



Memorandum

Draft for Review
Privileged and Confidential – Prepared at the Request of Counsel

May 12, 2018

To: Husky Energy Ref. No.: 11156937

From: GHD/dh/51 Tel: 501-224-1926

cc: Dyron Hamlin, MS, PE, CIH; Bradley Free

Subject: Summary of Community Air Monitoring Results: May 11, 2018 – Between 00:00 and 23:59

The purpose of this memorandum is to provide Husky Energy, Inc. (Husky) Site management a summary of the community air monitoring and observations from the air monitoring being performed in Superior, WI and the surrounding area following the fire at the Husky Superior Refinery. This summary memorandum summarizes the air monitoring data collected from May 11, 2018 between 00:00 and 23:59. Community air monitoring was completed during this period in the area around the refinery where residents have returned to their homes following an evacuation order that was in place during and after the refinery fire. Air monitoring activities were conducted in accordance with the Air Monitoring Plan developed in consultation with the USEPA.

Real-time air monitoring was used as a screening tool to indicate the presence or absence of airborne concentrations of Compounds of Interest (COI) for the purpose of evaluating conditions in the community surrounding the refinery. The results of the air monitoring conducted during this shift indicate that COIs are not present in the subject area above the action levels established in the air monitoring plan.

Air monitoring locations and results are shown on Figure 1 through Figure 4.

Manually Recorded and Continuously Logged Real-time Data

Using calibrated air quality monitoring instruments, GHD monitored for COIs throughout the study area and documented the results by both manually recording data into an electronic database and by using instrument data logging. Data was collected using calibrated monitoring instruments equipped with a photo ionization detector (PID) (10.6 eV lamp) for monitoring volatile organic compounds (VOCs) and electrochemical sensors specific for carbon monoxide (CO), hydrogen sulfide (H₂S), and flammability (LEL). Chemical-specific Dräger sensors were used to detect the presence or absence of Hydrogen Fluoride (HF). TSI DustTrak monitors were used to measure the presence of total airborne particulate matter (dust, smoke, etc).

The manually recorded data is summarized in Table 1.



Table 1: Manually Recorded Real-Time Data Summary

Monitoring Period 00:00 – 23:59 CDT May 11, 2018

Community Air Monitoring

Parameter	Action Level	Number of Readings Collected	Number of Detectable Readings	Reading Minimum	Reading Average	Reading Maximum	Units
VOC	1	666	0	0.0	0.0	0.0	ppm
H ₂ S	0.51	666	0	0.0	0.0	0.0	ppm
HF	1	661	0	0.0	0.0	0.0	ppm
Particulate	0.100	664	638	0.000	0.008	0.422	mg/m ³

Notes:

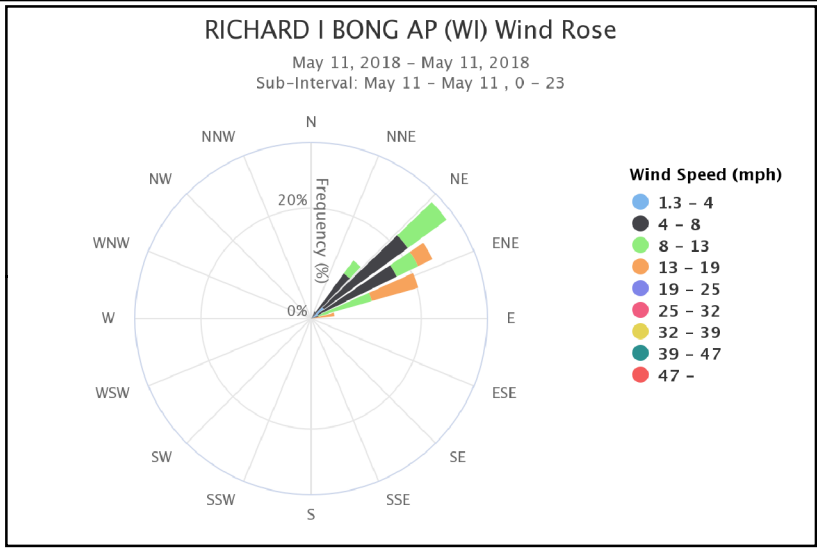
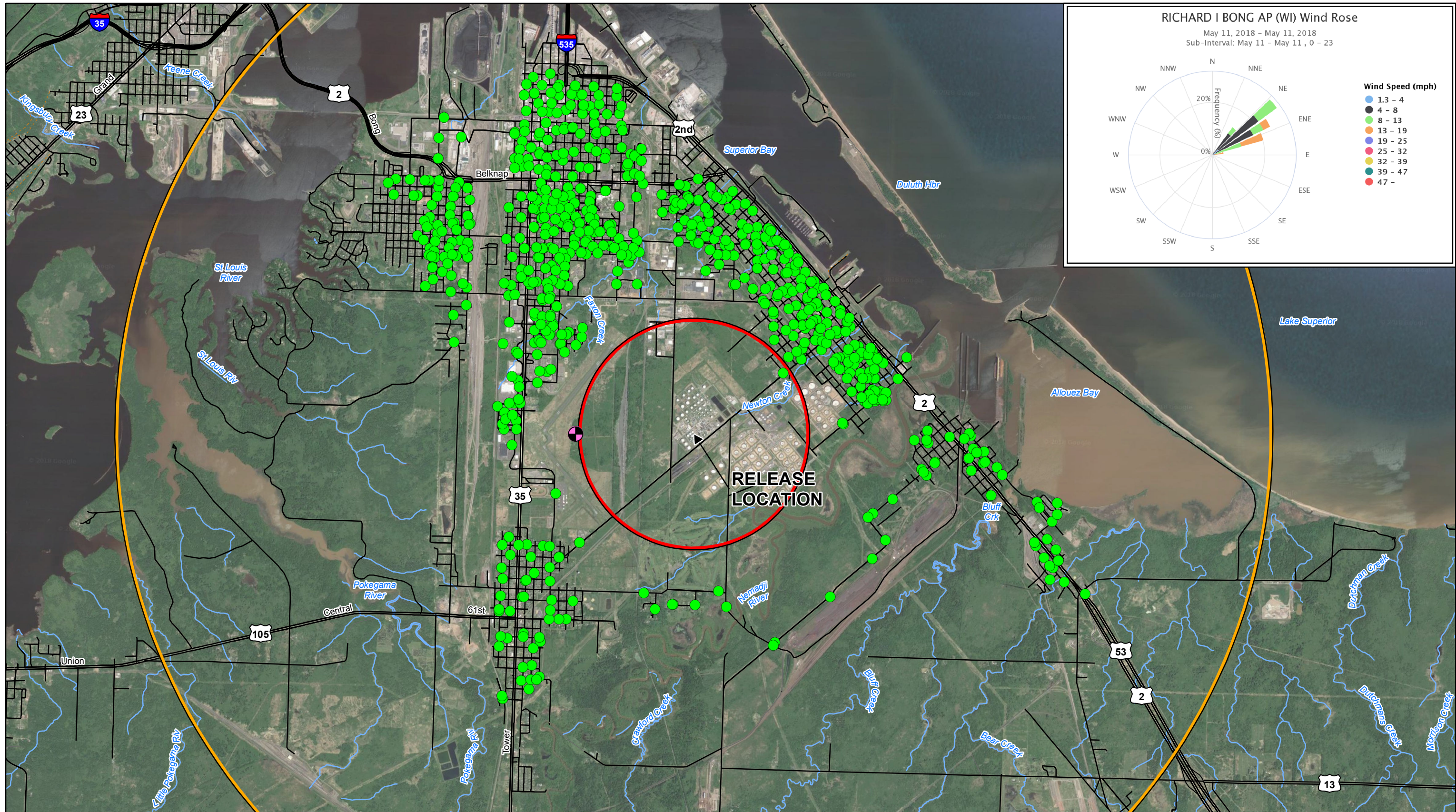
VOC – volatile organic compounds
H₂S – hydrogen sulfide
HF – hydrogen fluoride
mg/m³ – milligrams per cubic meter
ppm – parts per million

Air Monitoring / Sampling Data Evaluation and Summary of Results

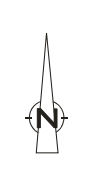
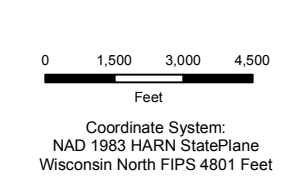
A low level particulate reading was detected above the community action level using hand-held air monitoring equipment. Based on site personnel observations, the low level reading was determined to be caused by street sweeping activities in the area and was not related to Husky refinery activities.

The information contained in this memorandum will be considered preliminary until a final Quality Assurance/Quality Control (QA/QC) review of the data is completed. At the completion of the project, a report will be prepared in which all data collected through real-time monitoring and integrated sampling analyses will be compiled, summarized, and reported to Husky. Data contained in the final report will have been through the final QA/QC process, will be reviewed by a GHD Certified Industrial Hygienist (CIH), and will be considered final.

Based on the air monitoring results for the time period specified, the air quality in the community around the refinery is below relevant action levels established for the Site in discussion with USEPA.



Sources: 2015 TIGER/Line Shapefiles, prepared by the U.S. Census Bureau, 2015; U.S. Geological Survey, National Geospatial Technical Operations Center - National Elevation Dataset, 2015; Imagery © Google.



- Legend**
- 1 Mile Buffer
 - 5 Mile Buffer
 - Richard I Bong Weather Station

- VOC (ppm) Reading**
- ≥ 1.0
 - < 1.0
 - Not Measured



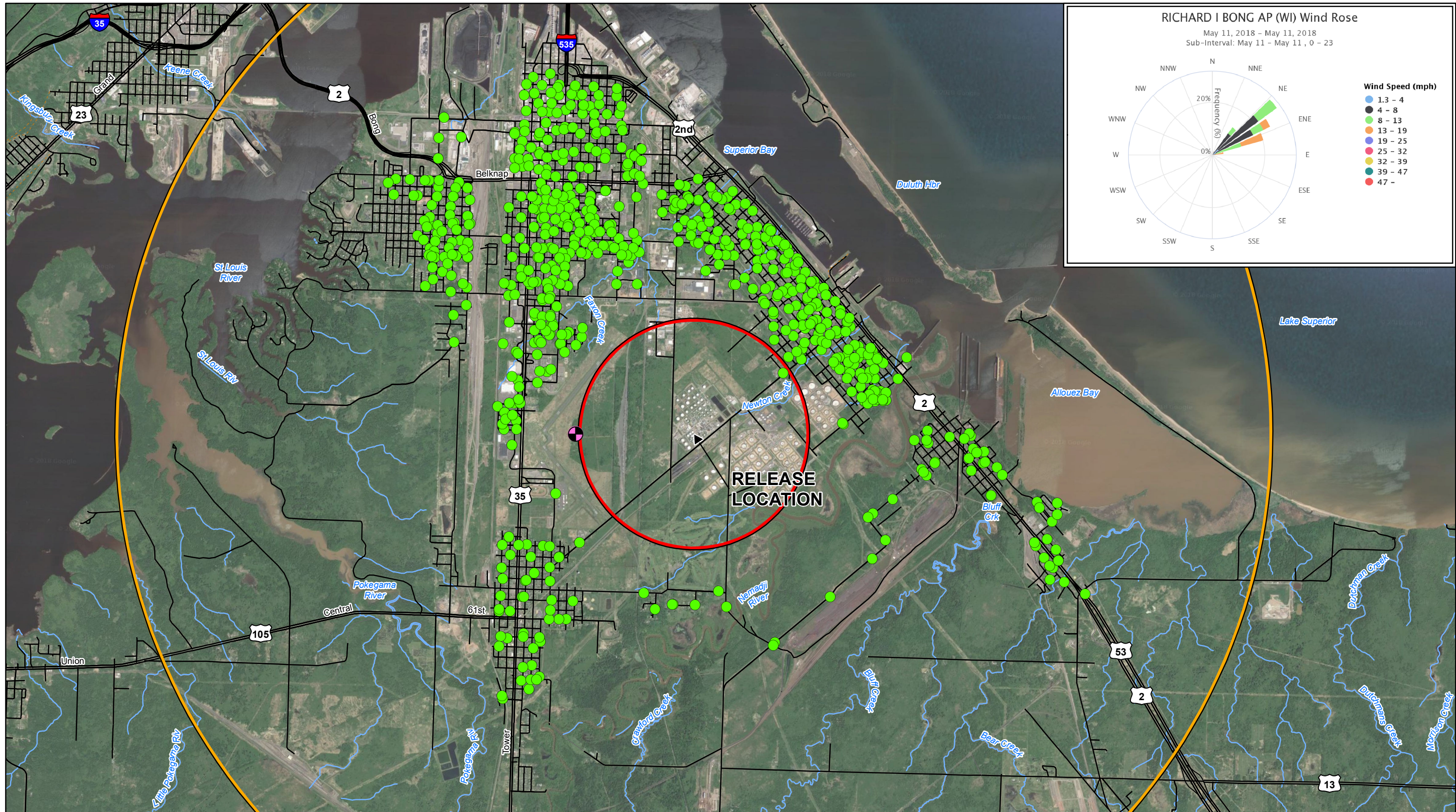
HUSKY ENERGY – SUPERIOR REFINERY FIRE
SUPERIOR, WISCONSIN

COMMUNITY MONITORING - MAY 11, 2018 - 00:00 TO 23:59
MANUALLY LOGGED REAL-TIME RESULTS - VOCs

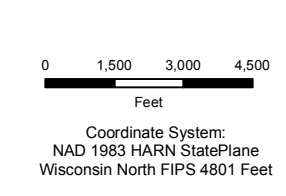
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FIGURE 1



Sources: 2015 TIGER/Line Shapefiles, prepared by the U.S. Census Bureau, 2015; U.S. Geological Survey, National Geospatial Technical Operations Center - National Elevation Dataset, 2015; Imagery © Google.



Legend

- 1 Mile Buffer
- 5 Mile Buffer
- Richard I Bong Weather Station

H2S (ppm) Reading

- >= 0.1
- < 0.1
- Not Measured



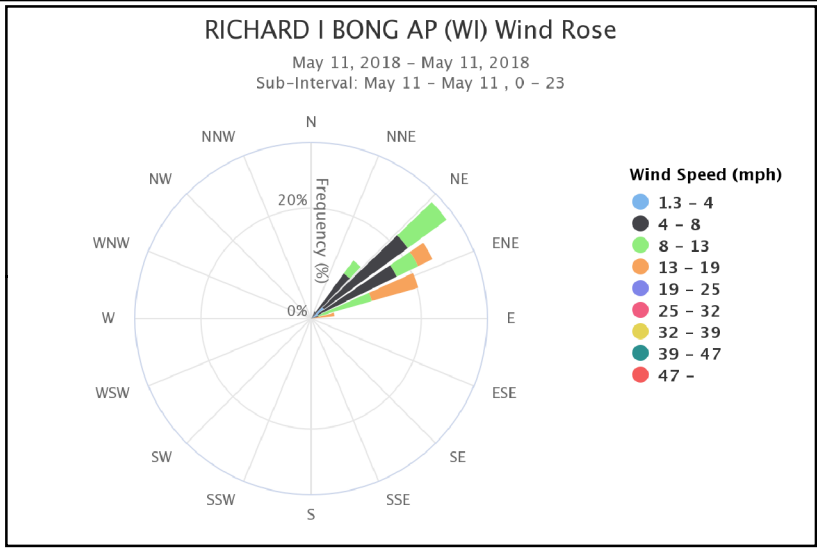
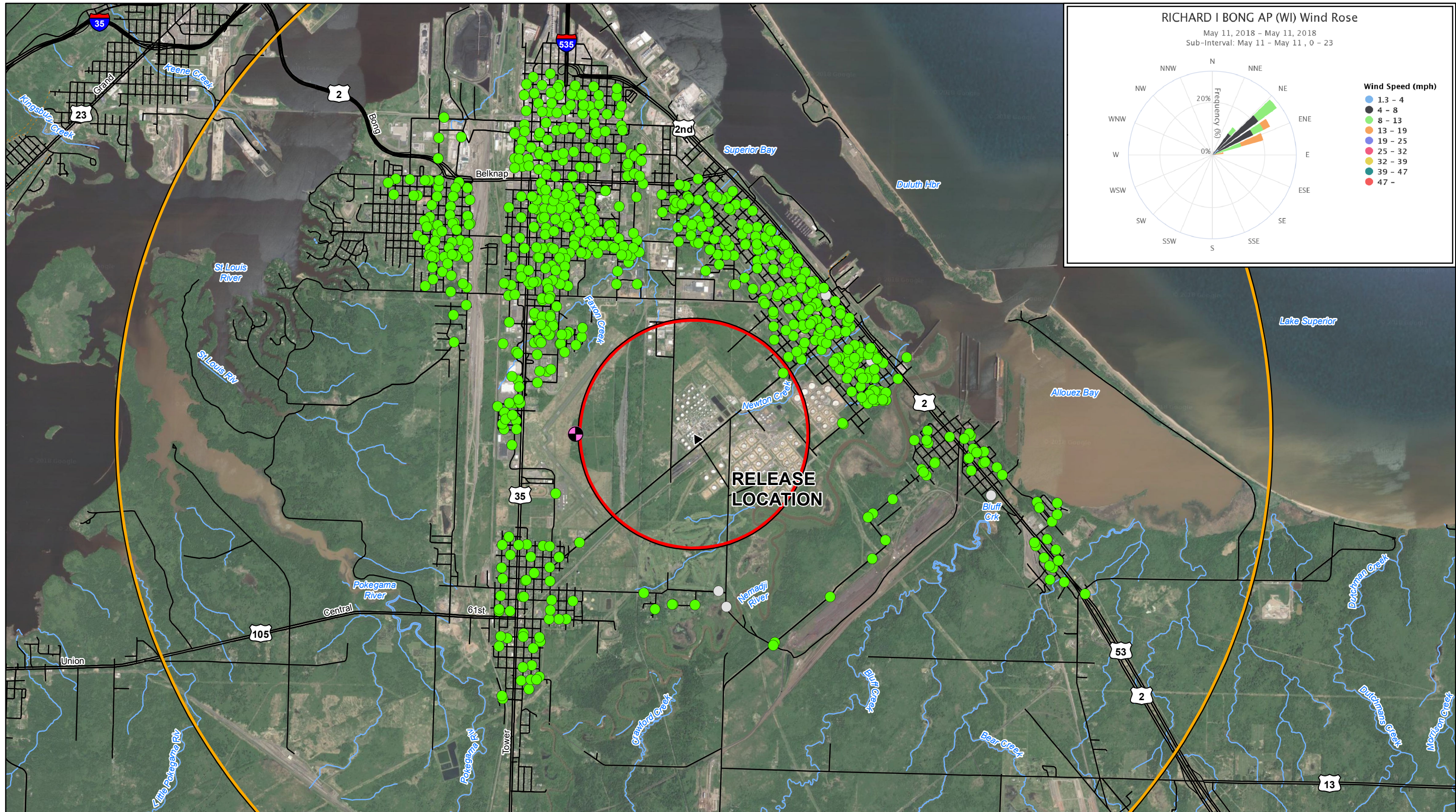
HUSKY ENERGY – SUPERIOR REFINERY FIRE
 SUPERIOR, WISCONSIN

COMMUNITY MONITORING - MAY 11, 2018 - 00:00 TO 23:59
 MANUALLY LOGGED REAL-TIME RESULTS - H2S

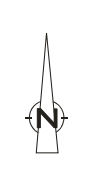
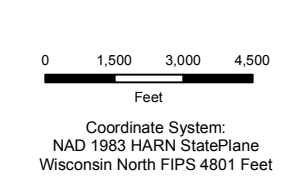
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FIGURE 2



Sources: 2015 TIGER/Line Shapefiles, prepared by the U.S. Census Bureau, 2015; U.S. Geological Survey, National Geospatial Technical Operations Center - National Elevation Dataset, 2015; Imagery © Google.



- Legend**
- 1 Mile Buffer
 - 5 Mile Buffer
 - Richard I Bong Weather Station

- HF (ppm) Reading**
- >= 1.0
 - < 1.0
 - Not Measured



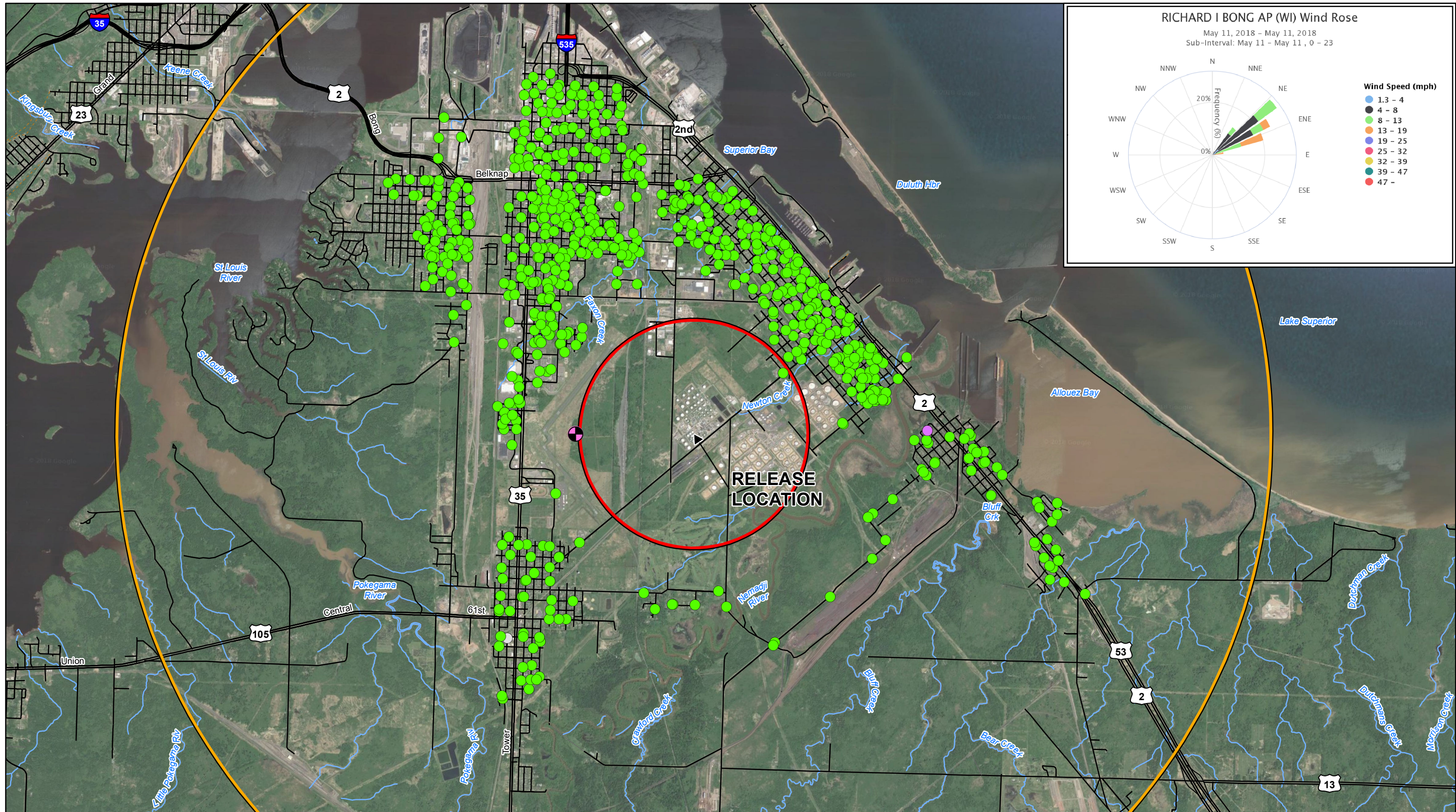
HUSKY ENERGY – SUPERIOR REFINERY FIRE
SUPERIOR, WISCONSIN

COMMUNITY MONITORING - MAY 11, 2018 - 00:00 TO 23:59
MANUALLY LOGGED REAL-TIME RESULTS - HF

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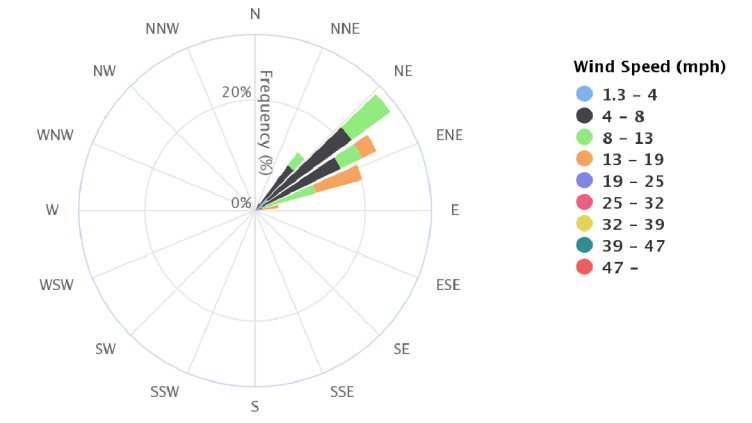
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May 12, 2018

FIGURE 3

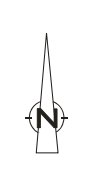
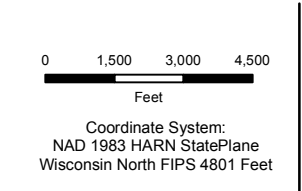


RICHARD I BONG AP (WI) Wind Rose

May 11, 2018 - May 11, 2018
 Sub-Interval: May 11 - May 11, 0 - 23



Sources: 2015 TIGER/Line Shapefiles, prepared by the U.S. Census Bureau, 2015; U.S. Geological Survey, National Geospatial Technical Operations Center - National Elevation Dataset, 2015; Imagery © Google.



Legend

- 1 Mile Buffer
- 5 Mile Buffer
- Richard I Bong Weather Station

Particulate Reading (mg/m3)

- >= 0.1 (Detections Above 0.1 are not Site Related)
- >= 0.1
- < 0.1
- Not Measured



HUSKY ENERGY – SUPERIOR REFINERY FIRE
 SUPERIOR, WISCONSIN

COMMUNITY MONITORING - MAY 11, 2018 - 00:00 TO 23:59
 MANUALLY LOGGED REAL-TIME RESULTS - PARTICULATE

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 May 12, 2018

FIGURE 4