, this time the fault could not be corrected. The TAGA mobile laboratory was returned to the Houston laboratory and further attempts were conducted to correct the problem. Additionally, the instrument service contract was contacted for advice. The telephone assistance did not yield a solution. A service technician is scheduled to arrive tomorrow to correct the vacuum fault. Moreover, replacement parts were shipped from RTP, NC and will arrive tomorrow. Further information will be provided on the progress and repair of the TAGA MS/MS system. If there are any questions or comments regarding the status of the TAGA, contact David Mickunas at (609) 865 1574.
OSC Enders and four EPA air inspectors coordinated with TCEQ regarding monitoring in the Manchester area. Two air personnel accompanied TCEQ for a Valero site visit and two air personnel conducted air monitoring with START.
Valero tank #3 continues to have oil on the floating roof, Valero cut an additional hole in the wall trying to pump down oil on top. Valero is trying to degas and has a cc eliminator which helps vapor go down. At this time Valero was not able to give a time for the tank to be emptied and degassed.
Valero tank 228, a gasoline tank will be emptied and degassed by next week. The leak has been identified and needs to be addressed and repairs will be made after the tank is emptied.
START and the air technical support teams collectively monitored Lawndale street, Magellan Transport, LyondellBassell Refinery, Flint Hills Refinery, Goodyear and the Motiva transfer

station located on Light Company Road. Magellan Transport and the Valero barge loading were monitored simultaneously by START and the air technical support teams. An area of interest was identified by one of the air technical support teams at the intersection of Witter & Red Bluff road between Pasadena Refining and Kinder Morgan. This location will be added to the TAGA route for tomorrow. The technical support lead will work with 6EN management to ensure there are no access issues with Pasadena Refining or Kinder Morgan.

OSC Enders attended the 8:30 conference call between EPA, TCEQ and Valero. Tank #3, Tank #228 (pinhole leak) and barge loading continue to be the only potential sources identified at this time. Valero has a contractor (Envent) coming to degas #3 vapor under the roof. Isolated pockets of oil remain and Valero is cutting door sheets to access. The TCEQ/EPA personnel who visited Valero yesterday, reported there were no strong odors coming off the #3 tank and also expressed they were pleased with the spill cleanup. The OSC spoke with the TCEQ Air Section Chief later in the day and he said TCEQ had no plans to do additional air monitoring unless a complaint was received. Valero is conducting daily perimeter and community air monitoring with a MiniRAE and an UltraRae. Valero is to notify EPA/TCEQ of barge loading in case of citizen complaints. The OSC will notify the R6 hotline. The city of Houston was not on the call.

The four EPA 6EN field personnel serving as air technical support to the OSC under ESF-10 provided air monitoring updates throughout the day. To keep from duplication of efforts on daily reports, the Chief, Air Toxics Enforcement will report the daily activities for these personnel under a separate email to the Situation and Environmental Units with a cc to the OSC.

The TAGA has been repaired and will be available for air monitoring tomorrow. The OSC, one START team and the 6EN air technical support teams will coordinate with TAGA tomorrow. One START team will monitor additional locations identified today. The Las Vegas TAGA mobile laboratory is anticipated to arrive latter this date.

Message

From: Foster, Althea [Foster.Althea@epa.gov]
Sent: 9/4/2017 11:24:03 PM
To: Smalley, Bryant [smalley.bryant@epa.gov]
Subject: Fwd: Manchester air monitoring
Attachments: Manchester Air Monitoring_20170903_1817CT.CSV; ATT00001.htm

Sent from my iPad

Begin forwarded message:

From: "Crow, David" <David.Crow@WestonSolutions.com>
Date: September 3, 2017 at 6:29:39 PM CDT
To: "foster.althea@epa.gov" <foster.althea@epa.gov>, "'crossland.ronnie@epa.gov'" <crossland.ronnie@epa.gov>, "smith.monica@epa.gov" <smith.monica@epa.gov>
Subject: Manchester air monitoring

Attached is a data table of air monitoring at this point.

From: Crow, David
Sent: Sunday, September 03, 2017 5:33 PM
To: foster.althea@epa.gov; crossland.ronnie@epa.gov; smith.monica@epa.gov
Subject: Manchester air monitoring

Today an EPA Team began mobile air monitoring in the Manchester community located in the NE quadrant of Interstate Highway 610 (I-610) and State Highway 225 in Houston, Harris County, Texas

Operations began at approximately 1630 hours on 3 September 2017

As of this reporting, 6 monitoring locations:

- <!--[if !supportLists]--><!--[endif]-->3 monitoring location adjacent to the Manchester Community Center
- <!--[if !supportLists]--><!--[endif]-->2 monitoring locations adjacent to the Manchester Baptist Church
- <!--[if !supportLists]--><!--[endif]-->1 monitoring location adjacent to the St. Alphonsus Catholic Church

All monitoring results were at background conditions.

Instrument utilized - MultiRAE multi-gas monitor

Time duration at each monitoring location was 3 – 5 minutes.

Monitoring parameters:

- <!--[if !supportLists]--><!--[endif]-->Oxygen (%)
- <!--[if !supportLists]--><!--[endif]-->SO2 (ppm)
- <!--[if !supportLists]--><!--[endif]-->CO (ppm)

- <!--[if !supportLists]--><!--[endif]-->LEL (%)
- <!--[if !supportLists]--><!--[endif]-->H2S (ppm)
- <!--[if !supportLists]--><!--[endif]-->VOCs (ppm)

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Message

From: Thomas, Mark J. [Thomas.Markj@epa.gov]
Sent: 8/31/2017 10:47:07 PM
To: Bernier, Roberto [bernier.roberto@epa.gov]; Smalley, Bryant [smalley.bryant@epa.gov]
Subject: RE: 31 Aug 2017 -- ASPECT update 15 -- 1555
Attachments: Infrared.png

Roberto,

Please find attached an ir image of the tankers. The dark ones appear to be cold. We count 8 cold tanks. The emissions may be residual from the fire.

Mark Thomas, PhD
ASPECT Program Manager
Field Operations Branch
CBRN Consequence Management Advisory Division
EPA Office of Emergency Management
11201 Renner Blvd
Lenexa, KS 66219

Office: 913-551-5018
Cell: 513-675-4753

From: Bernier, Roberto
Sent: Thursday, August 31, 2017 5:36 PM
To: Smalley, Bryant
Cc: Thomas, Mark J.
Subject: RE: 31 Aug 2017 -- ASPECT update 15 -- 1555

Can we pinpoint the source (trailer) of the peroxide detection. It will be good info to estimate which trailer is getting to decomp state

---

From: Smalley, Bryant
Sent: Thursday, August 31, 2017 4:03 PM
To: Carroll, Craig <Carroll.Craig@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Smith, Monica <smith.monica@epa.gov>; Gray, David <gray.david@epa.gov>
Cc: Mason, Steve <mason.steve@epa.gov>; McAteer, Mike <mcateer.mike@epa.gov>; Bernier, Roberto <bernier.roberto@epa.gov>
Subject: Fwd: 31 Aug 2017 -- ASPECT update 15 -- 1555

FYSA

Sent from my iPhone

Begin forwarded message:

> **From:** "Thomas, Mark J." <Thomas.Markj@epa.gov>
> **Date:** August 31, 2017 at 3:58:37 PM CDT
> **To:** "Thomas, Mark J." <Thomas.Markj@epa.gov>, "Martin, John" <martin.john@epa.gov>, Beorn Leger <beornleger@airborneaspect.com>, "Rhotenberry, William" <Rhotenberry.William@epa.gov>, "Kudarauskas, Paul" <Kudarauskas.Paul@epa.gov>, "Curry, Tim" <Curry.Timothy@epa.gov>, "Kroutil,

Robert" <robert.kroutil@kalmancoinc.com>, "Delgado, Eric" <Delgado.Eric@epa.gov>, R6HarveyENVL <R6HarveyENVL@epa.gov>, "Leonova, Larisa" <leonova.larisa@epa.gov>, "Rauscher, Jon" <Rauscher.Jon@epa.gov>, "Janine.Latham@WestonSolutions.com" <Janine.Latham@WestonSolutions.com>, "Smalley, Bryant" <smalley.bryant@epa.gov>, "Cardarelli, John" <Cardarelli.John@epa.gov>
Subject: 31 Aug 2017 -- ASPECT update 15 -- 1555

Refueling ops have been completed. The crew was able to push a large amount of data up to the server. We are working the data at this time. We are returning to the Arkema site ASAP.

The team is just about to start full resolution processing of the most recent data. I will send out products as soon as possible.

Mark Thomas, PhD
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