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

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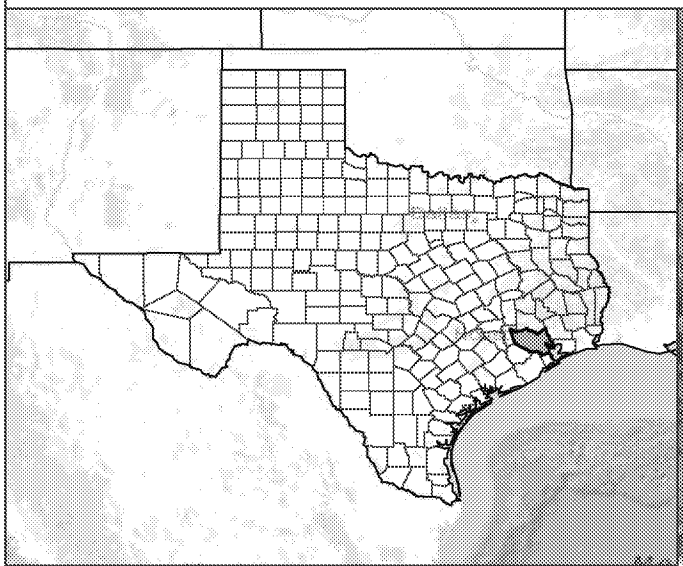
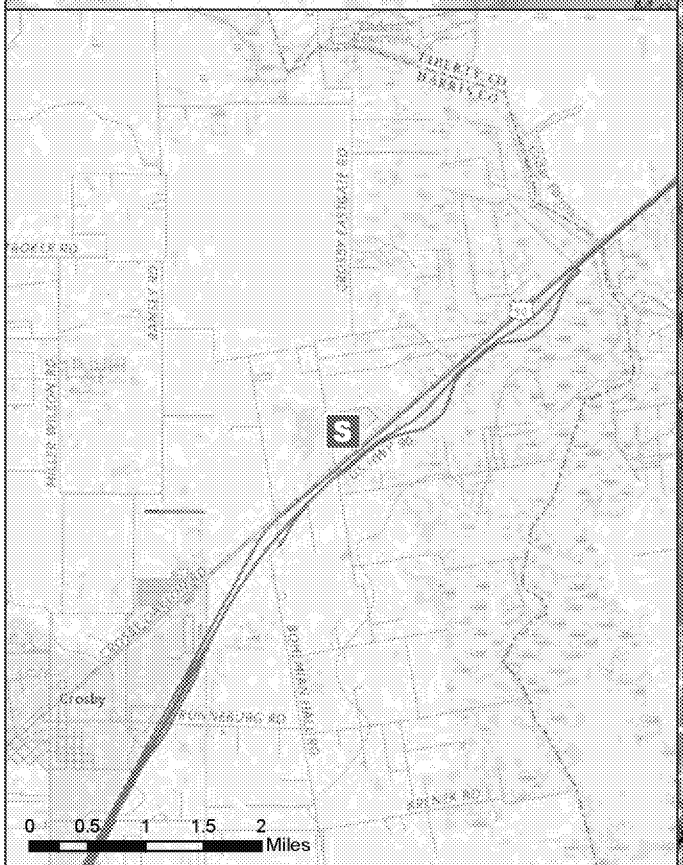
Site Location

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

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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

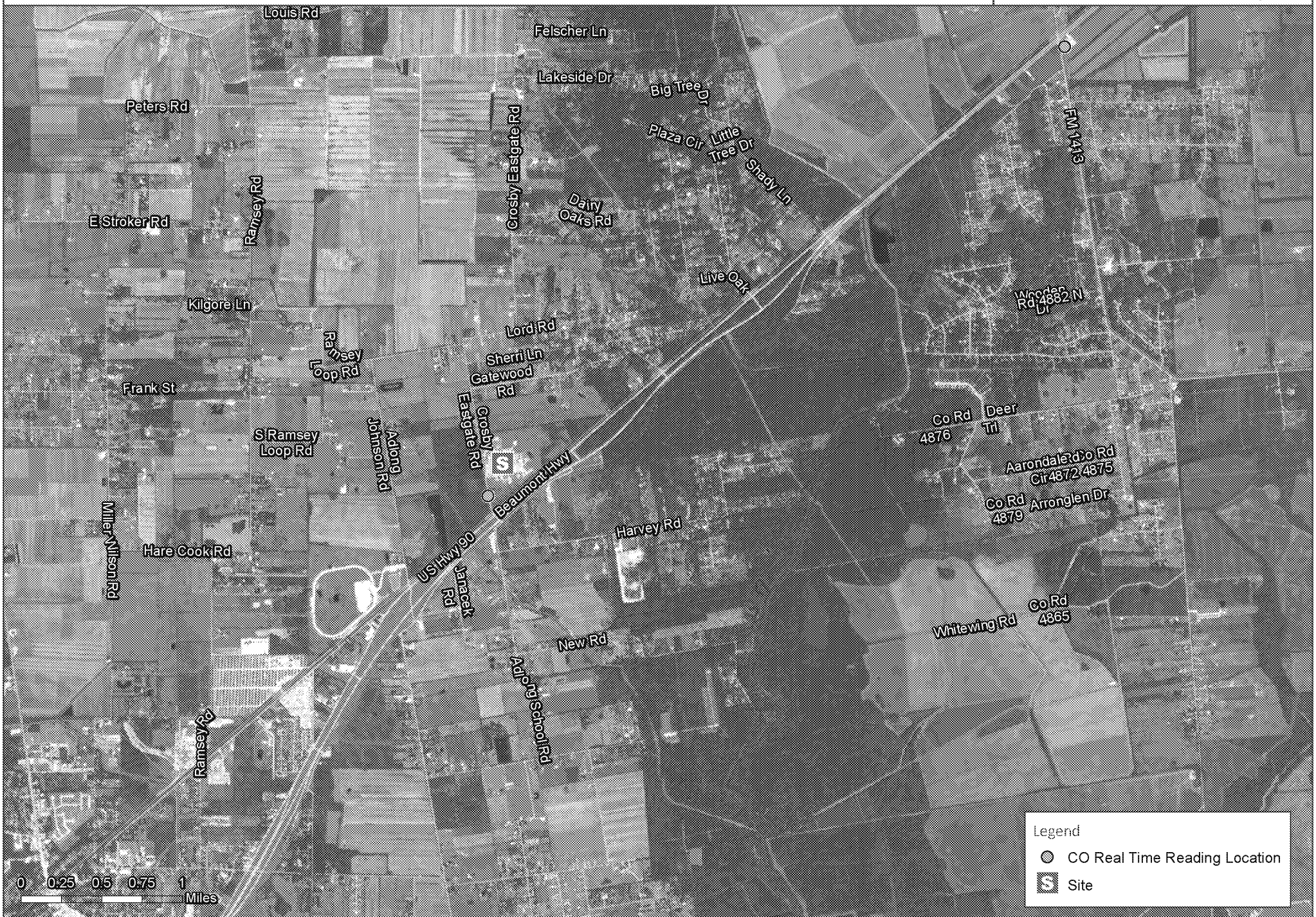
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

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

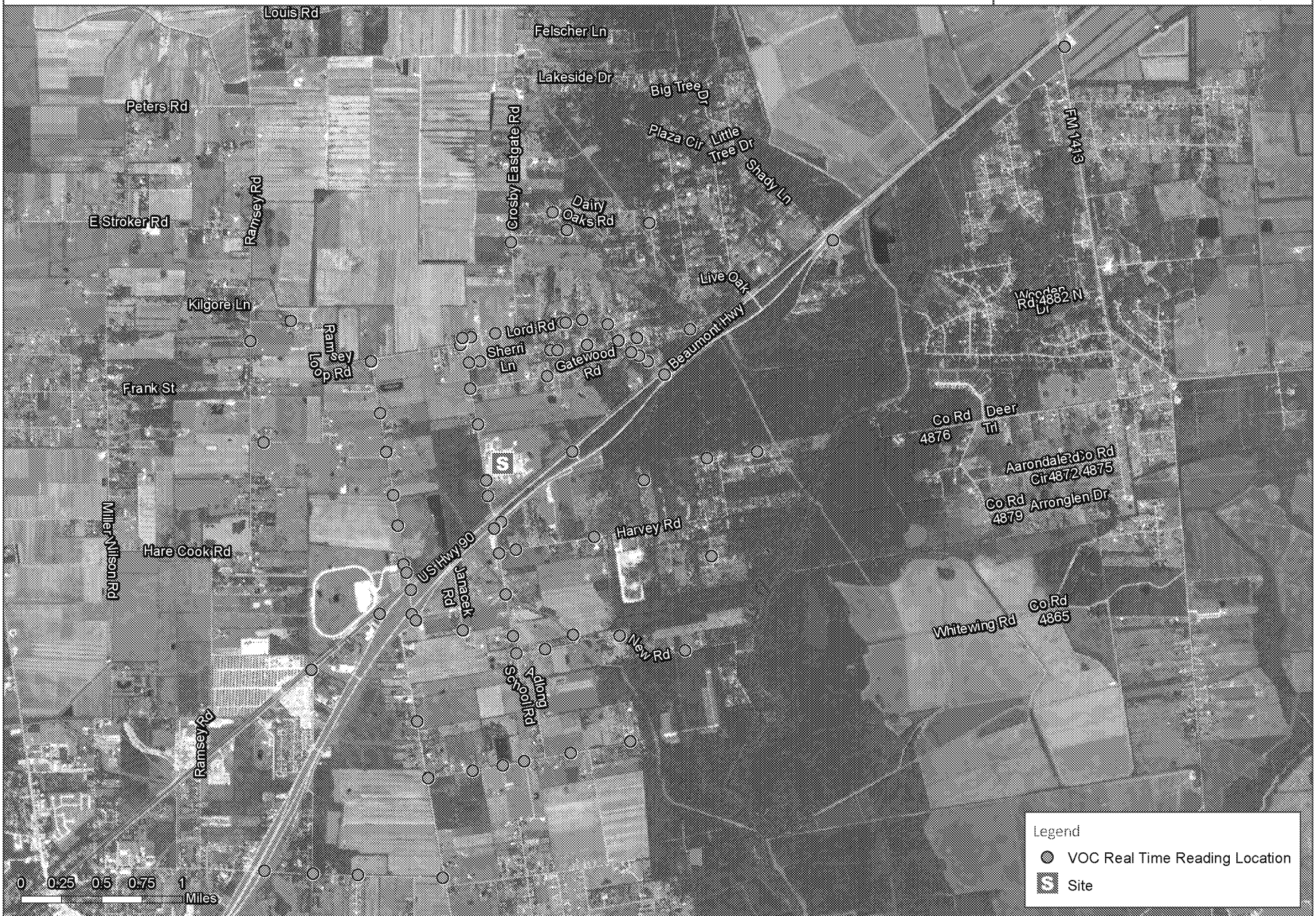
PROJECTION SYSTEM: UTM15 COORDINATE SYSTEM: WGS84

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

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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*

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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*

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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

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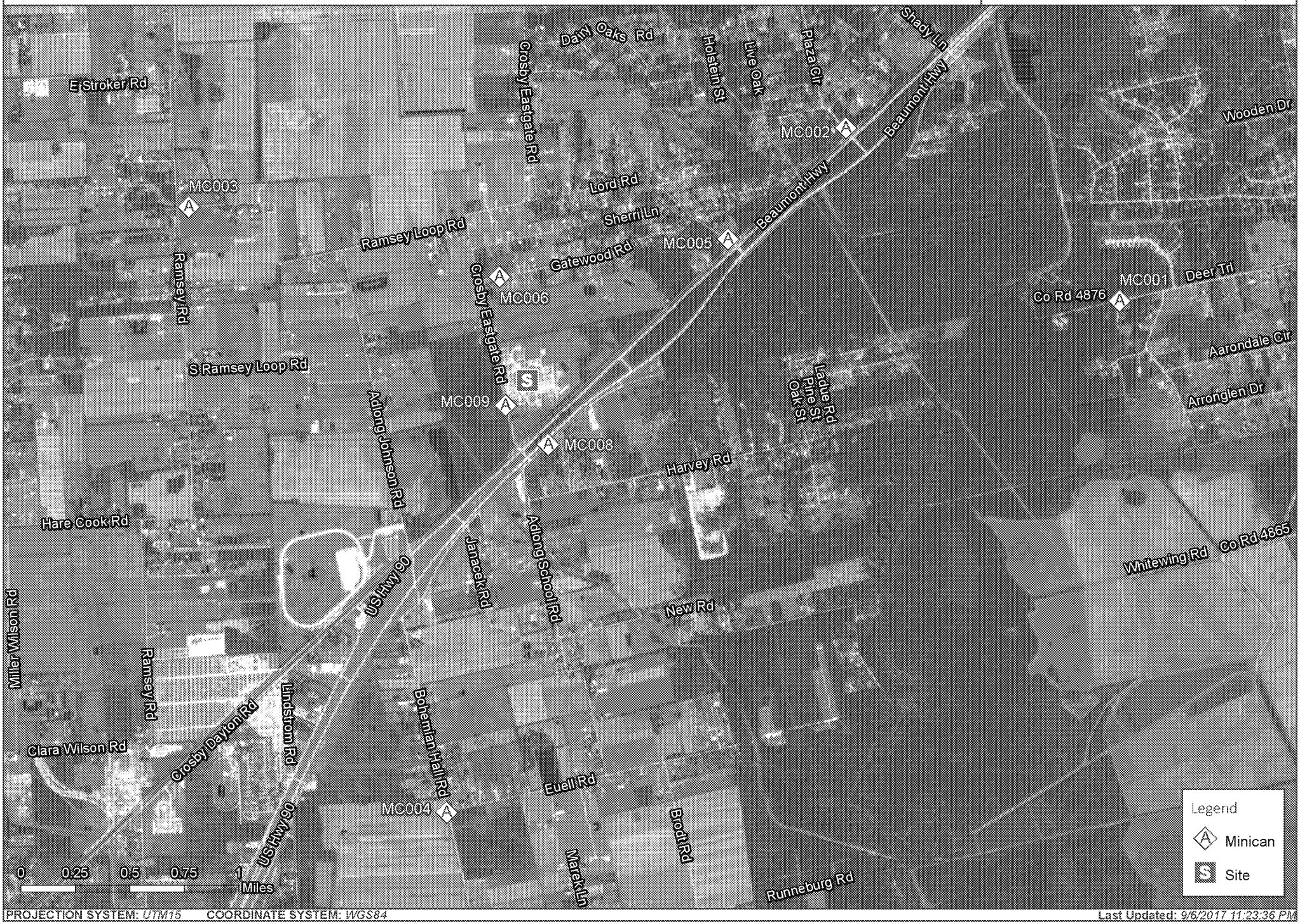
Analytical Air Monitoring Station Locations as of September 6, 2017

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)

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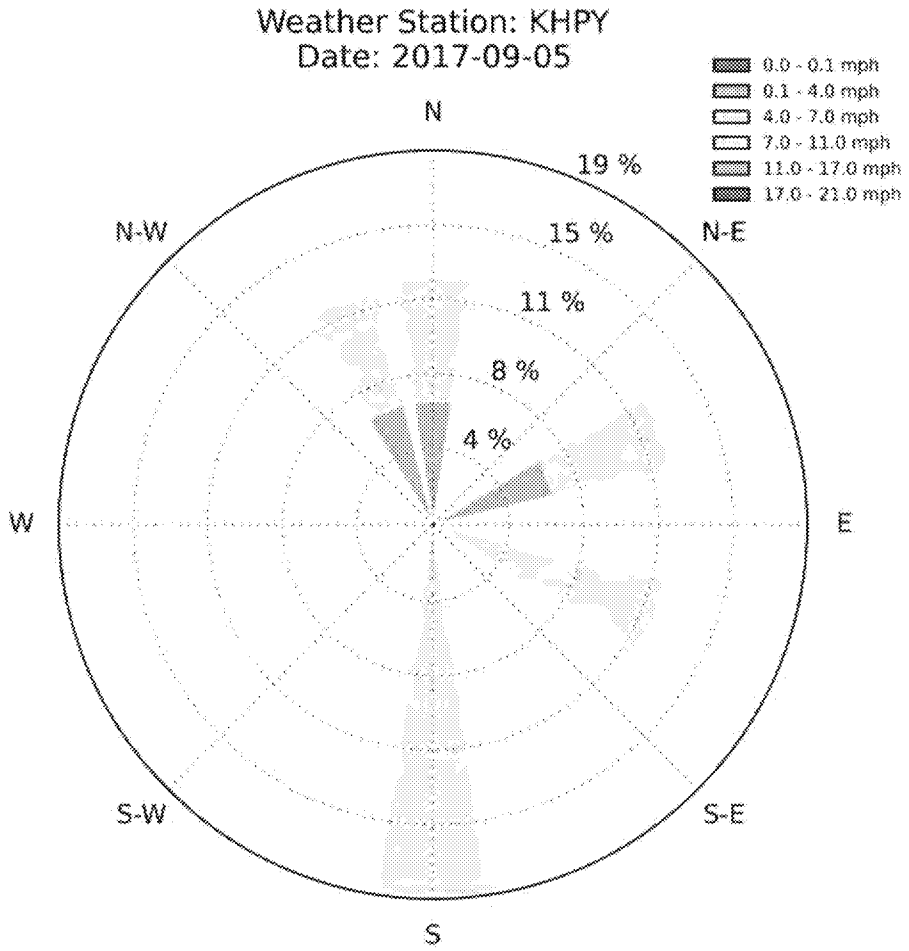
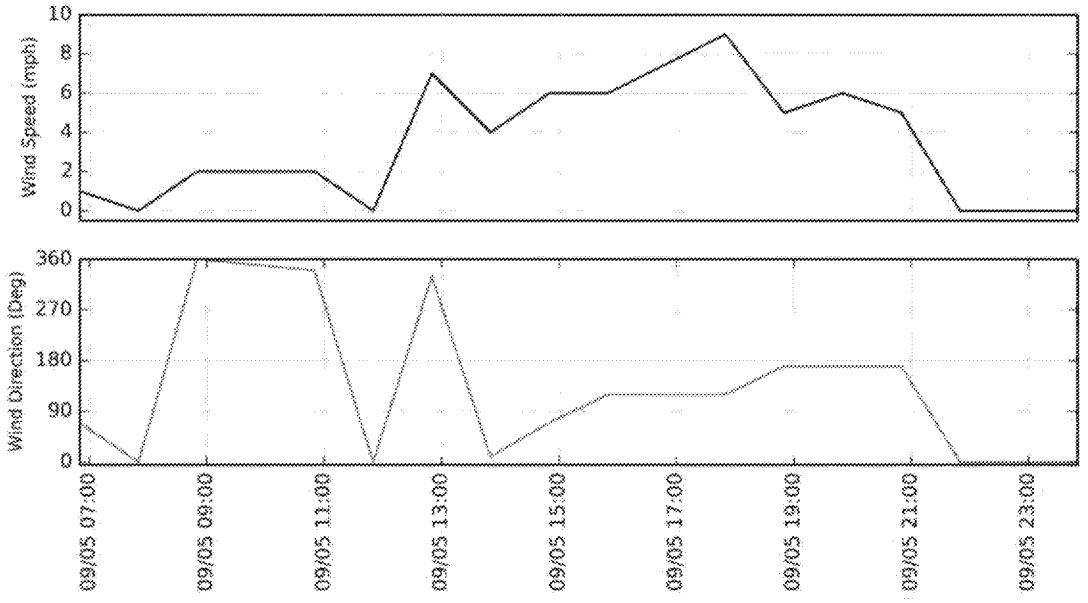

Weather Station: KHPY
Date: 2017-09-05
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
19 %
15 %
11 %
8 %
4 %


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
09/05 13:00
09/05 15:00
09/05 17:00
09/05 19:00
09/05 21:00
09/05 23:00

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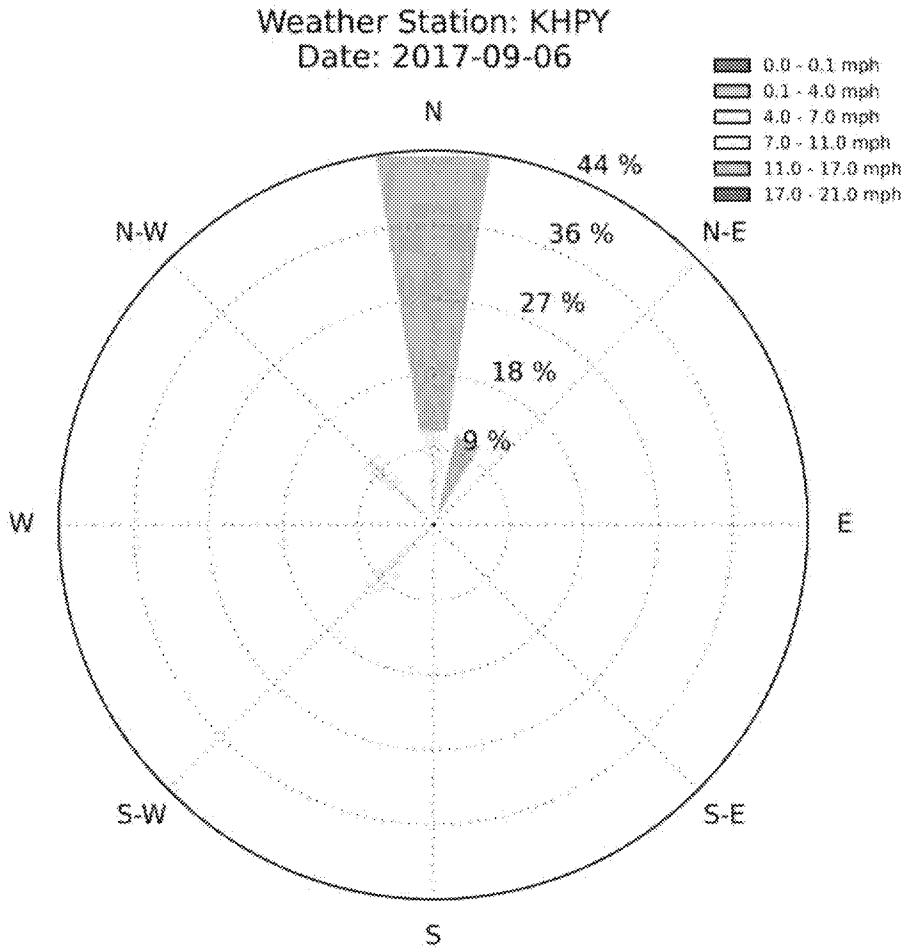
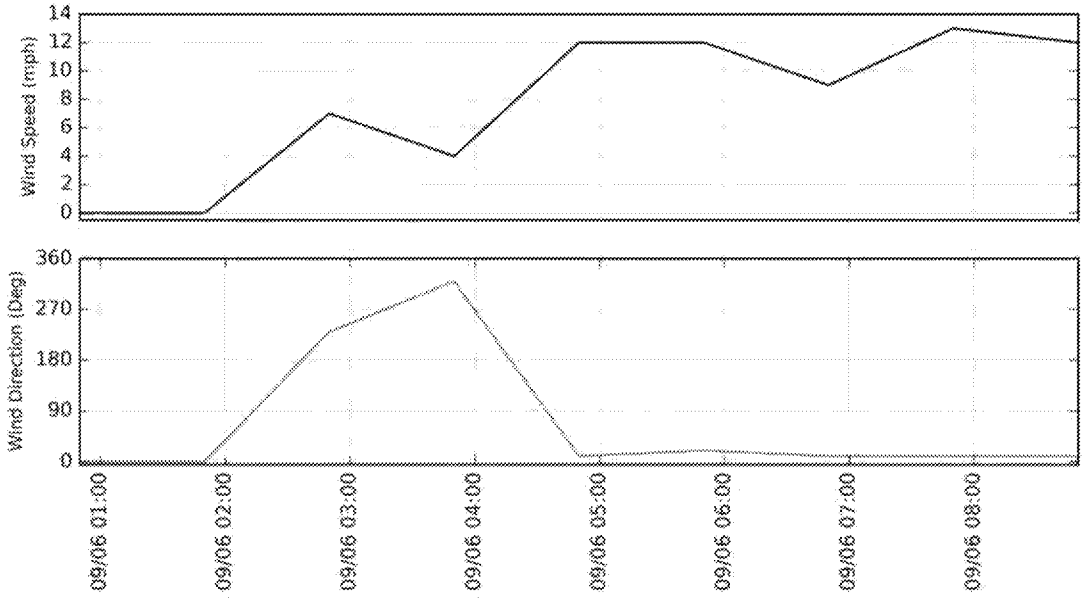

Weather Station: KHPY
Date: 2017-09-06
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
44 %
36 %
27 %
18 %
9 %


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

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