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May 2, 2016

Richard Franklin, On-Scene Coordinator
United States Environmental Protection Agency
Oregon Operations Office
805 SW Broadway, Suite 500
Portland, Oregon 97205

Re: Trip Report for Jantzen Beach Air Testing
Technical Direction Document 15-09-0003

Dear Mr. Franklin:

Enclosed please find the Trip Report for the Jantzen Beach Air Testing project, which is located in Portland, Oregon. If you have any question regarding this submittal, please call Ryan Whitchurch or myself at (206) 624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

for

Brad Martin
START-IV Emergency Response Team Leader

cc: Ryan Whitchurch, START-IV Project Manager, E & E, Portland, OR

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TRIP REPORT

**Jantzen Beach Air Testing
Portland, Oregon
TDD: 15-09-0003**



Prepared for

U.S. Environmental Protection Agency, Region 10
Oregon Operations Office
805 SW Broadway, Suite 500
Portland, Oregon 97205

Prepared by

Ecology and Environment, Inc.
333 SW Fifth Avenue, Suite 600
Portland, Oregon 97204

May 2016

***Jantzen Beach Air Testing
Trip Report***

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EXECUTIVE SUMMARY

In support of the Oregon Department of Environmental Quality (ODEQ), the U.S. Environmental Protection Agency (EPA) began air testing in response to air complaints near Jantzen Beach and Hayden Island in north Portland. The EPA On-Scene Coordinator (OSC) mobilized the EPA Superfund Technical Assessment and Response Team (START) contractor to conduct air testing for potential sources and chemical contaminants of potential concern (COPCs) in an effort to determine whether a time-critical removal action or emergency response was warranted pursuant to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The OSC also used the national EPA Environmental Response Team (ERT) for assistance in the effort.

EPA has concluded that the air testing results indicate no serious health effects or life-threatening levels of pollutants and that a time-critical removal or emergency response for air toxics was not needed. However, intermittent elevated pollutant levels could cause short term transient health effects, such as headaches and shortness of breath, and very unpleasant odors. These tests provide a snapshot in time and could help inform future testing and data collection efforts by state local agencies to determine possible sources. Further, ODEQ and EPA are requiring American Petroleum Environmental Services (APES) and Oil Re-refining Company (ORRCO) to perform air quality and odor testing and to report on their operations, processes, and emissions.

In support of ODEQ, EPA conducted limited short-term air testing in the area from September 2015 through January 2016. As a part of the air testing, the EPA installed two fixed air testing stations that monitored the air continuously for 60 days, from early November 2015 to early January 2016. One station was located at the Jantzen Beach Moorage Inc. (JBMI), a floating home community on the Columbia River, and one station was located at the Heron Lakes Golf Club (HLGC). Although EPA attempted to gain site access for installation of three additional air testing stations in the area (at a city pump station, a second floating home community, and a warehouse district), none of these facilities granted EPA access.

During the 60 days of fixed station testing, there were 41 days of non-detects or very low concentrations consistent with urban background levels of photo-ionizable chemicals, and most other chemical species (e.g. CO, O₂, LEL) were found to be normal with a few exceptions, including:

- Several notifications of elevated levels of H₂S and CO at JBMI appeared to be associated directly with the start-up of an adjacent motorboat. No other detections of H₂S that appeared unrelated to the start-up of the boat were noted during the 60 days of air testing at JBMI.
- Elevated H₂S levels were detected during one day at HLGC.

During the testing, EPA found several potential sources of the odors and COPCs in the immediate area, including two oil re-refineries (APES and ORRCO), as well as other facilities observed to handle or process a variety of chemicals. These included a sizeable railway terminal and truck transloading facility and operation, a graphics facility, two chemical processing facilities, a small shipyard, and a city sewer line. Further, there was a high volume of truck and auto traffic on nearby Interstate Highway 5 and local interchanges and streets.

The management approach in utilizing the fixed air testing stations was to look for spikes or elevated levels of photo-ionizable chemicals (e.g. many types of volatile organic compounds [VOCs]), combustible gas (LEL or Lower Explosive Limit), carbon monoxide gas (CO), molecular oxygen gas (O₂), and hydrogen sulfide vapor (H₂S), and then also to use such occurrences to drive air sampling decisions. Equipment included multi-gas/vapor detectors and a remote “Viper” system (the Viper system sends data via the internet to personnel monitoring the equipment). The Viper system was set to alert the START contractor when the stations detected total VOCs in the air greater than 100 parts per billion (ppb), or when other species such as H₂S exceeded preset levels.

Air testing personnel found during the scope and time of the EPA deployment that gas and vapor detections were often transitory, often occurring for only a few minutes or less at a time, with broad periods of time of either no detections of COPCs, or very low levels of COPCs. In the field, roving teams often observed a strong odor that would appear for a few minutes, then dissipate or disappear quickly. Odors typically smelled of a propane or petroleum-like odor, while other odors seemed to have an acidic and/or glycol-type smell.

On two occasions, levels of photo-ionizable chemicals were elevated for a long enough period to warrant air sampling, which was conducted using air canister collection vessels that were analyzed for the presence and concentration of 75 different VOCs: two 1-hour air samples were collected on December 22, 2015, and three 3- to 4-minute air grab samples were collected on December 27, 2015. The samplers detected 26 of these chemicals, of which four exceeded the chronic health benchmarks used by the EPA toxicologist to evaluate the data (EPA 2016).

Data and field observations indicate that some photo-ionizable chemicals, VOCs, and H₂S releases appear to have occurred from the vicinity of APES and may have contributed to detections of these COPCs during the time of this air testing.

1. PLACE VISITED

Site Name: Jantzen Beach Air Testing
Owner Name: Multiple property owners, public property
Location: Portland, Oregon
SSID: 10ZZ
CERCLIS ID: None
Latitude: +45.6 degrees, World Geodetic System (WGS) 1984
Longitude: -122.7 degrees, WGS 1984
Dates of Response: September 11, 2015 to January 8, 2016

2. PURPOSE

The United States Environmental Protection Agency (EPA) tasked Ecology and Environment, Inc. (E & E), under Superfund Technical Assessment and Response Team (START)-IV contract number EP-S7-13-07, Technical Direction Document number 15-09-0003, to assist EPA with conducting air testing at the Jantzen Beach Site (referred to herein as “the Site”).

The purpose of the air testing was to gather data to assess potential air contaminants and the source of any such contaminants reported to be causing odors and health effects in the north Portland area (Hayden Island, Jantzen Beach), and to determine whether a time-critical removal action or an emergency response action pursuant to CERCLA is needed.

3. PERSONS INVOLVED

Agency/Company	Contact Persons/ Position	Phone Number
U.S. Environmental Protection Agency	Richard Franklin – On-Scene Coordinator	(503) 553-2917
Ecology and Environment, Inc. (START)	Ryan Whitchurch – Project Manager/Responder	(503) 248-5600
	Christopher Whitehead – Field support	(206) 624-9537

4. BACKGROUND

Site Description

The Site is a broad area of north Portland that encompasses residential areas, industrial areas, commercial areas, recreational areas (including floating homes), and transportation infrastructure (Figure 1). Unusual “chemical” odors and suspected sources of these odors have been reported to the Oregon Emergency Response System (OERS), the Oregon Department of Environmental Quality (ODEQ), and to the United States Coast Guard National Response Center (NRC) from various locations at Hayden Island, Vancouver (Washington), North Portland, North Portland Harbor, Smith Lake, Vanport City, and Force Lake (place-names derived from USGS

Portland, OR 1961 quadrangle). These places are approximately bounded by Vancouver in the north, Interstate-5 to the east, Columbia Slough to the south, and Smith Lake to the west.

Many areas of the Site are accessible by public roads. River channel areas required access using vessels and therefore were not investigated by START. The floating home community moorages were only accessible on foot by START. Some areas were private property or restricted access, and were not accessible by START unless an access agreement had been obtained by EPA.

American Petroleum Environmental Services (APES) operates the facility that was formerly designated as the Harbor Oil Superfund Site. The Harbor Oil Superfund Site was listed on the National Priorities List in 2003. A remedial investigation (RI) was conducted by EPA to characterize the nature and extent of contamination at the site. COPCs found at the site included metals, petroleum hydrocarbons (TPHs), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT), and trichloroethylene (TCE). At the conclusion of the RI, EPA determined that no remedial action was necessary. The Harbor Oil Site was deleted from the National Priorities List on June 5, 2014. (EPA 2013)

Initial Report

According to records provided to START, multiple public reports of unusual “chemical” odors were reported to OERS, ODEQ, and the NRC beginning August 27, 2015. These reports prompted EPA to offer assistance to ODEQ in the state’s ongoing investigation of air quality concerns near Jantzen Beach and Hayden Island in north Portland, Oregon.

ODEQ provided a list to EPA and START describing the addresses, dates, and times of day that odor complaints had been received from the public (ODEQ 2015a). Public complainants described the odors as “noxious”, “horrible”, “acid”, and “choking”, and reported having significant upper respiratory, eye, and throat irritations. In the interest of protecting personally identifiable information, specific addresses are not included in this report.

Contaminants of Potential Concern Description

No specific contaminants of potential concern (COPCs) were identified prior to EPA involvement.

Based on screening-level air testing results and laboratory air testing results, the following COPCs appear to exist at the Site, and others may be identified by reviewers upon further analysis of existing data:

- Chemicals consistent with Volatile Organic Compounds (VOCs)
- Vapors or gases that are ionizable by hydrogen flame (FID)
- Vapors or gases with an ionization energy (IE) of approximately 10.6 electron volts (eV) or less
- Vapors or gases with an IE of approximately 11.7 eV or less
- Chemical(s) consistent with carbon monoxide (CO) gas
- Chemical(s) consistent with hydrogen sulfide (H₂S) vapor
- Chemical(s) consistent with chlorine (Cl₂) vapor
- Chemical(s) consistent with ammonia (NH₃) vapor

Transport Mechanisms

Wind dispersion and chemical density differentials appear to be the primary transport mechanisms for the inhalation pathway that was investigated at the Site.

Winds of variable speed and direction were observed at the Site.

Chemicals exhibit variable densities depending on temperature and pressure. Chemicals that are emitted from a stack are typically warmer than ambient temperatures and tend to initially rise. Depending on the chemical, they may continue to rise, or if the chemical is denser than the ambient air, it may eventually sink towards the ground surface.

Wind will act on emitted chemicals in the air to transport and disperse them horizontally and vertically, depending on the wind direction. Wind will also generally cause emitted chemicals to mix with ambient air, effectively diluting the chemical concentration and reducing density and temperature differences.

A detailed transport mechanism model and analysis has not been completed for this Site.

Receptors

Human residents live within several types of communities in or near this area, including floating home communities, mobile home communities, multi-family residence communities, and single-family residence communities. Businesses also employ commercial and industrial workers in or near this area. Transient human populations exist in this area, including short term residents, commuter drivers, delivery workers, recreational users, and potentially other population types not specifically described.

Ecological receptors also exist within the Site. Birds, mammals, and fish protected by statute or treaty use the Columbia River and local airspace. A detailed study of ecological receptors has not been conducted for this Site.

Source Identification

Based upon public reports to agencies, initial suspected potential sources of the odors included two oil re-recycling facilities: American Petroleum Environmental Services and Oil Re-refining Company. Other potential sources were identified based on data obtained from EPA and START air testing, organoleptic (human physical sense) detections, and portable air testing instrument detections (Table 1); these detections appeared to be emitted from the suspected source locations. Other potential sources include:

- Manufacturing, chemical handling, rail terminal / truck transloading, and shipyard facilities along N. Suttle Road, Marine Drive, and Force Avenue
- City of Portland sanitary sewer system (Force Ave line and pump station)
- Local transportation emissions along Interstate Highway 5 and local traffic (automobiles, trucks, vessels)

Significant rail-to-truck transloading (transfer of commodities from one vehicle to another) operations occur in the area. The types and kinds of commodities that are transferred include the following United Nations Committee of Experts on the Transport of Dangerous Goods (UN) hazard identifiers and descriptions (ODOT 2015):

- Class 3 Flammable liquids:
 - UN1987 Alcohols, not otherwise specified (n.o.s) (ethanol)

- UN1230 Methanol
- UN1993 Flammable liquid, n.o.s.
- UN1090 Acetone
- Class 5 Oxidizing substances and Organic peroxides:
 - UN2014 Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)
 - UN2015 Hydrogen peroxide, aqueous solution, stabilized, with more than 60% Hydrogen peroxide
- Class 8 Corrosive substances:
 - UN1760 (multiple descriptions; not specified; most generic description is: Corrosive liquid, n.o.s.)
 - UN3267 Corrosive liquid, basic, organic, n.o.s.

This list above was based on information that was known to be incomplete. Other transloaded commodities were identified that are not regulated in transportation by ODOT, such as petroleum-based lubrication oils. (ODOT 2015)

On October 21, 2015, ODEQ provided an update on its Northwest Region website which identified APES as a source of odor emissions. No other sources were identified. (ODEQ 2015b)

5. TESTING ACTIVITIES

See Figure 2 for a map of the air testing locations discussed in the following subsections. Figure 3 presents a key with a description of the air testing locations, and Figures 4 through 18 present the results of individual air testing events. Photographs taken during testing activities are presented in Attachment 1.

Initial Testing

On September 11, 2015, one START responder mobilized to the Site to conduct initial air testing (Figure 4). START was directed to monitor with gas/vapor detection instruments in the vicinity of APES on Force Ave in North Portland for fugitive emissions that were suspected to be a cause of odor complaints in communities located to the north (predominantly on Hayden Island). START monitored the air along Force Avenue, at the HLGC, around the Metro Expo Center, and around the Vanport Max Light Rail Station. Ammonia (NH₃), CO, and combustible gas/vapor (lower explosive limit, or LEL) were detected near the facility (Table 1, Figure 4). Inexplicable odors were noted, qualitatively consistent with caustic chemicals, glycols, and petroleum hydrocarbons.

Because many of the public odor complaints (documented in the OERS and NRC databases) suggested that odors were stronger at night, START and EPA returned to the Site after dark on September 15, 2015, to conduct additional air testing along Force Avenue (Table 1, Figure 5). EPA and START measured for photo-ionizable chemicals, flame-ionizable chemicals, H₂S, LEL, O₂, and CO, chlorine (Cl₂), NH₃, hydrogen cyanide (HCN), sulfur dioxide (SO₂), and gamma radiation. The team observed unusual odors (consistent with hydrocarbons, glycol, alcohol, propane, and peanut butter), flame-ionizable vapors (13,140 ppb), photo-ionizable vapors (7,900 ppb), normal levels of gamma radiation (3 to 4 µrem/hr), and normal levels of oxygen (20.9%). Although the team also attempted to obtain sulfur dioxide (SO₂) readings, the equipment and sensors specific to SO₂ failed.

On November 3, 2015, EPA and START returned to the Site during the day and conducted additional mobile air testing along Force Avenue, Marine View Drive, Jantzen Beach, Class Harbor floating home community, and HLGC. EPA and START measured for photo-ionizable chemicals, CO, H₂S, LEL, O₂, and gamma radiation. The team observed unusual odors (consistent with burnt oil, propane, and sewer gas odor), photo-ionizable chemicals (110 ppb), H₂S (1,400 ppb), normal levels of gamma radiation, and normal levels of oxygen (20.9%). Additionally, while seeking permission for property access at a warehouse facility, the team observed elevated CO (15 ppm) inside an office. The team alerted the facility's health and safety official to the CO detection, who agreed to investigate the matter further. The data was recorded using Viper telemetry in mobile mode (Charts 1 and 2).

Air Testing Network Overview

In October, 2015, EPA directed START to begin to deploy a real-time air testing network as a screening and decision-driving tool to determine when elevated levels of COPCs were occurring, and if further immediate actions at the site were needed. The air testing network was based on the EPA Environmental Response Team (ERT) Viper system.

Viper is a wireless telemetry system capable of broadcasting data from testing instrumentation via cellular networks. The data is housed on an EPA server for subsequent analysis. This system enabled START staff to monitor conditions at the site without being physically present, and alerted START by email if any sensors responded at or above an adjustable alarm level.

The Viper system for this Site were set up to monitor for photo-ionizable vapors and gases (e.g. many types of VOCs), CO gas, H₂S vapor, combustible gas/vapor (e.g. LEL or explosive vapors), and oxygen levels using both a Rae Systems (by Honeywell) MultiRAE Pro and UltraRAE 3000 screening instrument at each Viper fixed-station.

The Viper system rapidly (typically within a few minutes) provides data from the instruments to the operator using an internet interface that is accessible from most laptop computers or from smart phones. Current instrument readings and a limited range of historical data can be accessed through this interface. Complete historical data for the Site is stored and managed on ERT computers.

Alarm levels and alarm notification alerts can be set, and subsequently adjusted, for each instrument sensor through Viper. For this Site, the following alarms were set for the instrument sensors at the fixed Viper testing stations:

- PID-10.6: 100 parts per billion (ppb) (eventually adjusted to 150 ppb at JB02)
- PID-11.7: 100 ppb (eventually adjusted to 200 ppb at JB01)
- CO: 1 parts per million (ppm)
- H₂S: 1 ppm
- LEL: 1%

Once set, when the alarm was met or exceeded by the respective sensor, Viper automatically generated a notification email and sent it to the designated START personnel. After a notification email was received, START logged into the internet interface and checked for data trends. START then notified EPA of the alarm condition and described the data context.

Following the notification to EPA, subsequent actions included one or more of the following:

- No action
- Remote monitoring of Viper data

- Gathering additional data (e.g. contacting residents at the Viper station)
- Site visit to collect additional instrument readings and assess odors
- Site visit to collect air samples for laboratory analysis

Specific actions for each alarm notification are described further in the “*Air Testing Network Operations and Maintenance*” sub-section below.

Air Testing Network Corrective Action

After the air testing network had been deployed and had operated for an extended period, START discovered that the UltraRAE 3000 PID-11.7 was not correctly reporting data to the Viper network.

START discovered this problem after four distinct events with reported PID-11.7 detections as high as 186 ppm on December 1, 7, 17, and 27, 2015. Follow-up analysis of the Viper data revealed that the reported detections were 20 times higher than the expected instrument resolution. Two visits to the Site on December 7 and 27, 2016, to attempt to confirm the fixed-station detections with a similar (though mobile) instrument failed to reproduce detections higher than 350 ppb.

On December 28, 2015, START notified ERT that the detections from the UltraRAE 3000 PID-11.7 seemed inconsistent with field observations. ERT investigated and confirmed that the UltraRAE 3000 PID-11.7 was being reported three orders of magnitude (1000 times) higher than the actual detections, and that a 0.001 correction factor needed to be applied.

The PID-11.7 fixed-station detections discussed in this report from this point forward have been correctly converted from ppm units to ppb units. Mobile testing PID-11.7 detections have not been converted because they were recorded directly by the operator from the instrument display which was reporting the correct units.

Air Testing Network Installation

EPA intended to install at least five fixed air testing stations in the area to better assess the COPCs and to determine potential sources. EPA and START identified potential fixed-station locations using aerial imagery and on-ground reconnaissance, and on November 3, 2015, START and EPA visited the Site to conduct air testing and visit potential locations (Chart 1). Locations deemed best included sites adjacent to the APES fence line on Force Avenue, sites immediately north and west of APES, the JBMI community, and directly north of ORRCO at the Class Harbor floating home community. EPA obtained permission for one fixed testing station location at a residence at JBMI (Viper Station JB01) and for one fixed testing station location at the HLGC (Viper Station JB02) maintenance facility west of APES. Permission was sought to locate additional stations at the Expeditors International warehouse and transfer facility (directly north of APES), at the Class Harbor floating home community, and at the City of Portland Force Avenue pump station (located adjacent on the south side of APES), but in all three cases, no authorized person was available to sign the access agreement forms.

On November 10, 2015, START visited the Site to install the Viper fixed testing station at JBMI (JB01), conduct mobile air testing (Table 1, Figure 6), follow-up regarding the access agreement at HLGC, and scout locations at Blue Heron Landing floating home community.

On November 13, 2015, START visited the Site to install the Viper fixed testing station at HLGC (JB02) after receiving a signed access agreement form from the HLGC superintendent.

On November 27, 2015, START attempted to install an UltraRAE 3000 PID-11.7 instrument at JB01, but the residents requested that the work be postponed until the following week. On December 1, 2015, START returned and successfully installed the new instrument. This instrument increased the specified range of chemicals that could be observed by the system (compared to the PID-10.6 lamp).

On December 2, 2015, START deployed an additional UltraRAE 3000 with a second PID-11.7 lamp in fixed Viper testing mode at JB02. START also scouted for suitable locations for installation of an Oregon DEQ weather station near JB01 or JB02.

Although EPA attempted multiple times to obtain site access agreements for installation of air testing stations at Expeditors International, the Class Harbor floating home community, and the City of Portland pump station adjacent to APES, none of these organizations granted access. Therefore, air testing stations could not be installed. Further, EPA attempted to gain site access to the APES facility for installation of air testing equipment, but was denied access.

Mobile Air Testing

Periodically while the air testing network was deployed, START visited the Site and gathered mobile air testing data using hand-held instruments. Instrument readings were recorded manually using a laptop computer. Testing locations were selected based on vehicle accessibility, spatial coverage, and proximity to industrial operations. Instruments were deployed on foot, or were operated inside a vehicle with sample intake tubing positioned outside the vehicle. When instruments were operated in the vehicle, the vehicle climate controls were turned off so that instrument operated at near-ambient conditions, and the vehicle was driven forward to prevent cross-contamination by the vehicle's own exhaust emissions. Specific mobile air testing events are discussed in the "*Air Testing Network Operations and Maintenance*" section below. Instrument intake tubing was positioned at breathing zone height unless otherwise noted.

Air Testing Network Operations and Maintenance

On November 17, 2015, START observed Viper telemetry that indicated elevated PID-10.6 and CO detections from JB02 (Chart 3) at about 06:48 a.m. START contacted the HLGC superintendent, who stated that mower engines had been started at about that time. START notified EPA of the elevated detections and the apparent cause. Later in the day, START visited JB01 (at JBMI) to check on the system and made organoleptic odor observations while making the Site visit, and the odors were consistent with propane, natural gas, methyl mercaptan, and burnt-oil (Table 1, Figure 7).

On November 18, 2015, START attempted to upgrade the weather protection infrastructure at JB02, but arrived after closing time – the HLGC maintenance facility opens earlier and closes earlier than typical business hours. START made organoleptic observations while making the Site visit, and odors were consistent with sweet glycol, burnt oil, and natural gas (Table 1, Figure 8). START also scouted JB01 and JB02 prior to installation of ERT Snapper remote sampling triggers for vacuum air sample collection canisters.

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On November 19, 2015, ERT upgraded JB01 and JB02 with Snapper remote triggers and solenoid valves for 6 Liter (L) vacuum air sample collection canisters.

On November 24, 2015, START observed Viper telemetry at about 2:30 pm that indicated elevated H₂S, CO, and PID-10.6 detections from JB01 (Chart 4). The resident at JB01 reported to START that they had started their boat engine at about the same time. START reported the detections and apparent explanation of the cause of the event to EPA.

On November 27, 2015, START received an automated Viper email notification alarm from ERT at about 09:00 am indicating PID-10.6 detections at JB01 (JBMI) greater than 100 parts per billion (ppb; Chart 5). START contacted the residents; no apparent explanation for the detections was determined, and the residents did not detect any unusual odors. START visited the Site and conducted air testing on Hayden Island, Marine Drive, Suttle Road, and Force Avenue using a mobile UltraRAE 3000 PID-11.7 instrument, but observed no elevated detections and no odors (Table 1, Figure 9). START notified EPA of the testing results.

On December 1, 2015 at about 1:08 pm, START received Viper alarms for elevated PID-10.6, CO, and H₂S detections at JB01 (Chart 6). The residents informed START that the boat engine had been started again, and START notified EPA of the alarms and the apparent cause.

Later in the day, before alarm levels had been set for the newly installed PID-11.7 at JB01, detections up to 28 ppb were recorded by Viper (Chart 7). The data was not observed until the event had passed.

On December 2, 2015, START completed PID-11.7 and odor mobile testing around Force Avenue, Marine Drive, and Suttle Road using a mobile UltraRAE 3000 PID-11.7 instrument. Odors were detected, but no elevated detections were made with the mobile PID-11.7 (Figure 10). START reported the results to EPA.

On December 2, 2015, the residents at JB01 informed START that no odors were noted yesterday evening during the PID-11.7 detections at JB01 (Chart 7).

On December 3 and 4, 2015, START received numerous PID-10.6 Viper alarms for detections up to 140 ppb for the JB02 station at HLGC. The detections were reported to EPA, and were closely monitored. EPA decided not to trigger the Snapper system for sample collection and instead decided to wait for a more definitive event. (Charts 8, 9, and 10)

On December 4, 2015, START received a notification from the residents at JB01 that they would be starting their boat engine. No Viper alarms for JB01 were received.

On December 5 and 6, 2015, START received Viper PID-10.6 alarms for detections up to 170ppb for the JB02 Station at HLGC (Charts 5-12 and 5-13). START kept EPA notified of the detections; EPA decided not to collect an air sample with the Snapper system.

On December 7, 2015, around 12:00 pm, START received Viper alarms from ERT for PID-10.6 detections up to 180 ppb, and then PID-11.7 detections up to 111 ppb for the JB02 station at HLGC (Chart 14). START was collecting mobile testing measurements along Suttle Road (Table 1, Figure 11), quickly prepared the Snapper trigger, and then went to investigate JB02 after notifying EPA of the detections. START was unable to detect similar readings using the third

mobile UltraRAE 3000 with PID-11.7 detector. The detections subsided but persisted at lower levels through December 8, 2015 (Chart 15). During the afternoon, along Force Avenue and at a parking area on Marine Drive near the Metro Expo center, START detected elevated levels of gamma radiation (Table 1, Figure 11). No cause could be determined. START radiation specialists stated that the gamma sensor in the MultiRAE Pro instruments have had false positive issues in the past and recommended that a dedicated gamma radiation detection meter be brought out to the Site. START notified EPA of the high gamma detection and the plan to reassess with a dedicated instrument on the next visit. START also detected chlorine vapor along Force Avenue (Table 1, Figure 11) with a peak detection of 0.6 ppm. The instrument was not observed when the peak chlorine detection was recorded, but a lesser chlorine detection of 0.2 ppm was observed on Force Avenue; the peak detection was believed to have also occurred on Force Avenue (Table 1, Figure 11).

On December 8, 2015, at about 2:04 pm, START received a Viper alarm for a 3 ppm CO detection at JB02, and then at 2:40 pm, START received a Viper alarm for a 1.3ppm H₂S detection at JB02. Throughout the day (Chart 15), START had been receiving alarms for PID-10.6 detections up to 260 ppb. START reported the alarms to EPA and closely monitored the data from Viper. EPA elected not to trigger a Snapper air sample collection because there was no trend of increasing detections. In the evening, START requested that ERT adjust the PID-10.6 alarm to 150 ppb in order to reduce the large number of alert notifications.

On December 9, 2015, 100 ppb PID-10.6 Viper alarms were received from ERT for JB02 at HLGC (Charts 16, 17, 18, 19, and 20). START conducted a mobile testing event later in the day (Table 1, Figure 12). START notified EPA of the alarms and testing results.

On December 10, 2015, START received 160 ppb PID-10.6 Viper alarms from ERT for JB02 at HLGC (Charts 21, 22, 23, and 24). During the same day, START visited the JB01 station to test the system and troubleshoot connection problems. START conducted mobile air testing during the site visit (Table 1, Figure 13) and there were no elevated detections or any detectable odors.

On December 11, 2015, START completed mobile testing along Force Avenue, Marine Drive, Suttle Road, North Portland Road, and along the Smith and Bybee Wetlands public access road. Up to 38,000ppb PID-10.6 and 1,250ppb FID vapor/gas levels were detected, with PID detections clustered to the west, along, and to the south of Suttle Road, and FID detections clustered around the intersection of Marine Drive and North Portland Road (Table 1, Figure 14).

On December 15, 2015, shortly after midnight, high oxygen levels up to 30% (Table 1) were detected at JB01 for about 16 minutes. This detection roughly coincided with a drop in outdoor air temperatures, but this does not seem to satisfactorily explain the sudden rise in oxygen levels. START visited the Site and conducted mobile air testing along Force Avenue, Marine Drive, Suttle Road, North Portland Road, Heron Lakes Golf Course, and along the Smith and Bybee Wetlands public access road. Low (150 ppb) PID-10.6 levels were detected, but elevated (1,700 ppb) FID vapors/gases were detected, again around the intersection of Marine Drive and North Portland Road (Table 1, Figure 15). No unusual oxygen levels were detected at the Viper stations during this time. START reported the testing results to EPA.

On December 17, 2015, START received PID-11.7 Viper alarms from ERT (18 ppb) and PID-10.6 Viper alarms (100 ppb) for JB02 at HLGC (Chart 25). The alarms were missed because they were

received during the night and were not seen until it was too late to take any action. The alarms were reported to EPA.

On December 18, 2015, START completed mobile testing at the Site along Force Avenue, Marine Drive, Suttle Road, and the Smith and Bybee Wetlands access road. Nothing was detected with the instruments, but odors were noted (Table 1, Figure 16). Observations were reported to EPA.

On December 19, 2015, START received two Viper 110 ppb 10.6-PID alarms from ERT for JB02 at HLG (Chart 26). START notified EPA; based on the data, EPA decided that no sample would be collected.

On December 22, 2015, shortly after 8:00 a.m., START received 110 ppb PID-10.6 Viper alarms for JB02 at the HLG. START notified EPA of the alarms. Soon after at about 08:20 a.m., elevated 960 ppb and 790 ppb PID-10.6 alarms were received (Chart 27). START notified EPA, and EPA decided to dispatch a team to collect vacuum canister air samples manually since the Snapper system had uncorrected leaks (see discussion for December 11, 2015, above). By the time the team arrived to collect the air samples, the Viper alarms had terminated, but the team reported chemical odor in the Site air. One member of the testing team collected a 1-hour 6L vacuum canister at JB02 while the other collected a 1-hour 6L vacuum canister sample at the intersection of Force Avenue and North Expo Road. The two samples, plus a blank, were shipped to Test America Laboratory in Simi Valley, California for TO-15 analysis (VOCs). During the sampling event, odors and mobile testing detections (PID-10.6 detections up to 5ppm) were recorded (Table 1, Figure 17).

On December 27, 2015, at 3:28 p.m., START began receiving Viper PID-11.7 alarms for JB01 at JBMI. The alarms started at 1 ppb and increased to 6 ppb by about 3:40 pm. START notified EPA of the alarms, and START was directed to mobilize to the site and collect a second set of air samples. On the way to the Site, START noticed strong propane and hot-oil type odors around downtown Vancouver, Washington, which is the farthest north that START observed these odors. Upon arrival at JB01, Viper PID-11.7 detections as high as 97 ppb had been received (Charts 28 and 29), and strong odors of propane and heated oil were observed. A mobile UltraRAE 3000 measured 300 ppb PID-11.7 detections. Upon EPA concurrence, START collected a 6L vacuum canister grab sample at JB01 because multiple instruments indicated detections (despite differences in measurement levels), and because the chemical odor in the air was strong. START then proceeded across the Columbia River to the intersection of Marine Drive and Force Avenue, where strong odors were noted, and effluent aerosols were observed discharging from the APES facility on Force Avenue. On Force Avenue, the mobile UltraRAE 3000 instrument detected up to 350 ppb PID-10.6 vapors/gases, and detection peaks appeared to coincide with wind direction shifts toward the observation point on Force Avenue. START collected a second 6L vacuum canister grab sample on Force Ave near the intersection with North Expo Road, north and downwind of the APES facility. START then collected a third 6L vacuum canister grab sample on the south end of Force Ave, south and upwind of the APES facility. The three samples, plus a blank, were shipped to Test America Laboratory in Simi Valley, California for TO-15 analysis. During the sampling event, odors and mobile testing detections (PID-11.7 detections up to 350ppb) were recorded (Table 1, Figure 18).

On December 29, 2015, at 2:27 p.m. and 3:12 p.m., START received 104 ppb and 194 ppb PID-11.7 Viper alarms from ERT for JB01 at JBMI. START monitored Viper telemetry and notified EPA

of the detections (Chart 30). START continued to receive similar Viper alarms throughout the afternoon and night.

On December 30, 2015, START received multiple Viper alarms during the night for the PID-11.7 sensor at JB01 (JBMI). The peak alarm since the 3:12 p.m. 194 ppb alarm was 139 ppb. START monitored the Viper detections (Charts 5-31 and 5-33). At 2:32 p.m., the resident at JB01 notified START that they would be starting their boat. At 2:34 p.m., START began receiving Viper alarms from ERT for JB01 that peaked at 9,750 ppb (PID-10.6), 438 ppm (CO), and 2.8 ppm (H₂S) (Chart 32). START informed EPA of the new alarms and the apparent explanation for them. At 3:42 p.m., START received a 3 ppm CO Viper alarm from ERT for JB01, with no apparent cause determined; the sensor reverted back to 0 ppm. JB01 Viper PID-11.7 alarms were adjusted to a 200 ppb threshold, because the number of alarms were too voluminous, and the instrument's sensor appeared to have drifted.

On January 8, 2016, final Viper recorded PID-11.7 detections at JB01 (JBMI) peaked at about 100ppb (Chart 34). The system at JB02 had prematurely shut down by this point due to a power failure (see next section for site demobilization discussion).

Laboratory Sample Analysis

Three 6L vacuum canister air samples (two field samples and one blank sample) were collected on December 22, 2015, and four 6L vacuum canister air samples (three field samples and one blank sample) were collected on December 27, 2015. These samples were analyzed by ALS Laboratory in Simi Valley, California using the EPA TO-15 method for VOC analysis. A summary of collected samples is presented in Table 2.

Upon receipt of the two final lab data reports (ALS 2015, 2016), START reviewed the data and produced two quality assurance (QA) reports (E&E 2016a, 2016b). START provided the QA reports and original lab reports to EPA for EPA risk assessors to review. Copies of the laboratory data reports and data validation memoranda are included in Attachment 2.

COPCs were measured in air samples collected from the Site, as presented in Table 3. Detected COPCs appear in blue text. Chemicals that were analyzed for by the laboratory, but were not detected above the method detection limit (MDL), appear in black text and are also flagged with a "U" data qualifier.

EPA risk assessors found that four detected VOCs exceeded their selected chronic health benchmarks: benzene (up to 3.0 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$] detected), chloroform (up to 0.38 $\mu\text{g}/\text{m}^3$ detected), 1,4-dioxane (up to 0.98 $\mu\text{g}/\text{m}^3$ detected), and naphthalene (up to 0.86 $\mu\text{g}/\text{m}^3$ detected) (EPA 2016).

Site Demobilization

In early January 2016, after reviewing the Site's recent history, characteristics, and air testing and sampling data, and after consulting with EPA Office of Regional Counsel, the OSC determined that neither a time-critical removal action nor emergency response action was warranted, pursuant to CERCLA, and requested START demobilize from the Site.

Before shutting down JB01, the system was tested using 10 ppm isobutylene calibration vapor (Charts 5-35, 5-36). As the system was being shut down, H₂S was detected. START believes that

the H₂S detections were false positives generated by the instrument electronics during shut-down.

6. CONCLUSIONS

EPA has completed air testing to assess potential sources and COPCs in response to complaints of odors and health impacts from residents of floating homes and other communities and businesses along the Columbia River near Jantzen Beach and Hayden Island in north Portland.

EPA has concluded that the air testing results indicated no immediate serious or life threatening risks to the health of residents in this area and that a time-critical removal or emergency response for air toxics was not needed. However, EPA recommended that ODEQ collect additional data to further identify the sources, the chemicals that cause intermittent odors, and to evaluate any long-term health effects. Further, ODEQ and EPA are requiring APES and ORRCO to perform air quality and odor monitoring and to report on their operations, processes, and emissions.

During the 60 days of fixed station testing, there were 41 days of non-detects or very low concentrations consistent with urban background levels of photo-ionizable chemicals, and most other chemical species (e.g. CO, O₂, LEL) were found to be normal with a few exceptions, including:

- Several notifications of elevated levels of H₂S and CO at JBMI appeared to be associated directly with the start-up of an adjacent motorboat. No other detections of H₂S that appeared unrelated to the start-up of the boat were noted during the 60 days of air testing at JBMI.
- Elevated H₂S levels were detected during one day at HLGC.

After initially deploying teams of personnel to conduct air testing, EPA later installed two fixed air testing stations that monitored the air continuously for 60 days, from early November 2015 to early January 2016.

During the testing, EPA found several potential sources of the odors and COPCs in the immediate area, including two oil re-refineries, as well as other area facilities observed to handle or process a variety of chemicals. Gas and vapor detections were often transitory with broad periods of time of either no detections of COPCs or very low levels of COPCs. EPA's field teams often observed a strong odor that would appear for a few minutes and then dissipate or disappear quickly. Odors typically smelled of a propane or petroleum-like odor, while other odors seemed to have an acidic and/or glycol-type smell.

On two occasions, levels of photo-ionizable chemicals were elevated for a long enough period to warrant air sampling, which was conducted using air canister collection vessels that were analyzed for the presence and concentration of 75 different VOCs: two 1-hour air samples were collected on December 22, 2015, and three 3- to 4-minute air grab samples were collected on December 27, 2015. The samplers detected 26 of these chemicals, of which four exceeded the chronic health benchmarks used by the EPA toxicologist to evaluate the data.

Data and field observations indicate that some photo-ionizable chemicals, VOCs, and H₂S releases appear to have occurred from the vicinity APES and may have contributed to detections of these COPCs during the time of this testing.

7. REFERENCES

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- United States Environmental Protection Agency Region 10 (EPA), 2016, *NEED A REFERENCE FOR CHRONIC HEALTH BENCHMARK EVALUATION*

***Jantzen Beach Air Testing
Trip Report***

University of Michigan, Department of Astronomy (UMDA), 2016, *Ionization Energies (eV) of Atoms and Ions Prepared for IAU Symposium 210 (Uppsala Sweden, June 2002)*, hyper-text markup language page located on the world-wide web at <https://dept.astro.lsa.umich.edu/~cowley/ionen.htm> , last accessed by START on April 26, 2016.

FIGURES

***Jantzen Beach Air Testing
Trip Report***

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Source: ©2016 Microsoft Corporation (Bing).

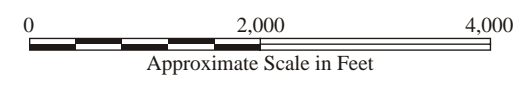


Key:

- Roads
- Railroad Right-of-way

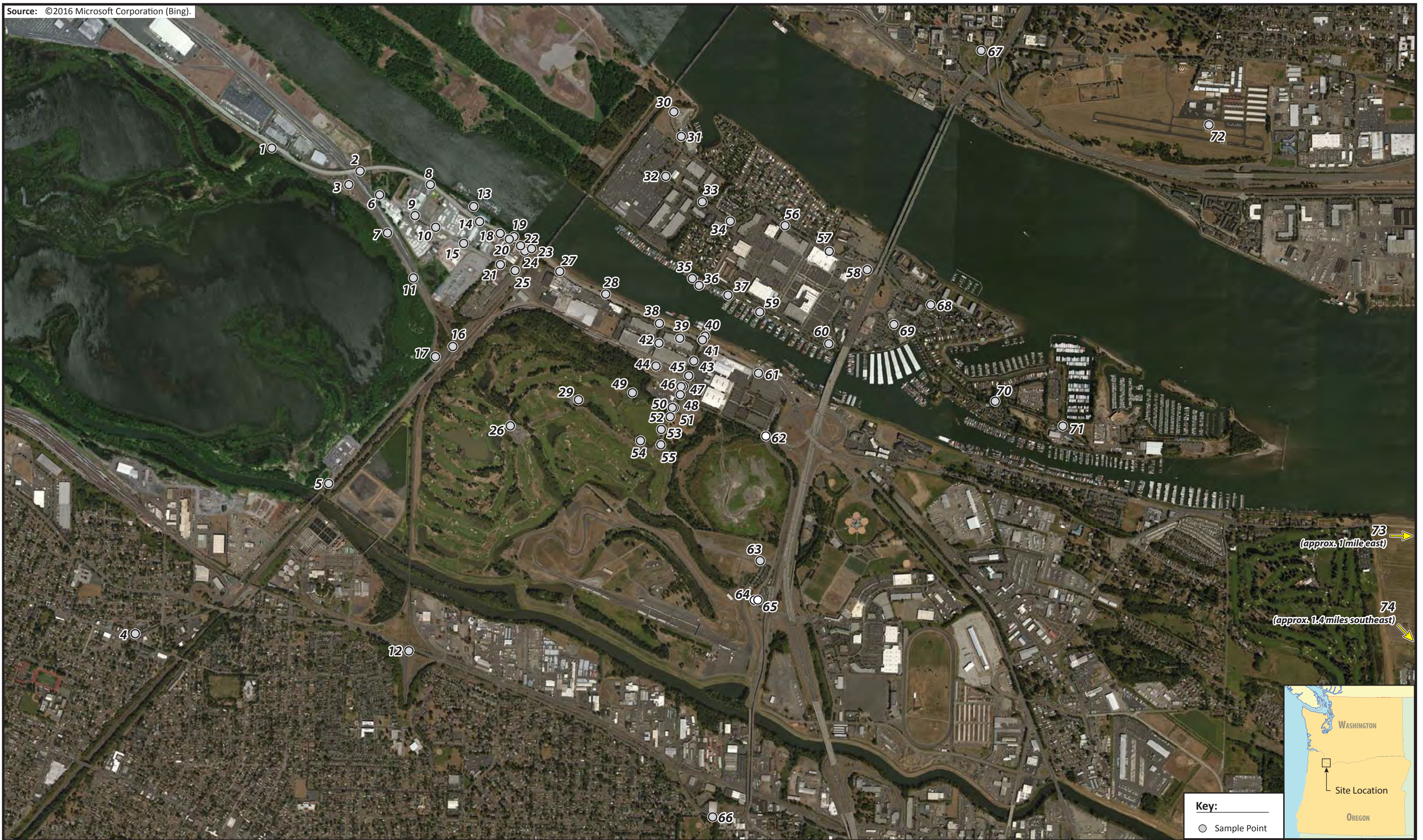
Figure 1

**AIR MONITORING EVENT
SITE ORIENTATION MAP**



JANTZEN BEACH AIR RELEASE
Portland, Oregon

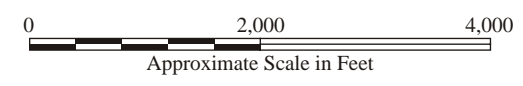
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5/2/16	AES	10:START IV\15090003\fig 1



Key:
 ○ Sample Point



73
 (approx. 1 mile east) →
 74
 (approx. 1.4 miles southeast) →



JANTZEN BEACH AIR RELEASE
 Portland, Oregon

Figure 2
AIR MONITORING EVENT LOCATIONS

Date: 5/2/16	Drawn by: AES	10:START IV\15090003\fig 2
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Numbers	Sample Name
1	Smith and Bybee Wetlands Natural Area Entrance
2	N. Marine Dr. and Railroad Right-of-Way
3	Smith and Bybee Monitoring Point 3
4	N. Fessenden St. and N. Columbia Way
5	N. Portland Rd. and Columbia Slough
6	West End of N. Suttle Rd.
7	Smith and Bybee Monitoring Point 1
8	Rhodia, Inc. and N. Marine Dr.
9	Rhodia, Inc. and N. Suttle Rd.
10	ORRCO and N. Suttle Rd.
11	Smith and Bybee Monitoring Point 2
12	N. Columbia Blvd. Monitoring Point 1
13	Class Harbor Floating Home Community Entrance
14	N. Marine Dr. Monitoring Point 5
15	Recology and N. Suttle Rd.
16	N. Portland Rd. and Railroad Wye S
17	N. Portland Rd. Monitoring Point 1
18	N. Marine Dr. Monitoring Point 6
19	N. Marine Dr. Monitoring Point 8
20	N. Marine Dr. Monitoring Point 7
21	East End of N. Suttle Rd.
22	N. Marine Dr. and N. Portland Rd. (N)
23	N. Marine Dr. and N. Portland Rd. (E)
24	N. Marine Dr. and N. Portland Rd. (S)
25	N. Portland Rd. and N. Suttle Rd.
26	Heron Lakes Golf Course Club House
27	N. Marine Dr. Monitoring Point 2
28	N. Marine Dr. Monitoring Point 1
29	Viper Monitoring Station JB02 at Heron Lakes Golf Course
30	West End of North Hayden Island Dr.
31	North Hayden Island Dr. and Schooner Creek Boat Works
32	North Hayden Island Dr. and Auto Auction
33	2422 North Hayden Island Dr.
34	North Hayden Island Dr. and N. South Shore Dr.
35	Residence (MH)
36	Viper Monitoring Station JB01 at Residence (PP)
37	Residence (JC)
38	N. Marine Dr. Monitoring Point 3
39	Expeditors Office No. 2506

Numbers	Sample Name
40	Blue Heron Landing Floating Home Community Entrance
41	N. Force Ave. and N. Marine Dr.
42	Expeditors Office
43	N. Force Ave. Monitoring Point 4
44	Peninsula Terminal Co.
45	N. Force Ave. Monitoring Point 5
46	N. Force Ave. Open Pipe
47	N. Force Ave. Sewer 2
48	N. Force Ave. Monitoring Point 2
49	Northwest of Force Lake
50	N. Force Ave. Monitoring Point 3
51	N. Force Ave. Sewer 1
52	N. Force Ave. Monitoring Point 1
53	Force Lake East Shore
54	Heron Lakes Golf Course Interpretive Parking
55	South End of N. Force Ave.
56	N. Hayden Island Dr. and N. Starlight Ave.
57	N. Hayden Island Dr. and Jantzen Beach Shopping Center
58	N. Hayden Island Dr. at Oregon DOT
59	Jantzen Beach Moorage, Inc. Business Office
60	N Jantzen St. Monitoring Point 1
61	Metro Expo Center Marine Drive Pullout
62	Metro Expo Center Max Station
63	N. Broadacre Rd. and N. Expo Rd.
64	West of Expo Center Max Station
65	Vanport Max Station
66	Argyle Monitoring Point 1
67	Interstate 5 at Downtown Vancouver
68	N. Jantzen Beach Ave. and N. Hayden Island Dr.
69	N. Jantzen Dr. and N. Tomahawk Island Dr.
70	N. Tomahawk Island Dr. and Lotus Beach
71	NE. Tomahawk Island Dr. and Kayak
72	Pearson Airfield
73	Multnomah Sheriff's Patrol Station
74	Portland International Airport



ecology and environment, inc.
Global Environmental Specialists
Seattle, Washington

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 3
AIR MONITORING EVENT
SAMPLE LOCATION DESCRIPTION KEY
(For Figures 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18)

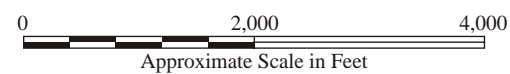
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Key:

- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)

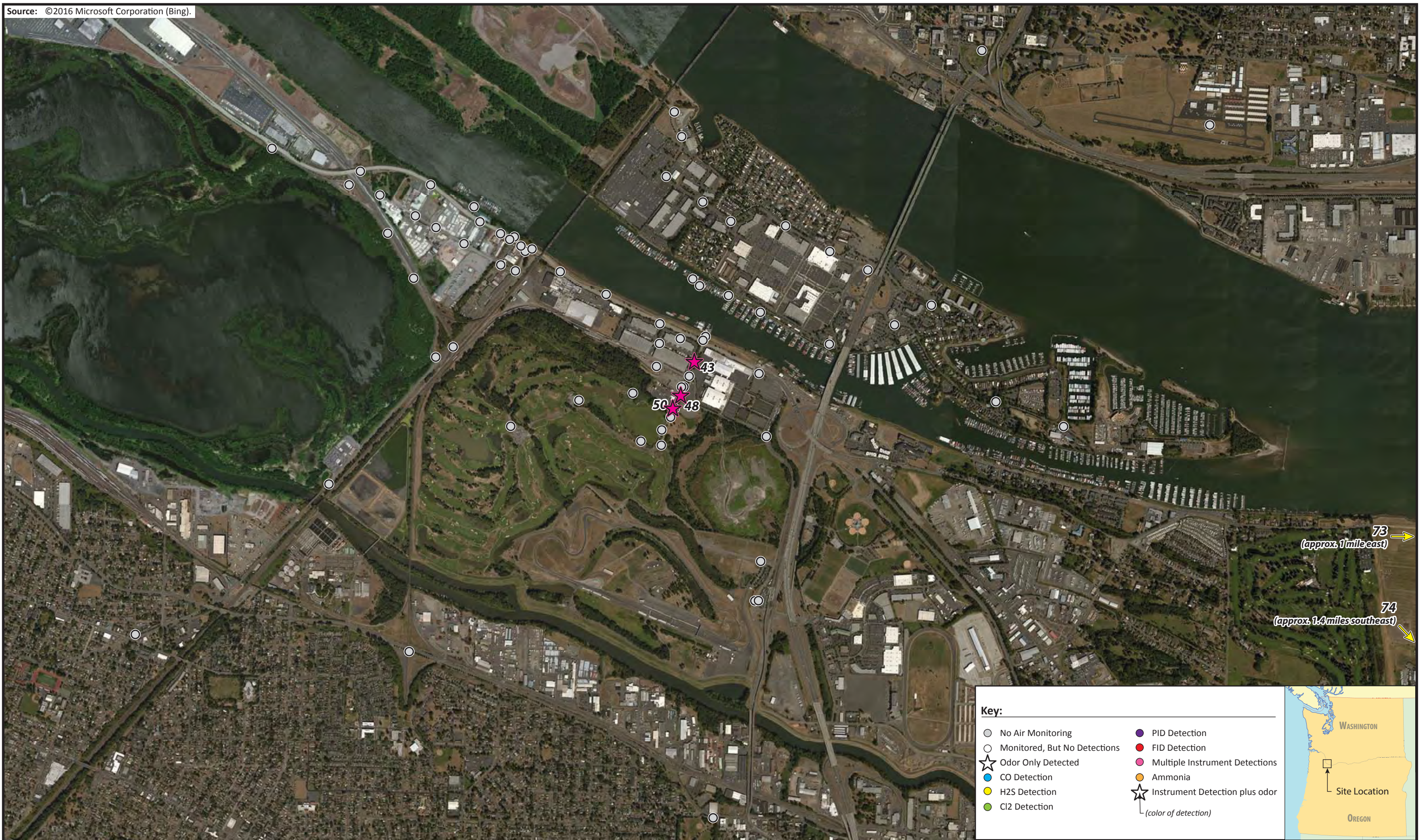


JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 4
AIR MONITORING EVENT
INITIAL RECON – SEPTEMBER 11, 2015

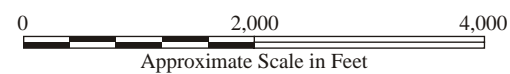
Date:	Drawn by:
5/2/16	AES

10:START IV\15090003\fig 4



Key:

- No Air Monitoring
- Monitored, But No Detections
- ★ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ★ Instrument Detection plus odor
(color of detection)

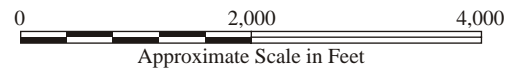


JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 5
AIR MONITORING EVENT
NIGHT RECON – SEPTEMBER 15, 2015

Date:	Drawn by:
5/2/16	AES

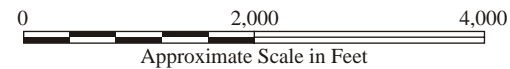
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Key:

- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)



JANTZEN BEACH AIR RELEASE
Portland, Oregon

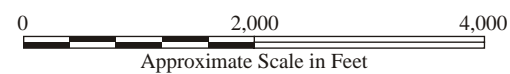
Figure 7
AIR MONITORING JBMI MAINTENANCE VISIT
NOVEMBER 17, 2015

Date:	Drawn by:	
5/2/16	AES	10:START IV\15090003\fig 7



Key:

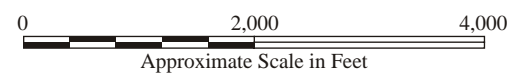
- No Air Monitoring
- Monitored, But No Detections
- ★ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ★ Instrument Detection plus odor
(color of detection)





Key:

- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)



JANTZEN BEACH AIR RELEASE
Portland, Oregon

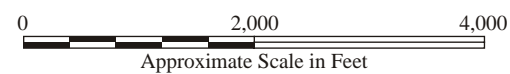
Figure 9
AIR MONITORING MOBILE EVENT
NOVEMBER 27, 2015

Date: 5/2/16	Drawn by: AES	10:START IV\15090003\fig 9
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Key:

- No Air Monitoring
- Monitored, But No Detections
- ★ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ★ Instrument Detection plus odor
(color of detection)

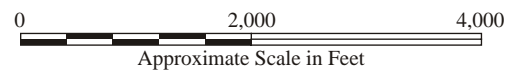


JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 10
AIR MONITORING MOBILE EVENT
DECEMBER 2, 2015

Date:	Drawn by:
5/2/16	AES

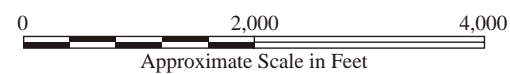
10:START IV\15090003\fig 10





Key:

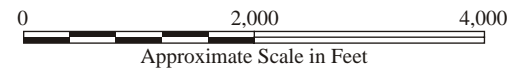
- No Air Monitoring
- Monitored, But No Detections
- ★ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ★ Instrument Detection plus odor
(color of detection)





Key:

- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)



JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 13
AIR MONITORING MOBILE EVENT
DECEMBER 10, 2015

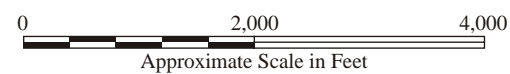
Date:	Drawn by:
5/2/16	AES

10:START IV\15090003\fig 13



Key:

- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)





Key:

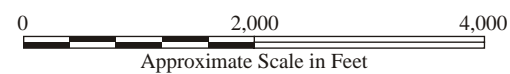
○ No Air Monitoring	● PID Detection
○ Monitored, But No Detections	● FID Detection
★ Odor Only Detected	● Multiple Instrument Detections
● CO Detection	● Ammonia
● H2S Detection	★ Instrument Detection plus odor
● Cl2 Detection	(color of detection)





Key:

- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)



JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 16
AIR MONITORING MOBILE EVENT
DECEMBER 18, 2015

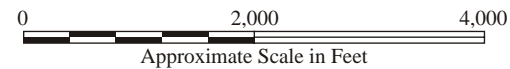
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5/2/16	AES

10:START IV\15090003\fig 16



Key:

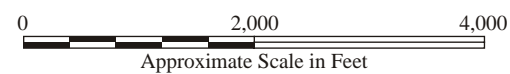
- No Air Monitoring
- Monitored, But No Detections
- ☆ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ☆ Instrument Detection plus odor
(color of detection)





Key:

- No Air Monitoring
- Monitored, But No Detections
- ★ Odor Only Detected
- CO Detection
- H2S Detection
- Cl2 Detection
- PID Detection
- FID Detection
- Multiple Instrument Detections
- Ammonia
- ★ Instrument Detection plus odor
(color of detection)



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TABLES

***Jantzen Beach Air Testing
Trip Report***

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Table 1: Air Testing Event Descriptions						
Chart/Figure	Dates	Site Area	Event Description	Equipment	Follow-Up	Action
Figure 4	9/11/2015 (3:36p.m. to 5:55p.m.)	Force Ave, HLGC, Marine Dr, Suttle Rd, Vanport	Manual Mobile Monitoring - initial Site recon: <ul style="list-style-type: none"> NH₃ (1ppm) CO (3ppm) Cl₂ (0.05ppm) LEL (1%) Odor (caustic, glycol, acrid, hydrocarbon) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) TVA-1000B A59291 (PID-10.6, FID) Dräger PAC-7000 (NH₃, HCN, Cl₂) 	None	Reported to EPA
Figure 5	9/15/2015 (04:19a.m. to 4:35a.m.)	Force Ave	Manual Mobile Monitoring - night Site recon: <ul style="list-style-type: none"> PID-10.6 (7,900ppb) FID (13,140ppb) Odor (acrid, alcohol, glycol, hydrocarbon, propane, peanut butter) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) TVA-1000B 897895 (PID-10.6, FID) Dräger PAC-7000 (NH₃, HCN, Cl₂) Dräger colorimetric kit 	Repairs to SO ₂ colorimetric analyzer (Dräger CMS) requested.	EPA present (no report)
Chart 1	11/3/2015 (10:56a.m. to 11:14a.m.)	Class Harbor, Force Ave, JBMI, HLGC, Marine Dr	Viper Mobile Monitoring – Viper fixed system location scouting: <ul style="list-style-type: none"> PID-10.6 (110ppb) H₂S (1.4ppm) Odors (burnt-oil, propane, sewer gas/vapor) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 105 Gateway EPAERT80 	Viper system planning. Detections of H ₂ S correlates with sewer lid and sewer pipe monitoring.	EPA present (no report)
Chart 2	11/3/2015 (4:29p.m. to 4:35p.m.)	Expeditors International	Viper Mobile Monitoring – Viper fixed system location scouting: <ul style="list-style-type: none"> CO (15ppm) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 105 Gateway EPAERT80 	CO was detected inside Expeditors office (#2506).	EPA present (no report)
Figure 6	11/10/2015 (8:46a.m. to 9:09a.m.)	Force Ave, HLGC, Heron Landing, Marine Dr	Manual Mobile Monitoring – Viper fixed system location scouting: <ul style="list-style-type: none"> PID-10.6 (80ppb) Gamma Radiation Odor (propane, burnt-oil, solvent, sweet, glycol, nauseating) 	<ul style="list-style-type: none"> MultiRAE Pro SB6193 (PID-10.6, H₂S, CO, LEL, O₂, Gamma) Linc 105 Gateway EPAERT80 MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 103 	JB01 Viper system installed. No correlated events were discovered. Suspected gamma sensor error (known issue).	Reported to EPA
Chart 3	11/17/2015 (6:48a.m. to 6:50a.m.)	HLGC (JB02)	Viper Alarms: <ul style="list-style-type: none"> PID-10.6 (110ppb) CO (4ppm) 	<ul style="list-style-type: none"> MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 Gateway EPAERT93 container 	Contacted superintendent – detection time roughly correlates with startup of mower engines.	Reported to EPA
Figure 7	11/17/2015 (1:21p.m. to 1:45p.m.)	JBMI (JB01)	Manual Mobile Monitoring - maintenance visit: <ul style="list-style-type: none"> Odor (propane, burnt-oil, mercaptan) 	<ul style="list-style-type: none"> None 	No correlated events were discovered. Residents reported no odor during the time START noticed it.	Reported to EPA
Figure 8	11/18/2015 (3:29p.m. to 3:55p.m.)	HLGC (JB02), Force Ave	Manual Mobile Monitoring - maintenance visit: <ul style="list-style-type: none"> Odor (burnt-oil, propane, sweet, glycol) 	<ul style="list-style-type: none"> None 	No correlated events were discovered.	Reported to EPA
Chart 4	11/24/2015 (2:06p.m. to 2:19p.m.)	JBMI (JB01)	Viper Detections: <ul style="list-style-type: none"> H₂S (3.1ppm) CO (360ppm) PID-10.6 (9,000ppb) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 103 Gateway EPAERT80 Snapper, 6L vacuum container 	Homeowner reported that boat engine (in proximity to monitors) had been started.	Reported to EPA
Chart 5	11/27/2015 (8:51a.m. to 8:56a.m.)	JBMI (JB01)	Viper Detections: <ul style="list-style-type: none"> PID-10.6 (275ppb) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 103 Gateway EPAERT80 Snapper, 6L vacuum container 	No correlated events were discovered. Residents reported no odor during detection event.	Reported to EPA
Figure 9	11/27/2015 (2:48p.m. to 4:51p.m.)	Force Ave, Hayden Is, Marine Dr., Suttle Rd.	Mobile monitoring: <ul style="list-style-type: none"> No elevated detections 	<ul style="list-style-type: none"> UltraRAE 3000 SB7017 (PID-11.7) 	None	Reported to EPA
Chart 6	12/1/2015 (1:04p.m. to 1:14p.m.)	JBMI (JB01)	Viper detections: <ul style="list-style-type: none"> PID-10.6 (37,400ppb) CO (340ppm) H₂S (2.5ppm) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 103 Gateway EPAERT80 Snapper, 6L vacuum container 	Homeowner reported that boat engine (in proximity to monitors) had been started.	Reported to EPA
Chart 7	12/1/2015 (4:04p.m. to 6:52p.m.)	JBMI (JB01)	Viper Detections: <ul style="list-style-type: none"> PID-11.7 (28ppb) 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 103 UltraRAE 3000 SB7017 Linc 108 Gateway EPAERT80 Snapper, 6L vacuum container 	No correlated events were discovered.	Reported to EPA
Figure 10	12/2/2015 (1:44p.m. to 2:09p.m.)	Force Ave, HLGC (JB02), Marine Dr, Suttle Rd	Mobile monitoring: <ul style="list-style-type: none"> Odor (burnt-oil) 	<ul style="list-style-type: none"> UltraRAE SB6189 (PID-11.7) 	No correlated events were discovered.	Reported to EPA
Chart 8	12/3/2015 (7:24p.m. to 10:24p.m.)	HLGC (JB02)	Viper Detections: <ul style="list-style-type: none"> PID-10.6 (140ppb) 	<ul style="list-style-type: none"> MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 Gateway EPAERT93 UltraRAE 3000 (PID-11.7) SB7016 Linc 109 Snapper, 6L vacuum container 	No correlated events were discovered.	Reported to EPA
Chart 9	12/4/2015 (0:00a.m. to 0:10a.m.)					
Chart 10	12/4/2015 (11:36a.m. to 2:36p.m.)					
Chart 11	12/4/2015 (0:09a.m. to 9:55p.m.)	JBMI (JB01)	Viper Alarm: <ul style="list-style-type: none"> No alarm triggered at time of engine starting 	<ul style="list-style-type: none"> MultiRAE Pro SB7020 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) Linc 103 UltraRAE 3000 SB7017 Linc 108 Gateway EPAERT80 Snapper, 6L vacuum container 	Homeowner reported that boat engine (in proximity to monitors) had been started.	None

Table 1: Air Testing Event Descriptions						
Chart/Figure	Dates	Site Area	Event Description	Equipment	Follow-Up	Action
Chart 12	12/5/2015 (0:00a.m. to 11:59p.m.)	HLGC (JB02)	Viper Alarms: • PID-10.6 (130ppb)	<ul style="list-style-type: none"> • MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container 	No correlated events were discovered.	Reported to EPA
Chart 13	12/6/2015 (7:00a.m. to 8:30a.m.)	HLGC (JB02)	Viper Alarms: • PID-10.6 (170ppb)	<ul style="list-style-type: none"> • MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container 	No correlated events were discovered.	Reported to EPA
Chart 14 Figure 11 Chart 15	12/7/2015 (7:21a.m. to 11:59p.m.) 12/7/2015 (12:15p.m. to 4:37p.m.) 12/8/2015 (0:00a.m. to 11:59p.m.)	HLGC (JB02)	Viper Detections: <ul style="list-style-type: none"> • PID-10.6 (260ppb) • PID-11.7 (111ppb) • CO (3ppm) • H₂S (1.4ppm) • O₂ (26.6%) Manual Mobile Monitoring: <ul style="list-style-type: none"> • Cl₂ (0.6ppm on Force Avenue, specific position not recorded) • Odors (propane) • Gamma Radiation 	<ul style="list-style-type: none"> • MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container <ul style="list-style-type: none"> • MultiRAE Pro B09942 (PID-10.6, Cl₂, NH₃, LEL, Gamma) 	No correlated events were discovered (except bump tests from 13:36 to 13:44). High gamma suspected to be due to sensor error (known issue).	Discussed with EPA – decision made to not collect a VOC air sample. Plan to return with a dedicated gamma radiation detector (Ludlum model 192). PID-10.6 alarm reset to 200ppb (due to sensor drift)
Chart 16 Chart 17 Chart 18 Chart 19 Figure 12 Chart 20	12/9/2015 (0:00a.m. to 6:57a.m.) 12/9/2015 (8:12a.m. to 9:03a.m.) 12/9/2015 (10:19a.m. to 10:27a.m.) 12/9/2015 (11:11a.m. to 8:24p.m.) 12/9/2015 (8:55p.m. to 10:24p.m.) 12/9/2015 (11:51p.m. to 11:54p.m.)	HLGC (JB02), Marine Dr, North Portland, Suttle Rd, Vanport	Viper alarm: <ul style="list-style-type: none"> • PID-10.6 (100ppb). Manual Mobile Monitoring: <ul style="list-style-type: none"> • Odors (propane) 	<ul style="list-style-type: none"> • MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container <ul style="list-style-type: none"> • MultiRAE Pro SB6193 (PID-10.6, H₂S, CO, LEL, O₂, Gamma) • UltraRAE 3000 SB6189 (PID-11.&) • Ludlum Model 192 A59251 	No correlated events were discovered.	Reported to EPA. Decision made to not collect a VOC air sample.
Chart 21 Chart 22 Chart 23 Chart 24	12/10/2015 (0:10a.m. to 0:16a.m.) 12/10/2015 (6:44a.m. to 6:46a.m.) 12/10/2015 (12:43p.m. to 12:54p.m.) 12/10/2015 (1:51p.m. to 2:36p.m.)	HLGC (JB02)	Viper Alarm: <ul style="list-style-type: none"> • PID-10.6 (160ppb) 	<ul style="list-style-type: none"> • MultiRAE Pro SB7023 (PID-10.6, CO, H₂S, LEL, O₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container 	No correlated events were discovered (except bump test at 15:17).	Reported to EPA
Figure 13	12/10/2015 (3:00p.m. to 3:17p.m.)	JBMI (JB01)	Manual Mobile Monitoring-during maintenance visit: <ul style="list-style-type: none"> • No elevated detections 	<ul style="list-style-type: none"> • MultiRAE Pro SB6193 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) • UltraRAE 3000 SB6189 (PID-11.7) 	None	None
Figure 14	12/11/2015 (3:18p.m. to 5:45p.m.)	Force Ave, Marine Dr, Smith and Bybee, Suttle Rd, N Portland Rd	Manual Mobile Monitoring: <ul style="list-style-type: none"> • PID-10.6 (38,000ppb) • FID (1,250ppb) • Odors (propane, solvent, kerosene, citrus) • Eye irritation 	<ul style="list-style-type: none"> • TVA-1000B 897895 (PID-10.6, FID) • MultiRAE Pro SB6193 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) • UltraRAE 3000 SB6189 (PID-11.7) 	Stack emissions from ORRCO observed. Instrument detections occurred adjacent to ORRCO and Lacamas Labs.	Reported to EPA
None	12/15/2015 (0:10a.m. to 0:26a.m.)	JBMI (JB01)	Viper Detections: <ul style="list-style-type: none"> • O₂ (30%) 	<ul style="list-style-type: none"> • MultiRAE Pro SB6193 (PID-10.6, CO, H₂S, LEL, O₂, Gamma) • UltraRAE 3000 SB6189 (PID-11.7) 	Conducted mobile air monitoring of industrial areas at daylight (see Figure 15, next line).	No record of report.
Figure 15	12/15/2015 (8:01a.m. to 2:34p.m.)	Force Ave, Marine Dr, Smith and Bybee, Suttle Rd, N Portland Rd	Manual Mobile Monitoring: <ul style="list-style-type: none"> • PID-10.6 (150ppb) • FID (1,700ppb) • Particulates (0.04mg/m³) • Odors (propane, hot-oil, glycol, solvent, citrus, burnt-oil, cyanide) 	<ul style="list-style-type: none"> • TVA-1000B 897895 (PID-10.6, FID) • pDR-1000 A59901 	Instrument detections occurred adjacent to Lacamas Labs and APES. Lower level detections appear to correlate to vehicle traffic. Stack emissions observed from ORRCO.	Reported to EPA

Table 1: Air Testing Event Descriptions						
Chart/Figure	Dates	Site Area	Event Description	Equipment	Follow-Up	Action
Chart 25	12/17/2015 (11:15p.m. to 11:44p.m.)	HLGC (JB02)	Viper Detections: • PID-11.7 (18ppb) • PID-10.6 (100ppb)	• MultiRAE Pro SB7023 (PID-10.6, CO, H ₂ S, LEL, O ₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container	No correlated events were discovered.	Reported to EPA. Decided not to collect a VOC air sample.
Figure 16	12/18/2015 (3:03a.m. to 3:20a.m.)	Force Ave, Marine Dr, Smith and Bybee Suttle Rd	Manual Mobile Monitoring: • Odors (propane, burnt-oil, hot-oil), no instrument detections.	• TVA-1000B A59291 (PID-10.6, FID) • UltraRAE 3000 SB6189 (PID-11.7)	Stack emissions observed from APES.	Reported to EPA
Chart 26	12/19/2015 (12:30p.m. to 12:59p.m.)	HLGC (JB02)	Viper Detections: • PID-10.6 (110ppb)	• MultiRAE Pro SB7023 (PID-10.6, CO, H ₂ S, LEL, O ₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container	No correlated events were discovered.	Reported to EPA
Chart 27 Figure 17	12/22/2015 (08:08a.m. to 08:40a.m.) 12/22/2015 (09:30a.m. to 11:00a.m.)	Force Ave, HLGC (JB02)	Viper Alarms: • PID-10.6 (630ppb) Manual Mobile monitoring: • PID-10.6 (5,000ppb) • Odors (chemical, sewer gas/vapor, propane)	• MultiRAE Pro SB7023 (PID-10.6, CO, H ₂ S, LEL, O ₂) Linc 105 • Gateway EPAERT93 • UltraRAE 3000 (PID-11.7) SB7016 Linc 109 • Snapper, 6L vacuum container • TVA-1000B A59291 (PID-10.6, FID)	No correlated events were discovered.	VOC air samples collected
Chart 28 Figure 18 Chart 29	12/27/2015 (3:28p.m. to 11:59p.m.) 12/27/2015 (5:05p.m. to 9:56p.m.) 12/28/2015 (0:00a.m. to 11:59p.m.)	Force Ave, JBMI (JB01), Vancouver	Viper Alarms: • PID-11.7 (186ppb) Manual Mobile Monitoring: • PID-11.7 (350ppb) • Odors (propane, hot-oil, acrid) • Taste	• MultiRAE Pro SB7020 (PID-10.6, CO, H ₂ S, LEL, O ₂ , Gamma) Linc 103 • UltraRAE 3000 SB7017 Linc 108 • Gateway EPAERT80 • Snapper, 6L vacuum container • UltraRAE 3000 SB6189 (PID-11.7)	Stack emissions observed from APES which correlated with odors and mobile PID-11.7 detections.	VOC air samples collected
Chart 30	12/29/2015 (0:00a.m. to 11:59p.m.)	JBMI (JB01)	Viper Detections: • PID-11.7 (194ppb)	• MultiRAE Pro SB7020 (PID-10.6, CO, H ₂ S, LEL, O ₂ , Gamma) Linc 103 • UltraRAE 3000 SB7017 Linc 108 • Gateway EPAERT80 • Snapper, 6L vacuum container	No correlated events were discovered.	Reported to EPA
Chart 31	12/30/2015 (0:00a.m. to 2:34p.m.)	JBMI (JB01)	Viper Detections: • PID-11.7 (130ppb)	• MultiRAE Pro SB7020 (PID-10.6, CO, H ₂ S, LEL, O ₂ , Gamma) Linc 103 • UltraRAE 3000 SB7017 Linc 108 • Gateway EPAERT80 • Snapper, 6L vacuum container	No correlated events were discovered.	PID-11.7 alarm reset to 200ppb (due to sensor drift)
Chart 32	12/30/2015 (2:34p.m. to 3:42p.m.)	JBMI (JB01)	Viper Detections: • PID-10.6 (9,750ppb) • CO (438ppm) • H ₂ S (5.0ppm)	• MultiRAE Pro SB7020 (PID-10.6, CO, H ₂ S, LEL, O ₂ , Gamma) Linc 103 • UltraRAE 3000 SB7017 Linc 108 • Gateway EPAERT80 • Snapper, 6L vacuum container	Homeowner reported that boat engine (in proximity to monitors) had been started.	Reported to EPA
Chart 33	12/30/2015 (3:42p.m. to 11:59p.m.)	JBMI (JB01)	Viper Detections: • PID-10.6 (100ppb) • CO (3ppm)	• MultiRAE Pro SB7020 (PID-10.6, CO, H ₂ S, LEL, O ₂ , Gamma) Linc 103 • UltraRAE 3000 SB7017 Linc 108 • Gateway EPAERT80 • Snapper, 6L vacuum container	No correlated events were discovered.	Reported to EPA
Chart 34 Chart 35 Chart 36	1/8/2016 (0:00a.m. to 12:54p.m.) 1/8/2016 (1:59p.m. to 2:06p.m.) 1/8/2016 (2:11p.m. to 2:21p.m.)	JBMI (JB01)	Viper Detections: • PID-10.6 (10,100ppb) • H ₂ S (0.8ppm)	• MultiRAE Pro SB7020 (PID-10.6, CO, H ₂ S, LEL, O ₂ , Gamma) Linc 103 • UltraRAE 3000 SB7017 Linc 108 • Gateway EPAERT80 • Snapper, 6L vacuum container	PID bump test conducted before system shutdown. Ten H ₂ S detections occurred (all 800ppb) in the last 12 seconds the unit transmitted data before shutdown; cause is unknown.	Systems dismantled after bump test. Power failure at JB02 prevented a bump test there.

Key:

a.m. = ante-meridian, or after mid-night until the following noon (0:00a.m. to 11:59a.m.)
 APES = American Petroleum Environmental Services
 Cl₂ = chlorine
 CO = carbon monoxide
 EPA = United States Environmental Protection Agency
 FID = flame-ionization detector
 Gamma = gamma radiation
 HCN = Hydrogen cyanide
 HLGC = Heron Lakes Golf Course
 JB01 = Jantzen Beach Viper station number 1
 JB02 = Jantzen Beach Viper station number 2
 JBMI = Jantzen Beach Moorage, Inc.
 L = Liter
 N/A = not applicable
 NH₃ = ammonia
 O₂ = oxygen
 ppb = parts per billion
 ppm = parts per million
 PID = photo-ionization detector
 PID-10.6 = photo-ionization detector equipped with a (nominal) 10.6 eV lamp.
 PID-11.7 = photo-ionization detector equipped with a (nominal) 11.7 eV lamp.
 p.m. = post meridian, or after mid-day noon until the following midnight (12:00p.m. to 11:59p.m.)
 WD = wind direction
 WS = wind speed

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Table 2 Laboratory Air Sample Collection Summary

Date	Time	Location	Sample Type	Sample Duration	Sample Number	Station PID levels	Hand-held PID levels	Odor Observations	Winds
12/22/15	9:50 – 10:50a.m.	Heron Lakes HLGC (JB02).	6L Vacuum Sampling Canister	1-hour	15121001	JB02: 60 – 790 ppb (prior to sampling)	4,000 – 5,000 ppb (10:30a.m. to 10:50a.m.)	Strong chemical odor on arrival, but began dissipating before vacuum canister samplers were deployed.	WS 0.6 mph to 2mph; WD 300 to 120 to 90 to 13 degrees CW from N (0 degrees). Observation by ODEQ met station.
12/22/15	10:00 – 11:00a.m.	Force Ave. & Delta Park	6L Vacuum Sampling Canister	1-hour	15121002	No station	0 ppb	Strong chemical odor on arrival, but began dissipating before vacuum canister samplers were deployed. Sewer-like odor noted during sampling.	WS 0.6 mph to 2mph; WD 300 to 120 to 90 to 13 degrees CW from N (0 degrees). Observation by ODEQ met station.
12/22/15	05:45a.m. (arbitrarily assigned time)	Accompanied sample containers.	6L Vacuum Sampling Canister	Trip Blank	15121003	N/A	N/A	N/A	N/A
12/22/15	N/A	N/A (Laboratory)	6L Vacuum Sampling Canister	Method Blank	Method Blank	N/A	N/A	N/A	N/A
12/27/15	5:38p.m.	Jantzen Beach Moorage (JB01)	6L Vacuum Sampling Canister	Grab	15121011	JB01: 1 to 28 ppb (sampling decision based on data that was mis-reported 1000x higher)	150 – 300 ppb	Propane-like burnt-oil odor.	WD from 120-degrees (CW from N, 0-degrees). WS 8.1mph. Observation at 5:53p.m. from Pearson Airfield (KVUO)
12/27/15	6:25p.m. (time arbitrarily assigned)	Accompanied sample containers.	6L Vacuum Sampling Canister	Trip Blank	15121012	N/A	N/A	N/A	N/A
12/27/15	6:35p.m.	Middle of Force Ave., Downwind of APES (Force & Delta Park)	6L Vacuum Sampling Canister	Grab	15121013	No station	350 ppb	Variable. During sampling: strong, acrid-like and oily-like odors that impart strange taste sensation; other times: mild propane-like burnt-oil odor with no taste.	WD variable blowing from S-SW-W (from SW-W at time of sampling, blowing towards the sampler). WS moderate. Observation by sampler.
12/27/15	6:42p.m.	South end of Force Ave, Upwind of APES	6L Vacuum Sampling Canister	Grab	15121014	No station	50 ppb	Faint propane-like, burnt-hot-oil-like odors with no taste sensation.	WD variable blowing from the S-SW-W. WS moderate. Observation by sampler.

Key:

a.m. = *ante-meridian*, or after mid-night until the following noon (0:00a.m. to 11:59a.m.)
 CW = clockwise direction
 EPA = United States Environmental Protection Agency
 HLGC = Heron Lakes Golf Course
 JB01 = Jantzen Beach Viper station number 1
 JB02 = Jantzen Beach Viper station number 2
 JBMI = Jantzen Beach Moorage, Inc.
 L = Liter
 N/A = not applicable
 ppb = parts per billion
 ppm = parts per million
 p.m. = *post meridian*, or after mid-day noon until the following midnight (12:00p.m. to 11:59p.m.)
 WD = wind direction
 WS = wind speed

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Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air ($\mu\text{g}/\text{m}^3$)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Heron Lakes Golf Course (JB02)	15121001	1,1,1-Trichloroethane	CAS 71-55-6	0.12	0.022	U	11
N. Force Ave. and W. Delta Park	15121002	1,1,1-Trichloroethane	CAS 71-55-6	0.13	0.024	U	11
Trip Blank	15121003	1,1,1-Trichloroethane	CAS 71-55-6	0.1	0.018	U	11
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,1,1-Trichloroethane	CAS 71-55-6	0.12	0.022	U	11
Second Trip Blank	15121012	1,1,1-Trichloroethane	CAS 71-55-6	0.1	0.018	U	11
N. Force Ave. and W. Delta Park	15121013	1,1,1-Trichloroethane	CAS 71-55-6	0.13	0.023	U	11
N. Force Ave. (south end)	15121014	1,1,1-Trichloroethane	CAS 71-55-6	0.12	0.022	U	11
Heron Lakes Golf Course (JB02)	15121001	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.12	0.017	U	11.1
N. Force Ave. and W. Delta Park	15121002	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.13	0.019	U	11.1
Trip Blank	15121003	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.1	0.015	U	11.1
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.12	0.017	U	11.1
Second Trip Blank	15121012	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.1	0.015	U	11.1
N. Force Ave. and W. Delta Park	15121013	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.13	0.018	U	11.1
N. Force Ave. (south end)	15121014	1,1,2,2-Tetrachloroethane	CAS 79-34-5	0.12	0.017	U	11.1
Heron Lakes Golf Course (JB02)	15121001	1,1,2-Trichloroethane	CAS 79-00-5	0.12	0.022	U	11
N. Force Ave. and W. Delta Park	15121002	1,1,2-Trichloroethane	CAS 79-00-5	0.13	0.024	U	11
Trip Blank	15121003	1,1,2-Trichloroethane	CAS 79-00-5	0.1	0.018	U	11
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,1,2-Trichloroethane	CAS 79-00-5	0.12	0.022	U	11
Second Trip Blank	15121012	1,1,2-Trichloroethane	CAS 79-00-5	0.1	0.018	U	11
N. Force Ave. and W. Delta Park	15121013	1,1,2-Trichloroethane	CAS 79-00-5	0.13	0.023	U	11
N. Force Ave. (south end)	15121014	1,1,2-Trichloroethane	CAS 79-00-5	0.12	0.022	U	11
Heron Lakes Golf Course (JB02)	15121001	1,1-Dichloroethane	CAS 75-34-3	0.12	0.029	U	
N. Force Ave. and W. Delta Park	15121002	1,1-Dichloroethane	CAS 75-34-3	0.13	0.032	U	
Trip Blank	15121003	1,1-Dichloroethane	CAS 75-34-3	0.1	0.025	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,1-Dichloroethane	CAS 75-34-3	0.12	0.029	U	
Second Trip Blank	15121012	1,1-Dichloroethane	CAS 75-34-3	0.1	0.025	U	
N. Force Ave. and W. Delta Park	15121013	1,1-Dichloroethane	CAS 75-34-3	0.13	0.031	U	
N. Force Ave. (south end)	15121014	1,1-Dichloroethane	CAS 75-34-3	0.12	0.03	U	
Heron Lakes Golf Course (JB02)	15121001	1,1-Dichloroethene	CAS 75-35-4	0.12	0.03	U	9.79
N. Force Ave. and W. Delta Park	15121002	1,1-Dichloroethene	CAS 75-35-4	0.13	0.033	U	9.79
Trip Blank	15121003	1,1-Dichloroethene	CAS 75-35-4	0.1	0.025	U	9.79
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,1-Dichloroethene	CAS 75-35-4	0.12	0.03	U	9.79
Second Trip Blank	15121012	1,1-Dichloroethene	CAS 75-35-4	0.1	0.025	U	9.79
N. Force Ave. and W. Delta Park	15121013	1,1-Dichloroethene	CAS 75-35-4	0.13	0.032	U	9.79
N. Force Ave. (south end)	15121014	1,1-Dichloroethene	CAS 75-35-4	0.12	0.03	U	9.79
Heron Lakes Golf Course (JB02)	15121001	1,2,4-Trichlorobenzene	CAS 120-82-1	0.59	0.08	U	9.04
N. Force Ave. and W. Delta Park	15121002	1,2,4-Trichlorobenzene	CAS 120-82-1	0.65	0.087	U	9.04
Trip Blank	15121003	1,2,4-Trichlorobenzene	CAS 120-82-1	0.5	0.067	U	9.04
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2,4-Trichlorobenzene	CAS 120-82-1	0.6	0.08	U	9.04
Second Trip Blank	15121012	1,2,4-Trichlorobenzene	CAS 120-82-1	0.5	0.067	U	9.04
N. Force Ave. and W. Delta Park	15121013	1,2,4-Trichlorobenzene	CAS 120-82-1	0.63	0.084	U	9.04
N. Force Ave. (south end)	15121014	1,2,4-Trichlorobenzene	CAS 120-82-1	0.6	0.081	U	9.04
Heron Lakes Golf Course (JB02)	15121001	1,2,4-Trimethylbenzene	CAS 95-63-6	1	0.21		
N. Force Ave. and W. Delta Park	15121002	1,2,4-Trimethylbenzene	CAS 95-63-6	1.2	0.24		
Trip Blank	15121003	1,2,4-Trimethylbenzene	CAS 95-63-6	0.5	0.1	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2,4-Trimethylbenzene	CAS 95-63-6	0.6	0.12	U	
Second Trip Blank	15121012	1,2,4-Trimethylbenzene	CAS 95-63-6	0.5	0.1	U	
N. Force Ave. and W. Delta Park	15121013	1,2,4-Trimethylbenzene	CAS 95-63-6	1.1	0.22		
N. Force Ave. (south end)	15121014	1,2,4-Trimethylbenzene	CAS 95-63-6	0.6	0.12	U	
Heron Lakes Golf Course (JB02)	15121001	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.59	0.061	U	
N. Force Ave. and W. Delta Park	15121002	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.65	0.067	U	
Trip Blank	15121003	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.5	0.052	U	

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air ($\mu\text{g}/\text{m}^3$)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.6	0.062	U	
Second Trip Blank	15121012	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.5	0.052	U	
N. Force Ave. and W. Delta Park	15121013	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.63	0.065	U	
N. Force Ave. (south end)	15121014	1,2-Dibromo-3-chloropropane	CAS 96-12-8	0.6	0.062	U	
Heron Lakes Golf Course (JB02)	15121001	1,2-Dibromoethane	CAS 106-93-4	0.12	0.015	U	10.37
N. Force Ave. and W. Delta Park	15121002	1,2-Dibromoethane	CAS 106-93-4	0.13	0.017	U	10.37
Trip Blank	15121003	1,2-Dibromoethane	CAS 106-93-4	0.1	0.013	U	10.37
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2-Dibromoethane	CAS 106-93-4	0.12	0.015	U	10.37
Second Trip Blank	15121012	1,2-Dibromoethane	CAS 106-93-4	0.1	0.013	U	10.37
N. Force Ave. and W. Delta Park	15121013	1,2-Dibromoethane	CAS 106-93-4	0.13	0.016	U	10.37
N. Force Ave. (south end)	15121014	1,2-Dibromoethane	CAS 106-93-4	0.12	0.016	U	10.37
Heron Lakes Golf Course (JB02)	15121001	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.59	0.084	U	
N. Force Ave. and W. Delta Park	15121002	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.65	0.092	U	
Trip Blank	15121003	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.5	0.072	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.6	0.085	U	
Second Trip Blank	15121012	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.5	0.072	U	
N. Force Ave. and W. Delta Park	15121013	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.63	0.089	U	
N. Force Ave. (south end)	15121014	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	CAS 76-14-2	0.6	0.086	U	
Heron Lakes Golf Course (JB02)	15121001	1,2-Dichlorobenzene	CAS 95-50-1	0.12	0.02	U	9.08
N. Force Ave. and W. Delta Park	15121002	1,2-Dichlorobenzene	CAS 95-50-1	0.13	0.021	U	9.08
Trip Blank	15121003	1,2-Dichlorobenzene	CAS 95-50-1	0.1	0.017	U	9.08
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2-Dichlorobenzene	CAS 95-50-1	0.12	0.02	U	9.08
Second Trip Blank	15121012	1,2-Dichlorobenzene	CAS 95-50-1	0.1	0.017	U	9.08
N. Force Ave. and W. Delta Park	15121013	1,2-Dichlorobenzene	CAS 95-50-1	0.13	0.021	U	9.08
N. Force Ave. (south end)	15121014	1,2-Dichlorobenzene	CAS 95-50-1	0.12	0.02	U	9.08
Heron Lakes Golf Course (JB02)	15121001	1,2-Dichloroethane	CAS 107-06-2	0.12	0.029	U	11.04
N. Force Ave. and W. Delta Park	15121002	1,2-Dichloroethane	CAS 107-06-2	0.13	0.032	U	11.04
Trip Blank	15121003	1,2-Dichloroethane	CAS 107-06-2	0.1	0.025	U	11.04
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2-Dichloroethane	CAS 107-06-2	0.12	0.029	U	11.04
Second Trip Blank	15121012	1,2-Dichloroethane	CAS 107-06-2	0.1	0.025	U	11.04
N. Force Ave. and W. Delta Park	15121013	1,2-Dichloroethane	CAS 107-06-2	0.13	0.031	U	11.04
N. Force Ave. (south end)	15121014	1,2-Dichloroethane	CAS 107-06-2	0.12	0.03	U	11.04
Heron Lakes Golf Course (JB02)	15121001	1,2-Dichloropropane	CAS 78-87-5	0.12	0.026	U	10.87
N. Force Ave. and W. Delta Park	15121002	1,2-Dichloropropane	CAS 78-87-5	0.13	0.028	U	10.87
Trip Blank	15121003	1,2-Dichloropropane	CAS 78-87-5	0.1	0.022	U	10.87
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,2-Dichloropropane	CAS 78-87-5	0.12	0.026	U	10.87
Second Trip Blank	15121012	1,2-Dichloropropane	CAS 78-87-5	0.1	0.022	U	10.87
N. Force Ave. and W. Delta Park	15121013	1,2-Dichloropropane	CAS 78-87-5	0.13	0.027	U	10.87
N. Force Ave. (south end)	15121014	1,2-Dichloropropane	CAS 78-87-5	0.12	0.026	U	10.87
Heron Lakes Golf Course (JB02)	15121001	1,3,5-Trimethylbenzene	CAS 108-67-8	0.59	0.12	U	8.41
N. Force Ave. and W. Delta Park	15121002	1,3,5-Trimethylbenzene	CAS 108-67-8	0.65	0.13	U	8.41
Trip Blank	15121003	1,3,5-Trimethylbenzene	CAS 108-67-8	0.5	0.1	U	8.41
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,3,5-Trimethylbenzene	CAS 108-67-8	0.6	0.12	U	8.41
Second Trip Blank	15121012	1,3,5-Trimethylbenzene	CAS 108-67-8	0.5	0.1	U	8.41
N. Force Ave. and W. Delta Park	15121013	1,3,5-Trimethylbenzene	CAS 108-67-8	0.63	0.13	U	8.41
N. Force Ave. (south end)	15121014	1,3,5-Trimethylbenzene	CAS 108-67-8	0.6	0.12	U	8.41
Heron Lakes Golf Course (JB02)	15121001	1,3-Butadiene	CAS 106-99-0	0.24	0.11	U	9.07

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
N. Force Ave. and W. Delta Park	15121002	1,3-Butadiene	CAS 106-99-0	0.26	0.12	U	9.07
Trip Blank	15121003	1,3-Butadiene	CAS 106-99-0	0.2	0.09	U	9.07
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,3-Butadiene	CAS 106-99-0	0.24	0.11	U	9.07
Second Trip Blank	15121012	1,3-Butadiene	CAS 106-99-0	0.2	0.09	U	9.07
N. Force Ave. and W. Delta Park	15121013	1,3-Butadiene	CAS 106-99-0	0.25	0.11	U	9.07
N. Force Ave. (south end)	15121014	1,3-Butadiene	CAS 106-99-0	0.24	0.11	U	9.07
Heron Lakes Golf Course (JB02)	15121001	1,3-Dichlorobenzene	CAS 541-73-1	0.12	0.02	U	
N. Force Ave. and W. Delta Park	15121002	1,3-Dichlorobenzene	CAS 541-73-1	0.13	0.021	U	
Trip Blank	15121003	1,3-Dichlorobenzene	CAS 541-73-1	0.1	0.017	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,3-Dichlorobenzene	CAS 541-73-1	0.12	0.02	U	
Second Trip Blank	15121012	1,3-Dichlorobenzene	CAS 541-73-1	0.1	0.017	U	
N. Force Ave. and W. Delta Park	15121013	1,3-Dichlorobenzene	CAS 541-73-1	0.13	0.021	U	
N. Force Ave. (south end)	15121014	1,3-Dichlorobenzene	CAS 541-73-1	0.12	0.02	U	
Heron Lakes Golf Course (JB02)	15121001	1,4-Dichlorobenzene	CAS 106-46-7	0.12	0.02	U	
N. Force Ave. and W. Delta Park	15121002	1,4-Dichlorobenzene	CAS 106-46-7	0.13	0.021	U	
Trip Blank	15121003	1,4-Dichlorobenzene	CAS 106-46-7	0.1	0.017	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,4-Dichlorobenzene	CAS 106-46-7	0.12	0.02	U	
Second Trip Blank	15121012	1,4-Dichlorobenzene	CAS 106-46-7	0.1	0.017	U	
N. Force Ave. and W. Delta Park	15121013	1,4-Dichlorobenzene	CAS 106-46-7	0.13	0.021	U	
N. Force Ave. (south end)	15121014	1,4-Dichlorobenzene	CAS 106-46-7	0.12	0.02	U	
Heron Lakes Golf Course (JB02)	15121001	1,4-Dioxane	CAS 123-91-1	0.59	0.16	U	9.19
N. Force Ave. and W. Delta Park	15121002	1,4-Dioxane	CAS 123-91-1	0.65	0.18	U	9.19
Trip Blank	15121003	1,4-Dioxane	CAS 123-91-1	0.5	0.14	U	9.19
Jantzen Beach Moorage, Inc. (JB02)	15121011	1,4-Dioxane	CAS 123-91-1	0.6	0.17	U	9.19
Second Trip Blank	15121012	1,4-Dioxane	CAS 123-91-1	0.5	0.14	U	9.19
N. Force Ave. and W. Delta Park	15121013	1,4-Dioxane	CAS 123-91-1	0.98	0.27		9.19
N. Force Ave. (south end)	15121014	1,4-Dioxane	CAS 123-91-1	0.6	0.17	U	9.19
Heron Lakes Golf Course (JB02)	15121001	2-Butanone (MEK)	CAS 78-93-3	5.9	2	U	9.51
N. Force Ave. and W. Delta Park	15121002	2-Butanone (MEK)	CAS 78-93-3	6.5	2.2	U	9.51
Trip Blank	15121003	2-Butanone (MEK)	CAS 78-93-3	5	1.7	U	9.51
Jantzen Beach Moorage, Inc. (JB02)	15121011	2-Butanone (MEK)	CAS 78-93-3	6	2	U	9.51
Second Trip Blank	15121012	2-Butanone (MEK)	CAS 78-93-3	5	1.7	U	9.51
N. Force Ave. and W. Delta Park	15121013	2-Butanone (MEK)	CAS 78-93-3	6.3	2.1	U	9.51
N. Force Ave. (south end)	15121014	2-Butanone (MEK)	CAS 78-93-3	6	2	U	9.51
Heron Lakes Golf Course (JB02)	15121001	2-Hexanone	CAS 591-78-6	0.59	0.14	U	
N. Force Ave. and W. Delta Park	15121002	2-Hexanone	CAS 591-78-6	0.65	0.16	U	
Trip Blank	15121003	2-Hexanone	CAS 591-78-6	0.5	0.12	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	2-Hexanone	CAS 591-78-6	0.6	0.15	U	
Second Trip Blank	15121012	2-Hexanone	CAS 591-78-6	0.5	0.12	U	
N. Force Ave. and W. Delta Park	15121013	2-Hexanone	CAS 591-78-6	0.63	0.15	U	
N. Force Ave. (south end)	15121014	2-Hexanone	CAS 591-78-6	0.6	0.15	U	
Heron Lakes Golf Course (JB02)	15121001	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	5.9	2.4	U	10.12
N. Force Ave. and W. Delta Park	15121002	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	6.5	2.6	U	10.12
Trip Blank	15121003	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	5	2	U	10.12
Jantzen Beach Moorage, Inc. (JB02)	15121011	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	6	2.4	U	10.12
Second Trip Blank	15121012	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	5	2	U	10.12
N. Force Ave. and W. Delta Park	15121013	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	6.3	2.5	U	10.12
N. Force Ave. (south end)	15121014	2-Propanol (Isopropyl Alcohol)	CAS 67-63-0	6	2.4	U	10.12
Heron Lakes Golf Course (JB02)	15121001	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.12	0.038	U	9.9
N. Force Ave. and W. Delta Park	15121002	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.13	0.041	U	9.9
Trip Blank	15121003	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.1	0.032	U	9.9

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)

Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Jantzen Beach Moorage, Inc. (JB02)	15121011	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.12	0.038	U	9.9
Second Trip Blank	15121012	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.1	0.032	U	9.9
N. Force Ave. and W. Delta Park	15121013	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.13	0.04	U	9.9
N. Force Ave. (south end)	15121014	3-Chloro-1-propene (Allyl Chloride)	CAS 107-05-1	0.12	0.038	U	9.9
Heron Lakes Golf Course (JB02)	15121001	4-Ethyltoluene	CAS 622-96-8	0.59	0.12	U	
N. Force Ave. and W. Delta Park	15121002	4-Ethyltoluene	CAS 622-96-8	0.65	0.13	U	
Trip Blank	15121003	4-Ethyltoluene	CAS 622-96-8	0.5	0.1	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	4-Ethyltoluene	CAS 622-96-8	0.6	0.12	U	
Second Trip Blank	15121012	4-Ethyltoluene	CAS 622-96-8	0.5	0.1	U	
N. Force Ave. and W. Delta Park	15121013	4-Ethyltoluene	CAS 622-96-8	0.63	0.13	U	
N. Force Ave. (south end)	15121014	4-Ethyltoluene	CAS 622-96-8	0.6	0.12	U	
Heron Lakes Golf Course (JB02)	15121001	4-Methyl-2-pentanone	CAS 108-10-1	0.59	0.14	U	9.3
N. Force Ave. and W. Delta Park	15121002	4-Methyl-2-pentanone	CAS 108-10-1	0.65	0.16	U	9.3
Trip Blank	15121003	4-Methyl-2-pentanone	CAS 108-10-1	0.5	0.12	U	9.3
Jantzen Beach Moorage, Inc. (JB02)	15121011	4-Methyl-2-pentanone	CAS 108-10-1	0.6	0.15	U	9.3
Second Trip Blank	15121012	4-Methyl-2-pentanone	CAS 108-10-1	0.5	0.12	U	9.3
N. Force Ave. and W. Delta Park	15121013	4-Methyl-2-pentanone	CAS 108-10-1	0.63	0.15	U	9.3
N. Force Ave. (south end)	15121014	4-Methyl-2-pentanone	CAS 108-10-1	0.6	0.15	U	9.3
Heron Lakes Golf Course (JB02)	15121001	Acetone	CAS 67-64-1	5.9	2.5	U	9.71
N. Force Ave. and W. Delta Park	15121002	Acetone	CAS 67-64-1	6.5	2.7	U	9.71
Trip Blank	15121003	Acetone	CAS 67-64-1	5	2.1	U	9.71
Jantzen Beach Moorage, Inc. (JB02)	15121011	Acetone	CAS 67-64-1	6	2.5	U	9.71
Second Trip Blank	15121012	Acetone	CAS 67-64-1	5	2.1	U	9.71
N. Force Ave. and W. Delta Park	15121013	Acetone	CAS 67-64-1	6.3	2.6	U	9.71
N. Force Ave. (south end)	15121014	Acetone	CAS 67-64-1	6	2.5	U	9.71
Heron Lakes Golf Course (JB02)	15121001	Acetonitrile	CAS 75-05-8	0.59	0.35	U	12.19
N. Force Ave. and W. Delta Park	15121002	Acetonitrile	CAS 75-05-8	0.65	0.38	U	12.19
Trip Blank	15121003	Acetonitrile	CAS 75-05-8	0.5	0.3	U	12.19
Jantzen Beach Moorage, Inc. (JB02)	15121011	Acetonitrile	CAS 75-05-8	0.6	0.35	U	12.19
Second Trip Blank	15121012	Acetonitrile	CAS 75-05-8	0.5	0.3	U	12.19
N. Force Ave. and W. Delta Park	15121013	Acetonitrile	CAS 75-05-8	0.63	0.37	U	12.19
N. Force Ave. (south end)	15121014	Acetonitrile	CAS 75-05-8	0.6	0.36	U	12.19
Heron Lakes Golf Course (JB02)	15121001	Acrolein	CAS 107-02-8	2.4	1	U	10.1
N. Force Ave. and W. Delta Park	15121002	Acrolein	CAS 107-02-8	2.6	1.1	U	10.1
Trip Blank	15121003	Acrolein	CAS 107-02-8	2	0.87	U	10.1
Jantzen Beach Moorage, Inc. (JB02)	15121011	Acrolein	CAS 107-02-8	2.4	1	U	10.1
Second Trip Blank	15121012	Acrolein	CAS 107-02-8	2	0.87	U	10.1
N. Force Ave. and W. Delta Park	15121013	Acrolein	CAS 107-02-8	2.5	1.1	U	10.1
N. Force Ave. (south end)	15121014	Acrolein	CAS 107-02-8	2.4	1	U	10.1
Heron Lakes Golf Course (JB02)	15121001	Acrylonitrile	CAS 107-13-1	0.59	0.27	U	10.91
N. Force Ave. and W. Delta Park	15121002	Acrylonitrile	CAS 107-13-1	0.65	0.3	U	10.91
Trip Blank	15121003	Acrylonitrile	CAS 107-13-1	0.5	0.23	U	10.91
Jantzen Beach Moorage, Inc. (JB02)	15121011	Acrylonitrile	CAS 107-13-1	0.6	0.27	U	10.91
Second Trip Blank	15121012	Acrylonitrile	CAS 107-13-1	0.5	0.23	U	10.91
N. Force Ave. and W. Delta Park	15121013	Acrylonitrile	CAS 107-13-1	0.63	0.29	U	10.91
N. Force Ave. (south end)	15121014	Acrylonitrile	CAS 107-13-1	0.6	0.28	U	10.91
Heron Lakes Golf Course (JB02)	15121001	alpha-Pinene	CAS 80-56-8	0.75	0.13		
N. Force Ave. and W. Delta Park	15121002	alpha-Pinene	CAS 80-56-8	0.65	0.12	U	
Trip Blank	15121003	alpha-Pinene	CAS 80-56-8	0.5	0.09	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	alpha-Pinene	CAS 80-56-8	0.6	0.11	U	
Second Trip Blank	15121012	alpha-Pinene	CAS 80-56-8	0.5	0.09	U	
N. Force Ave. and W. Delta Park	15121013	alpha-Pinene	CAS 80-56-8	0.63	0.11	U	

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)

Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
N. Force Ave. (south end)	15121014	alpha-Pinene	CAS 80-56-8	0.6	0.11	U	
Heron Lakes Golf Course (JB02)	15121001	Benzene	CAS 71-43-2	1.5	0.46	U	9.25
N. Force Ave. and W. Delta Park	15121002	Benzene	CAS 71-43-2	1.4	0.45	U	9.25
Trip Blank	15121003	Benzene	CAS 71-43-2	0.37	0.12		9.25
Jantzen Beach Moorage, Inc. (JB02)	15121011	Benzene	CAS 71-43-2	3	0.93		9.25
Second Trip Blank	15121012	Benzene	CAS 71-43-2	0.1	0.031	U	9.25
N. Force Ave. and W. Delta Park	15121013	Benzene	CAS 71-43-2	0.93	0.29		9.25
N. Force Ave. (south end)	15121014	Benzene	CAS 71-43-2	0.59	0.19		9.25
Heron Lakes Golf Course (JB02)	15121001	Benzyl Chloride	CAS 100-44-7	0.59	0.11	U	9.14
N. Force Ave. and W. Delta Park	15121002	Benzyl Chloride	CAS 100-44-7	0.65	0.12	U	9.14
Trip Blank	15121003	Benzyl Chloride	CAS 100-44-7	0.5	0.097	U	9.14
Jantzen Beach Moorage, Inc. (JB02)	15121011	Benzyl Chloride	CAS 100-44-7	0.6	0.11	U	9.14
Second Trip Blank	15121012	Benzyl Chloride	CAS 100-44-7	0.5	0.097	U	9.14
N. Force Ave. and W. Delta Park	15121013	Benzyl Chloride	CAS 100-44-7	0.63	0.12	U	9.14
N. Force Ave. (south end)	15121014	Benzyl Chloride	CAS 100-44-7	0.6	0.12	U	9.14
Heron Lakes Golf Course (JB02)	15121001	Bromodichloromethane	CAS 75-27-4	0.12	0.018	U	
N. Force Ave. and W. Delta Park	15121002	Bromodichloromethane	CAS 75-27-4	0.13	0.019	U	
Trip Blank	15121003	Bromodichloromethane	CAS 75-27-4	0.1	0.015	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	Bromodichloromethane	CAS 75-27-4	0.12	0.018	U	
Second Trip Blank	15121012	Bromodichloromethane	CAS 75-27-4	0.1	0.015	U	
N. Force Ave. and W. Delta Park	15121013	Bromodichloromethane	CAS 75-27-4	0.13	0.019	U	
N. Force Ave. (south end)	15121014	Bromodichloromethane	CAS 75-27-4	0.12	0.018	U	
Heron Lakes Golf Course (JB02)	15121001	Bromoform	CAS 75-25-2	0.59	0.057	U	10.48
N. Force Ave. and W. Delta Park	15121002	Bromoform	CAS 75-25-2	0.65	0.062	U	10.48
Trip Blank	15121003	Bromoform	CAS 75-25-2	0.5	0.048	U	10.48
Jantzen Beach Moorage, Inc. (JB02)	15121011	Bromoform	CAS 75-25-2	0.6	0.058	U	10.48
Second Trip Blank	15121012	Bromoform	CAS 75-25-2	0.5	0.048	U	10.48
N. Force Ave. and W. Delta Park	15121013	Bromoform	CAS 75-25-2	0.63	0.06	U	10.48
N. Force Ave. (south end)	15121014	Bromoform	CAS 75-25-2	0.6	0.058	U	10.48
Heron Lakes Golf Course (JB02)	15121001	Bromomethane	CAS 74-83-9	0.24	0.061	U	10.54
N. Force Ave. and W. Delta Park	15121002	Bromomethane	CAS 74-83-9	0.26	0.066	U	10.54
Trip Blank	15121003	Bromomethane	CAS 74-83-9	0.2	0.052	U	10.54
Jantzen Beach Moorage, Inc. (JB02)	15121011	Bromomethane	CAS 74-83-9	0.24	0.061	U	10.54
Second Trip Blank	15121012	Bromomethane	CAS 74-83-9	0.2	0.052	U	10.54
N. Force Ave. and W. Delta Park	15121013	Bromomethane	CAS 74-83-9	0.25	0.064	U	10.54
N. Force Ave. (south end)	15121014	Bromomethane	CAS 74-83-9	0.24	0.062	U	10.54
Heron Lakes Golf Course (JB02)	15121001	Carbon Disulfide	CAS 75-15-0	5.9	1.9	U	10.07
N. Force Ave. and W. Delta Park	15121002	Carbon Disulfide	CAS 75-15-0	6.5	2.1	U	10.07
Trip Blank	15121003	Carbon Disulfide	CAS 75-15-0	5	1.6	U	10.07
Jantzen Beach Moorage, Inc. (JB02)	15121011	Carbon Disulfide	CAS 75-15-0	6	1.9	U	10.07
Second Trip Blank	15121012	Carbon Disulfide	CAS 75-15-0	5	1.6	U	10.07
N. Force Ave. and W. Delta Park	15121013	Carbon Disulfide	CAS 75-15-0	6.3	2	U	10.07
N. Force Ave. (south end)	15121014	Carbon Disulfide	CAS 75-15-0	6	1.9	U	10.07
Heron Lakes Golf Course (JB02)	15121001	Carbon Tetrachloride	CAS 56-23-5	0.42	0.067		11.47
N. Force Ave. and W. Delta Park	15121002	Carbon Tetrachloride	CAS 56-23-5	0.44	0.07		11.47
Trip Blank	15121003	Carbon Tetrachloride	CAS 56-23-5	0.1	0.016	U	11.47
Jantzen Beach Moorage, Inc. (JB02)	15121011	Carbon Tetrachloride	CAS 56-23-5	0.45	0.071		11.47
Second Trip Blank	15121012	Carbon Tetrachloride	CAS 56-23-5	0.1	0.016	U	11.47
N. Force Ave. and W. Delta Park	15121013	Carbon Tetrachloride	CAS 56-23-5	0.46	0.074		11.47
N. Force Ave. (south end)	15121014	Carbon Tetrachloride	CAS 56-23-5	0.46	0.073		11.47
Heron Lakes Golf Course (JB02)	15121001	Chlorobenzene	CAS 108-90-7	0.12	0.026	U	9.06
N. Force Ave. and W. Delta Park	15121002	Chlorobenzene	CAS 108-90-7	0.13	0.028	U	9.06
Trip Blank	15121003	Chlorobenzene	CAS 108-90-7	0.1	0.022	U	9.06

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Jantzen Beach Moorage, Inc. (JB02)	15121011	Chlorobenzene	CAS 108-90-7	0.12	0.026	U	9.06
Second Trip Blank	15121012	Chlorobenzene	CAS 108-90-7	0.1	0.022	U	9.06
N. Force Ave. and W. Delta Park	15121013	Chlorobenzene	CAS 108-90-7	0.13	0.027	U	9.06
N. Force Ave. (south end)	15121014	Chlorobenzene	CAS 108-90-7	0.12	0.026	U	9.06
Heron Lakes Golf Course (JB02)	15121001	Chloroethane	CAS 75-00-3	0.24	0.089	U	10.97
N. Force Ave. and W. Delta Park	15121002	Chloroethane	CAS 75-00-3	0.26	0.098	U	10.97
Trip Blank	15121003	Chloroethane	CAS 75-00-3	0.2	0.076	U	10.97
Jantzen Beach Moorage, Inc. (JB02)	15121011	Chloroethane	CAS 75-00-3	0.24	0.09	U	10.97
Second Trip Blank	15121012	Chloroethane	CAS 75-00-3	0.2	0.076	U	10.97
N. Force Ave. and W. Delta Park	15121013	Chloroethane	CAS 75-00-3	0.25	0.095	U	10.97
N. Force Ave. (south end)	15121014	Chloroethane	CAS 75-00-3	0.24	0.091	U	10.97
Heron Lakes Golf Course (JB02)	15121001	Chloroform	CAS 67-66-3	0.12	0.025		11.37
N. Force Ave. and W. Delta Park	15121002	Chloroform	CAS 67-66-3	0.14	0.028		11.37
Trip Blank	15121003	Chloroform	CAS 67-66-3	0.1	0.02	U	11.37
Jantzen Beach Moorage, Inc. (JB02)	15121011	Chloroform	CAS 67-66-3	0.38	0.078		11.37
Second Trip Blank	15121012	Chloroform	CAS 67-66-3	0.1	0.02	U	11.37
N. Force Ave. and W. Delta Park	15121013	Chloroform	CAS 67-66-3	0.13	0.026	U	11.37
N. Force Ave. (south end)	15121014	Chloroform	CAS 67-66-3	0.12	0.025	U	11.37
Heron Lakes Golf Course (JB02)	15121001	Chloromethane	CAS 74-87-3	0.32	0.15		11.22
N. Force Ave. and W. Delta Park	15121002	Chloromethane	CAS 74-87-3	0.28	0.14		11.22
Trip Blank	15121003	Chloromethane	CAS 74-87-3	0.2	0.097	U	11.22
Jantzen Beach Moorage, Inc. (JB02)	15121011	Chloromethane	CAS 74-87-3	0.35	0.17		11.22
Second Trip Blank	15121012	Chloromethane	CAS 74-87-3	0.2	0.097	U	11.22
N. Force Ave. and W. Delta Park	15121013	Chloromethane	CAS 74-87-3	0.32	0.16		11.22
N. Force Ave. (south end)	15121014	Chloromethane	CAS 74-87-3	0.33	0.16		11.22
Heron Lakes Golf Course (JB02)	15121001	cis-1,2-Dichloroethene	CAS 156-59-2	0.12	0.03	U	9.66
N. Force Ave. and W. Delta Park	15121002	cis-1,2-Dichloroethene	CAS 156-59-2	0.13	0.033	U	9.66
Trip Blank	15121003	cis-1,2-Dichloroethene	CAS 156-59-2	0.1	0.025	U	9.66
Jantzen Beach Moorage, Inc. (JB02)	15121011	cis-1,2-Dichloroethene	CAS 156-59-2	0.12	0.03	U	9.66
Second Trip Blank	15121012	cis-1,2-Dichloroethene	CAS 156-59-2	0.1	0.025	U	9.66
N. Force Ave. and W. Delta Park	15121013	cis-1,2-Dichloroethene	CAS 156-59-2	0.13	0.032	U	9.66
N. Force Ave. (south end)	15121014	cis-1,2-Dichloroethene	CAS 156-59-2	0.12	0.03	U	9.66
Heron Lakes Golf Course (JB02)	15121001	cis-1,3-Dichloropropene	CAS 10061-01-5	0.59	0.13	U	
N. Force Ave. and W. Delta Park	15121002	cis-1,3-Dichloropropene	CAS 10061-01-5	0.65	0.14	U	
Trip Blank	15121003	cis-1,3-Dichloropropene	CAS 10061-01-5	0.5	0.11	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	cis-1,3-Dichloropropene	CAS 10061-01-5	0.6	0.13	U	
Second Trip Blank	15121012	cis-1,3-Dichloropropene	CAS 10061-01-5	0.5	0.11	U	
N. Force Ave. and W. Delta Park	15121013	cis-1,3-Dichloropropene	CAS 10061-01-5	0.63	0.14	U	
N. Force Ave. (south end)	15121014	cis-1,3-Dichloropropene	CAS 10061-01-5	0.6	0.13	U	
Heron Lakes Golf Course (JB02)	15121001	Cumene	CAS 98-82-8	0.59	0.12	U	8.73
N. Force Ave. and W. Delta Park	15121002	Cumene	CAS 98-82-8	0.65	0.13	U	8.73
Trip Blank	15121003	Cumene	CAS 98-82-8	0.5	0.1	U	8.73
Jantzen Beach Moorage, Inc. (JB02)	15121011	Cumene	CAS 98-82-8	0.6	0.12	U	8.73
Second Trip Blank	15121012	Cumene	CAS 98-82-8	0.5	0.1	U	8.73
N. Force Ave. and W. Delta Park	15121013	Cumene	CAS 98-82-8	0.63	0.13	U	8.73
N. Force Ave. (south end)	15121014	Cumene	CAS 98-82-8	0.6	0.12	U	8.73
Heron Lakes Golf Course (JB02)	15121001	Cyclohexane	CAS 110-82-7	1.2	0.34	U	9.86
N. Force Ave. and W. Delta Park	15121002	Cyclohexane	CAS 110-82-7	1.3	0.37	U	9.86
Trip Blank	15121003	Cyclohexane	CAS 110-82-7	1	0.29	U	9.86
Jantzen Beach Moorage, Inc. (JB02)	15121011	Cyclohexane	CAS 110-82-7	3.7	1.1		9.86
Second Trip Blank	15121012	Cyclohexane	CAS 110-82-7	1	0.29	U	9.86
N. Force Ave. and W. Delta Park	15121013	Cyclohexane	CAS 110-82-7	1.3	0.36	U	9.86
N. Force Ave. (south end)	15121014	Cyclohexane	CAS 110-82-7	1.2	0.35	U	9.86

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Heron Lakes Golf Course (JB02)	15121001	Dibromochloromethane	CAS 124-48-1	0.12	0.014	U	10.59
N. Force Ave. and W. Delta Park	15121002	Dibromochloromethane	CAS 124-48-1	0.13	0.015	U	10.59
Trip Blank	15121003	Dibromochloromethane	CAS 124-48-1	0.1	0.012	U	10.59
Jantzen Beach Moorage, Inc. (JB02)	15121011	Dibromochloromethane	CAS 124-48-1	0.12	0.014	U	10.59
Second Trip Blank	15121012	Dibromochloromethane	CAS 124-48-1	0.1	0.012	U	10.59
N. Force Ave. and W. Delta Park	15121013	Dibromochloromethane	CAS 124-48-1	0.13	0.015	U	10.59
N. Force Ave. (south end)	15121014	Dibromochloromethane	CAS 124-48-1	0.12	0.014	U	10.59
Heron Lakes Golf Course (JB02)	15121001	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	2.2	0.45		11.75
N. Force Ave. and W. Delta Park	15121002	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	2	0.4		11.75
Trip Blank	15121003	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	0.5	0.1	U	11.75
Jantzen Beach Moorage, Inc. (JB02)	15121011	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	2	0.4		11.75
Second Trip Blank	15121012	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	0.5	0.1	U	11.75
N. Force Ave. and W. Delta Park	15121013	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	2	0.41		11.75
N. Force Ave. (south end)	15121014	Dichlorodifluoromethane (CFC 12)	CAS 75-71-8	2	0.4		11.75
Heron Lakes Golf Course (JB02)	15121001	d-Limonene	CAS 5989-27-5	0.79	0.14		8.2
N. Force Ave. and W. Delta Park	15121002	d-Limonene	CAS 5989-27-5	0.68	0.12		8.2
Trip Blank	15121003	d-Limonene	CAS 5989-27-5	0.5	0.09	U	8.2
Jantzen Beach Moorage, Inc. (JB02)	15121011	d-Limonene	CAS 5989-27-5	0.6	0.11	U	8.2
Second Trip Blank	15121012	d-Limonene	CAS 5989-27-5	0.5	0.09	U	8.2
N. Force Ave. and W. Delta Park	15121013	d-Limonene	CAS 5989-27-5	1.5	0.26		8.2
N. Force Ave. (south end)	15121014	d-Limonene	CAS 5989-27-5	0.6	0.11	U	8.2
Heron Lakes Golf Course (JB02)	15121001	Ethanol	CAS 64-17-5	7.5	4	U	10.47
N. Force Ave. and W. Delta Park	15121002	Ethanol	CAS 64-17-5	9.6	5.1	U	10.47
Trip Blank	15121003	Ethanol	CAS 64-17-5	7.2	3.8		10.47
Jantzen Beach Moorage, Inc. (JB02)	15121011	Ethanol	CAS 64-17-5	6	3.2	U	10.47
Second Trip Blank	15121012	Ethanol	CAS 64-17-5	5	2.7	U	10.47
N. Force Ave. and W. Delta Park	15121013	Ethanol	CAS 64-17-5	6.3	3.3	U	10.47
N. Force Ave. (south end)	15121014	Ethanol	CAS 64-17-5	6	3.2	U	10.47
Heron Lakes Golf Course (JB02)	15121001	Ethyl Acetate	CAS 141-78-6	1.2	0.33	U	10.01
N. Force Ave. and W. Delta Park	15121002	Ethyl Acetate	CAS 141-78-6	10	2.9	U	10.01
Trip Blank	15121003	Ethyl Acetate	CAS 141-78-6	3.1	0.85		10.01
Jantzen Beach Moorage, Inc. (JB02)	15121011	Ethyl Acetate	CAS 141-78-6	1.2	0.33	U	10.01
Second Trip Blank	15121012	Ethyl Acetate	CAS 141-78-6	1	0.28	U	10.01
N. Force Ave. and W. Delta Park	15121013	Ethyl Acetate	CAS 141-78-6	1.3	0.35	U	10.01
N. Force Ave. (south end)	15121014	Ethyl Acetate	CAS 141-78-6	1.2	0.33	U	10.01
Heron Lakes Golf Course (JB02)	15121001	Ethylbenzene	CAS 100-41-4	0.87	0.2		8.77
N. Force Ave. and W. Delta Park	15121002	Ethylbenzene	CAS 100-41-4	0.88	0.2		8.77
Trip Blank	15121003	Ethylbenzene	CAS 100-41-4	0.5	0.12	U	8.77
Jantzen Beach Moorage, Inc. (JB02)	15121011	Ethylbenzene	CAS 100-41-4	0.6	0.14	U	8.77
Second Trip Blank	15121012	Ethylbenzene	CAS 100-41-4	0.5	0.12	U	8.77
N. Force Ave. and W. Delta Park	15121013	Ethylbenzene	CAS 100-41-4	0.63	0.14	U	8.77
N. Force Ave. (south end)	15121014	Ethylbenzene	CAS 100-41-4	0.6	0.14	U	8.77
Heron Lakes Golf Course (JB02)	15121001	Hexachlorobutadiene	CAS 87-68-3	0.59	0.055	U	
N. Force Ave. and W. Delta Park	15121002	Hexachlorobutadiene	CAS 87-68-3	0.65	0.06	U	
Trip Blank	15121003	Hexachlorobutadiene	CAS 87-68-3	0.5	0.047	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	Hexachlorobutadiene	CAS 87-68-3	0.6	0.056	U	
Second Trip Blank	15121012	Hexachlorobutadiene	CAS 87-68-3	0.5	0.047	U	
N. Force Ave. and W. Delta Park	15121013	Hexachlorobutadiene	CAS 87-68-3	0.63	0.059	U	
N. Force Ave. (south end)	15121014	Hexachlorobutadiene	CAS 87-68-3	0.6	0.056	U	
Heron Lakes Golf Course (JB02)	15121001	m,p-Xylenes	InChi Key MVZVDAGWAAZJP E-UHFFFAOYSA-N	3.1	0.71	U	

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
N. Force Ave. and W. Delta Park	15121002	m,p-Xylenes	InChi Key MVZVDAGWAAZJP E-UHFFFAOYSA-N	3.1	0.72	U	
Trip Blank	15121003	m,p-Xylenes	InChi Key MVZVDAGWAAZJ PE-UHFFFAOYSA-N	0.95	0.22		
Jantzen Beach Moorage, Inc. (JB02)	15121011	m,p-Xylenes	InChi Key MVZVDAGWAAZJ PE-UHFFFAOYSA-N	1	0.23		
Second Trip Blank	15121012	m,p-Xylenes	InChi Key MVZVDAGWAAZJP E-UHFFFAOYSA-N	0.5	0.12	U	
N. Force Ave. and W. Delta Park	15121013	m,p-Xylenes	InChi Key MVZVDAGWAAZJ PE-UHFFFAOYSA-N	1.9	0.43		
N. Force Ave. (south end)	15121014	m,p-Xylenes	InChi Key MVZVDAGWAAZJP E-UHFFFAOYSA-N	0.6	0.14	U	
Heron Lakes Golf Course (JB02)	15121001	Methyl Methacrylate	CAS 80-62-6	1.2	0.29	U	9.7
N. Force Ave. and W. Delta Park	15121002	Methyl Methacrylate	CAS 80-62-6	1.3	0.32	U	9.7
Trip Blank	15121003	Methyl Methacrylate	CAS 80-62-6	1	0.24	U	9.7
Jantzen Beach Moorage, Inc. (JB02)	15121011	Methyl Methacrylate	CAS 80-62-6	1.2	0.29	U	9.7
Second Trip Blank	15121012	Methyl Methacrylate	CAS 80-62-6	1	0.24	U	9.7
N. Force Ave. and W. Delta Park	15121013	Methyl Methacrylate	CAS 80-62-6	1.3	0.31	U	9.7
N. Force Ave. (south end)	15121014	Methyl Methacrylate	CAS 80-62-6	1.2	0.29	U	9.7
Heron Lakes Golf Course (JB02)	15121001	Methyl tert-Butyl Ether	CAS 1634-04-4	0.12	0.033	U	9.24
N. Force Ave. and W. Delta Park	15121002	Methyl tert-Butyl Ether	CAS 1634-04-4	0.13	0.036	U	9.24
Trip Blank	15121003	Methyl tert-Butyl Ether	CAS 1634-04-4	0.1	0.028	U	9.24
Jantzen Beach Moorage, Inc. (JB02)	15121011	Methyl tert-Butyl Ether	CAS 1634-04-4	0.12	0.033	U	9.24
Second Trip Blank	15121012	Methyl tert-Butyl Ether	CAS 1634-04-4	0.1	0.028	U	9.24
N. Force Ave. and W. Delta Park	15121013	Methyl tert-Butyl Ether	CAS 1634-04-4	0.13	0.035	U	9.24
N. Force Ave. (south end)	15121014	Methyl tert-Butyl Ether	CAS 1634-04-4	0.12	0.033	U	9.24
Heron Lakes Golf Course (JB02)	15121001	Methylene Chloride	CAS 75-09-2	1.1	0.31		11.32
N. Force Ave. and W. Delta Park	15121002	Methylene Chloride	CAS 75-09-2	1.8	0.52		11.32
Trip Blank	15121003	Methylene Chloride	CAS 75-09-2	0.5	0.14	U	11.32
Jantzen Beach Moorage, Inc. (JB02)	15121011	Methylene Chloride	CAS 75-09-2	0.63	0.18		11.32
Second Trip Blank	15121012	Methylene Chloride	CAS 75-09-2	0.5	0.14	U	11.32
N. Force Ave. and W. Delta Park	15121013	Methylene Chloride	CAS 75-09-2	0.63	0.18	U	11.32
N. Force Ave. (south end)	15121014	Methylene Chloride	CAS 75-09-2	0.6	0.17	U	11.32
Heron Lakes Golf Course (JB02)	15121001	Naphthalene	CAS 91-20-3	0.59	0.11	U	
N. Force Ave. and W. Delta Park	15121002	Naphthalene	CAS 91-20-3	0.65	0.12	U	
Trip Blank	15121003	Naphthalene	CAS 91-20-3	0.5	0.095	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	Naphthalene	CAS 91-20-3	0.6	0.11	U	
Second Trip Blank	15121012	Naphthalene	CAS 91-20-3	0.5	0.095	U	
N. Force Ave. and W. Delta Park	15121013	Naphthalene	CAS 91-20-3	0.86	0.16		
N. Force Ave. (south end)	15121014	Naphthalene	CAS 91-20-3	0.6	0.11	U	
Heron Lakes Golf Course (JB02)	15121001	n-Butyl Acetate	CAS 123-86-4	1.1	0.24		10
N. Force Ave. and W. Delta Park	15121002	n-Butyl Acetate	CAS 123-86-4	1.2	0.25		10
Trip Blank	15121003	n-Butyl Acetate	CAS 123-86-4	0.5	0.11	U	10
Jantzen Beach Moorage, Inc. (JB02)	15121011	n-Butyl Acetate	CAS 123-86-4	0.6	0.13	U	10
Second Trip Blank	15121012	n-Butyl Acetate	CAS 123-86-4	0.5	0.11	U	10
N. Force Ave. and W. Delta Park	15121013	n-Butyl Acetate	CAS 123-86-4	0.63	0.13	U	10
N. Force Ave. (south end)	15121014	n-Butyl Acetate	CAS 123-86-4	0.6	0.13	U	10
Heron Lakes Golf Course (JB02)	15121001	n-Heptane	CAS 142-82-5	1	0.25		9.92
N. Force Ave. and W. Delta Park	15121002	n-Heptane	CAS 142-82-5	1.1	0.28		9.92
Trip Blank	15121003	n-Heptane	CAS 142-82-5	0.5	0.12	U	9.92
Jantzen Beach Moorage, Inc. (JB02)	15121011	n-Heptane	CAS 142-82-5	2.6	0.64		9.92
Second Trip Blank	15121012	n-Heptane	CAS 142-82-5	0.5	0.12	U	9.92
N. Force Ave. and W. Delta Park	15121013	n-Heptane	CAS 142-82-5	0.72	0.18		9.92

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
N. Force Ave. (south end)	15121014	n-Heptane	CAS 142-82-5	0.6	0.15	U	9.92
Heron Lakes Golf Course (JB02)	15121001	n-Hexane	CAS 110-54-3	1.6	0.45	U	10.13
N. Force Ave. and W. Delta Park	15121002	n-Hexane	CAS 110-54-3	1.8	0.5	U	10.13
Trip Blank	15121003	n-Hexane	CAS 110-54-3	1.3	0.36		10.13
Jantzen Beach Moorage, Inc. (JB02)	15121011	n-Hexane	CAS 110-54-3	12	3.5		10.13
Second Trip Blank	15121012	n-Hexane	CAS 110-54-3	0.5	0.14	U	10.13
N. Force Ave. and W. Delta Park	15121013	n-Hexane	CAS 110-54-3	0.82	0.23		10.13
N. Force Ave. (south end)	15121014	n-Hexane	CAS 110-54-3	0.6	0.17	U	10.13
Heron Lakes Golf Course (JB02)	15121001	n-Nonane	CAS 111-84-2	0.59	0.11	U	9.72
N. Force Ave. and W. Delta Park	15121002	n-Nonane	CAS 111-84-2	0.65	0.12	U	9.72
Trip Blank	15121003	n-Nonane	CAS 111-84-2	0.5	0.095	U	9.72
Jantzen Beach Moorage, Inc. (JB02)	15121011	n-Nonane	CAS 111-84-2	0.6	0.11	U	9.72
Second Trip Blank	15121012	n-Nonane	CAS 111-84-2	0.5	0.095	U	9.72
N. Force Ave. and W. Delta Park	15121013	n-Nonane	CAS 111-84-2	0.63	0.12	U	9.72
N. Force Ave. (south end)	15121014	n-Nonane	CAS 111-84-2	0.6	0.11	U	9.72
Heron Lakes Golf Course (JB02)	15121001	n-Octane	CAS 111-65-9	0.59	0.13	U	9.82
N. Force Ave. and W. Delta Park	15121002	n-Octane	CAS 111-65-9	0.65	0.14	U	9.82
Trip Blank	15121003	n-Octane	CAS 111-65-9	0.5	0.11	U	9.82
Jantzen Beach Moorage, Inc. (JB02)	15121011	n-Octane	CAS 111-65-9	0.6	0.13	U	9.82
Second Trip Blank	15121012	n-Octane	CAS 111-65-9	0.5	0.11	U	9.82
N. Force Ave. and W. Delta Park	15121013	n-Octane	CAS 111-65-9	0.63	0.13	U	9.82
N. Force Ave. (south end)	15121014	n-Octane	CAS 111-65-9	0.6	0.13	U	9.82
Heron Lakes Golf Course (JB02)	15121001	n-Propylbenzene	CAS 103-65-1	0.59	0.12	U	
N. Force Ave. and W. Delta Park	15121002	n-Propylbenzene	CAS 103-65-1	0.65	0.13	U	
Trip Blank	15121003	n-Propylbenzene	CAS 103-65-1	0.5	0.1	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	n-Propylbenzene	CAS 103-65-1	0.6	0.12	U	
Second Trip Blank	15121012	n-Propylbenzene	CAS 103-65-1	0.5	0.1	U	
N. Force Ave. and W. Delta Park	15121013	n-Propylbenzene	CAS 103-65-1	0.63	0.13	U	
N. Force Ave. (south end)	15121014	n-Propylbenzene	CAS 103-65-1	0.6	0.12	U	
Heron Lakes Golf Course (JB02)	15121001	o-Xylene	CAS 95-47-6	1.1	0.24		8.56
N. Force Ave. and W. Delta Park	15121002	o-Xylene	CAS 95-47-6	1.1	0.26		8.56
Trip Blank	15121003	o-Xylene	CAS 95-47-6	0.5	0.12	U	8.56
Jantzen Beach Moorage, Inc. (JB02)	15121011	o-Xylene	CAS 95-47-6	0.6	0.14	U	8.56
Second Trip Blank	15121012	o-Xylene	CAS 95-47-6	0.5	0.12	U	8.56
N. Force Ave. and W. Delta Park	15121013	o-Xylene	CAS 95-47-6	0.7	0.16		8.56
N. Force Ave. (south end)	15121014	o-Xylene	CAS 95-47-6	0.6	0.14	U	8.56
Heron Lakes Golf Course (JB02)	15121001	Propene	CAS 115-07-1	1.9	1.1	U	9.73
N. Force Ave. and W. Delta Park	15121002	Propene	CAS 115-07-1	1.9	1.1	U	9.73
Trip Blank	15121003	Propene	CAS 115-07-1	0.53	0.31		9.73
Jantzen Beach Moorage, Inc. (JB02)	15121011	Propene	CAS 115-07-1	1.3	0.78		9.73
Second Trip Blank	15121012	Propene	CAS 115-07-1	0.5	0.29	U	9.73
N. Force Ave. and W. Delta Park	15121013	Propene	CAS 115-07-1	1.3	0.76		9.73
N. Force Ave. (south end)	15121014	Propene	CAS 115-07-1	0.6	0.35	U	9.73
Heron Lakes Golf Course (JB02)	15121001	Styrene	CAS 100-42-5	0.59	0.14	U	8.43
N. Force Ave. and W. Delta Park	15121002	Styrene	CAS 100-42-5	0.65	0.15	U	8.43
Trip Blank	15121003	Styrene	CAS 100-42-5	0.5	0.12	U	8.43
Jantzen Beach Moorage, Inc. (JB02)	15121011	Styrene	CAS 100-42-5	0.6	0.14	U	8.43
Second Trip Blank	15121012	Styrene	CAS 100-42-5	0.5	0.12	U	8.43
N. Force Ave. and W. Delta Park	15121013	Styrene	CAS 100-42-5	0.63	0.15	U	8.43
N. Force Ave. (south end)	15121014	Styrene	CAS 100-42-5	0.6	0.14	U	8.43
Heron Lakes Golf Course (JB02)	15121001	Tetrachloroethene	CAS 127-18-4	0.19	0.029		9.32
N. Force Ave. and W. Delta Park	15121002	Tetrachloroethene	CAS 127-18-4	0.2	0.029		9.32
Trip Blank	15121003	Tetrachloroethene	CAS 127-18-4	0.1	0.015	U	9.32

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)							
Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air (µg/m³)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Jantzen Beach Moorage, Inc. (JB02)	15121011	Tetrachloroethene	CAS 127-18-4	0.12	0.018		9.32
Second Trip Blank	15121012	Tetrachloroethene	CAS 127-18-4	0.1	0.015	U	9.32
N. Force Ave. and W. Delta Park	15121013	Tetrachloroethene	CAS 127-18-4	0.13	0.018	U	9.32
N. Force Ave. (south end)	15121014	Tetrachloroethene	CAS 127-18-4	0.12	0.018	U	9.32
Heron Lakes Golf Course (JB02)	15121001	Tetrahydrofuran (THF)	CAS 109-99-9	0.59	0.2	U	9.41
N. Force Ave. and W. Delta Park	15121002	Tetrahydrofuran (THF)	CAS 109-99-9	0.65	0.22	U	9.41
Trip Blank	15121003	Tetrahydrofuran (THF)	CAS 109-99-9	0.5	0.17	U	9.41
Jantzen Beach Moorage, Inc. (JB02)	15121011	Tetrahydrofuran (THF)	CAS 109-99-9	0.6	0.2	U	9.41
Second Trip Blank	15121012	Tetrahydrofuran (THF)	CAS 109-99-9	0.5	0.17	U	9.41
N. Force Ave. and W. Delta Park	15121013	Tetrahydrofuran (THF)	CAS 109-99-9	0.63	0.21	U	9.41
N. Force Ave. (south end)	15121014	Tetrahydrofuran (THF)	CAS 109-99-9	0.6	0.2	U	9.41
Heron Lakes Golf Course (JB02)	15121001	Toluene	CAS 108-88-3	4.9	1.3	U	8.82
N. Force Ave. and W. Delta Park	15121002	Toluene	CAS 108-88-3	5	1.3	U	8.82
Trip Blank	15121003	Toluene	CAS 108-88-3	4.8	1.3		8.82
Jantzen Beach Moorage, Inc. (JB02)	15121011	Toluene	CAS 108-88-3	5	1.3		8.82
Second Trip Blank	15121012	Toluene	CAS 108-88-3	0.5	0.13	U	8.82
N. Force Ave. and W. Delta Park	15121013	Toluene	CAS 108-88-3	3.6	0.96		8.82
N. Force Ave. (south end)	15121014	Toluene	CAS 108-88-3	0.82	0.22	U	8.82
Heron Lakes Golf Course (JB02)	15121001	trans-1,2-Dichloroethene	CAS 156-60-5	0.12	0.03	U	9.65
N. Force Ave. and W. Delta Park	15121002	trans-1,2-Dichloroethene	CAS 156-60-5	0.13	0.033	U	9.65
Trip Blank	15121003	trans-1,2-Dichloroethene	CAS 156-60-5	0.1	0.025	U	9.65
Jantzen Beach Moorage, Inc. (JB02)	15121011	trans-1,2-Dichloroethene	CAS 156-60-5	0.12	0.03	U	9.65
Second Trip Blank	15121012	trans-1,2-Dichloroethene	CAS 156-60-5	0.1	0.025	U	9.65
N. Force Ave. and W. Delta Park	15121013	trans-1,2-Dichloroethene	CAS 156-60-5	0.13	0.032	U	9.65
N. Force Ave. (south end)	15121014	trans-1,2-Dichloroethene	CAS 156-60-5	0.12	0.03	U	9.65
Heron Lakes Golf Course (JB02)	15121001	trans-1,3-Dichloropropene	CAS 10061-02-6	0.59	0.13	U	
N. Force Ave. and W. Delta Park	15121002	trans-1,3-Dichloropropene	CAS 10061-02-6	0.65	0.14	U	
Trip Blank	15121003	trans-1,3-Dichloropropene	CAS 10061-02-6	0.5	0.11	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	trans-1,3-Dichloropropene	CAS 10061-02-6	0.6	0.13	U	
Second Trip Blank	15121012	trans-1,3-Dichloropropene	CAS 10061-02-6	0.5	0.11	U	
N. Force Ave. and W. Delta Park	15121013	trans-1,3-Dichloropropene	CAS 10061-02-6	0.63	0.14	U	
N. Force Ave. (south end)	15121014	trans-1,3-Dichloropropene	CAS 10061-02-6	0.6	0.13	U	
Heron Lakes Golf Course (JB02)	15121001	Trichloroethene	CAS 79-01-6	0.21	0.039		9.47
N. Force Ave. and W. Delta Park	15121002	Trichloroethene	CAS 79-01-6	0.28	0.051		9.47
Trip Blank	15121003	Trichloroethene	CAS 79-01-6	0.1	0.019	U	9.47
Jantzen Beach Moorage, Inc. (JB02)	15121011	Trichloroethene	CAS 79-01-6	0.12	0.022	U	9.47
Second Trip Blank	15121012	Trichloroethene	CAS 79-01-6	0.1	0.019	U	9.47
N. Force Ave. and W. Delta Park	15121013	Trichloroethene	CAS 79-01-6	0.13	0.023	U	9.47
N. Force Ave. (south end)	15121014	Trichloroethene	CAS 79-01-6	0.12	0.022	U	9.47
Heron Lakes Golf Course (JB02)	15121001	Trichlorofluoromethane	CAS 75-69-4	1.3	0.23		
N. Force Ave. and W. Delta Park	15121002	Trichlorofluoromethane	CAS 75-69-4	1.2	0.21		
Trip Blank	15121003	Trichlorofluoromethane	CAS 75-69-4	0.1	0.018	U	
Jantzen Beach Moorage, Inc. (JB02)	15121011	Trichlorofluoromethane	CAS 75-69-4	1.3	0.23		
Second Trip Blank	15121012	Trichlorofluoromethane	CAS 75-69-4	0.1	0.018	U	
N. Force Ave. and W. Delta Park	15121013	Trichlorofluoromethane	CAS 75-69-4	1.3	0.23		
N. Force Ave. (south end)	15121014	Trichlorofluoromethane	CAS 75-69-4	1.3	0.23		
Heron Lakes Golf Course (JB02)	15121001	Trichlorotrifluoroethane	CAS 76-13-1	0.45	0.059		11.99
N. Force Ave. and W. Delta Park	15121002	Trichlorotrifluoroethane	CAS 76-13-1	0.5	0.065		11.99
Trip Blank	15121003	Trichlorotrifluoroethane	CAS 76-13-1	0.1	0.013	U	11.99
Jantzen Beach Moorage, Inc. (JB02)	15121011	Trichlorotrifluoroethane	CAS 76-13-1	0.47	0.061		11.99
Second Trip Blank	15121012	Trichlorotrifluoroethane	CAS 76-13-1	0.1	0.013	U	11.99
N. Force Ave. and W. Delta Park	15121013	Trichlorotrifluoroethane	CAS 76-13-1	0.51	0.067		11.99
N. Force Ave. (south end)	15121014	Trichlorotrifluoroethane	CAS 76-13-1	0.49	0.064		11.99

Table 3: Air Sampling Laboratory Analysis Results (Detections indicated with blue text)

Location	Sample Number	Analyte Name	Analyte Reference Number	Analyte Concentration in Air ($\mu\text{g}/\text{m}^3$)	Analyte Concentration in ppb by volume in Air	Data Qualifier	IE (eV)
Heron Lakes Golf Course (JB02)	15121001	Vinyl Acetate	CAS 108-05-4	5.9	1.7	U	9.19
N. Force Ave. and W. Delta Park	15121002	Vinyl Acetate	CAS 108-05-4	6.5	1.8	U	9.19
Trip Blank	15121003	Vinyl Acetate	CAS 108-05-4	5	1.4	U	9.19
Jantzen Beach Moorage, Inc. (JB02)	15121011	Vinyl Acetate	CAS 108-05-4	6	1.7	U	9.19
Second Trip Blank	15121012	Vinyl Acetate	CAS 108-05-4	5	1.4	U	9.19
N. Force Ave. and W. Delta Park	15121013	Vinyl Acetate	CAS 108-05-4	6.3	1.8	U	9.19
N. Force Ave. (south end)	15121014	Vinyl Acetate	CAS 108-05-4	6	1.7	U	9.19
Heron Lakes Golf Course (JB02)	15121001	Vinyl Chloride	CAS 75-01-4	0.12	0.046	U	9.99
N. Force Ave. and W. Delta Park	15121002	Vinyl Chloride	CAS 75-01-4	0.13	0.05	U	9.99
Trip Blank	15121003	Vinyl Chloride	CAS 75-01-4	0.1	0.039	U	9.99
Second Trip Blank	15121011	Vinyl Chloride	CAS 75-01-4	0.12	0.047	U	9.99
Second Trip Blank	15121012	Vinyl Chloride	CAS 75-01-4	0.1	0.039	U	9.99
N. Force Ave. and W. Delta Park	15121013	Vinyl Chloride	CAS 75-01-4	0.13	0.049	U	9.99
N. Force Ave. (south end)	15121014	Vinyl Chloride	CAS 75-01-4	0.12	0.047	U	9.99

Key:

CAS = Chemical Abstract Services

eV = electron-volts

IE = chemical ionization energy

InChI = International Union of Pure and Applied Chemistry

m = IUPAC meta-substitution pattern.

o = IUPAC ortho-substitution pattern.

p = IUPAC para-substitution pattern.

ppb = parts per billion

U = The analyte was analyzed for, but was not detected by the laboratory.

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

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CHARTS

***Jantzen Beach Air Testing
Trip Report***

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Jantzen Beach Air Release Site - Selected Viper Network Data Chart 1

EventKey 2015/11/03 10:56:17...11:14:15 Viper Location Scouting

H2S Electrochemical Detections

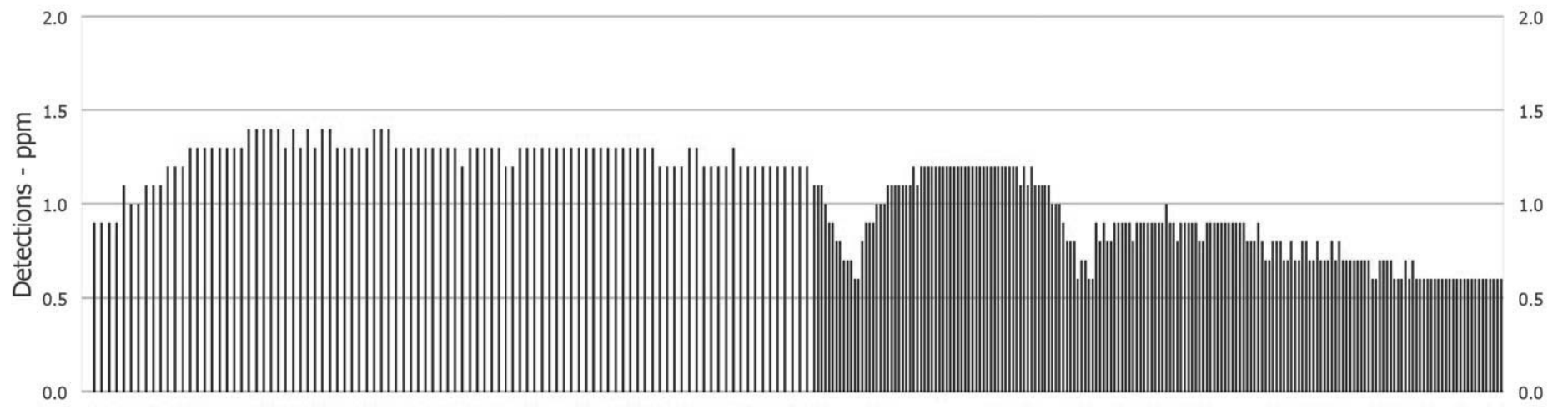


Photo-ionization (<11.7 eV nominal) Detections

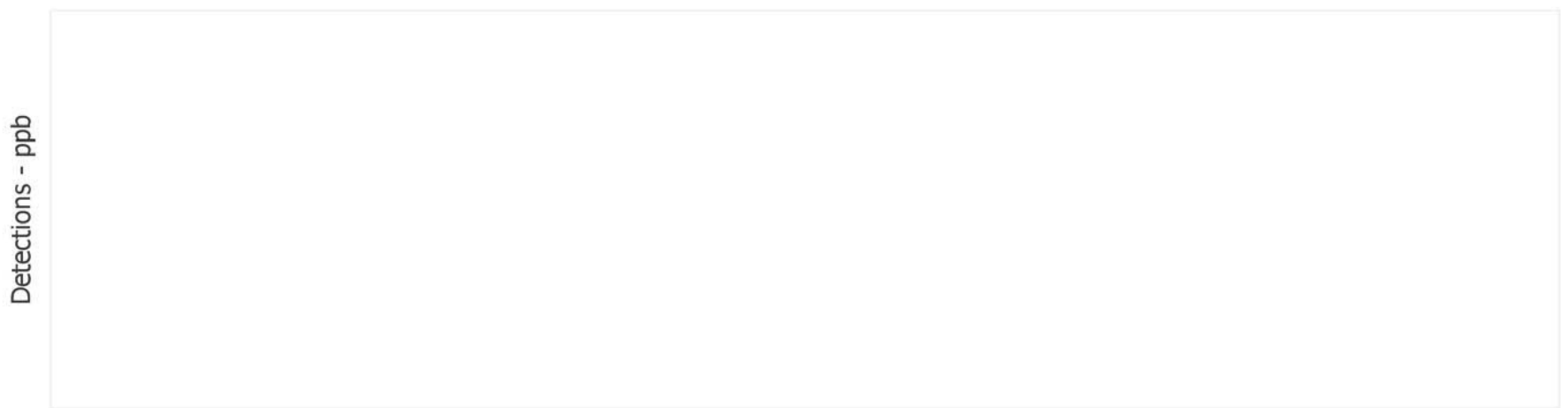
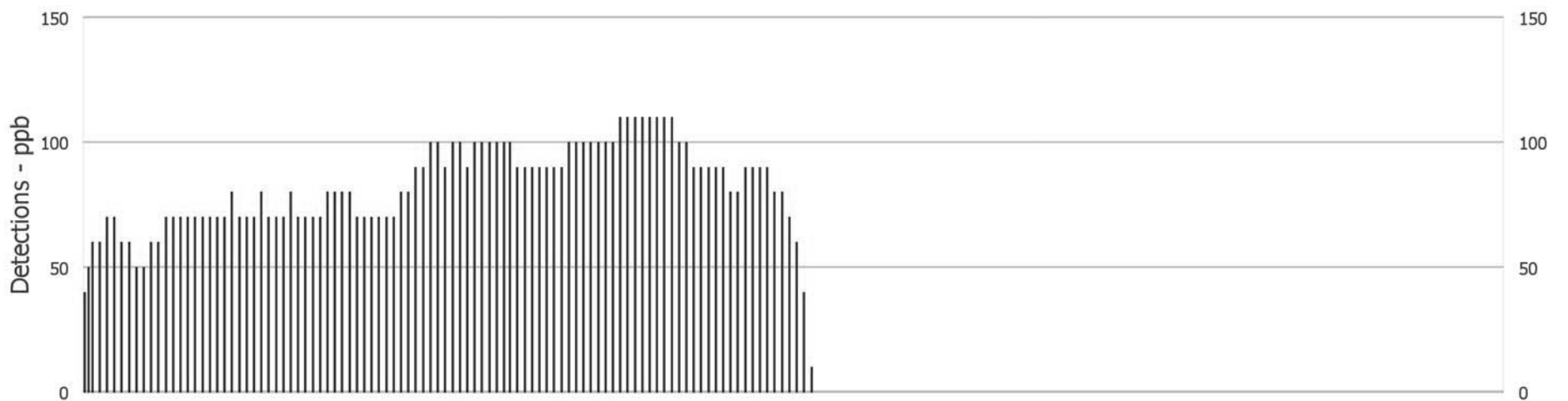
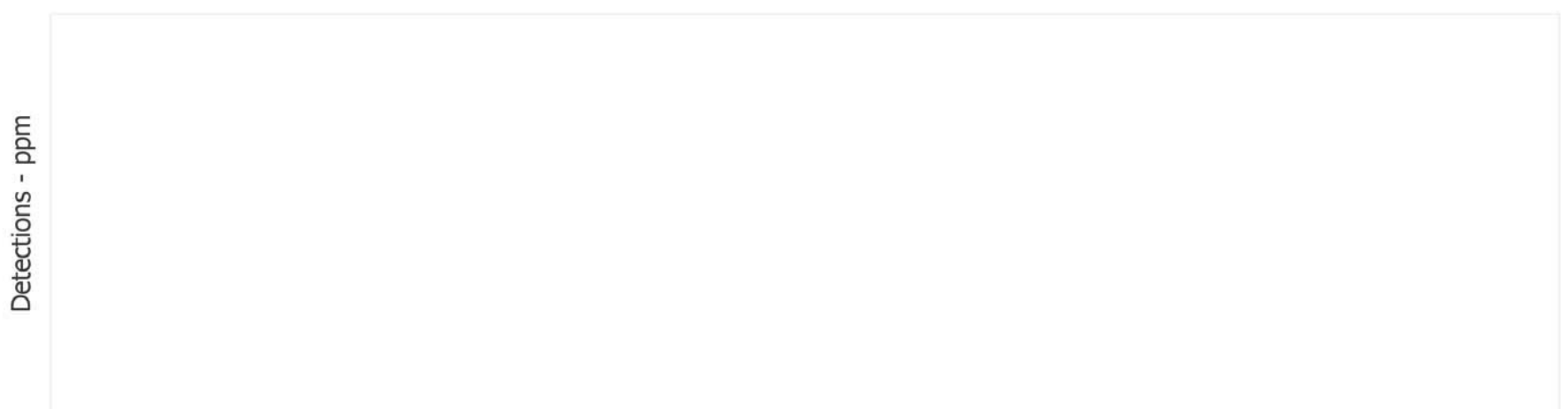


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 2

EventKey 2015/11/03 16:29:48...16:35:49 Expeditors CO Detects

H2S Electrochemical Detections

Detections - ppm

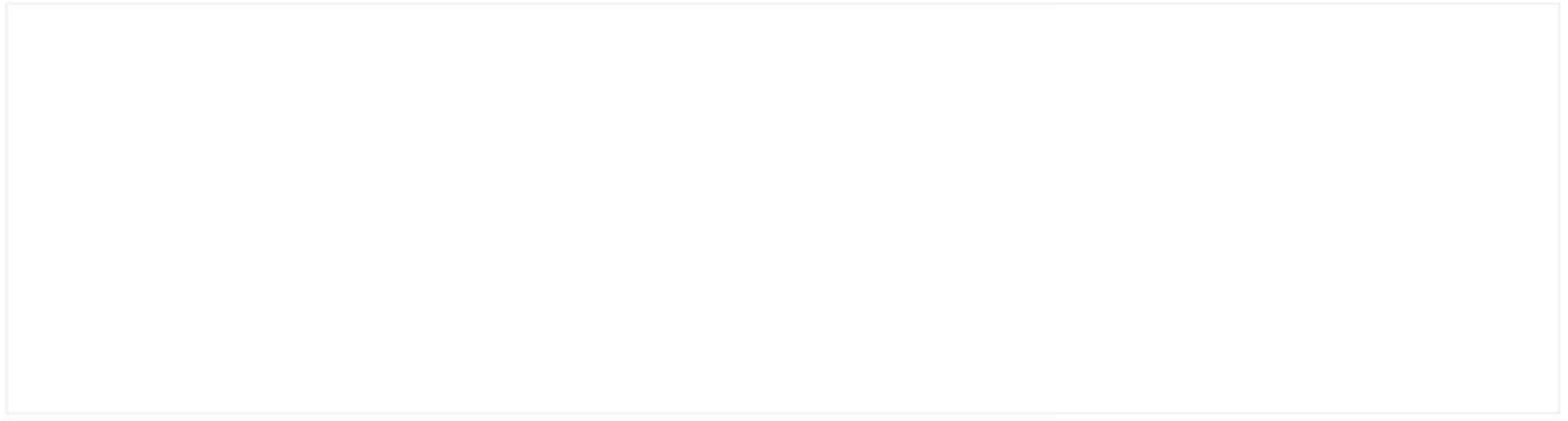


Photo-ionization (<11.7 eV nominal) Detections

Detections - ppb

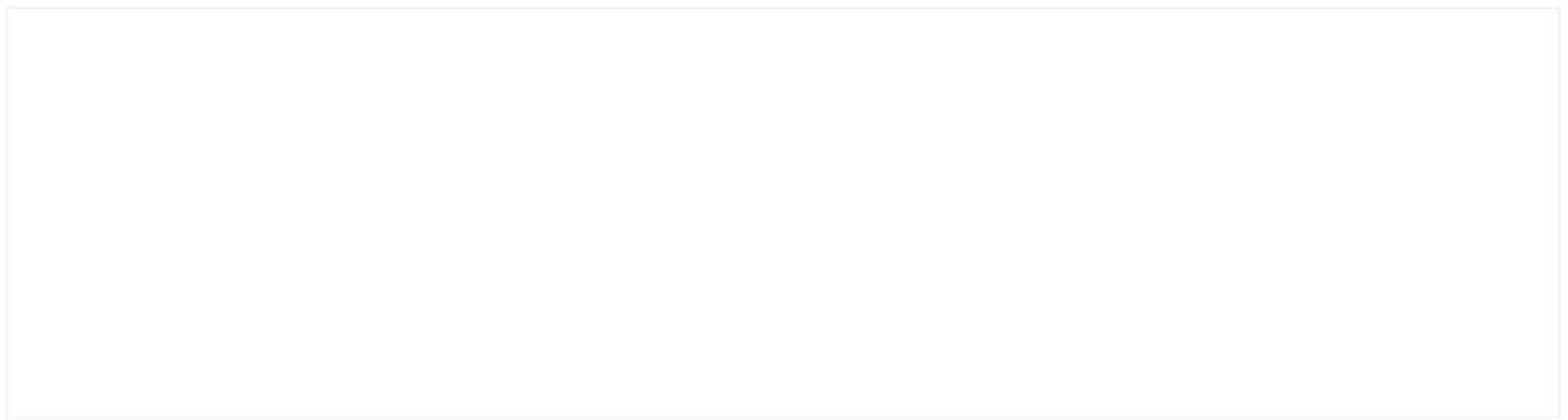
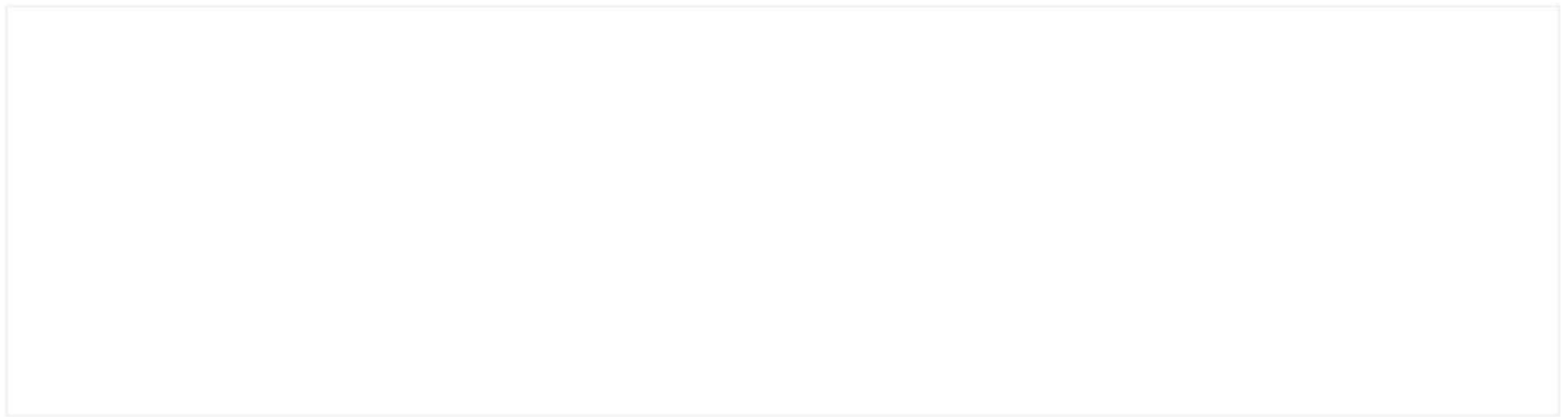
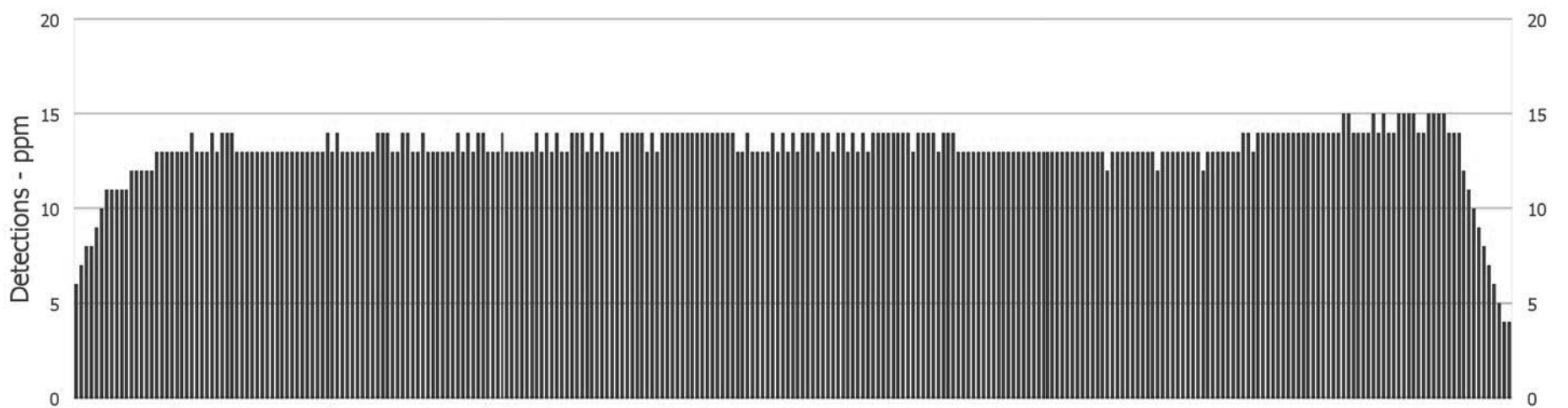


Photo-ionization (<10.6 eV nominal) Detections

Detections - ppb



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 3

EventKey 2015/11/17 06:48:27...06:50:00 Heron Lakes Engine Event

H2S Electrochemical Detections

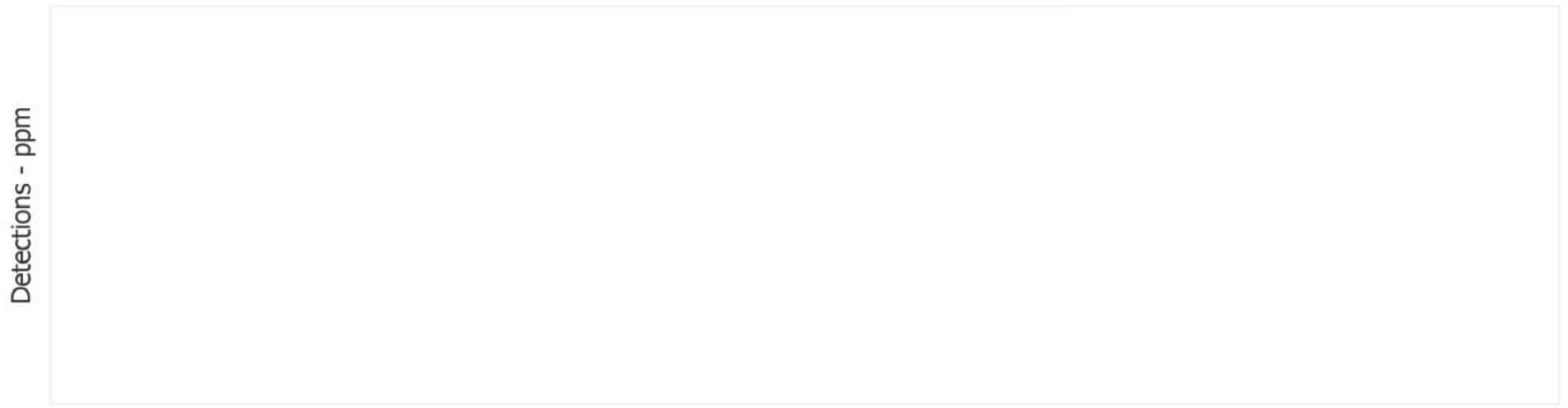


Photo-ionization (<11.7 eV nominal) Detections

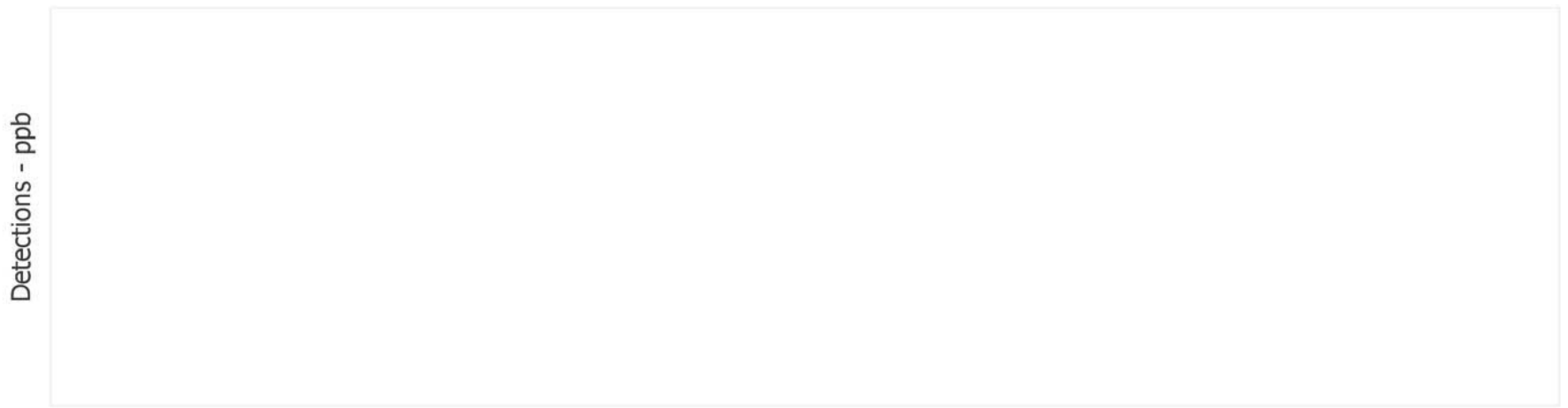
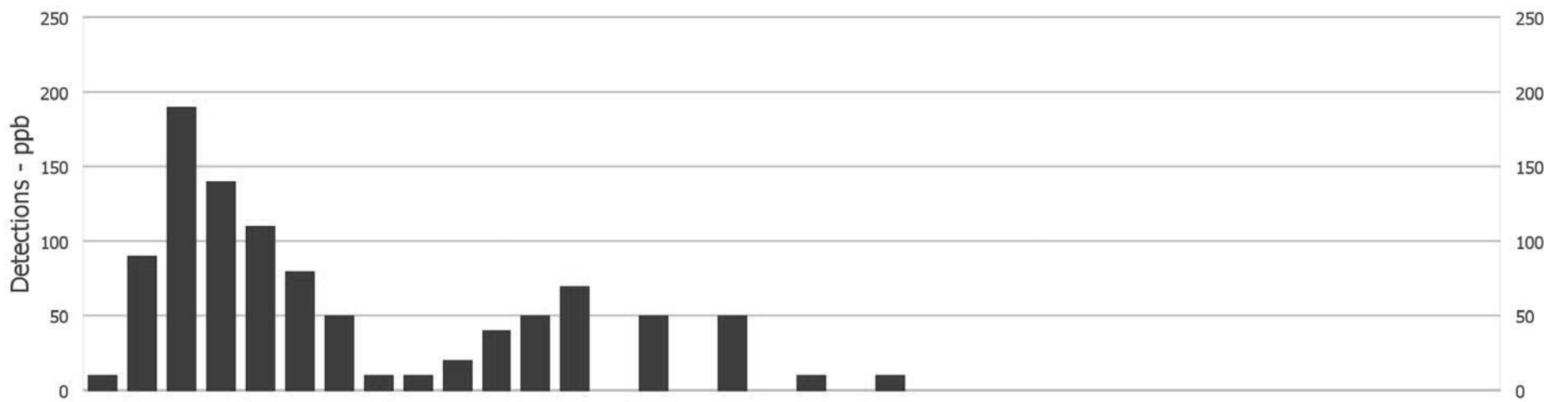
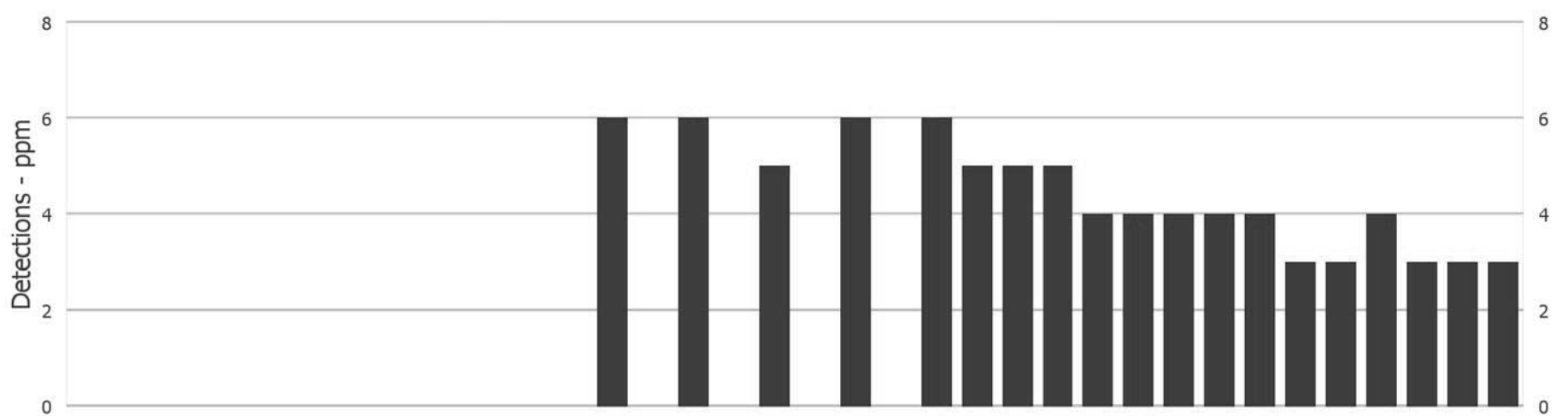


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 4

Monitoring Event (from Table 5.1): 2015/11/24 14:06:48...14:19:23 JBMI Engine Event

H2S Electrochemical Detections



Photo-ionization (<11.7 eV nominal) Detections

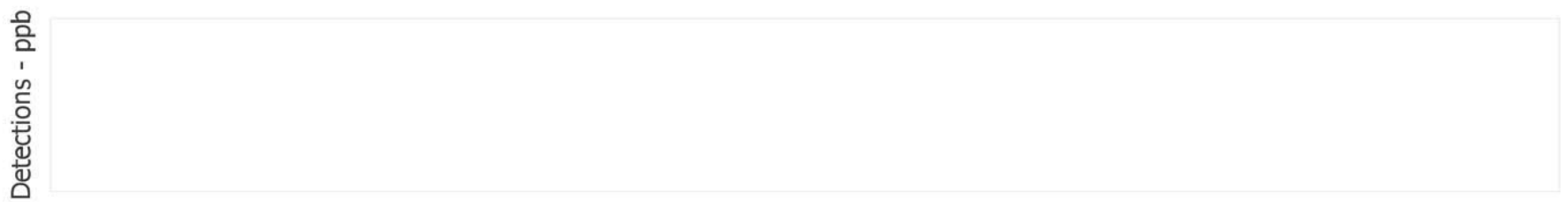
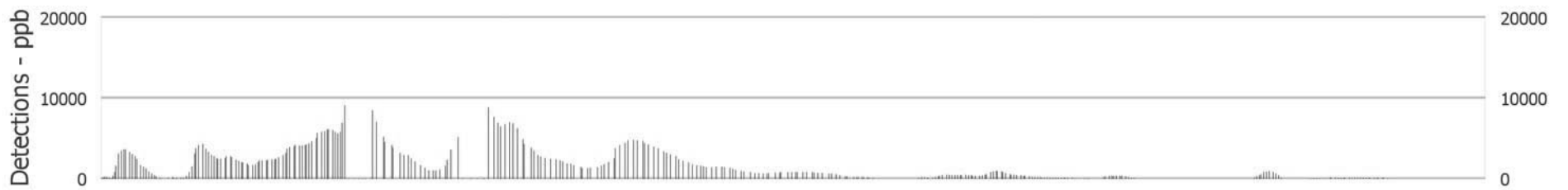
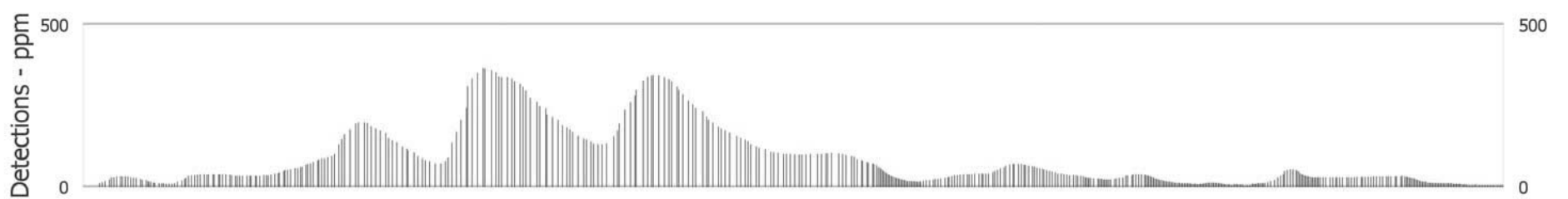


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 5

Monitoring Event (from Table 5.1): 2015/11/27 08:51:54...08:56:18 JBMI 10.6eV Event

H2S Electrochemical Detections

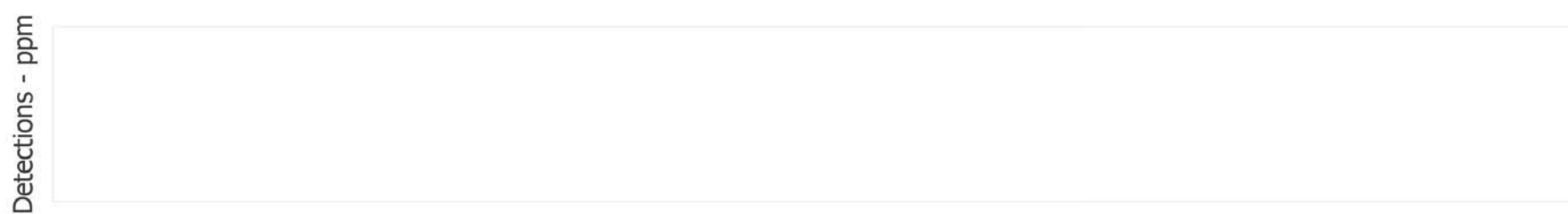


Photo-ionization (<11.7 eV nominal) Detections

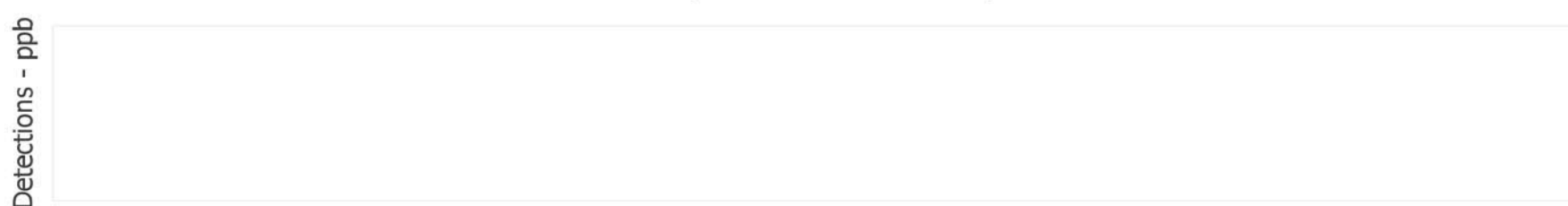
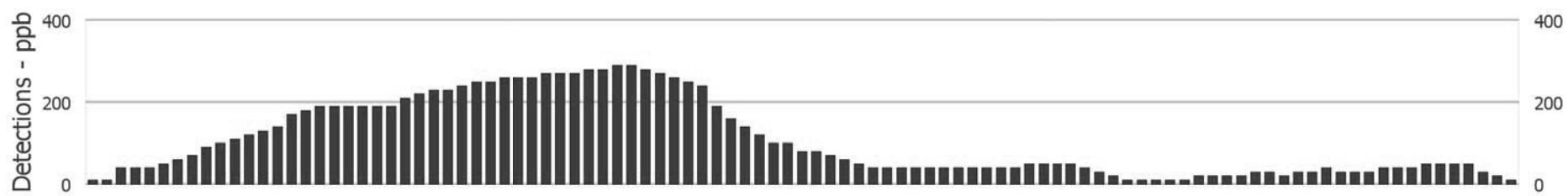
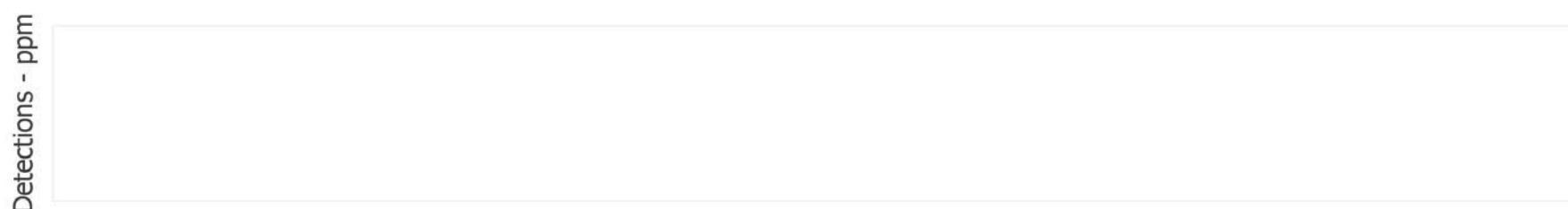


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 6

Monitoring Event (from Table 5.1): 2015/12/01 13:04:33...13:14:35 JBMI Engine Event

H2S Electrochemical Detections



Photo-ionization (<11.7 eV nominal) Detections

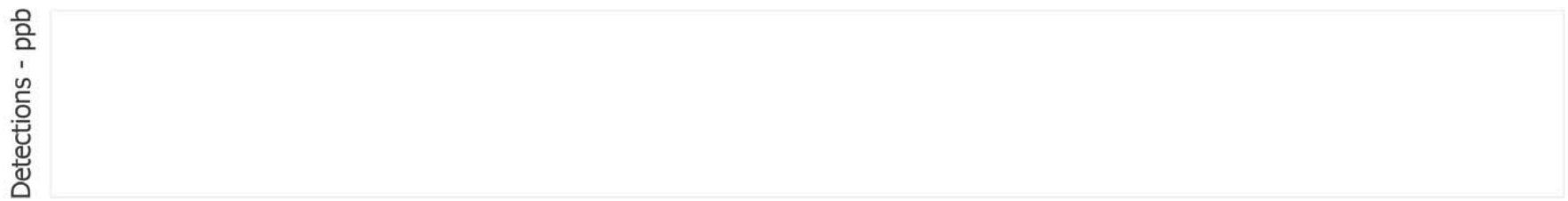
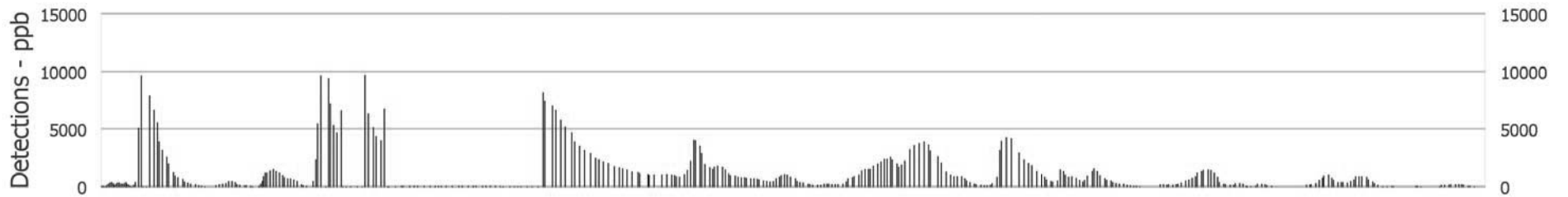


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 7

Monitoring Event (from Table 5.1): 2015/12/01 16:04:17...18:52:29 JBMI 11.7eV Event

H2S Electrochemical Detections

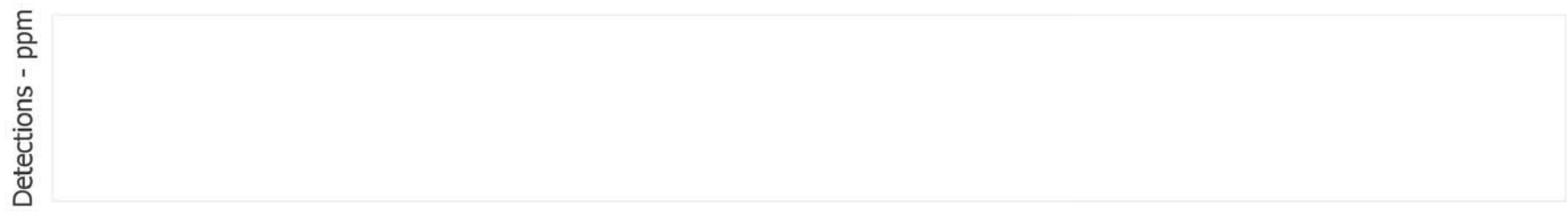


Photo-ionization (<11.7 eV nominal) Detections

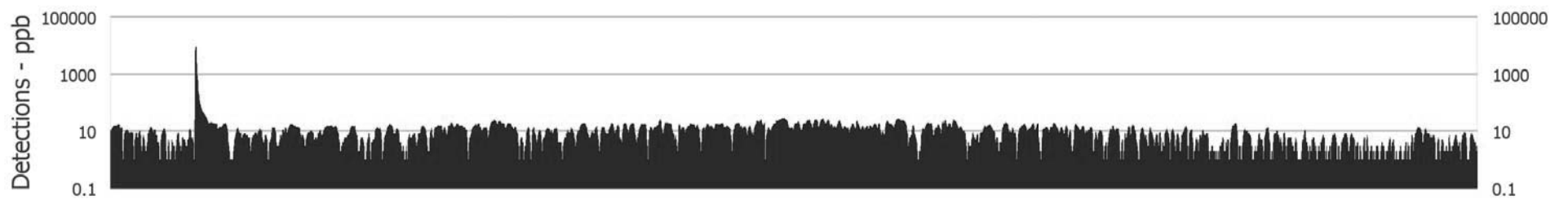
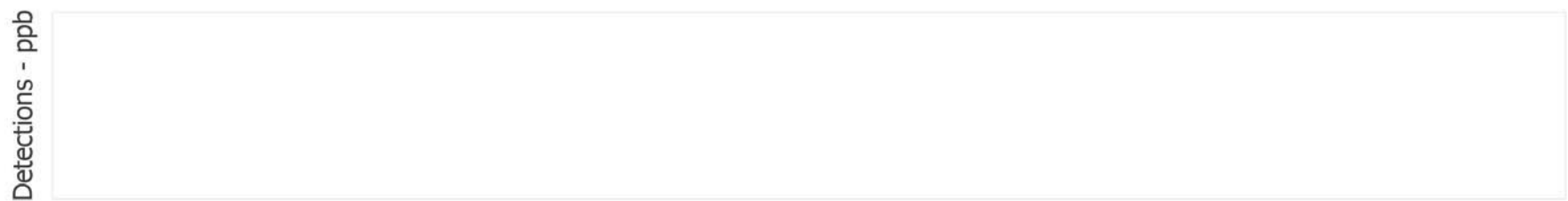
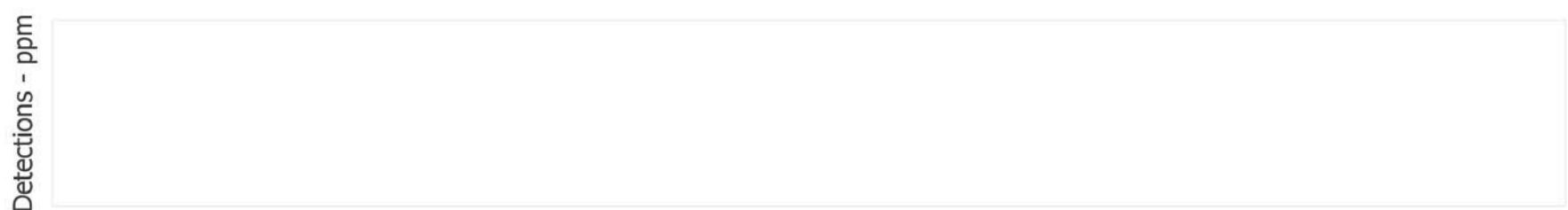


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 8

EventKey 2015/12/03 19:24:44...22:24:25 HLGC 10.6eV Events

H2S Electrochemical Detections

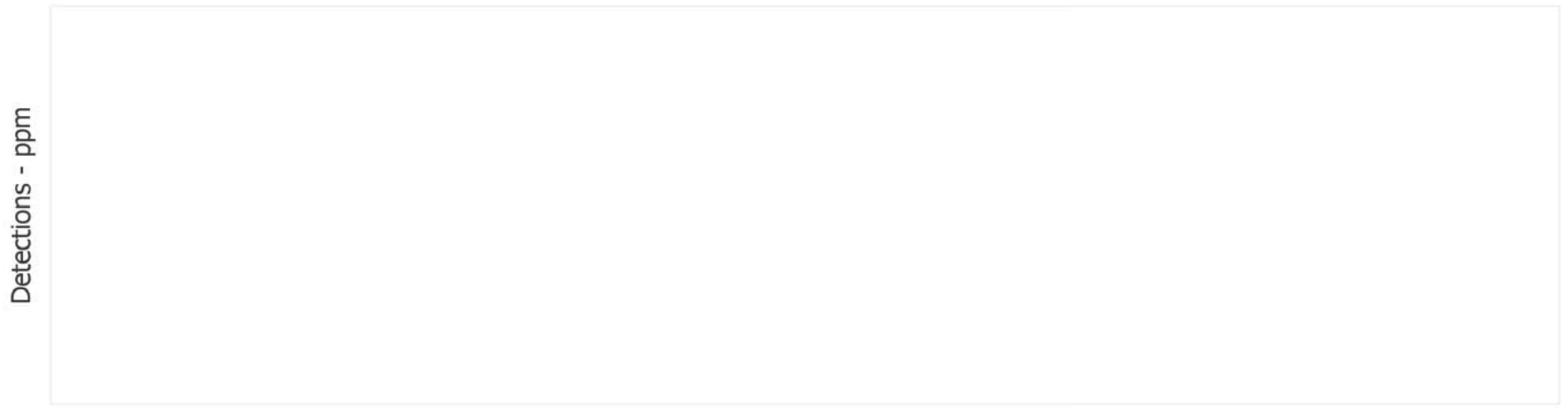


Photo-ionization (<11.7 eV nominal) Detections

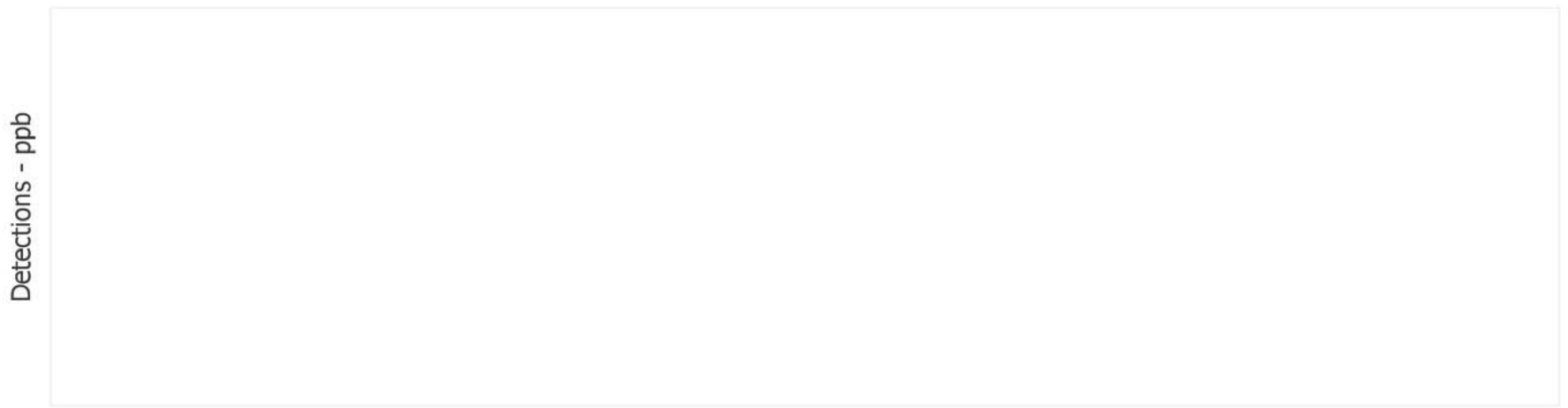
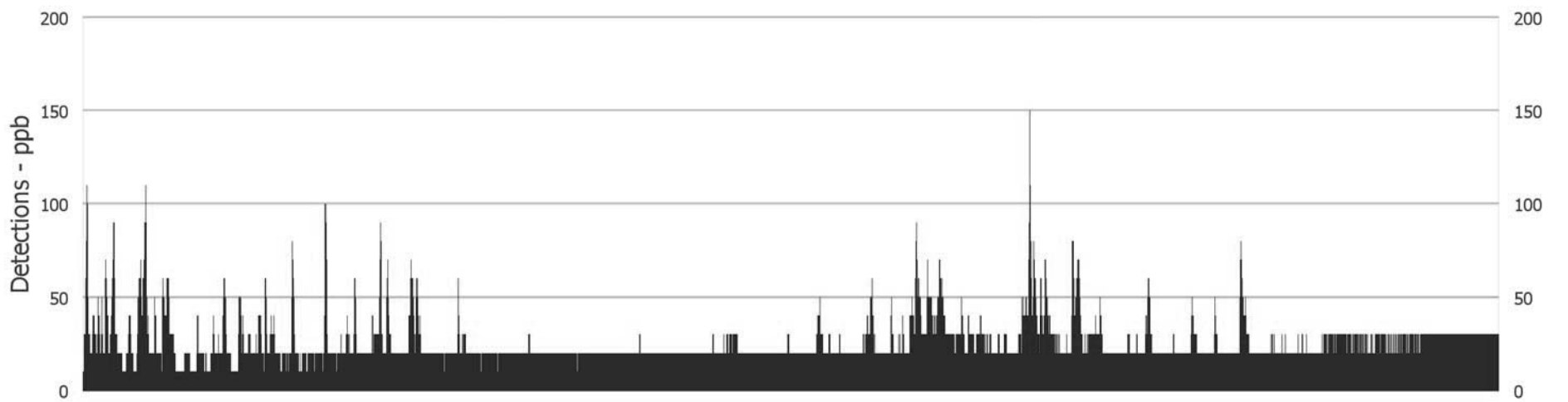
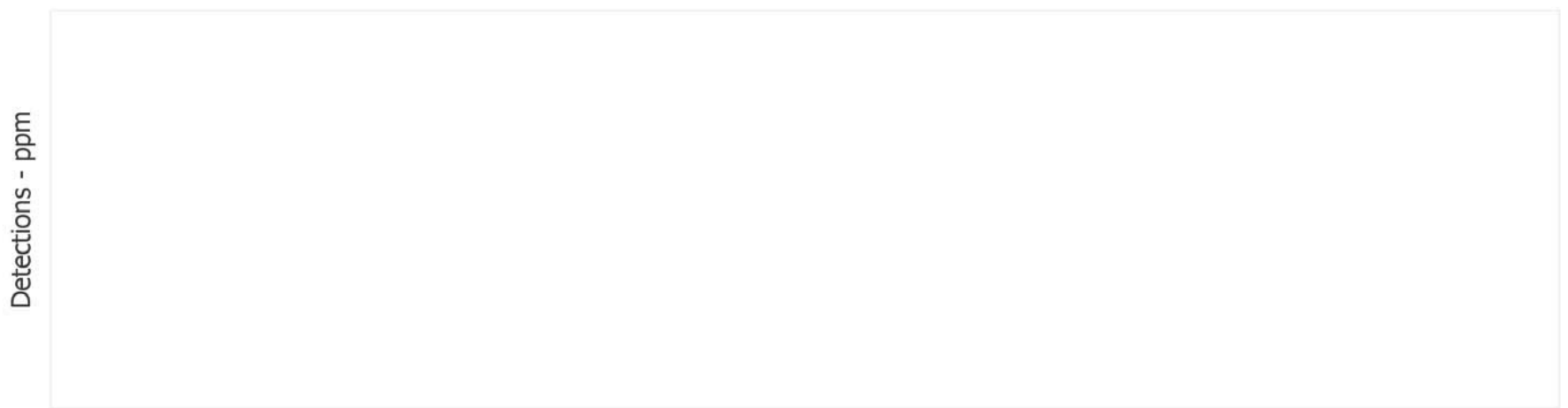


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 9

EventKey 2015/12/04 00:00:00...00:10:00 HLGC 10.6eV Event

H2S Electrochemical Detections

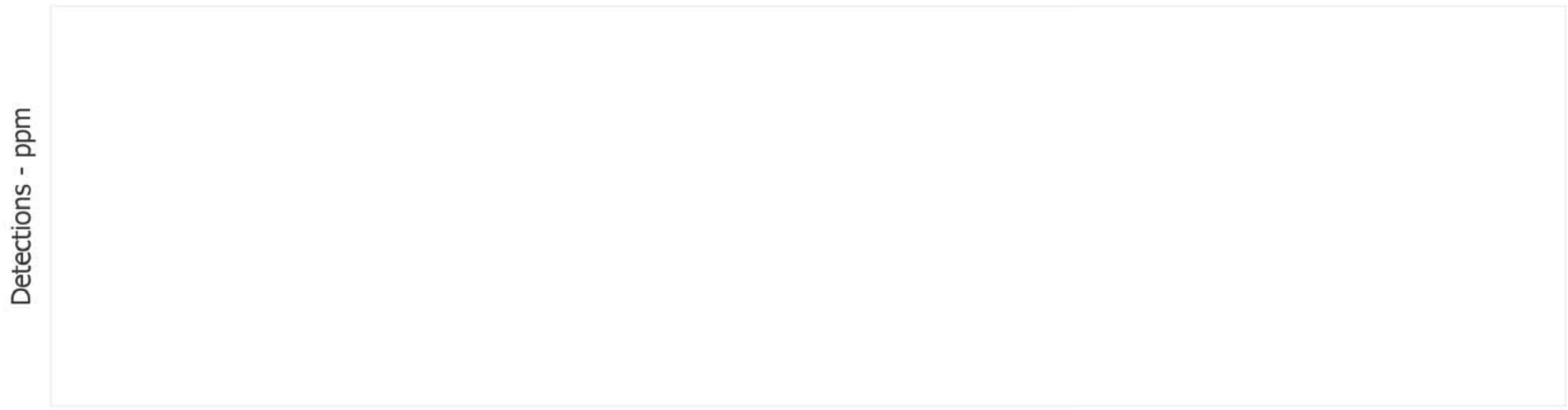


Photo-ionization (<11.7 eV nominal) Detections

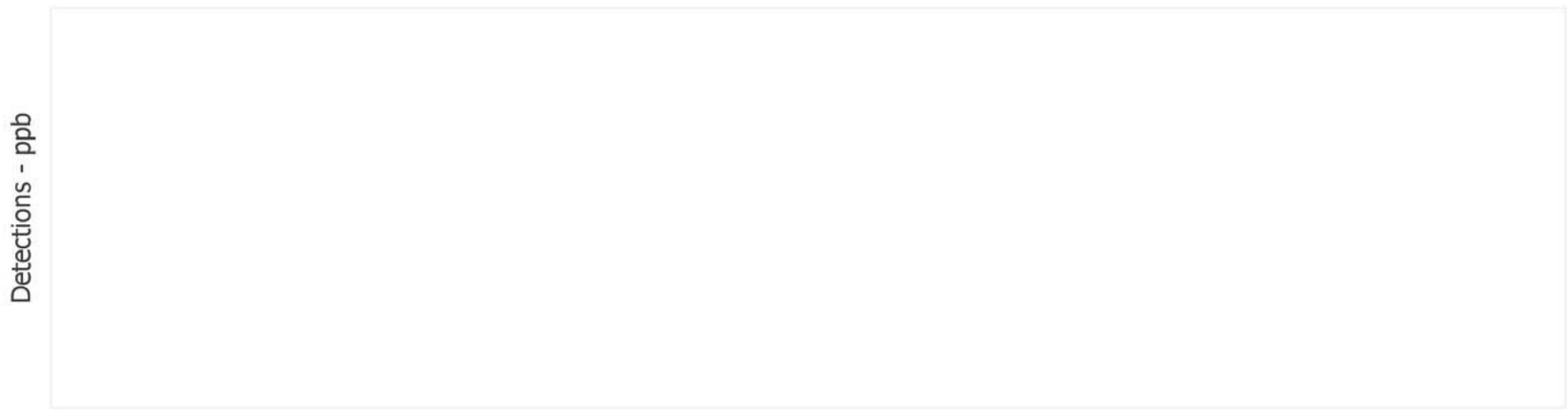
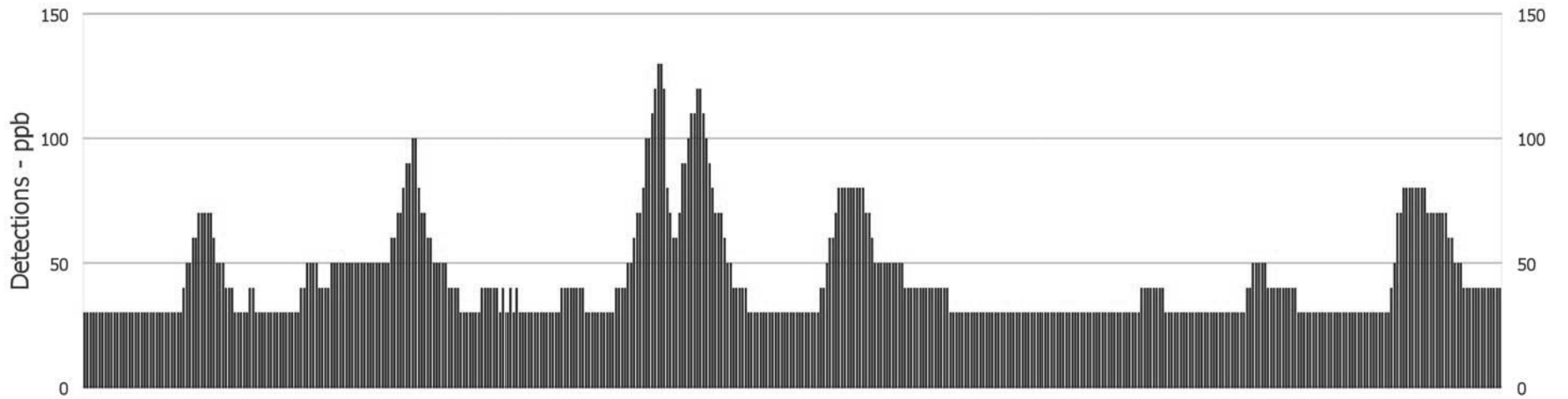
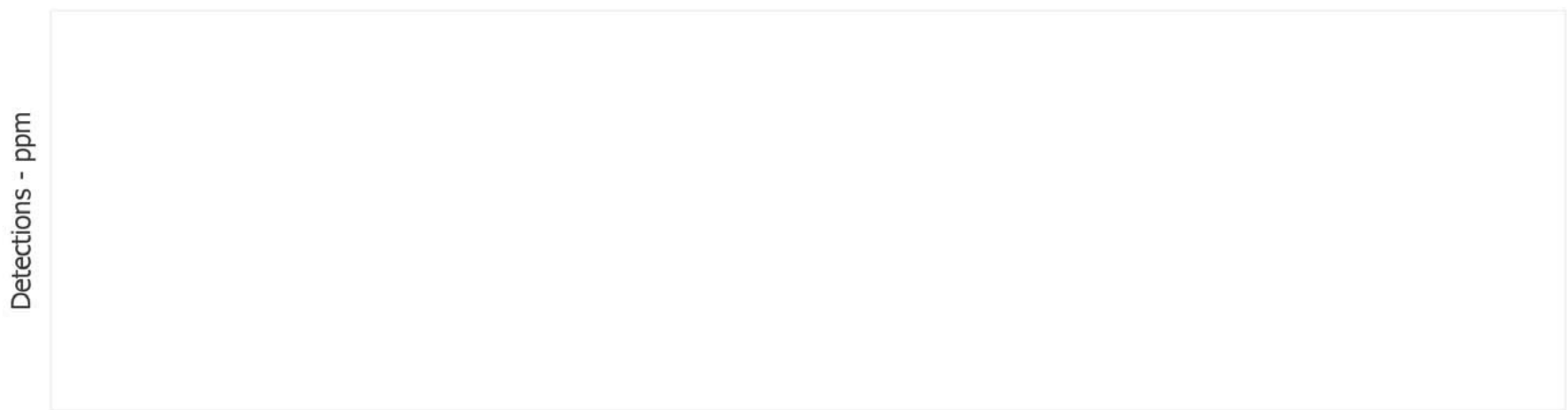


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 10

EventKey 2015/12/04 11:36:37...14:36:37 HLGC 10.6eV Events

H2S Electrochemical Detections

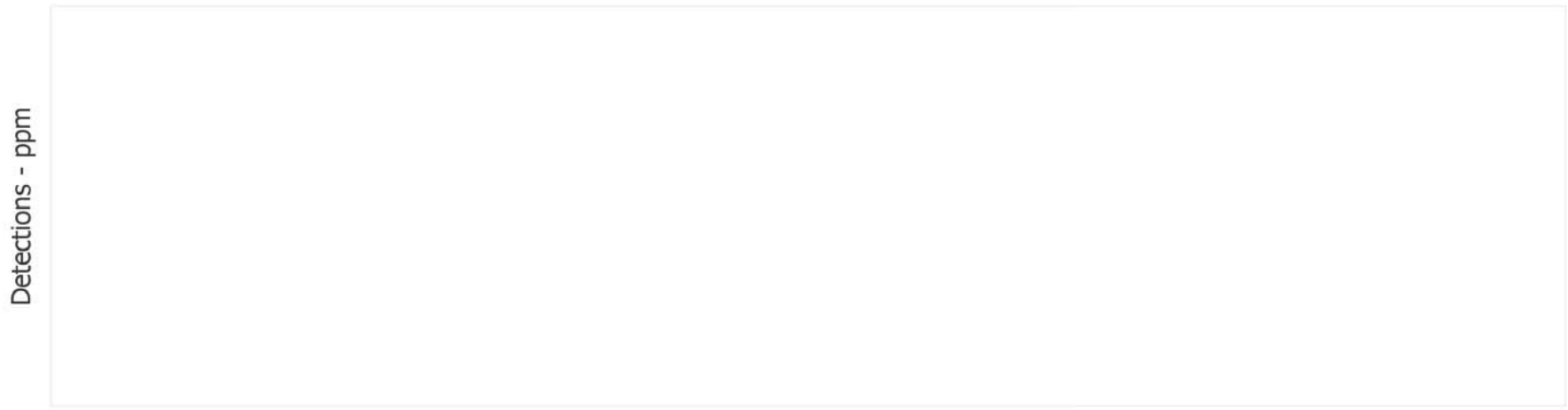


Photo-ionization (<11.7 eV nominal) Detections

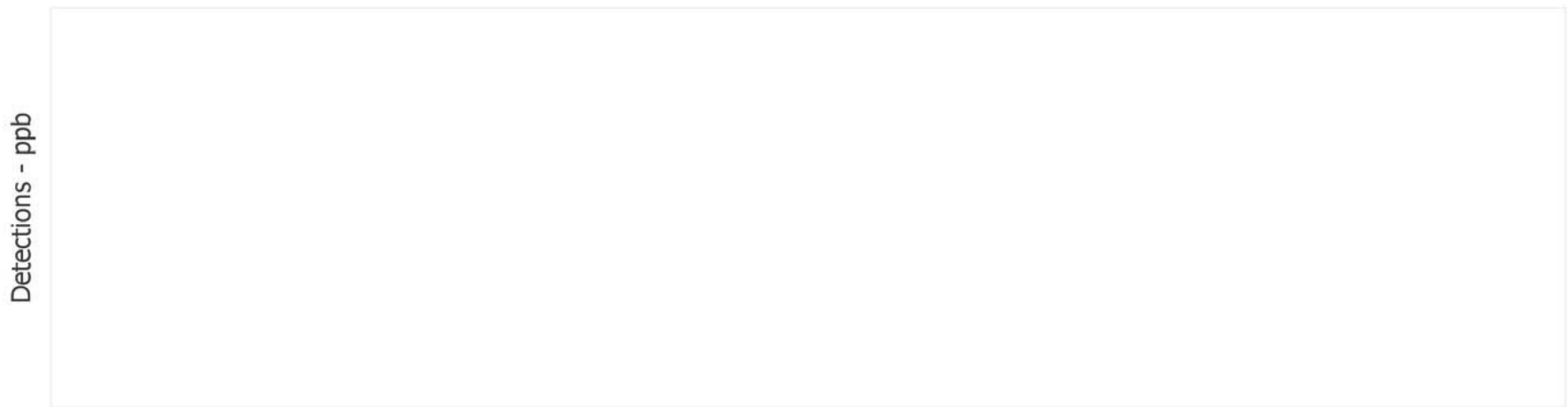
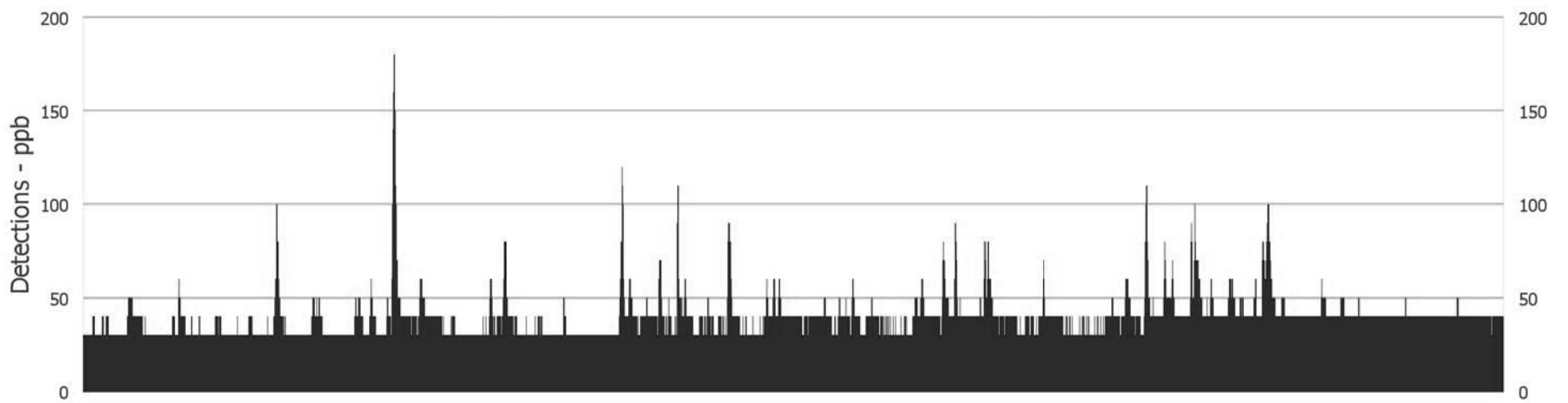
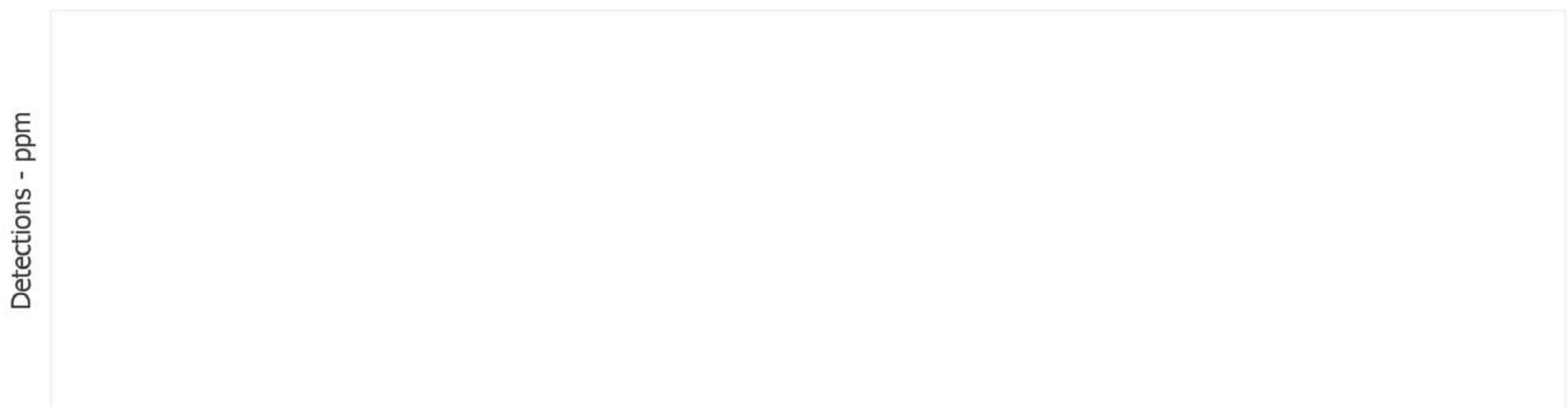


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 11

Monitoring Event (from Table 5.1): 2015/12/04 00:09:26...21:55:33 JBMI Engine Event No Detects

H2S Electrochemical Detections

Detections - ppm

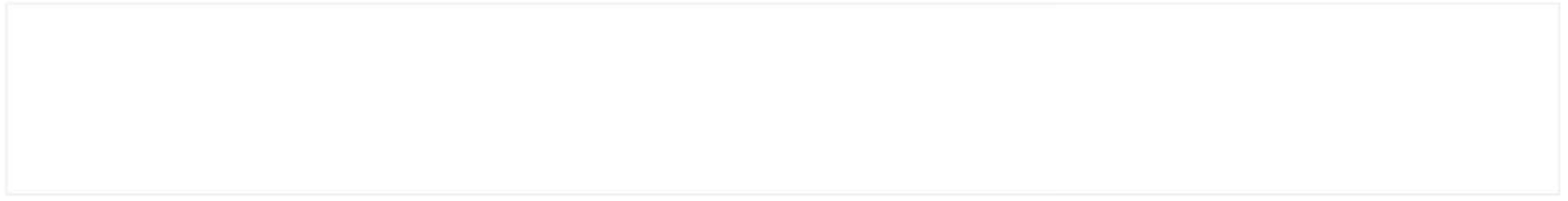


Photo-ionization (<11.7 eV nominal) Detections

Detections - ppb

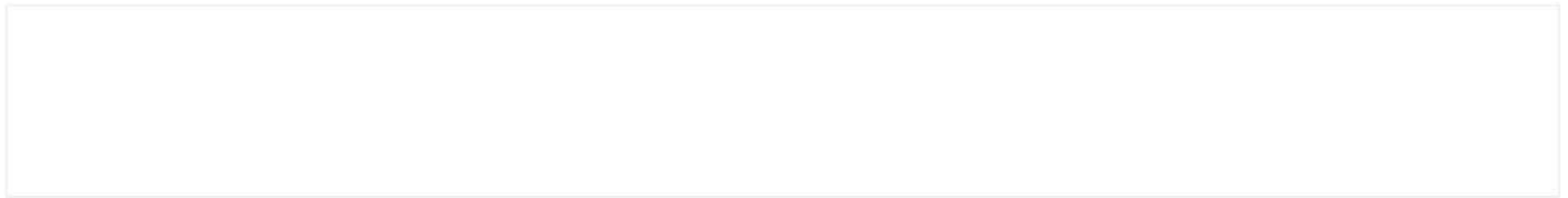
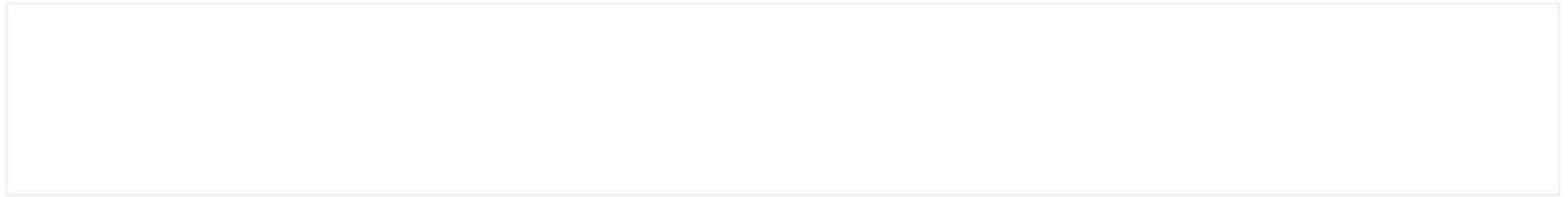


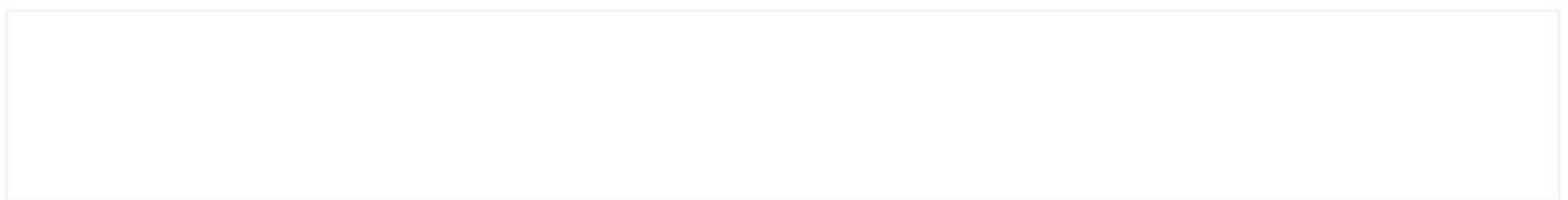
Photo-ionization (<10.6 eV nominal) Detections

Detections - ppb



Carbon Monoxide Electrochemical Detections

Detections - ppm



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 12

EventKey 2015/12/05 00:00:00...23:59:59 HLGC 10.6 eV Events

H2S Electrochemical Detections

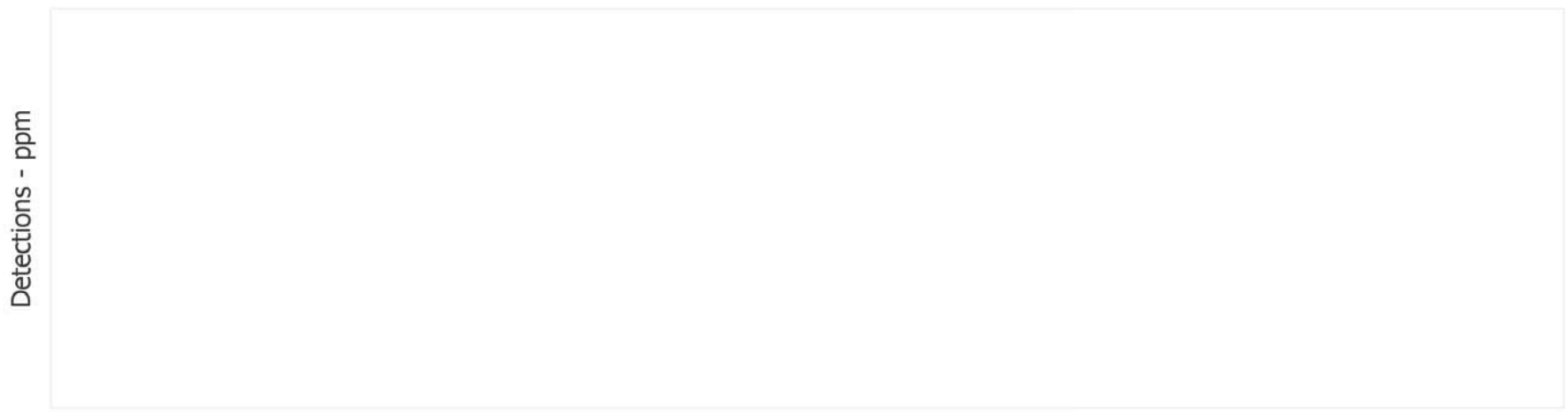


Photo-ionization (<11.7 eV nominal) Detections

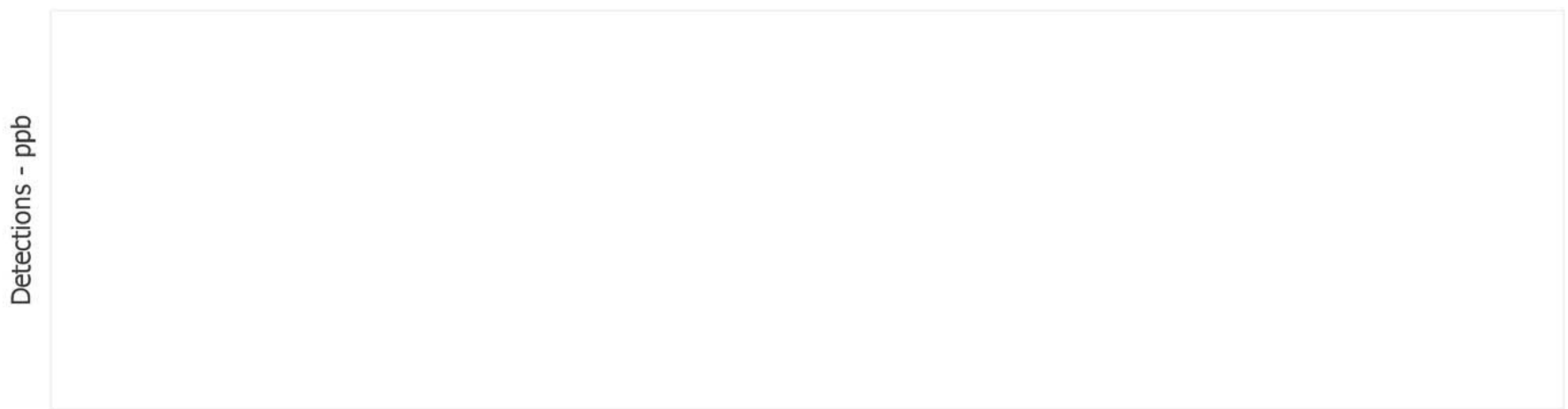
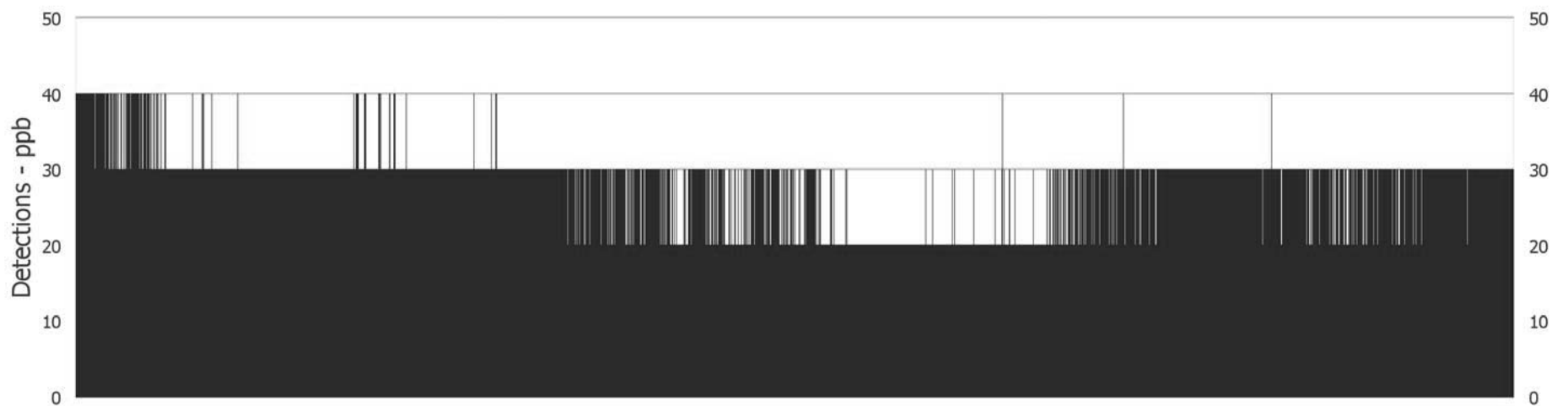
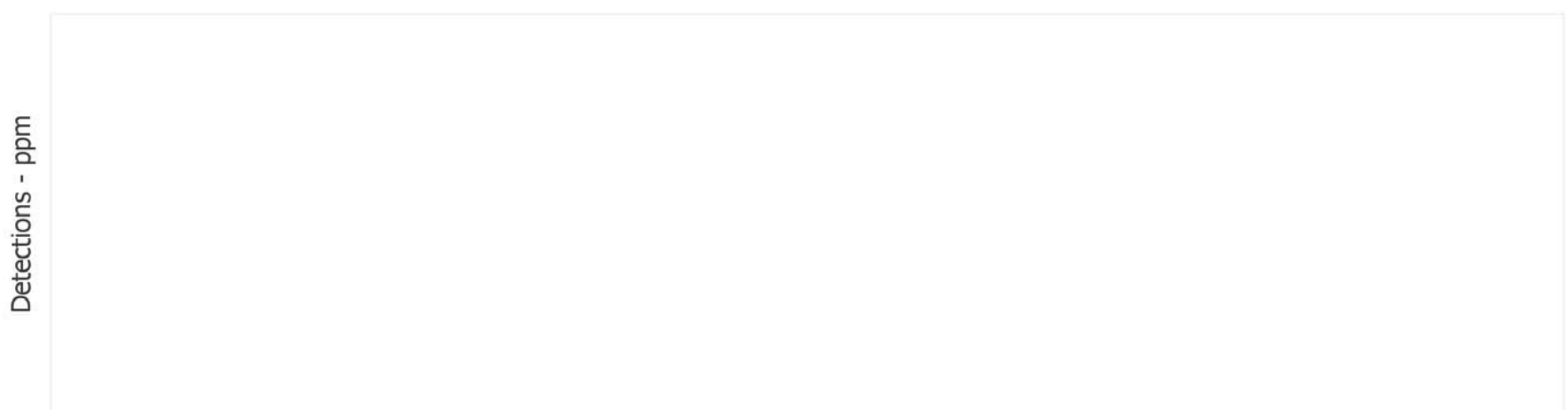


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 13

EventKey 2015/12/06 07:00:00...08:30:00 HLGC 10.6eV Events

H2S Electrochemical Detections

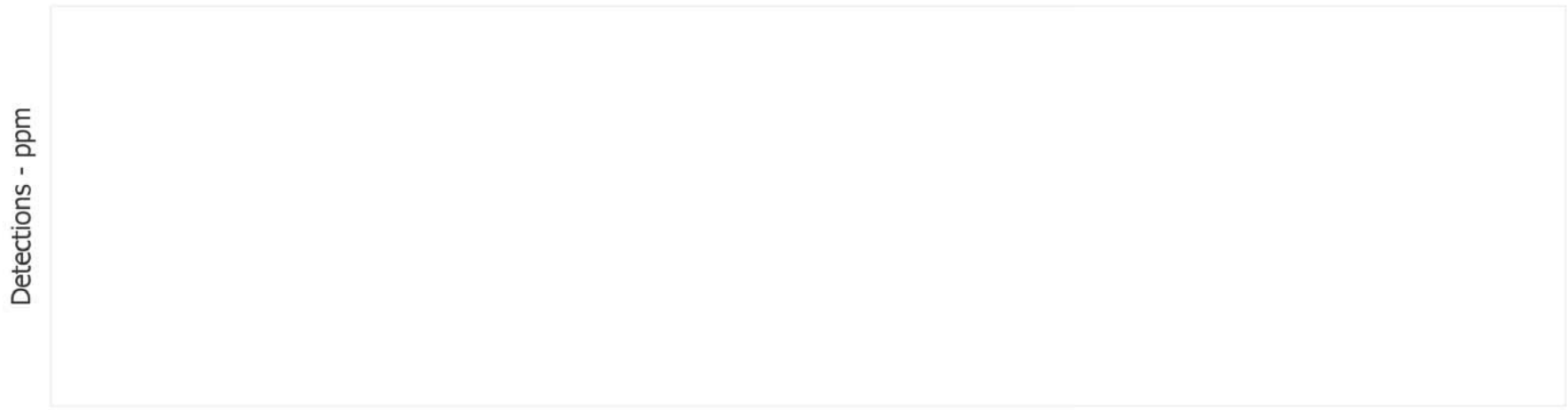


Photo-ionization (<11.7 eV nominal) Detections

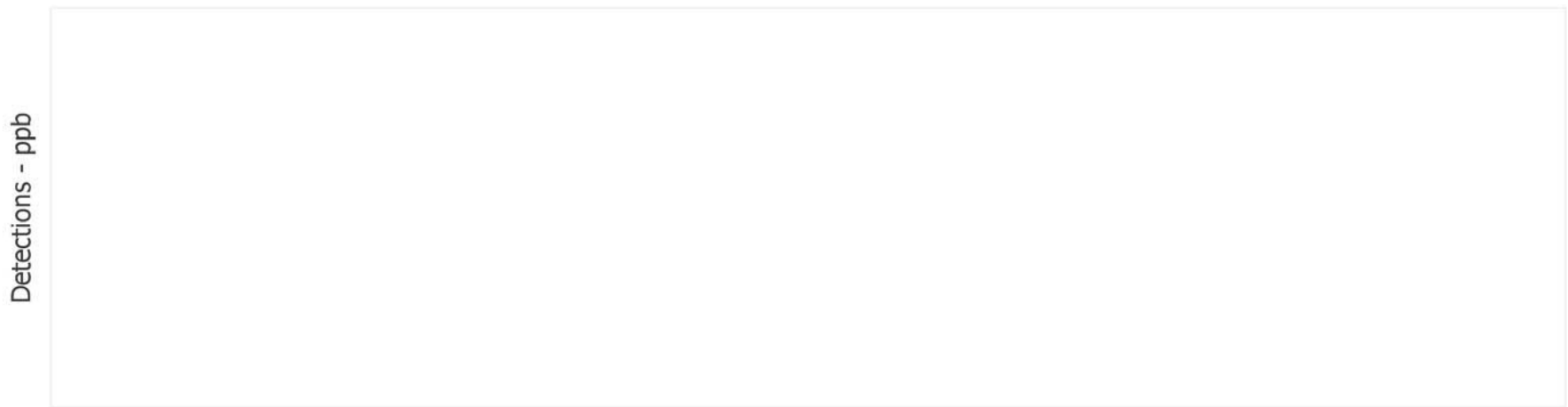
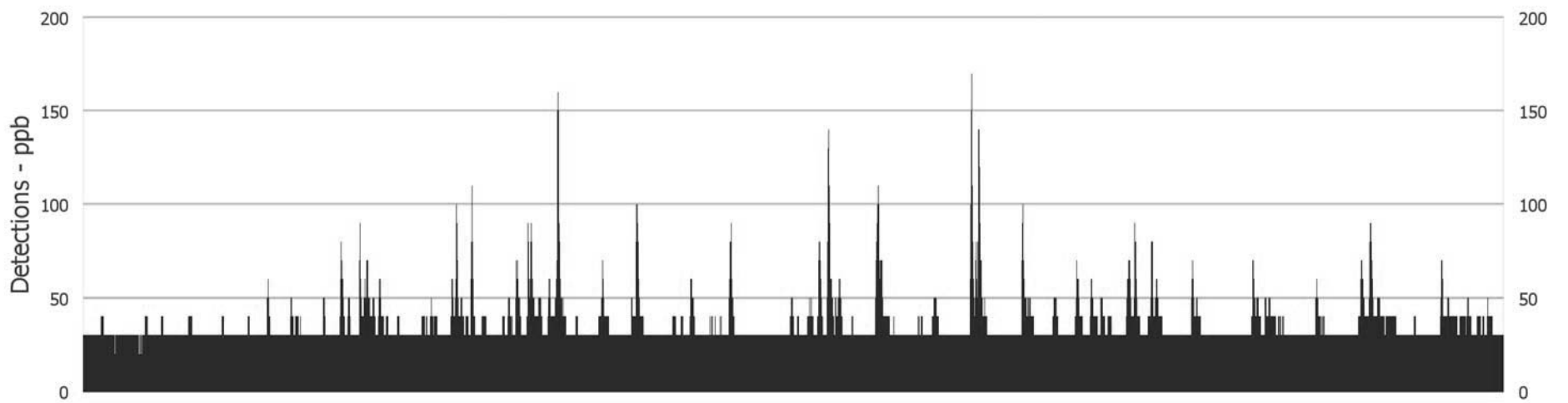
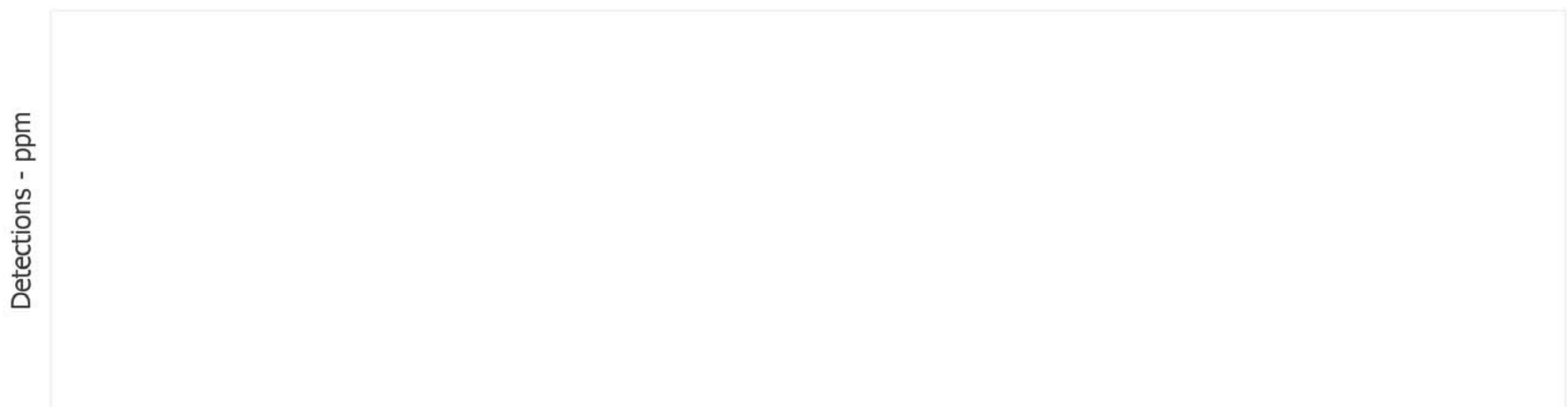


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 14

EventKey 2015/12/07 07:21:34...23:59:59 (TBC) HLGC 10.6eV 11.7eV Events

H2S Electrochemical Detections

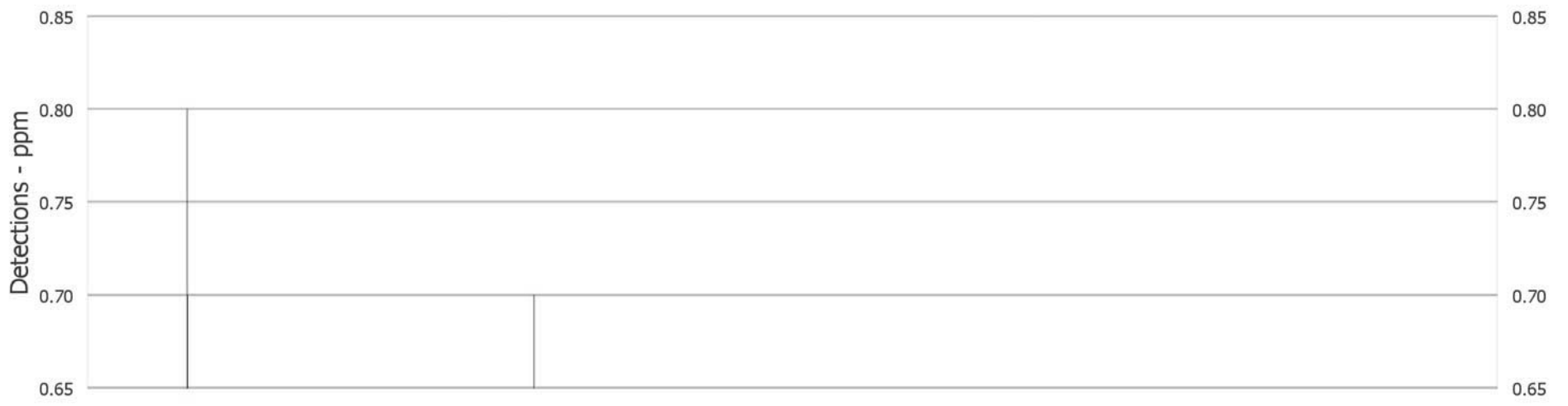
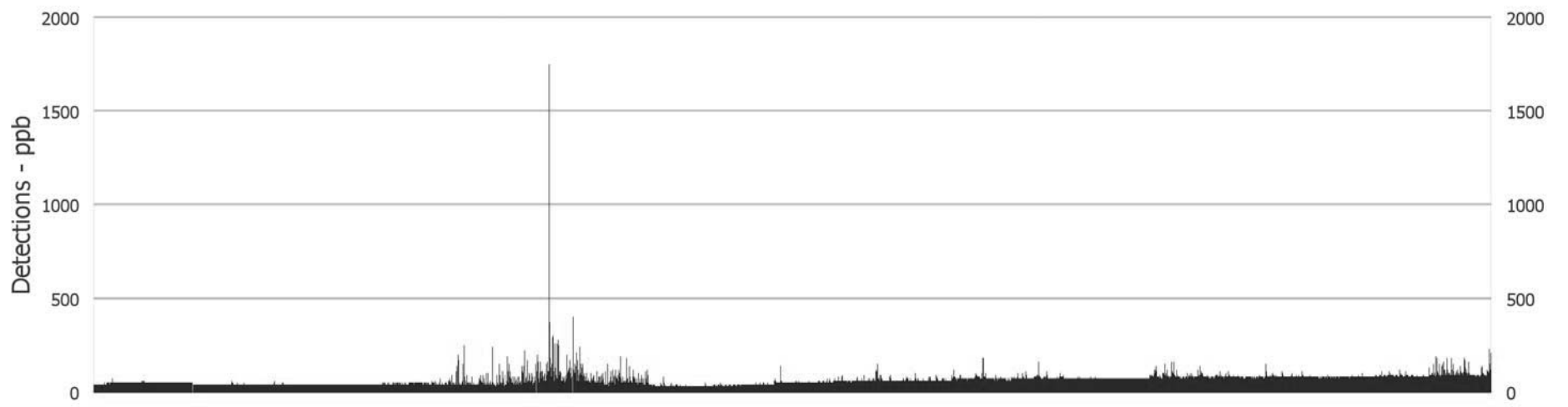


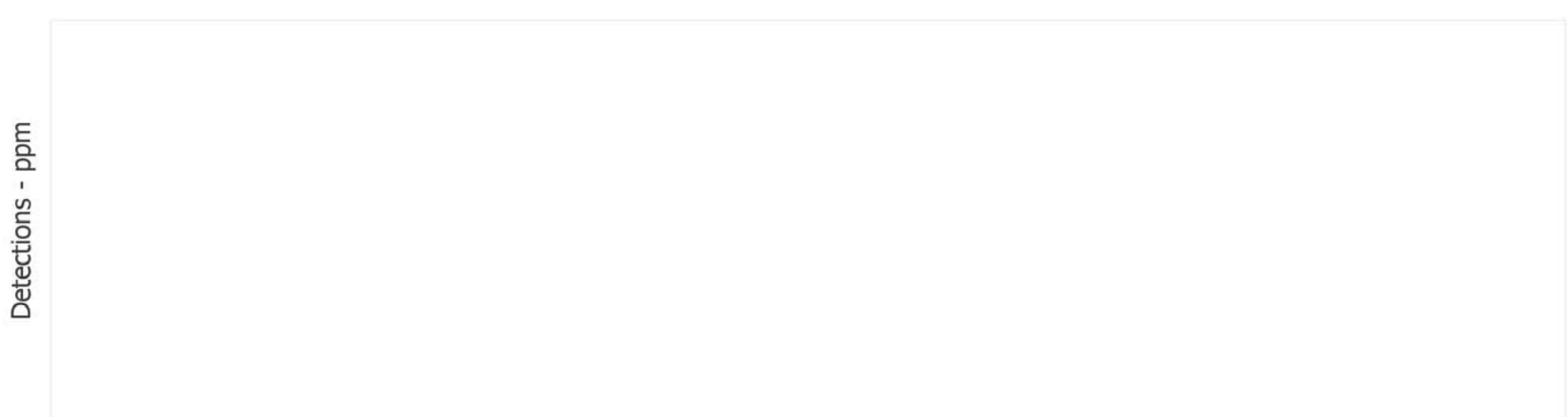
Photo-ionization (<11.7 eV nominal) Detections



Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 15

EventKey 2015/12/08 00:00:00...23:59:58 (TBC) HLGC 10.6eV CO H2S Events

H2S Electrochemical Detections

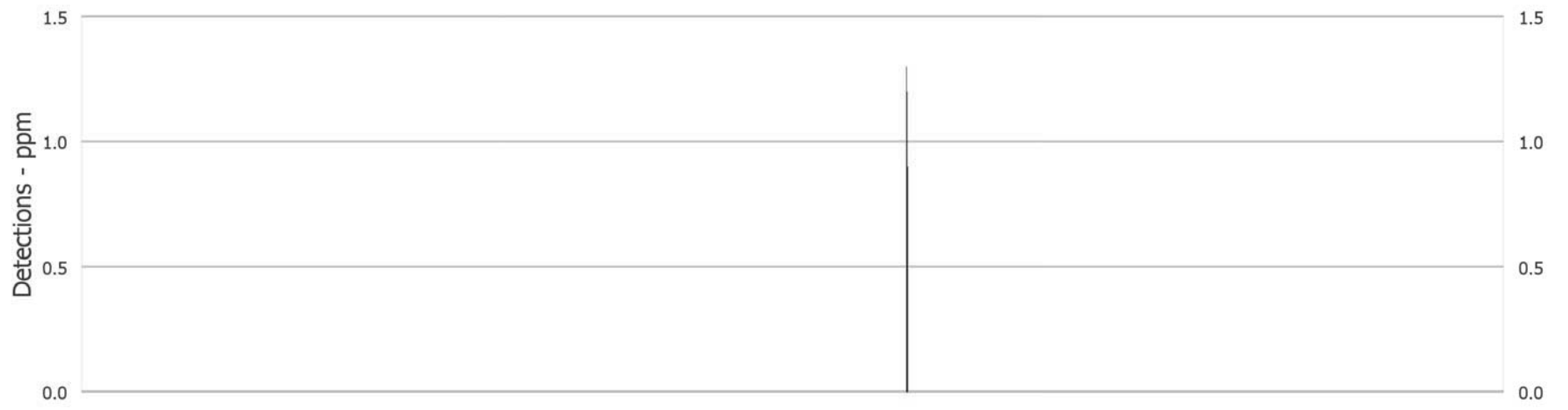


Photo-ionization (<11.7 eV nominal) Detections

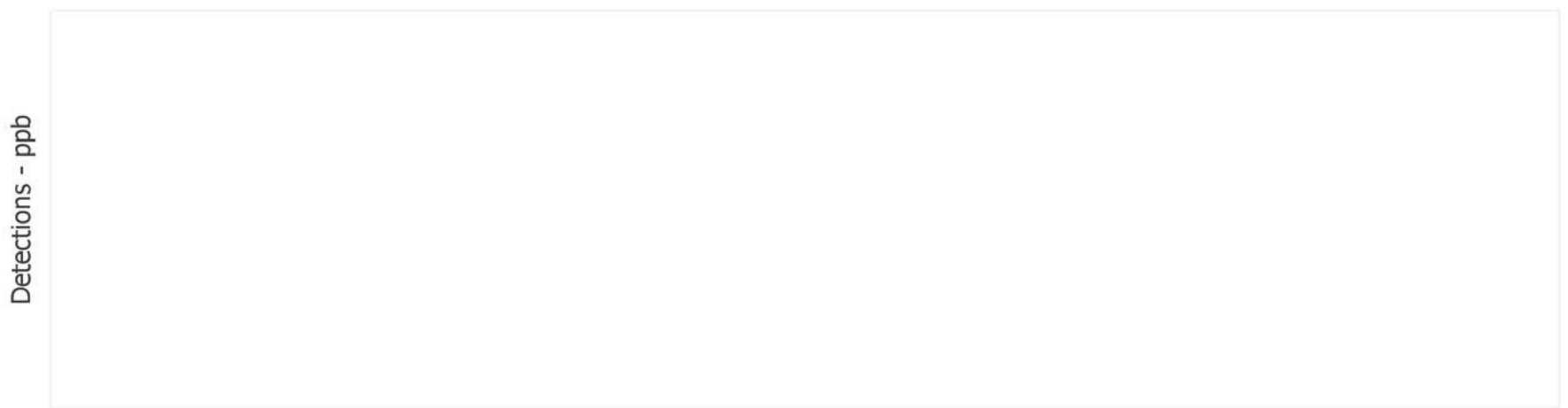
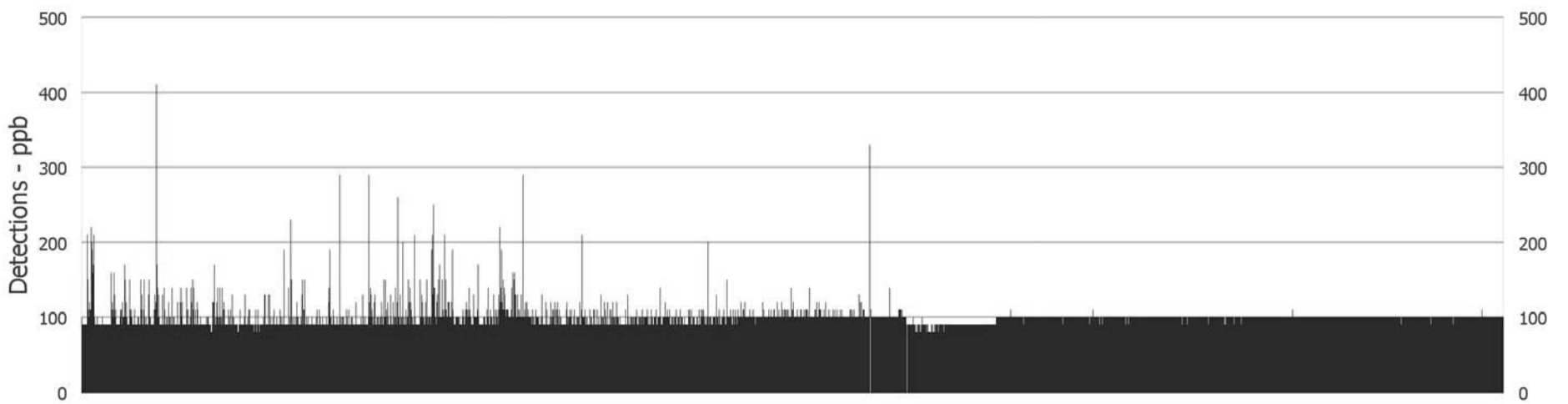
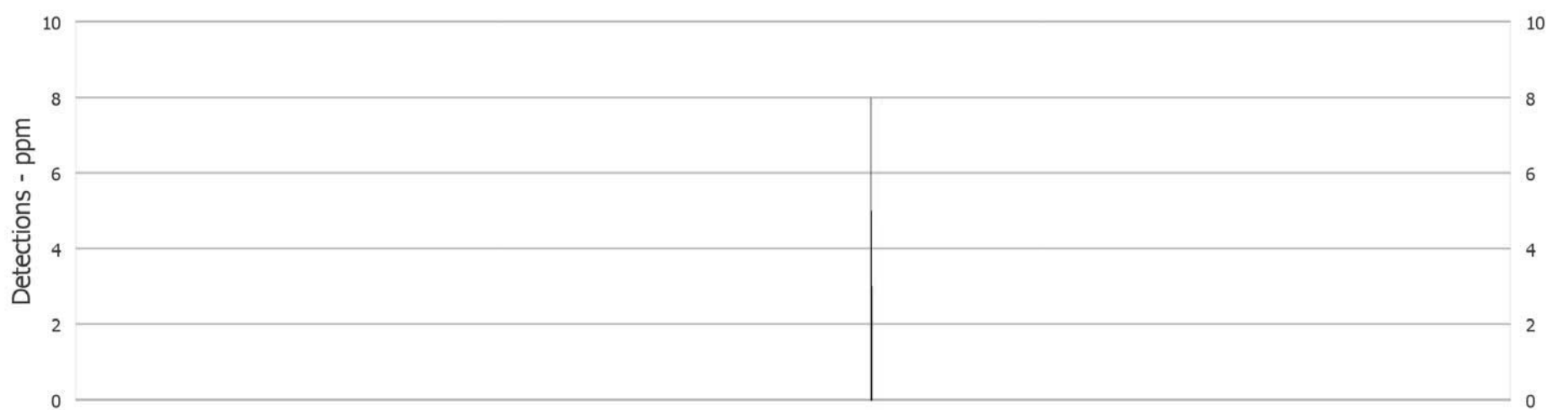


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 16

EventKey 2015/12/09 00:00:00...06:57:14 HLGC 10.6eV Event

H2S Electrochemical Detections

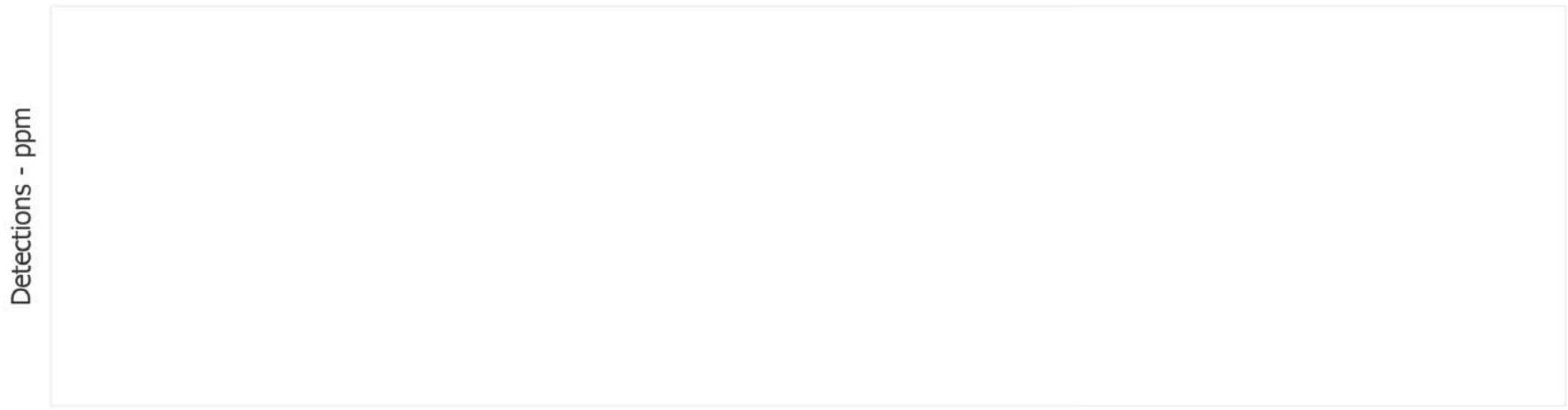


Photo-ionization (<11.7 eV nominal) Detections

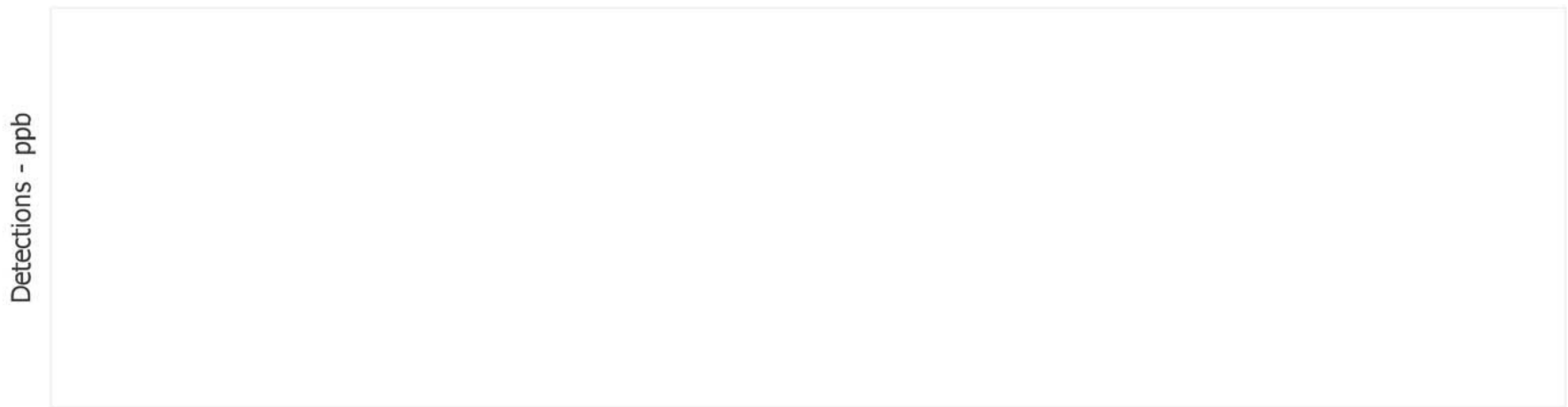
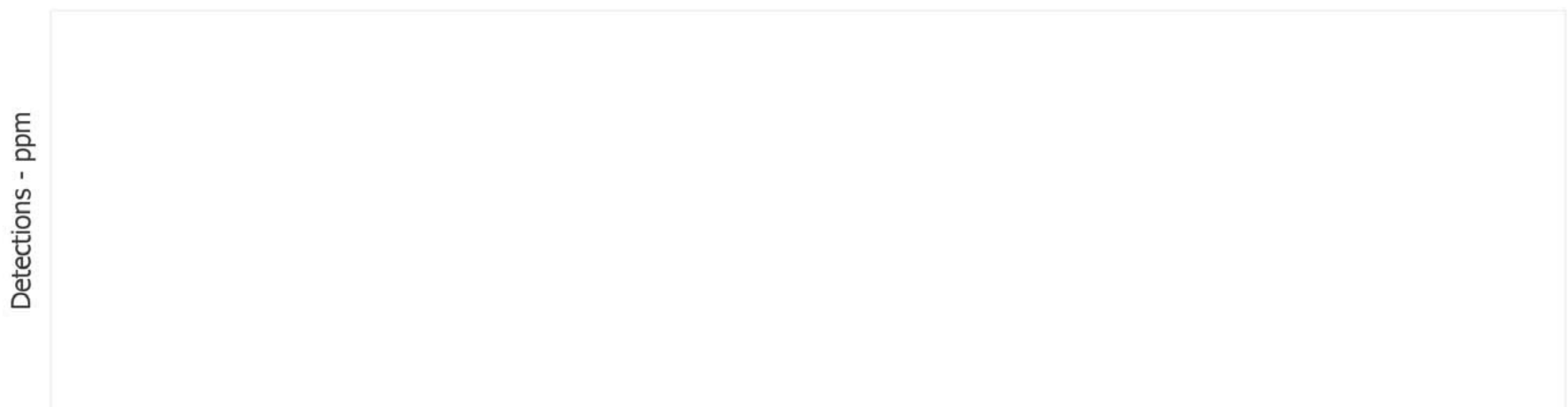


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 17

EventKey 2015/12/09 08:12:49...09:03:47 HLGC 10.6eV Event

H2S Electrochemical Detections

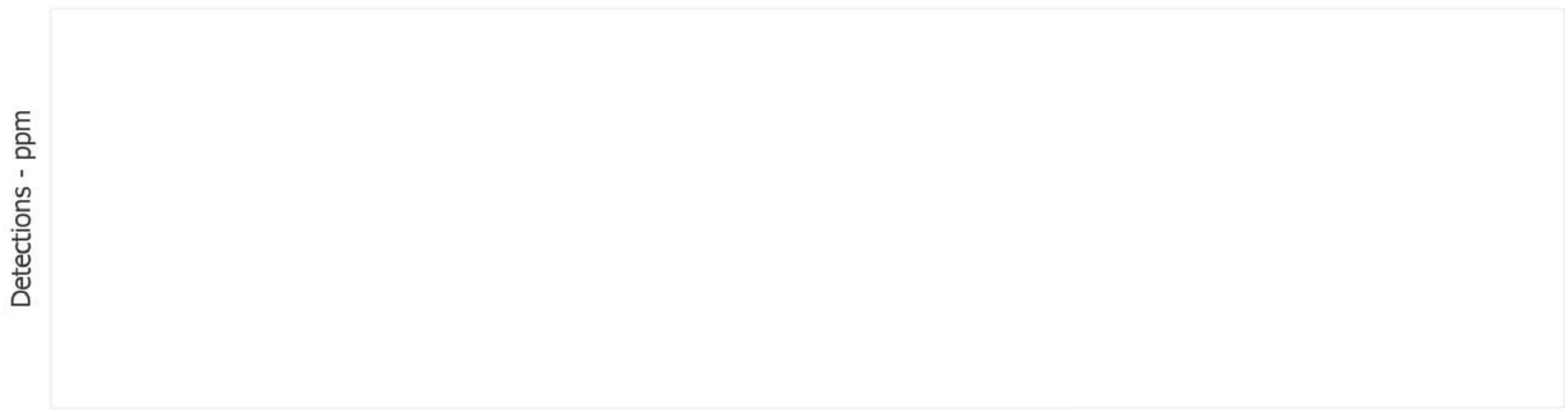


Photo-ionization (<11.7 eV nominal) Detections

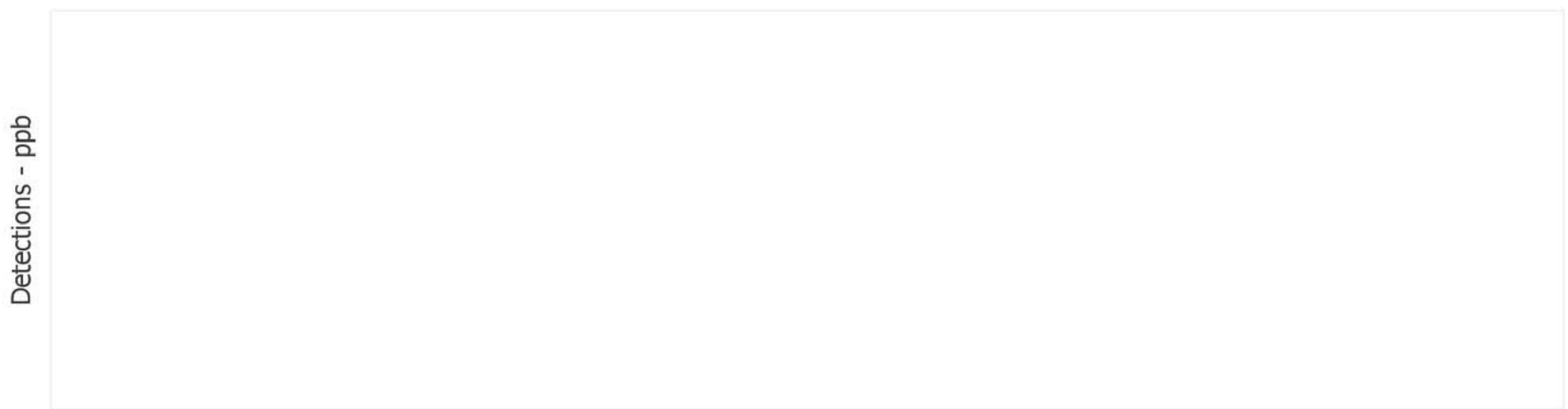
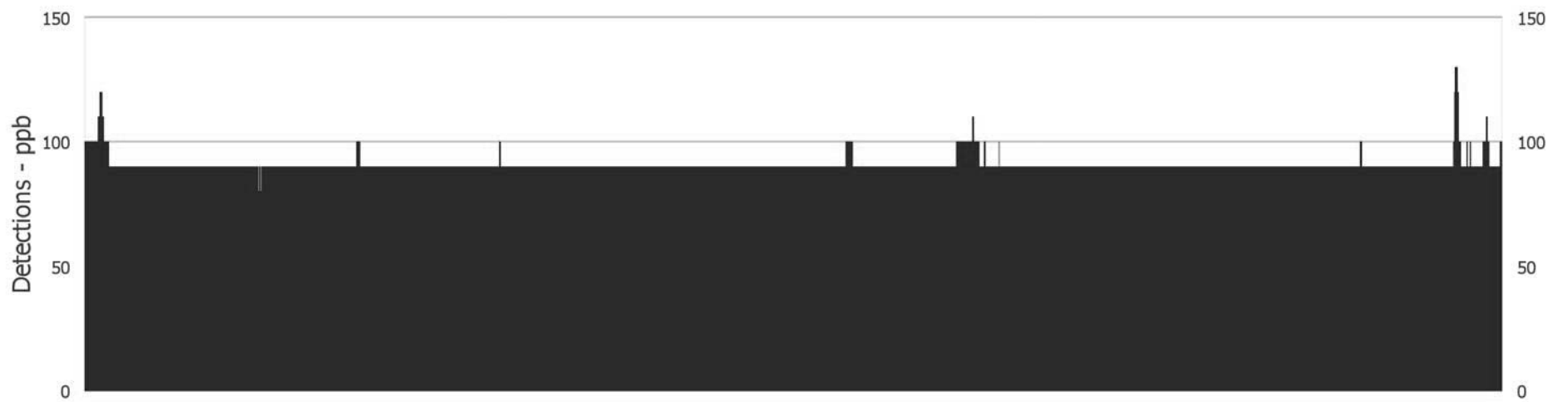
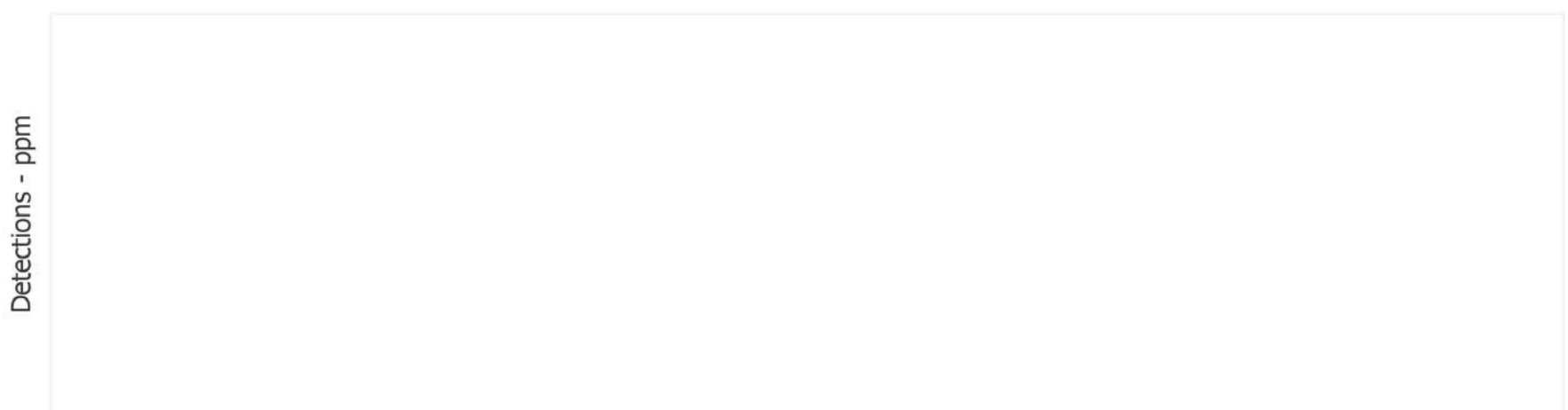


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 18

EventKey 2015/12/09 10:19:21...10:27:30 HLGC 10.6eV Event

H2S Electrochemical Detections

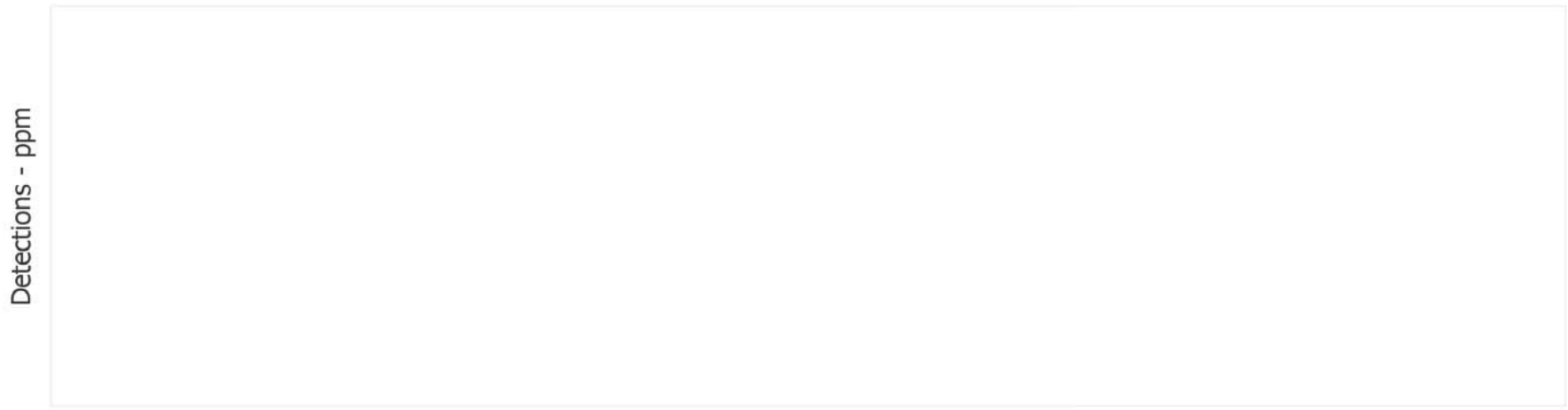


Photo-ionization (<11.7 eV nominal) Detections

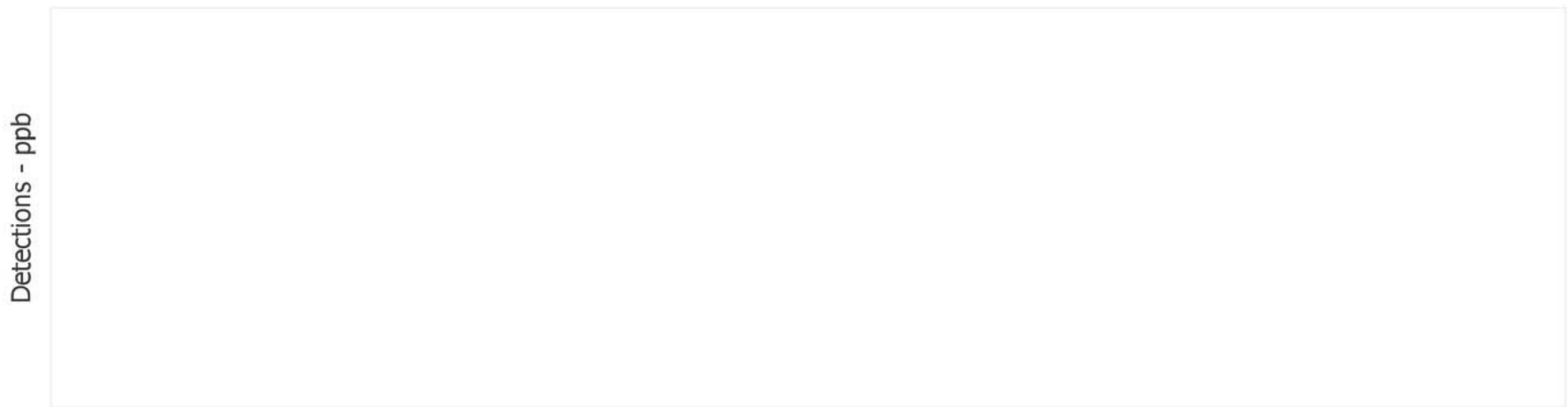
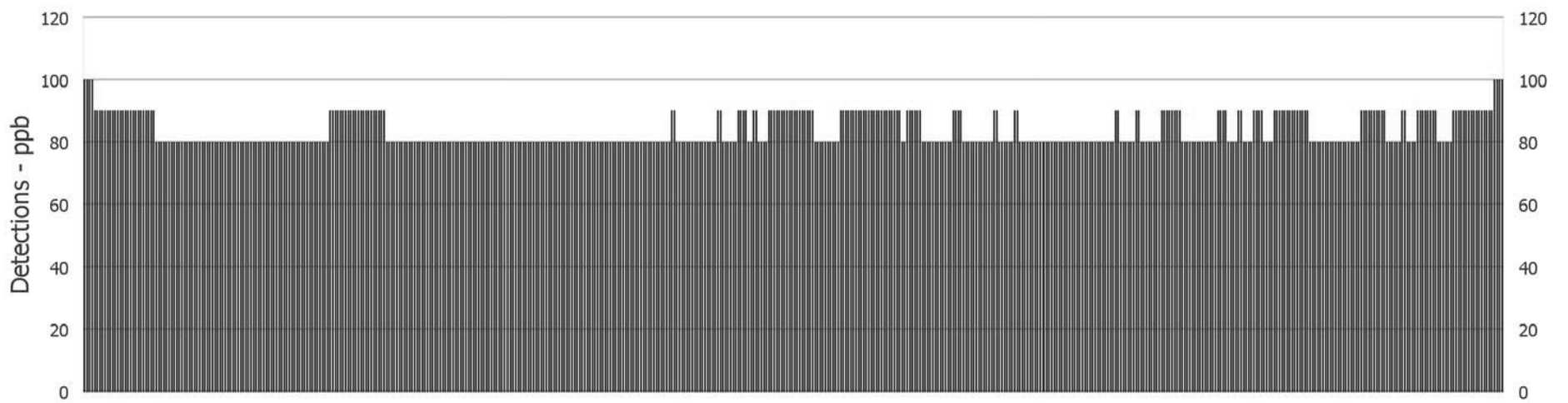
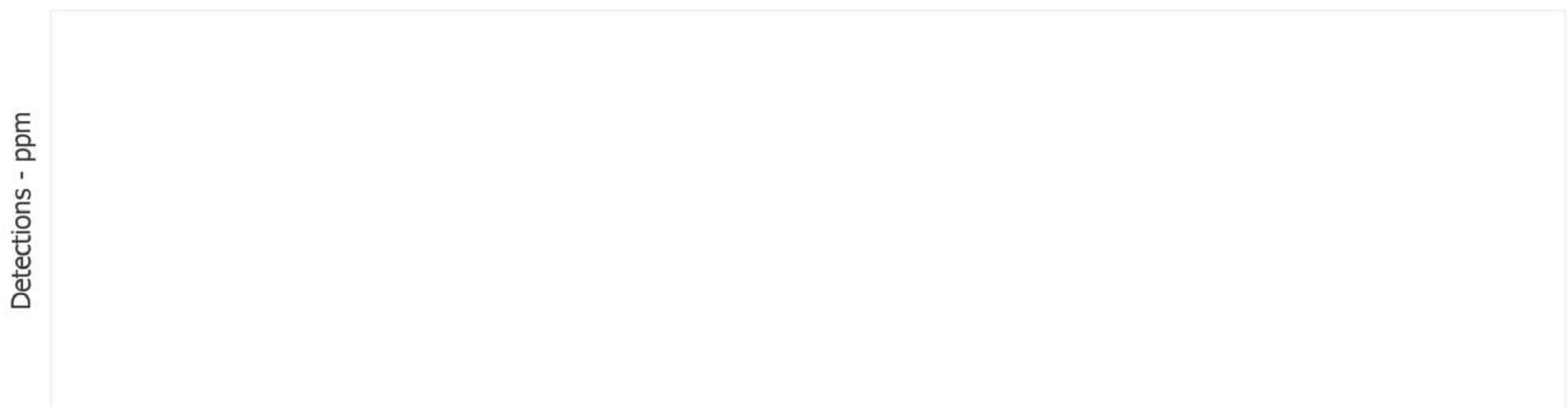


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 19

EventKey 2015/12/09 11:11:06...20:24:16 HLGC 10.6eV Event

H2S Electrochemical Detections

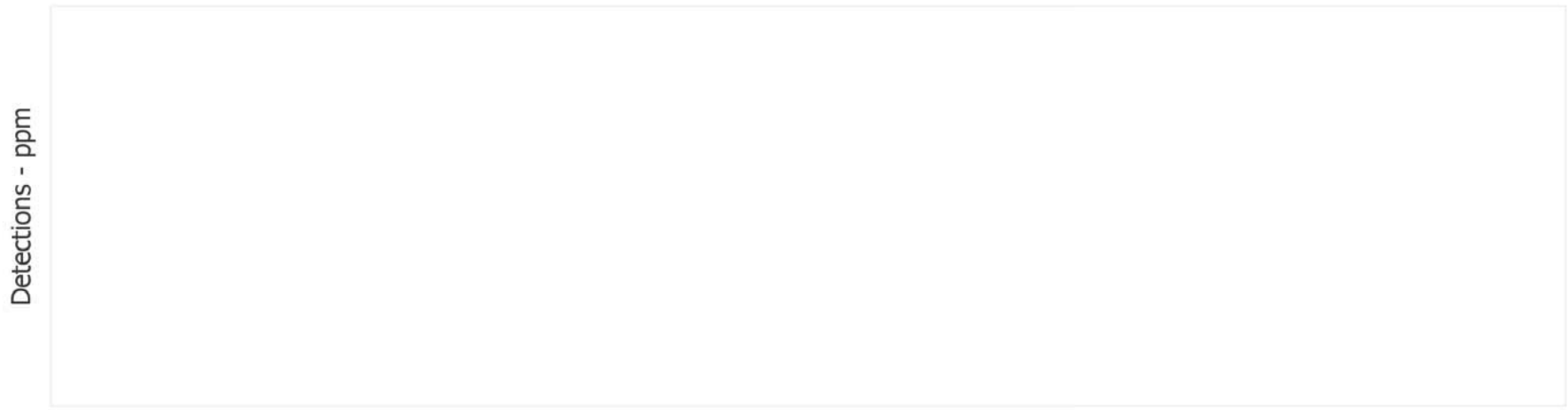


Photo-ionization (<11.7 eV nominal) Detections

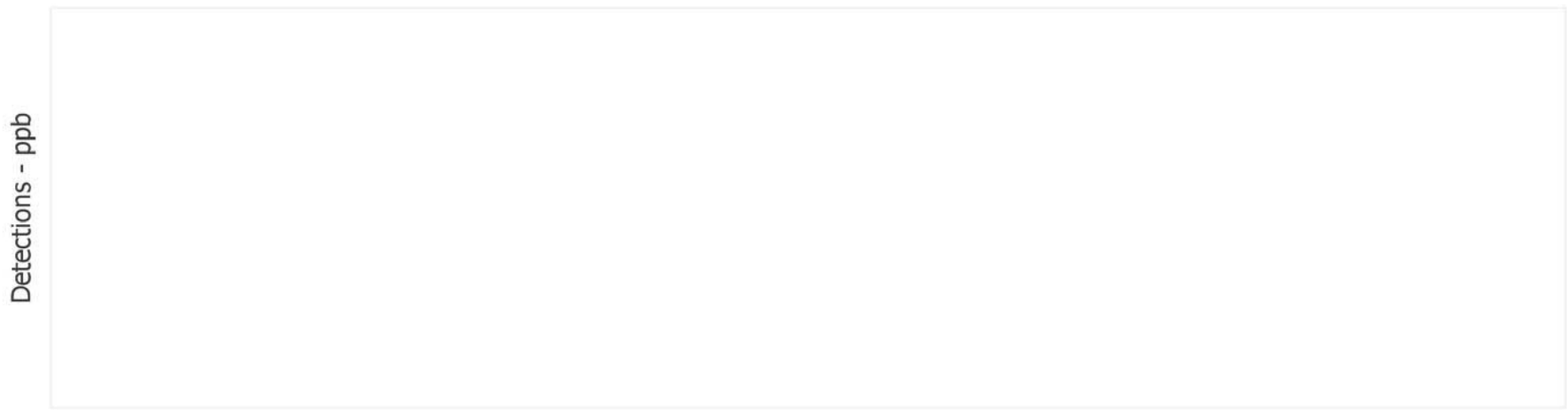
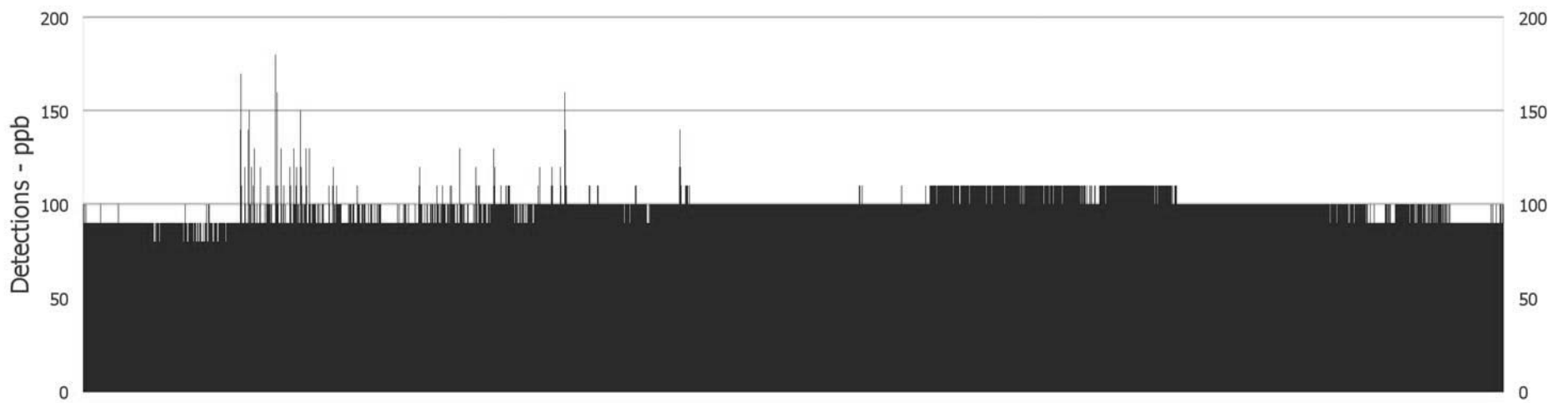
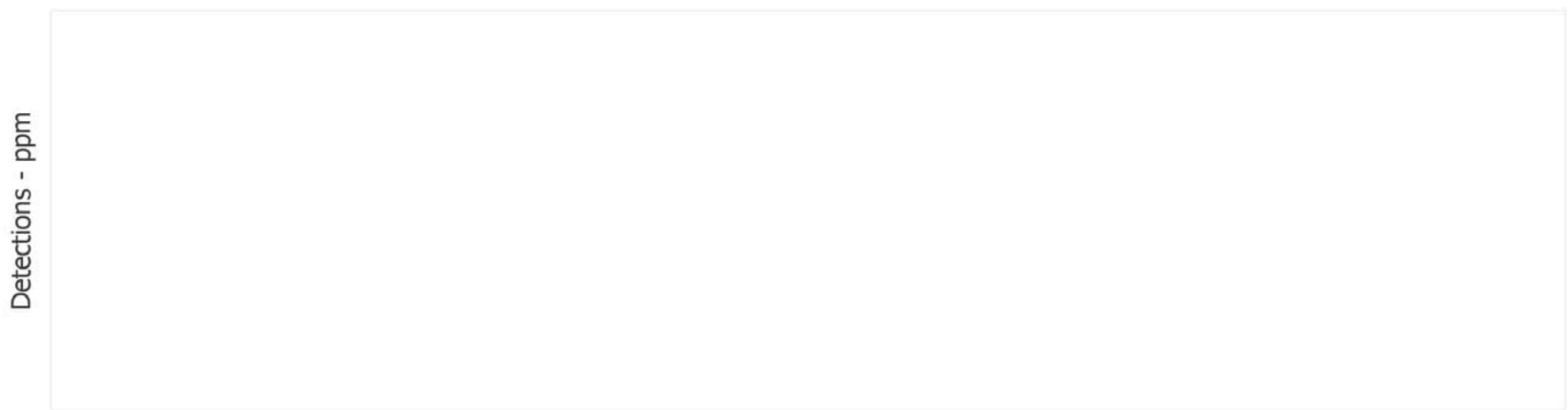


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 20

EventKey 2015/12/09 23:51:11...23:54:39 HLGC 10.6eV Event

H2S Electrochemical Detections

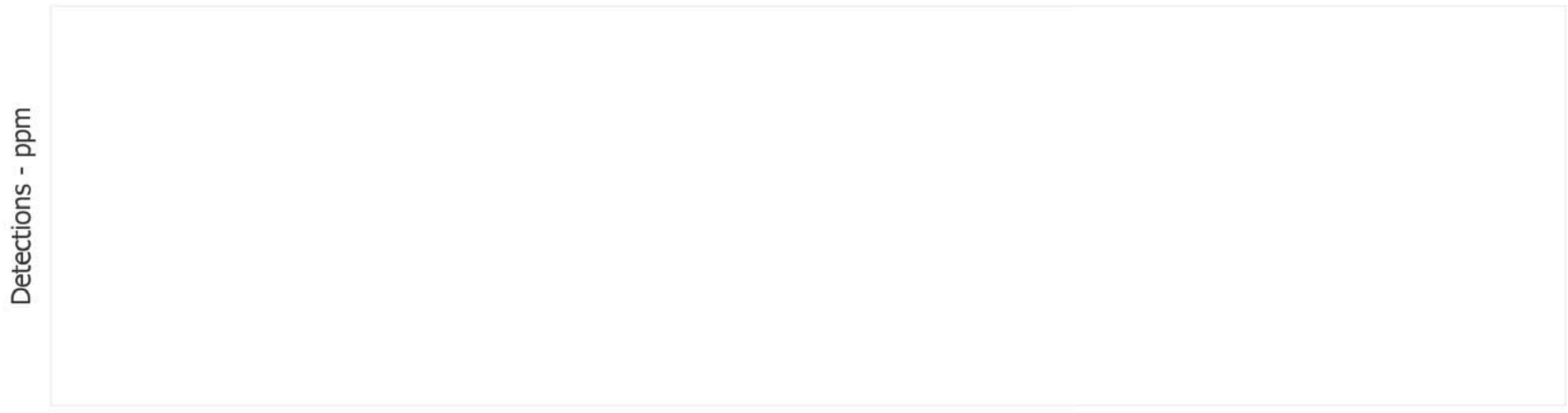


Photo-ionization (<11.7 eV nominal) Detections

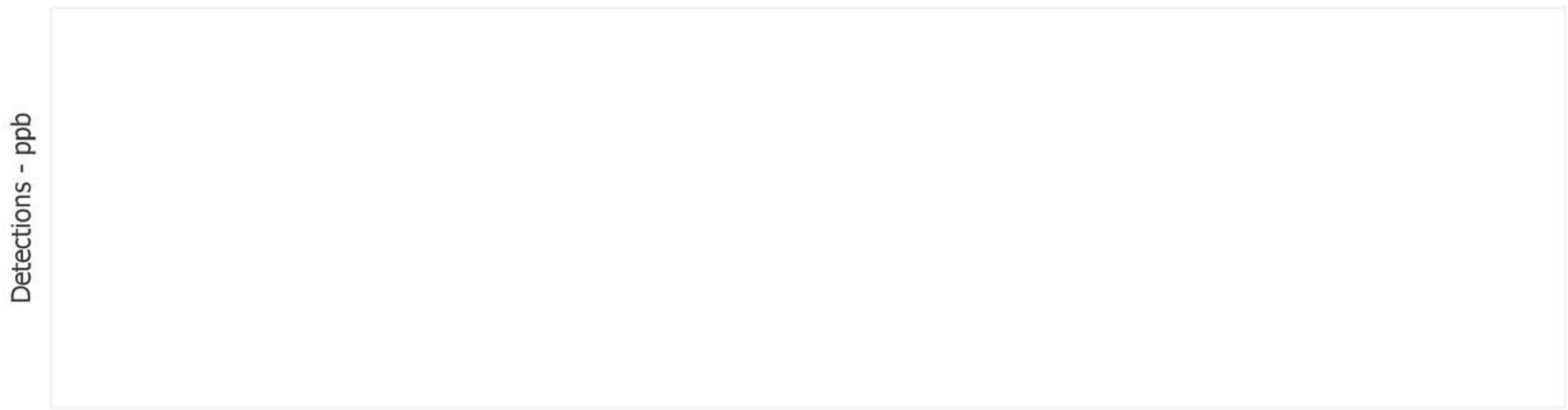
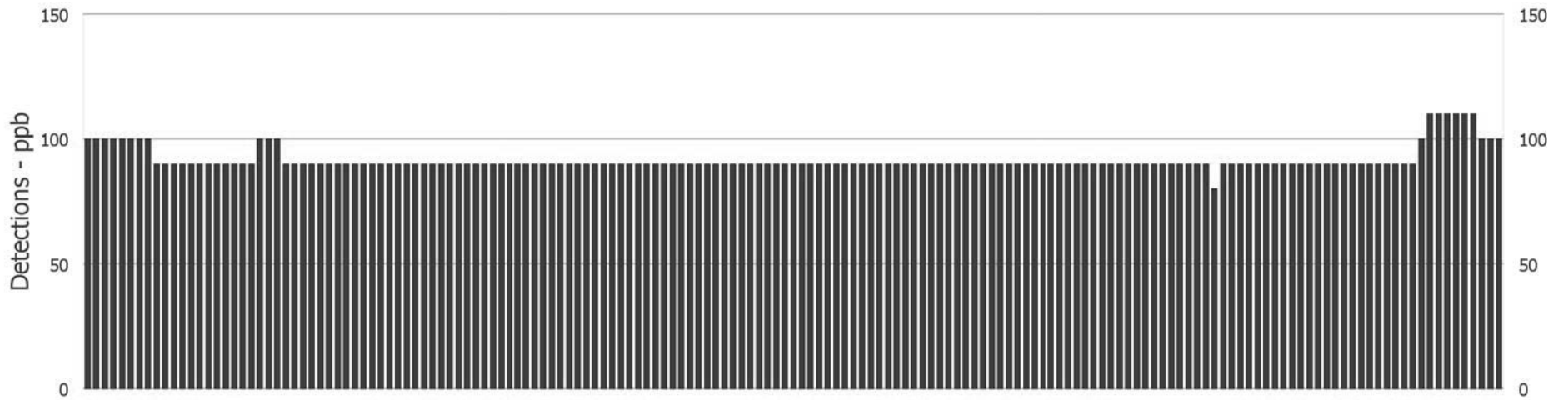
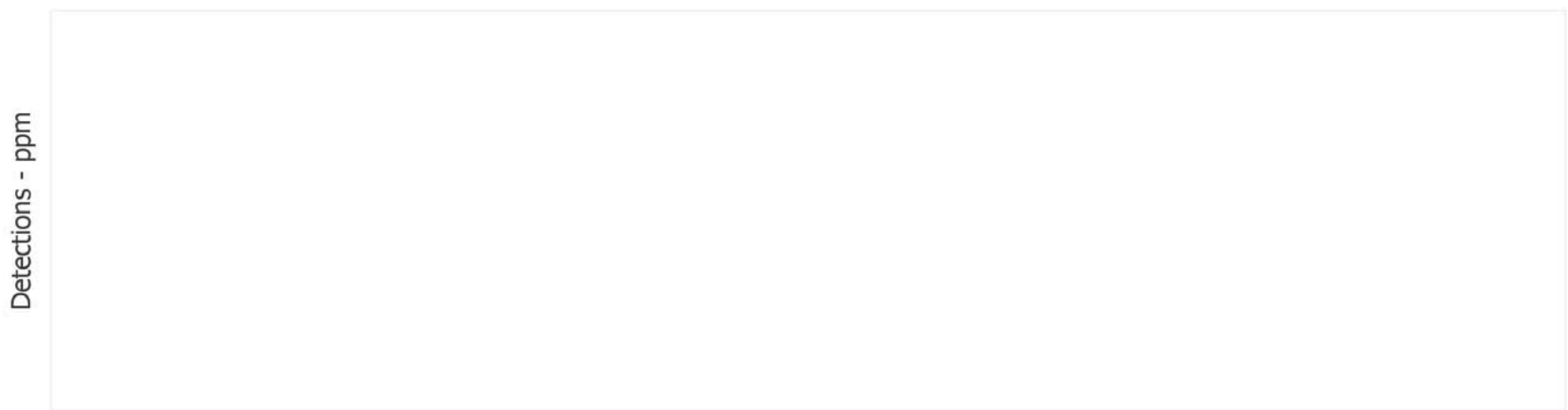


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 21

EventKey 2015/12/10 00:10:016...00:16:41 HLGC 10.6eV Event

H2S Electrochemical Detections

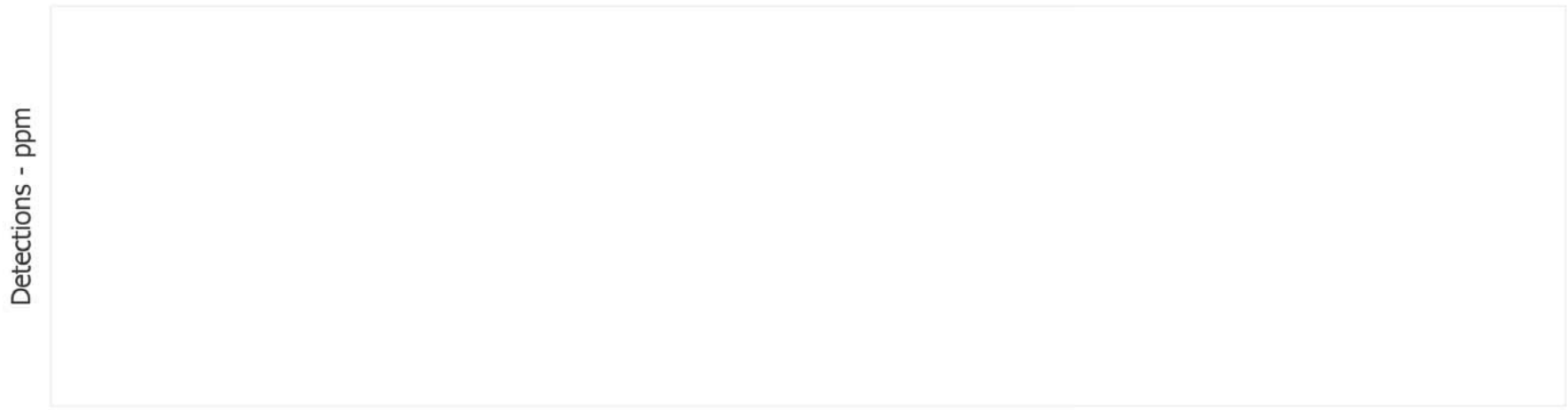


Photo-ionization (<11.7 eV nominal) Detections

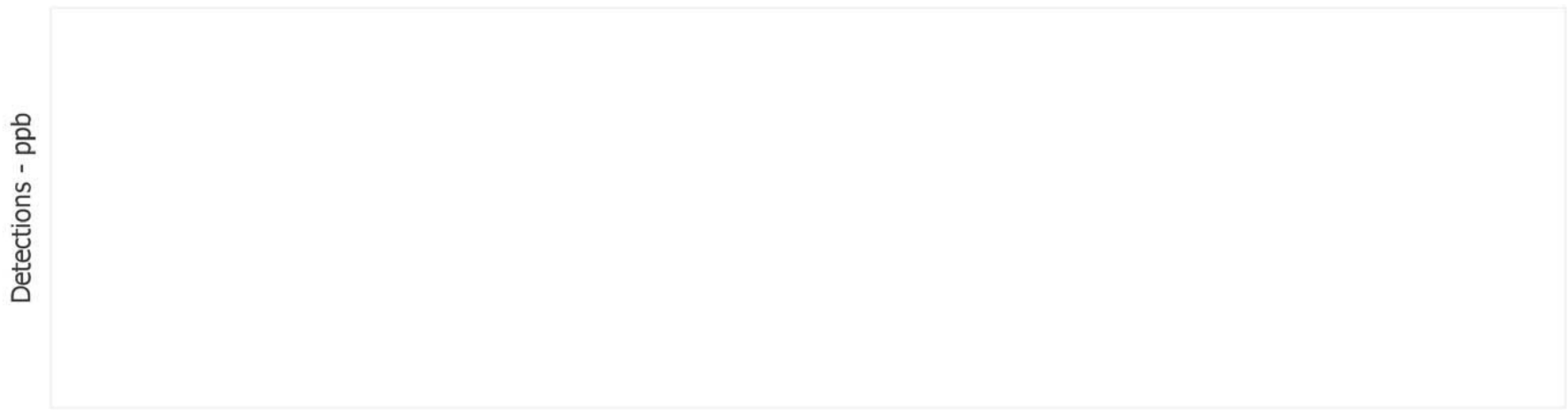
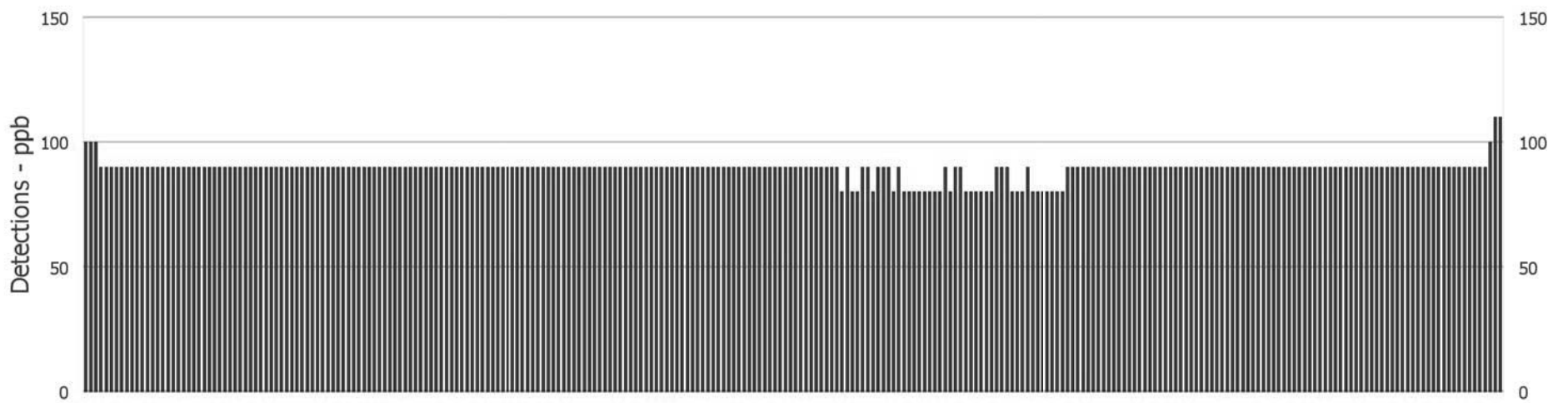
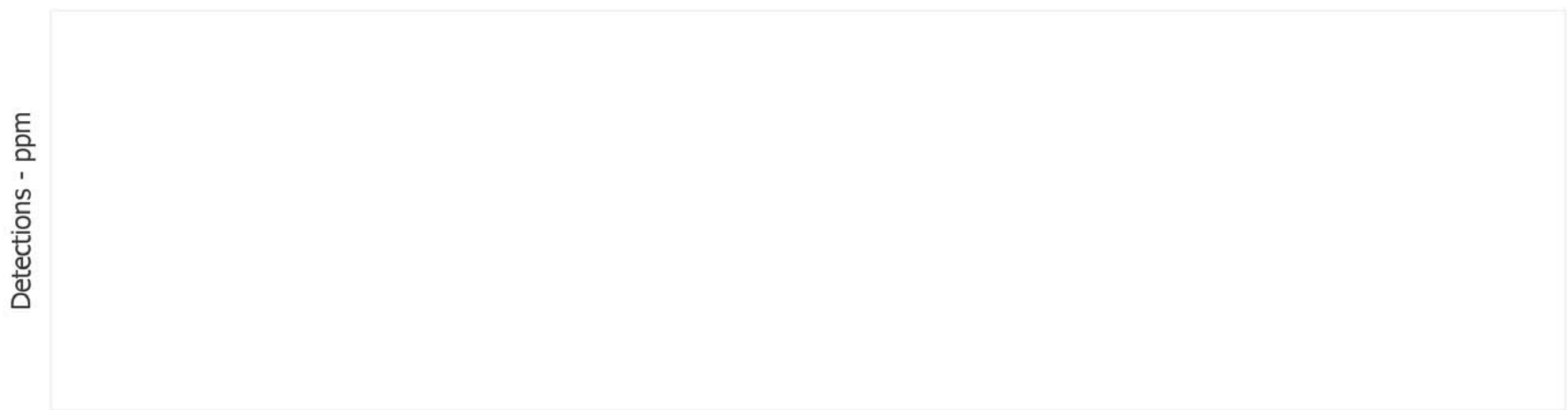


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 23

EventKey 2015/12/10 12:43:59...12:54:46 HLGC 10.6eV Event

H2S Electrochemical Detections

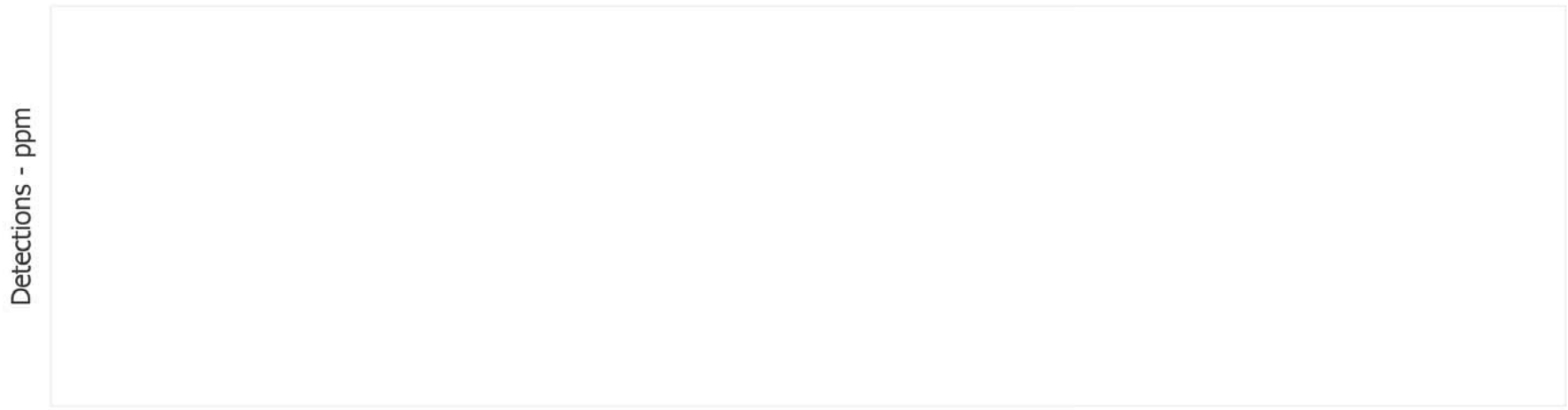


Photo-ionization (<11.7 eV nominal) Detections

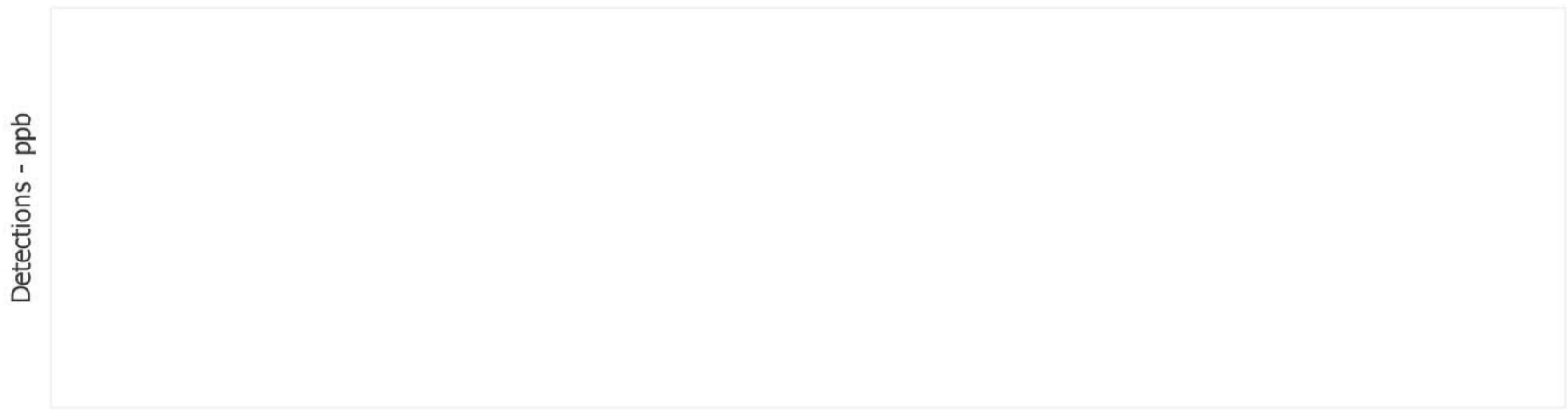
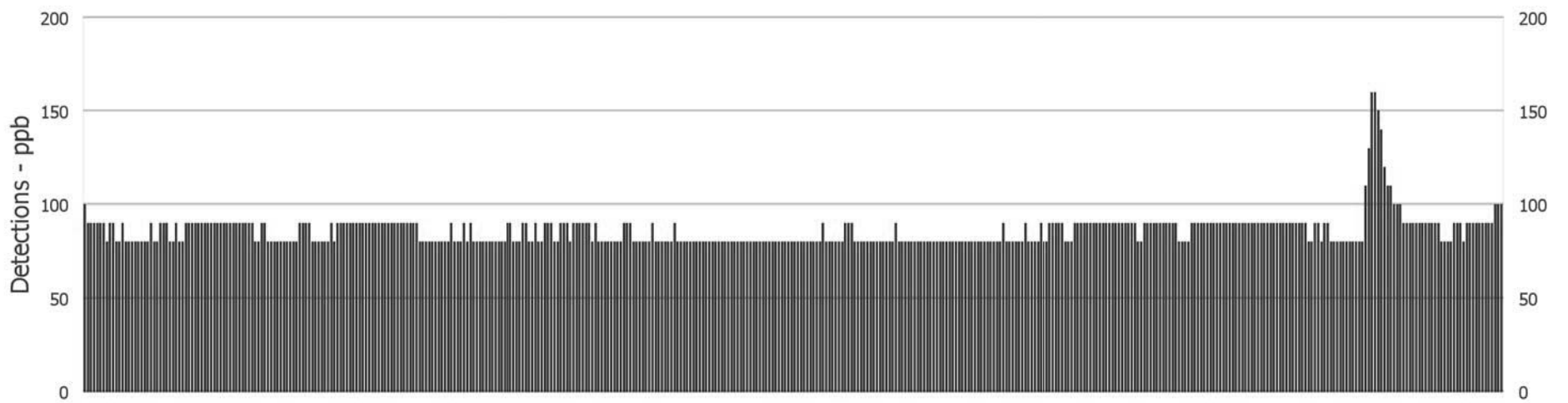
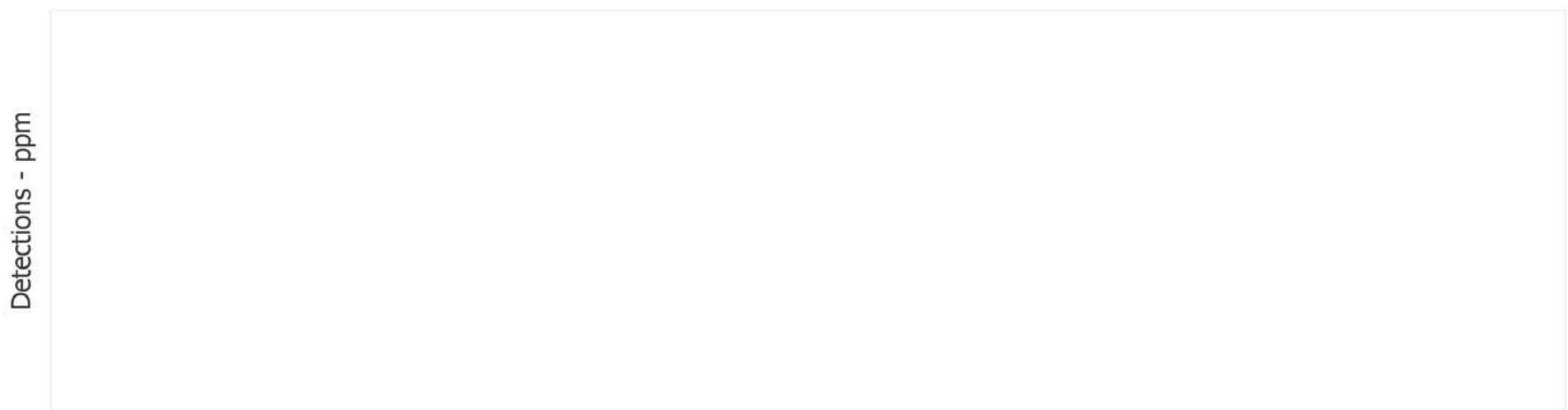


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 24

EventKey 2015/12/10 13:51:47...14:36:55 HGLC 10.6eV Event

H2S Electrochemical Detections

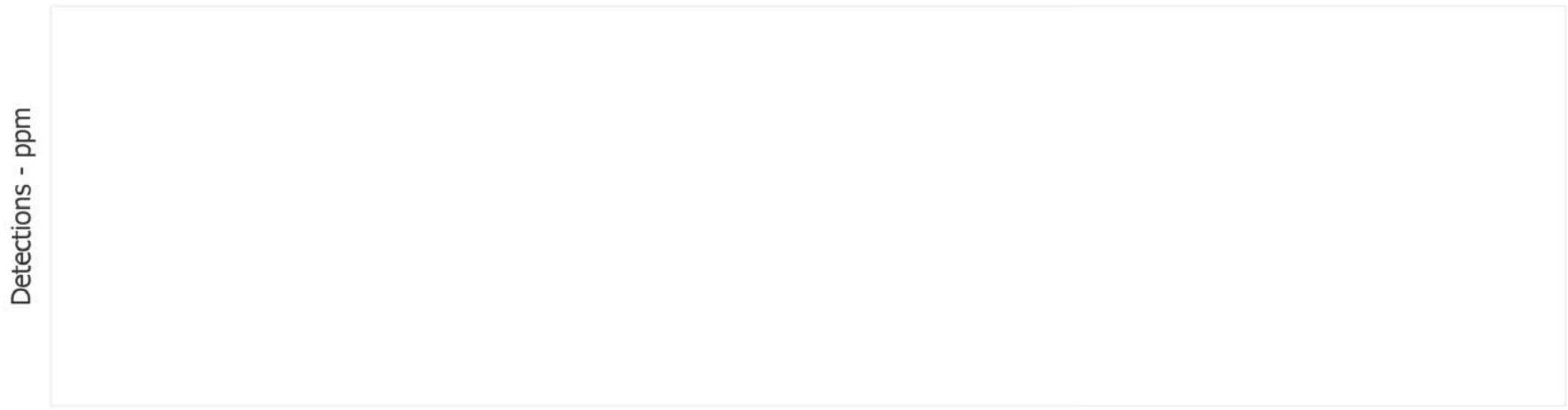


Photo-ionization (<11.7 eV nominal) Detections

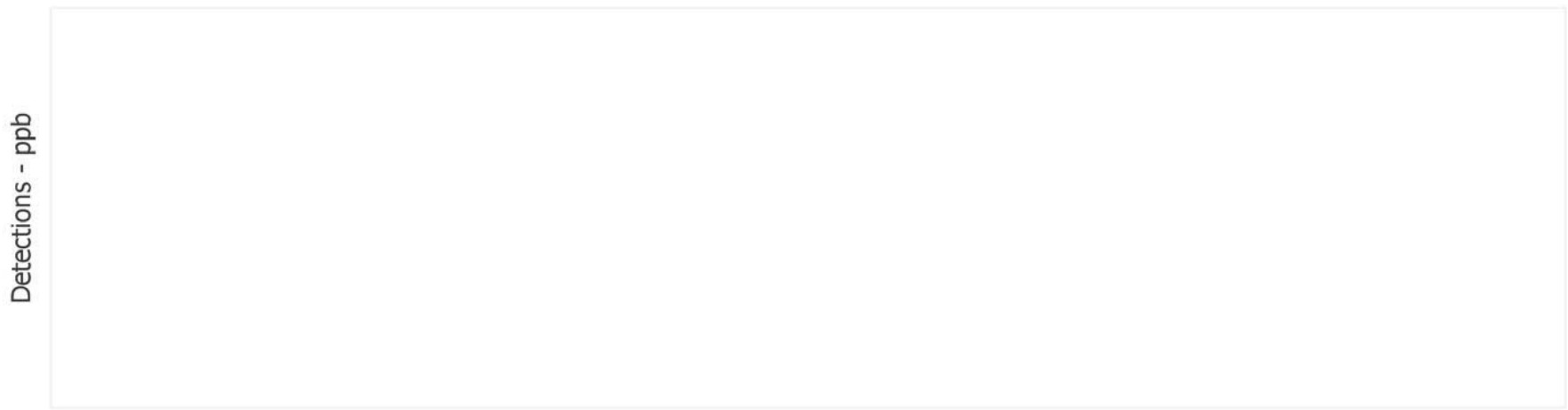
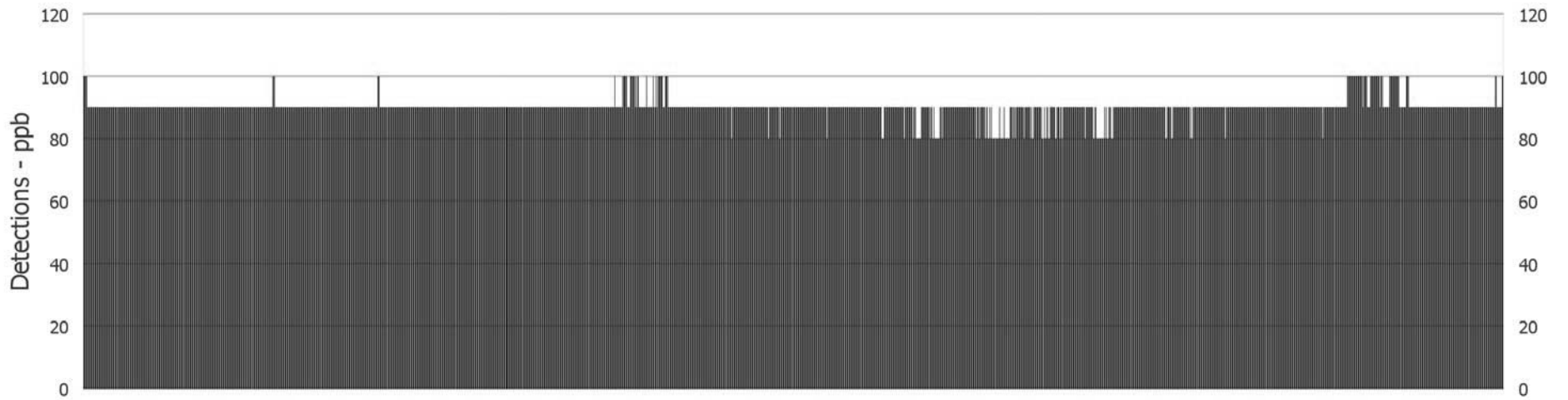
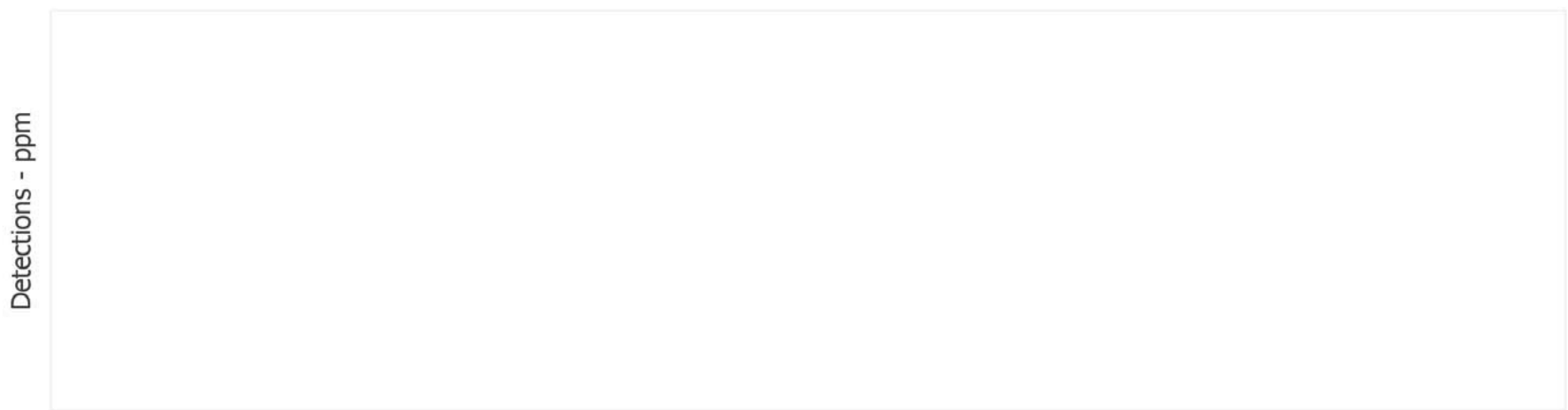


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 25

EventKey 2015/12/17 23:15:11...23:44:42 HLGC 106eV, 11.7eV Events

H2S Electrochemical Detections

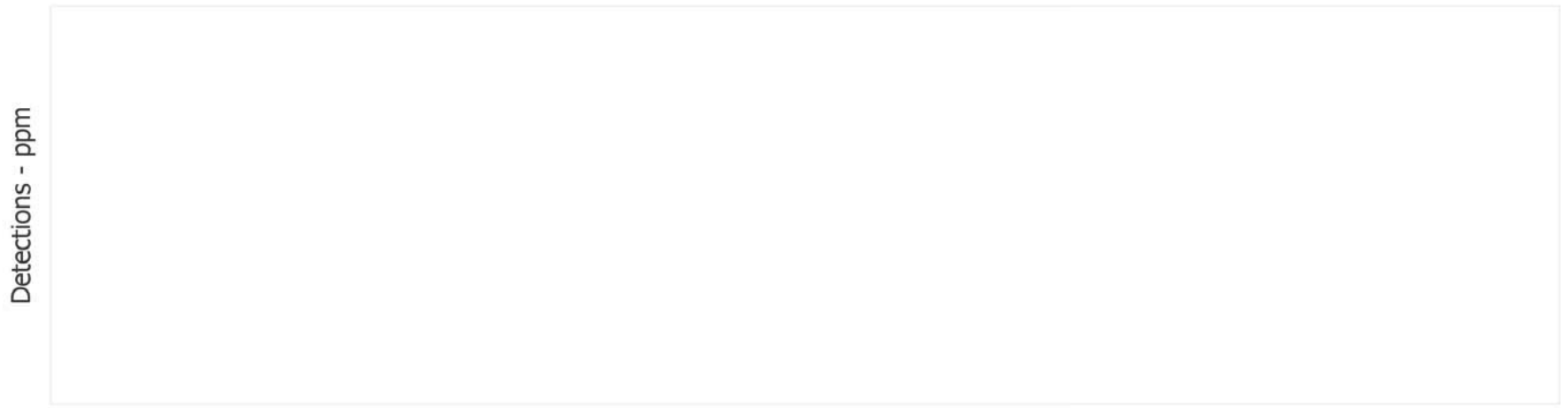


Photo-ionization (<11.7 eV nominal) Detections

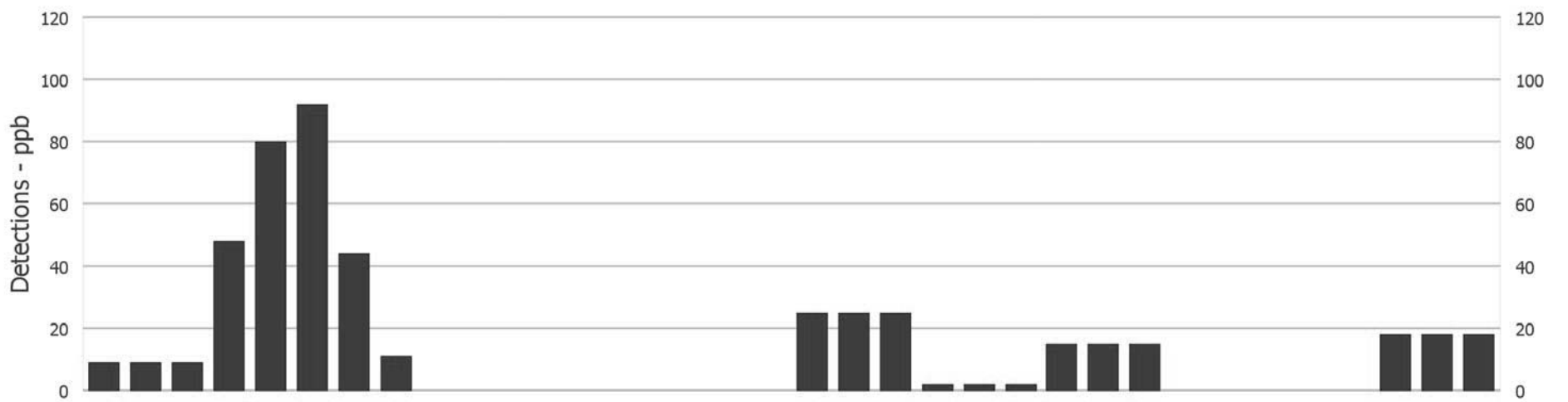
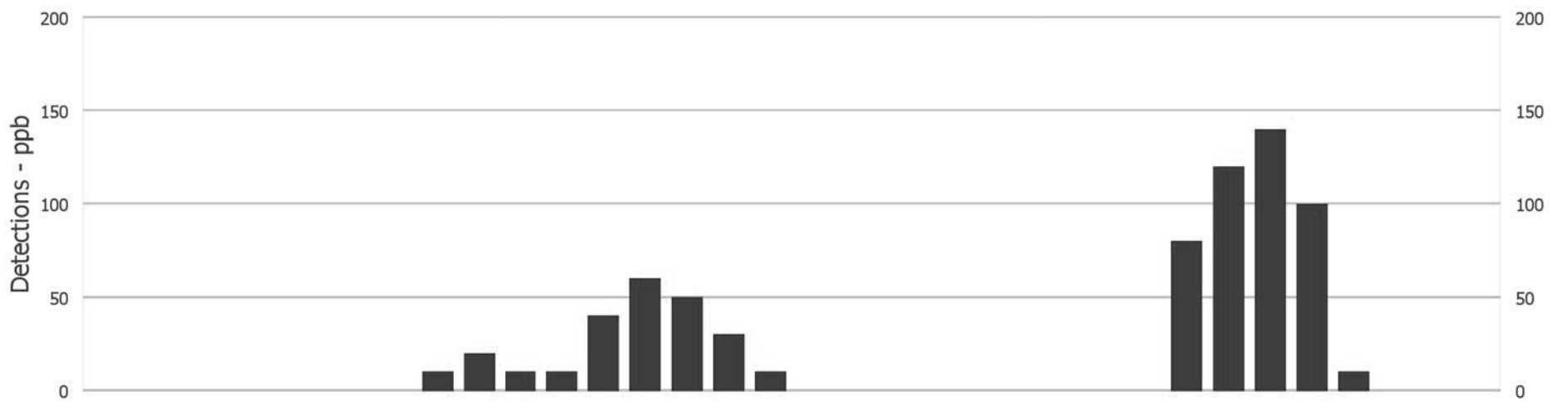
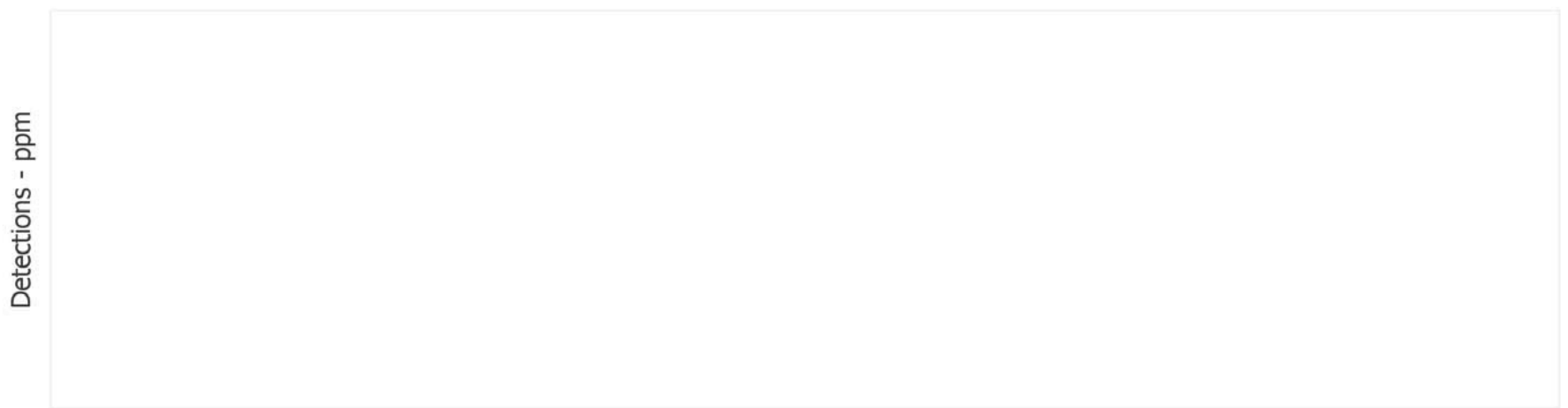


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 26

EventKey 2015/12/19 12:30:12...12:59:35 HLGC 10.6eV Event

H2S Electrochemical Detections

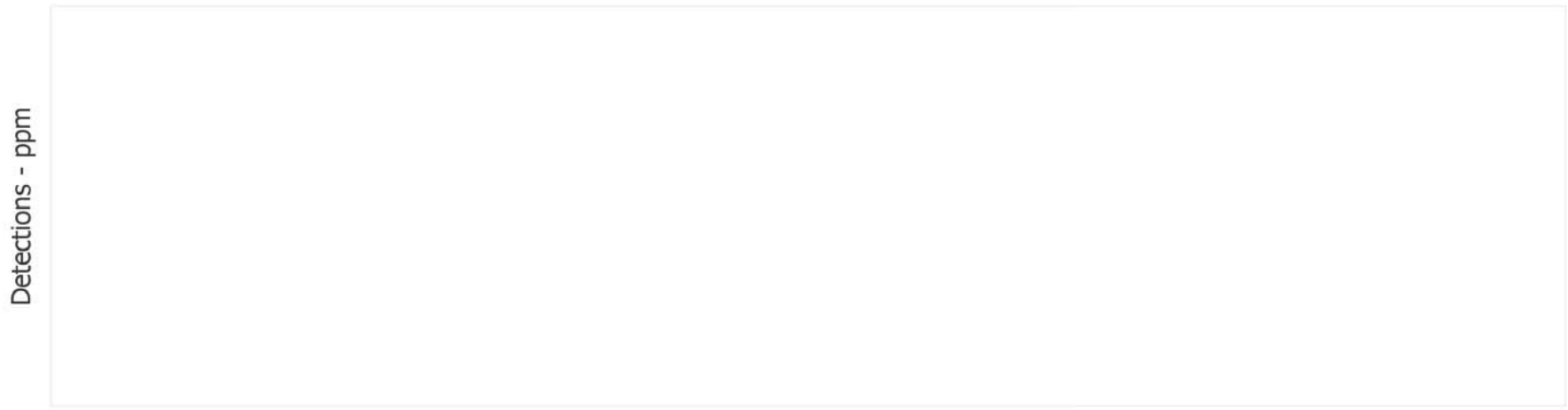


Photo-ionization (<11.7 eV nominal) Detections

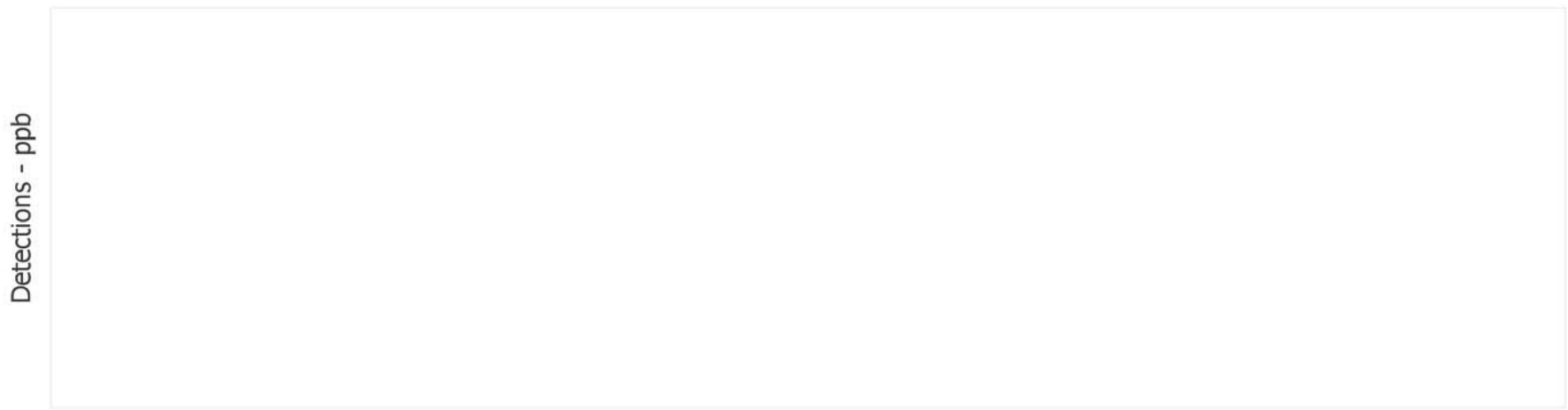
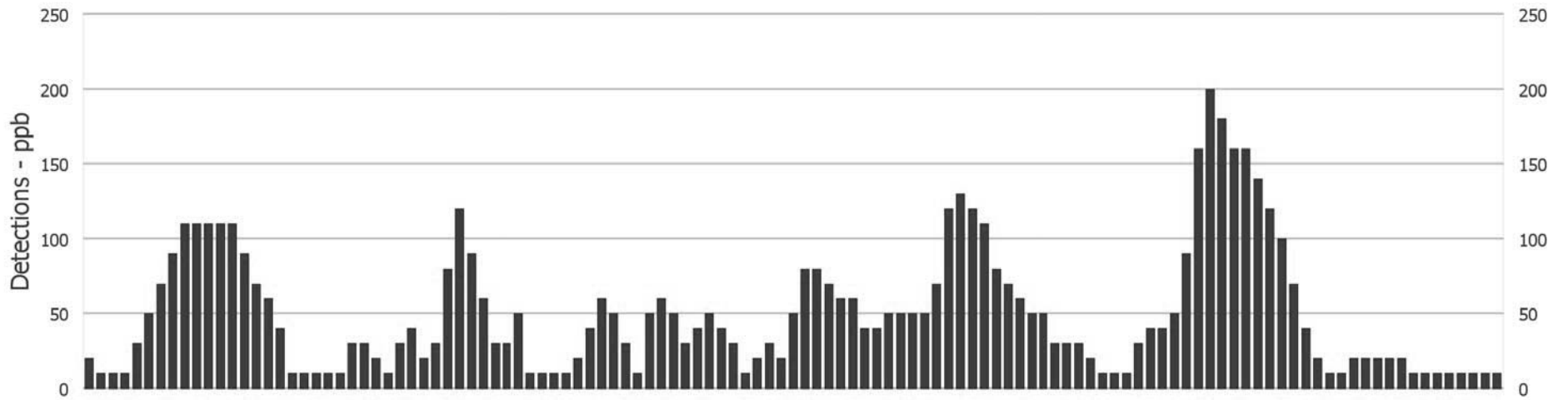
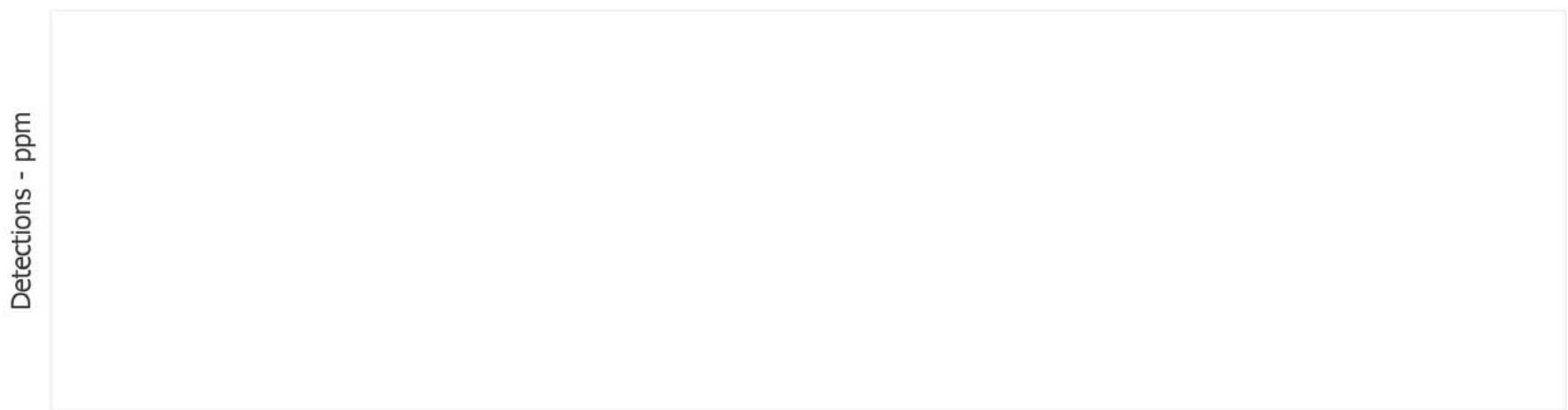


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 27

EventKey 2015/12/22 08:08:05...08:40:40 HLGC 10.6eV Event

H2S Electrochemical Detections

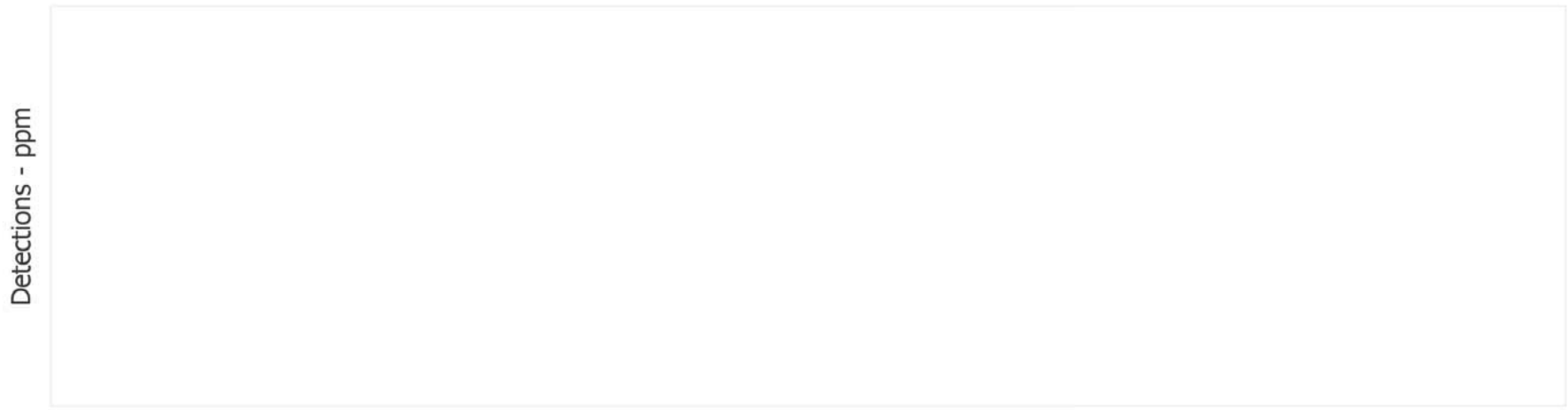


Photo-ionization (<11.7 eV nominal) Detections

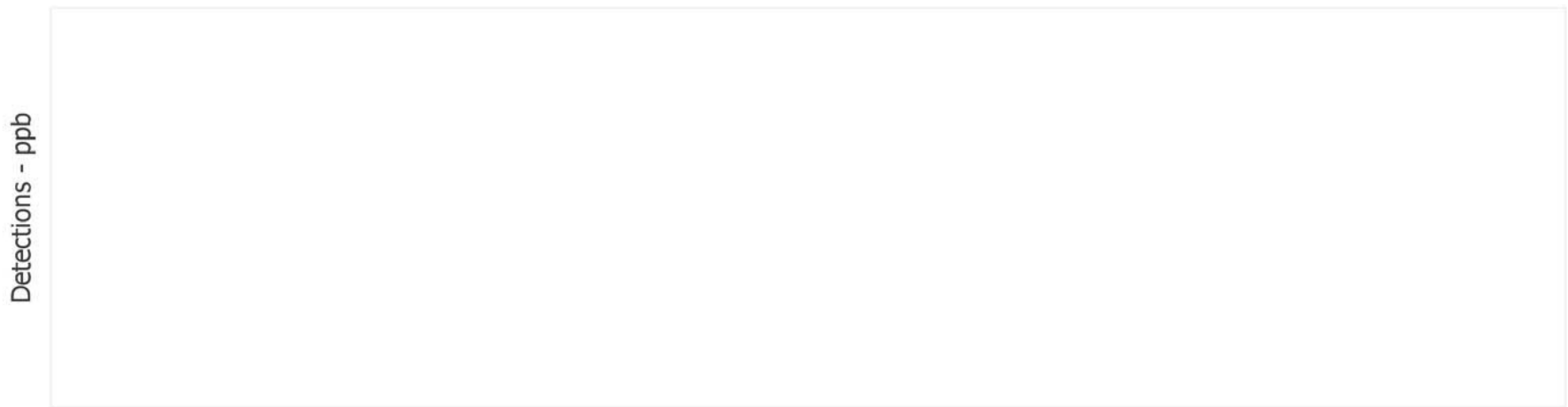
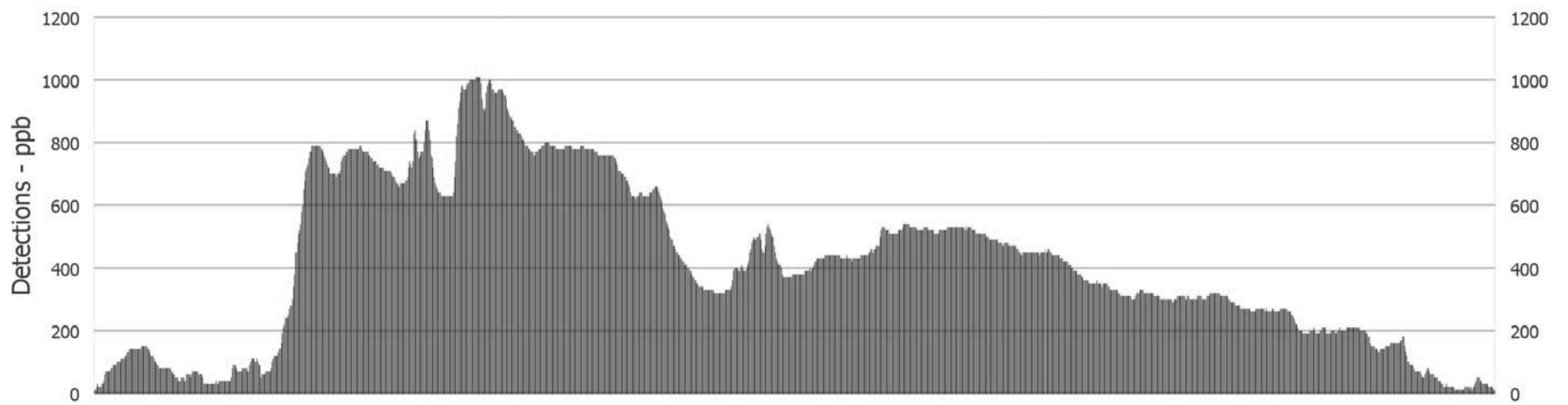
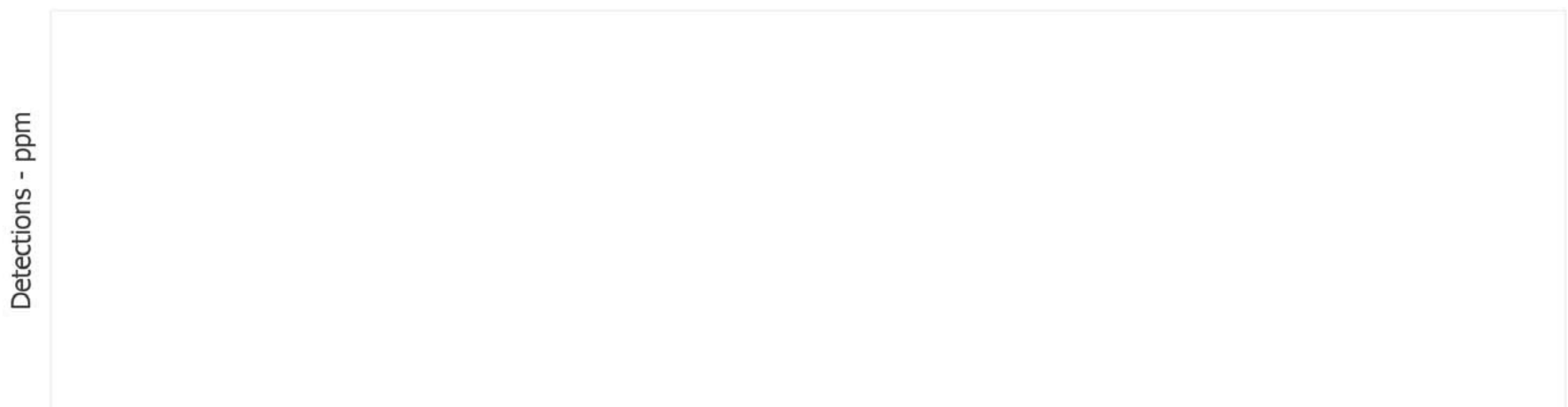


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 28

Monitoring Event (from Table 5.1): 2015/12/27 15:28:07...23:59:59 JBMI 11.7eV Event

H2S Electrochemical Detections

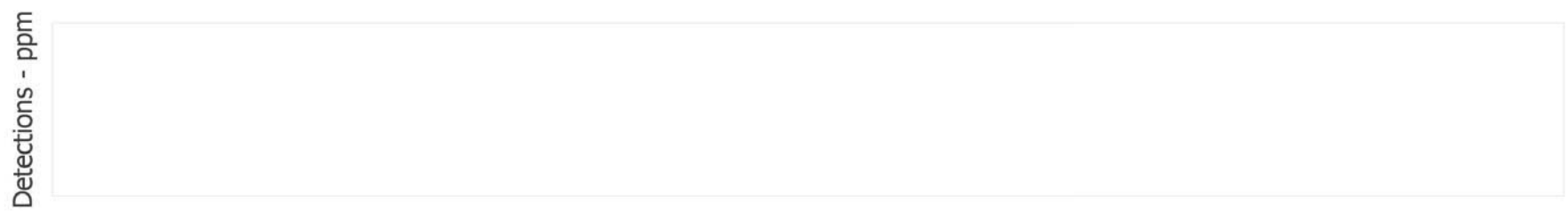


Photo-ionization (<11.7 eV nominal) Detections

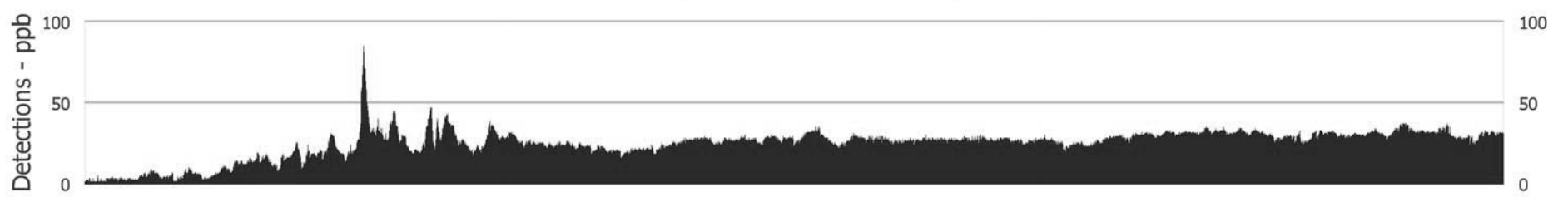
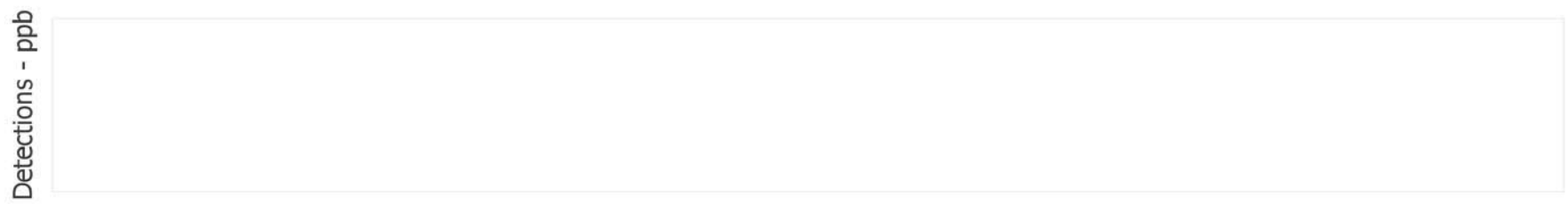
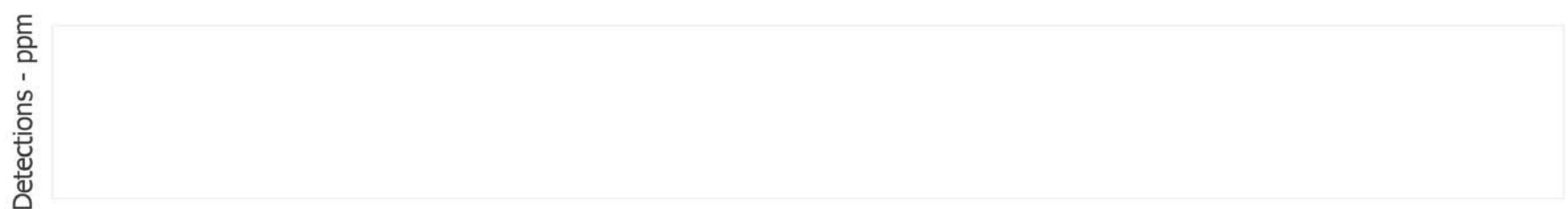


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 29

Monitoring Event (from Table 5.1): 2015/12/28 00:00:00...23:59:59 JBMI 11.7eV Event

H2S Electrochemical Detections

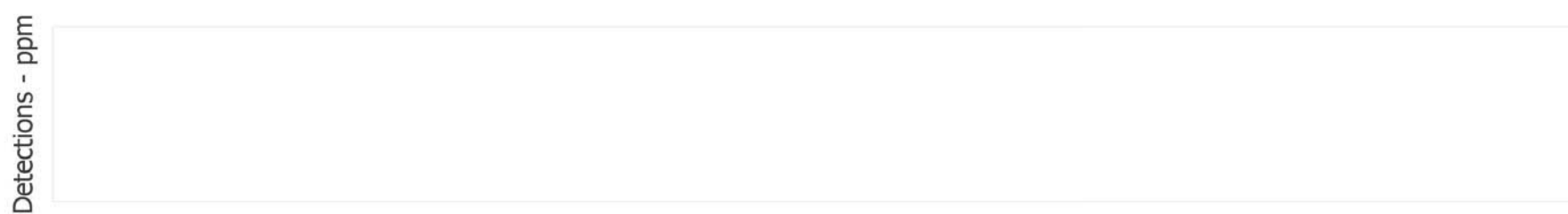


Photo-ionization (<11.7 eV nominal) Detections

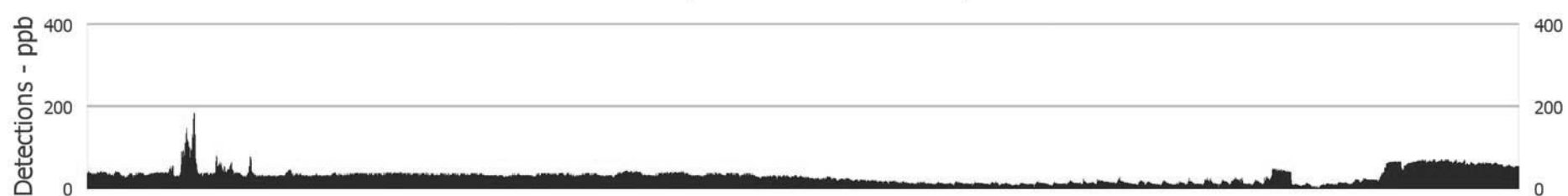
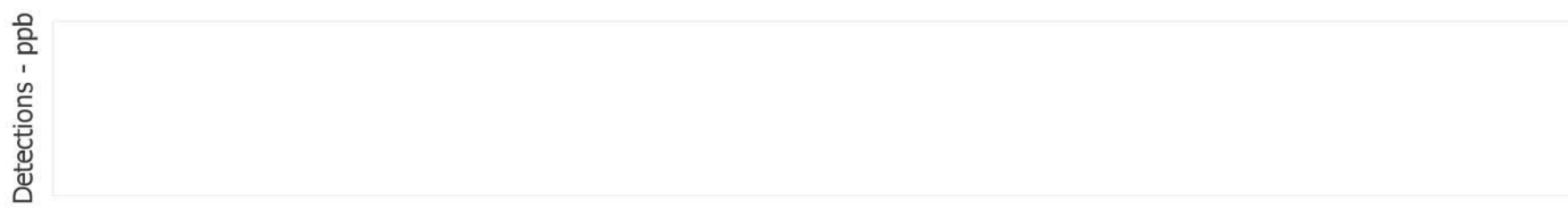
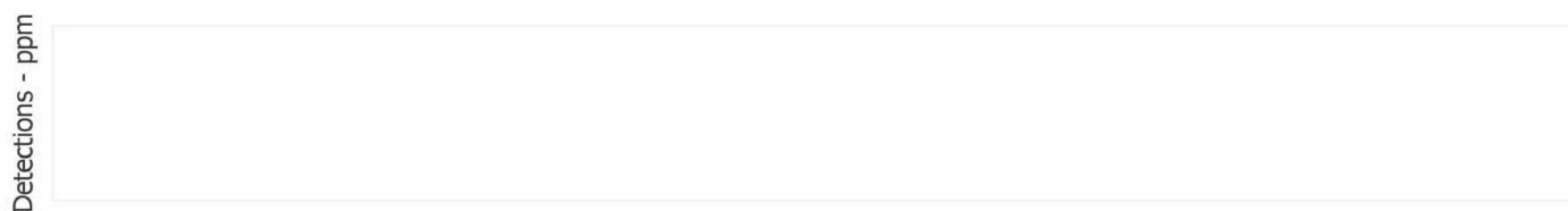


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 30

Monitoring Event (from Table 5.1): 2015/12/29 00:00:00...23:59:59 JBMI 11.7eV Event

H2S Electrochemical Detections

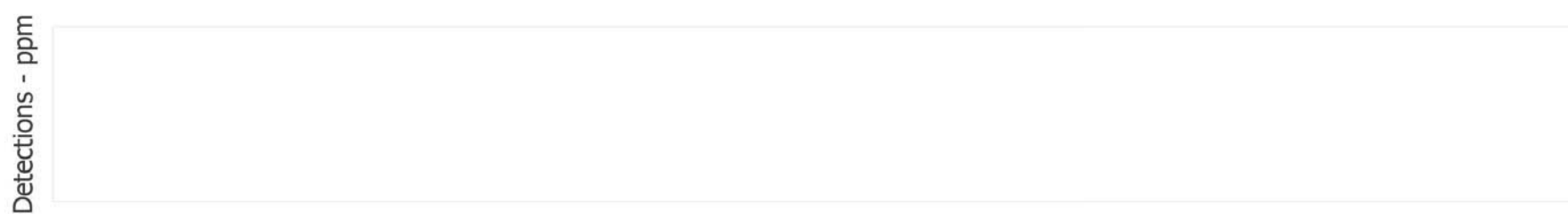


Photo-ionization (<11.7 eV nominal) Detections

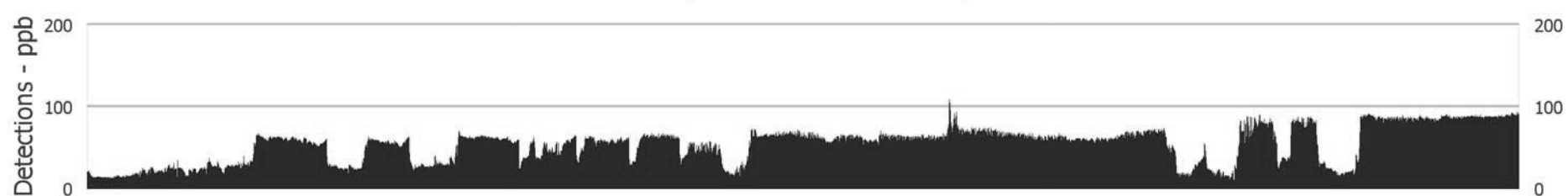
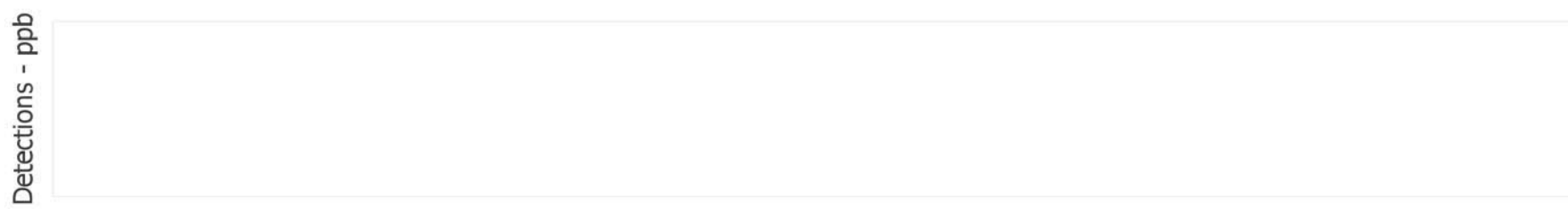
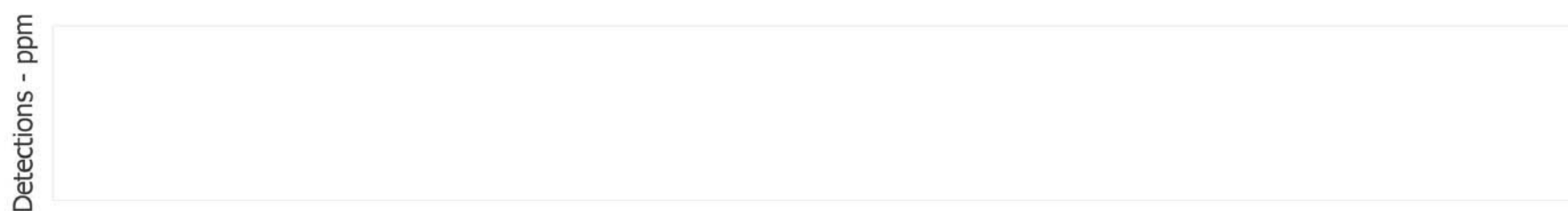


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 31

Monitoring Event (from Table 5.1): 2015/12/30 00:00:00...14:34:02 JBMI 11.7eV Event

H2S Electrochemical Detections

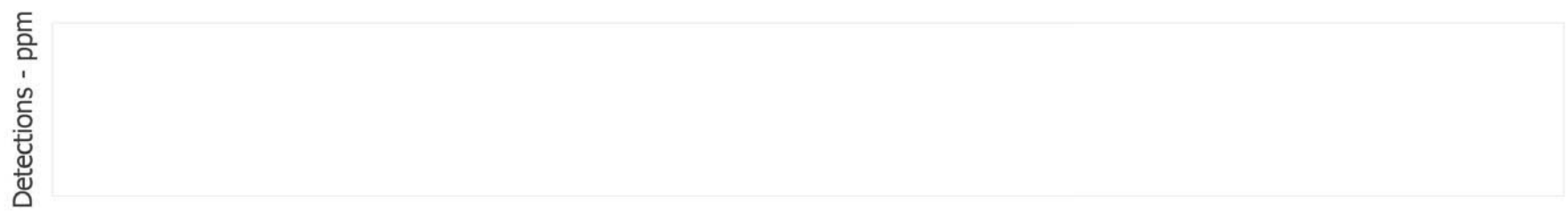


Photo-ionization (<11.7 eV nominal) Detections

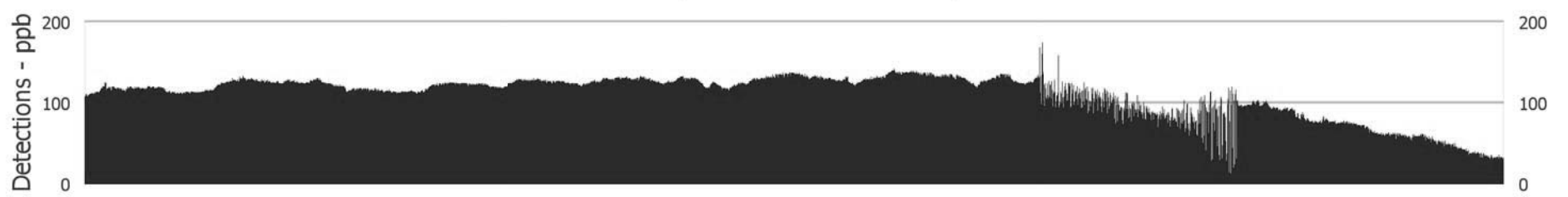
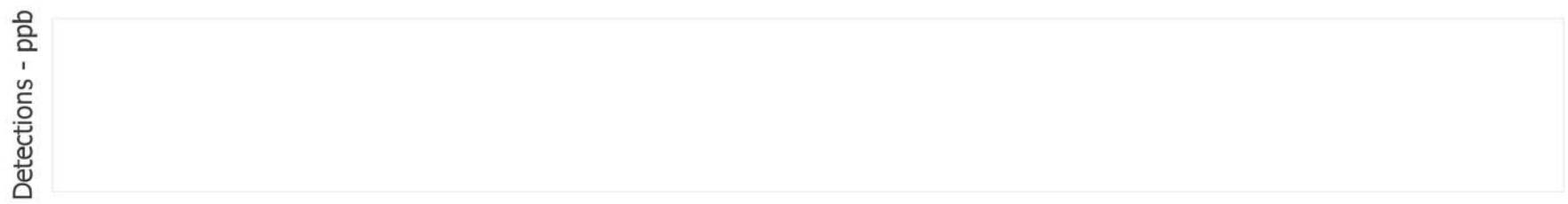
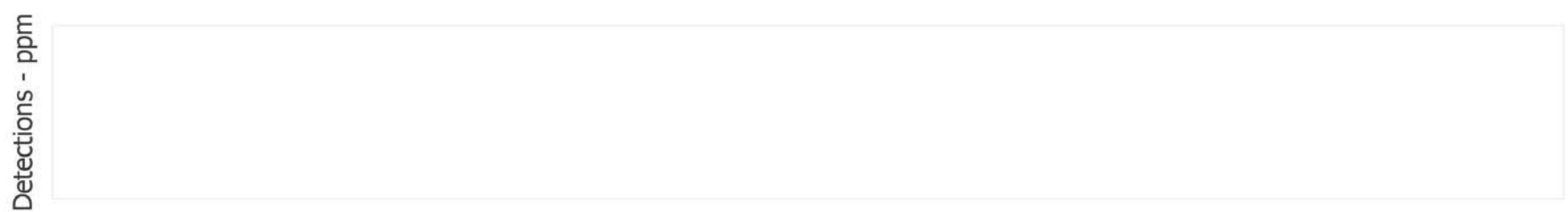


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 32

Monitoring Event (from Table 5.1): 2015/12/30 14:34:03...15:42:58 JBMI Engine Event

H2S Electrochemical Detections

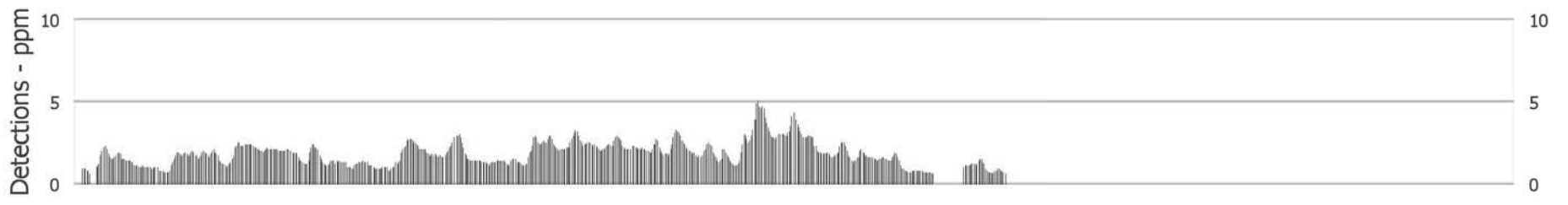


Photo-ionization (<11.7 eV nominal) Detections

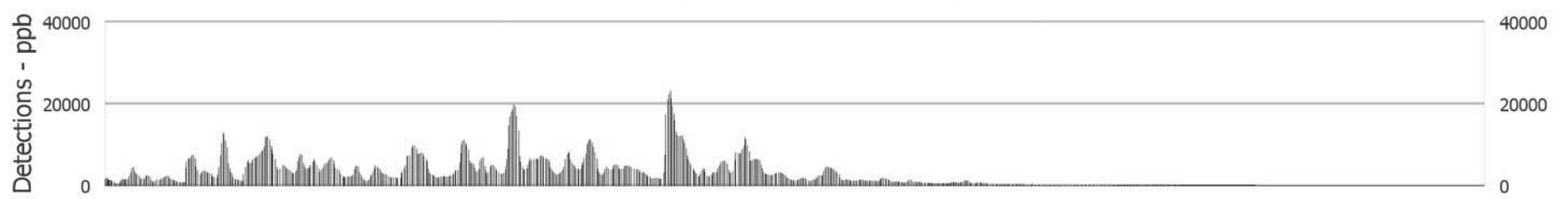
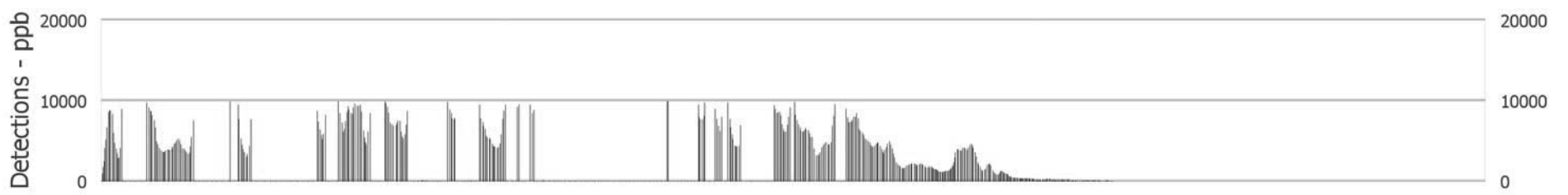
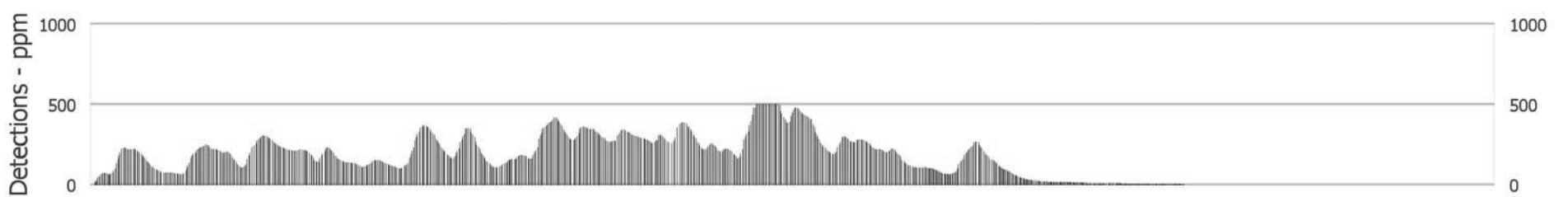


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 33

Monitoring Event (from Table 5.1): 2015/12/30 15:42:59...23:59:59 JBMI 11.7eV Event

H2S Electrochemical Detections

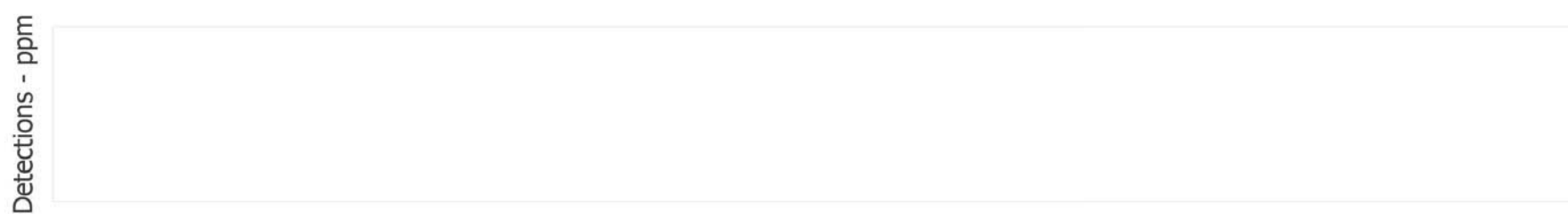


Photo-ionization (<11.7 eV nominal) Detections

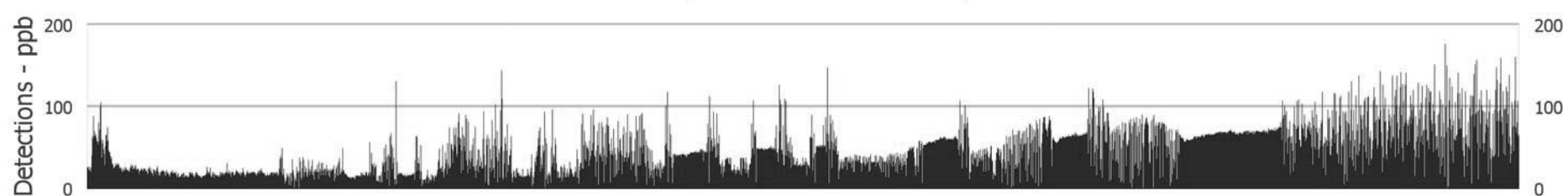
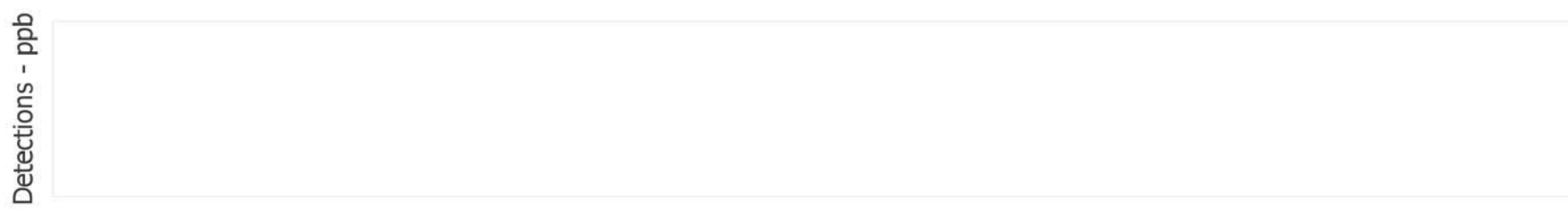
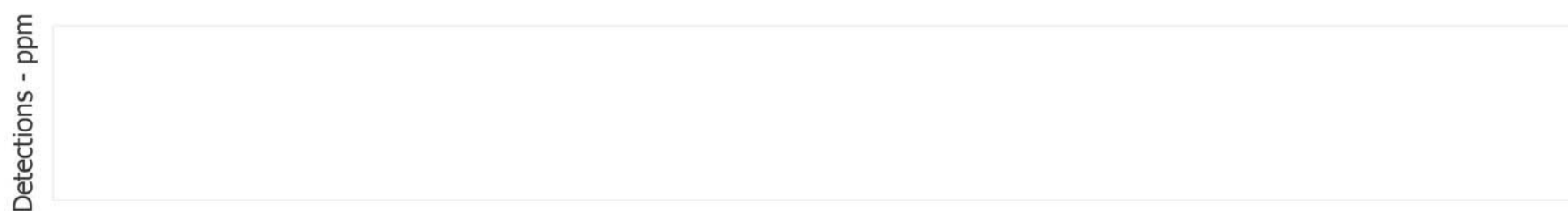


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 34

Monitoring Event (from Table 5.1): 2016/01/08 00:00:00...12:54:01 JBMI 11.7eV Event

H2S Electrochemical Detections

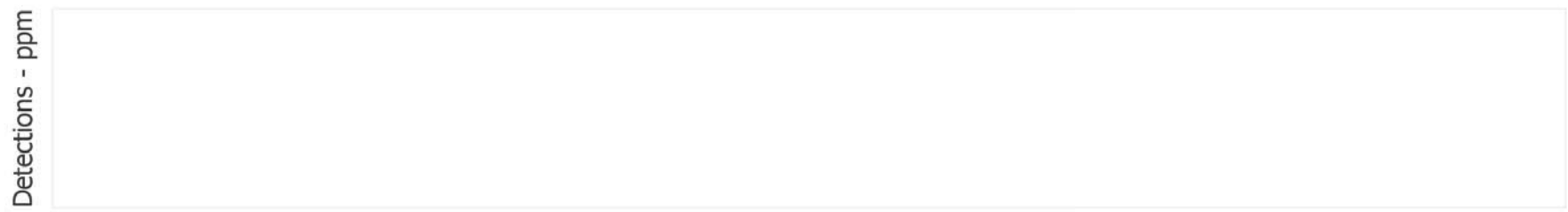


Photo-ionization (<11.7 eV nominal) Detections

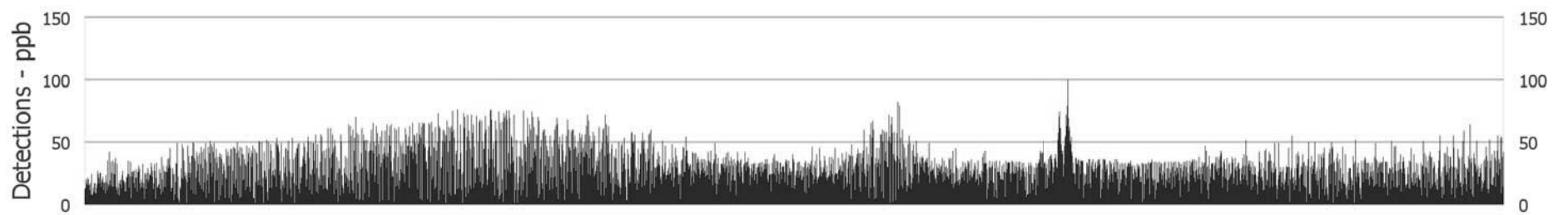
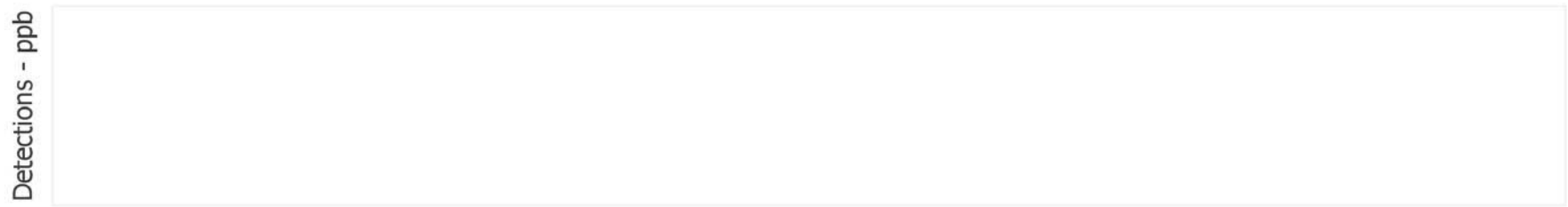
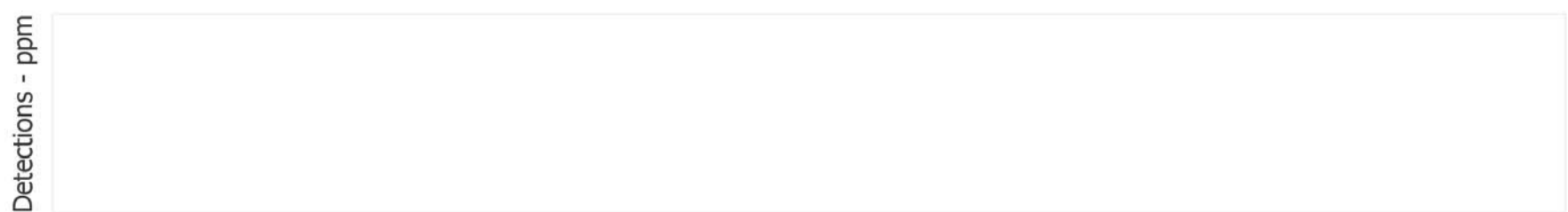


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 35

Monitoring Event (from Table 5.1): 2016/01/08 13:59:58...14:06:36 JBMI 11.7eV Test

H2S Electrochemical Detections

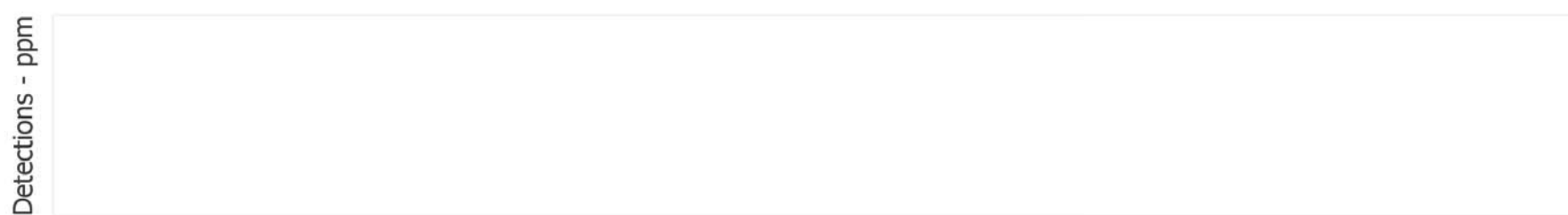


Photo-ionization (<11.7 eV nominal) Detections

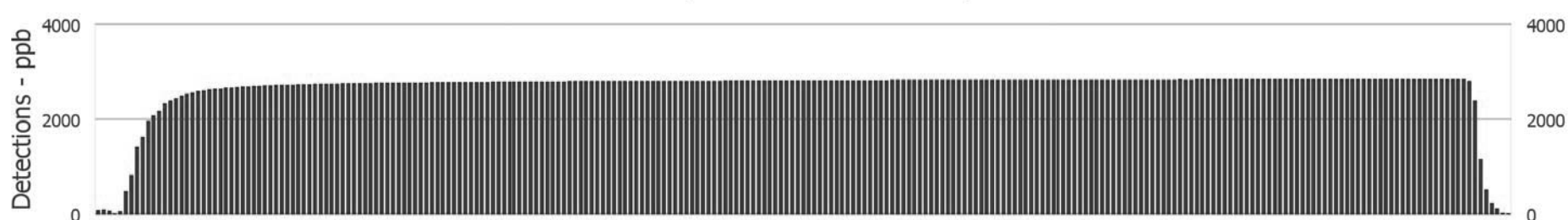
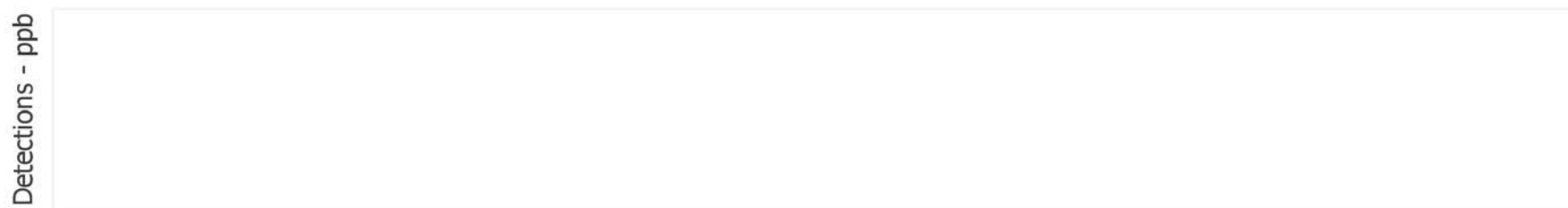
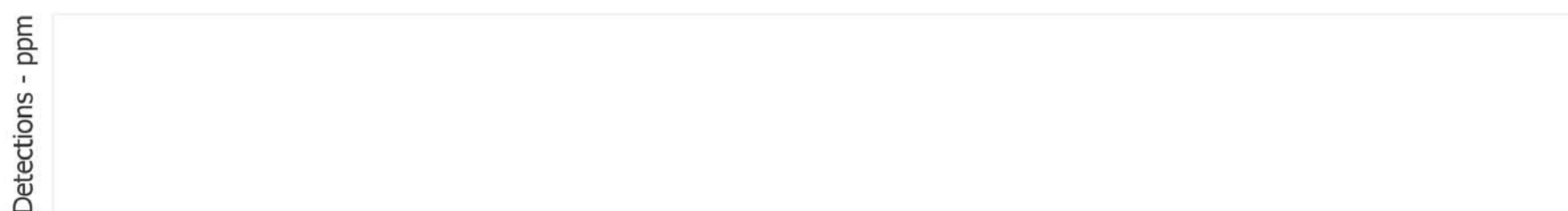


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



Jantzen Beach Air Release Site - Selected Viper Network Data Chart 36

Monitoring Event (from Table 5.1): 2016/01/08 14:11:12...14:21:38 JBMI 10.6eV Test

H2S Electrochemical Detections



Photo-ionization (<11.7 eV nominal) Detections

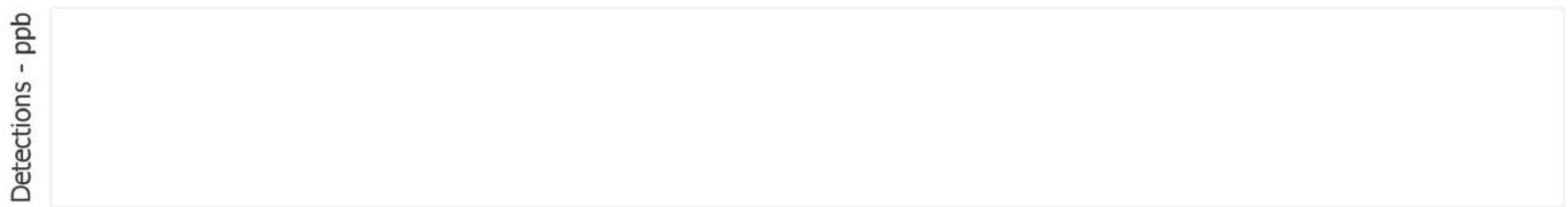
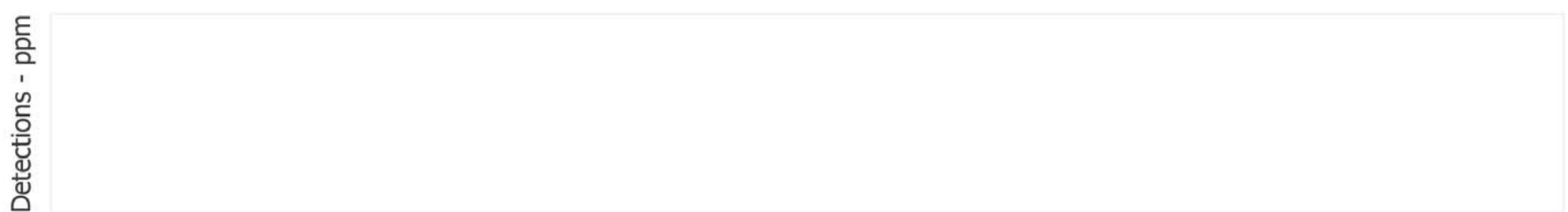


Photo-ionization (<10.6 eV nominal) Detections



Carbon Monoxide Electrochemical Detections



ATTACHMENT 1
Photographic Documentation

***Jantzen Beach Air Testing
Trip Report***

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Photo 1 EPA and START assess the viability of locating a fixed Viper air monitoring station at the City of Portland Force Avenue sewer pump station.

Direction: Northwest *Date:* 11/3/15 *Time:* 10:51



Photo 2 Monitoring for sewer gas emissions from a city of Portland sewer lid located along Force Avenue.

Direction: West *Date:* 11/3/15 *Time:* 10:53



Photo 3 Monitoring effluent vapors from an open pipe on the west shoulder of Force Ave. The City of Portland later determined that it was related to the sewer and had been damaged.

Direction: Down *Date:* 11/3/15 *Time:* 11:02

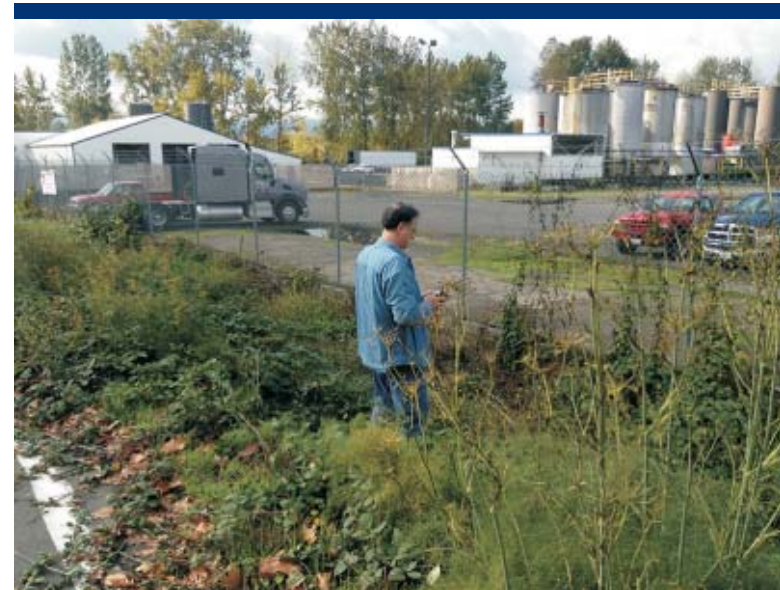


Photo 4 Monitoring effluent vapors from an open pipe on the west shoulder of Force Ave. The City of Portland later determined that it was related to the sewer and had been damaged.

Direction: Southwest *Date:* 11/3/15 *Time:* 11:03



Photo 5 EPA monitoring sewer gas vapors from City of Portland sewer lid openings on Force Avenue.

Direction: Southwest *Date:* 11/3/15 *Time:* 11:08



Photo 6 Location that START and EPA were permitted to use at Jantzen Beach Moorage Inc. for installation of a Viper fixed monitoring station.

Direction: East *Date:* 11/3/15 *Time:* 13:26



Photo 7 View of Columbia River and a personal vessel from the JB01 Viper fixed monitoring station location.

Direction: Southwest *Date:* 11/3/15 *Time:* 13:27



Photo 8 Mobile monitoring near Class Harbor floating home community.

Direction: North *Date:* 11/3/15 *Time:* 14:01

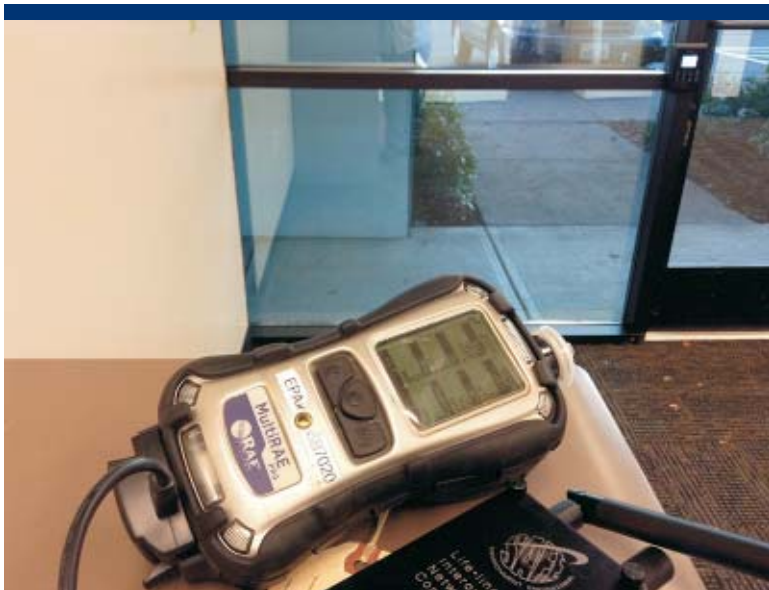


Photo 9 Instrument used for mobile monitoring inside an office used by Expeditors personnel. Elevated CO was detected and the information was shared with their manager.

Direction: North Date: 11/3/15 Time: 16:27



Photo 10 Instrument used for mobile vapor monitoring on Force Avenue during a moment when a sweet-solvent or glycol odor was detected.

Direction: Down Date: 11/10/15 Time: 09:10

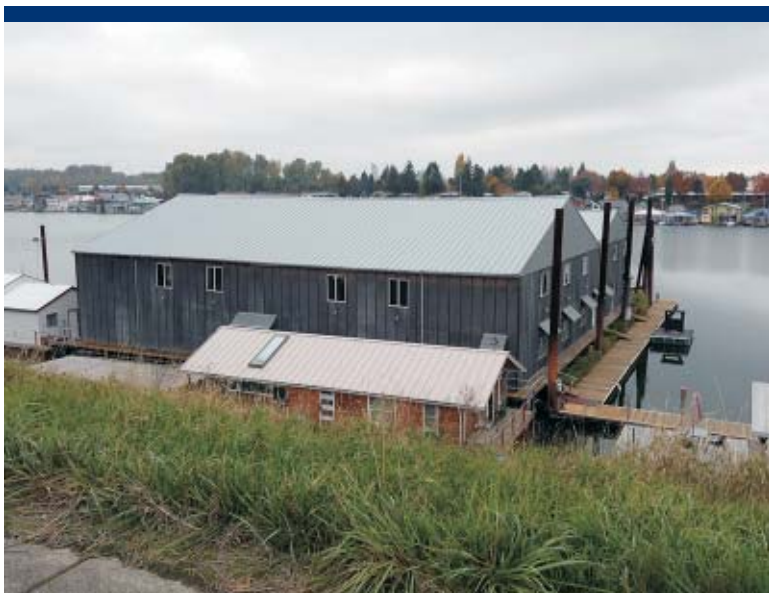


Photo 11 Scouting for potential Viper fixed air monitoring station location at Blue Heron Landing floating home community.

Direction: North Date: 11/10/15 Time: 13:51

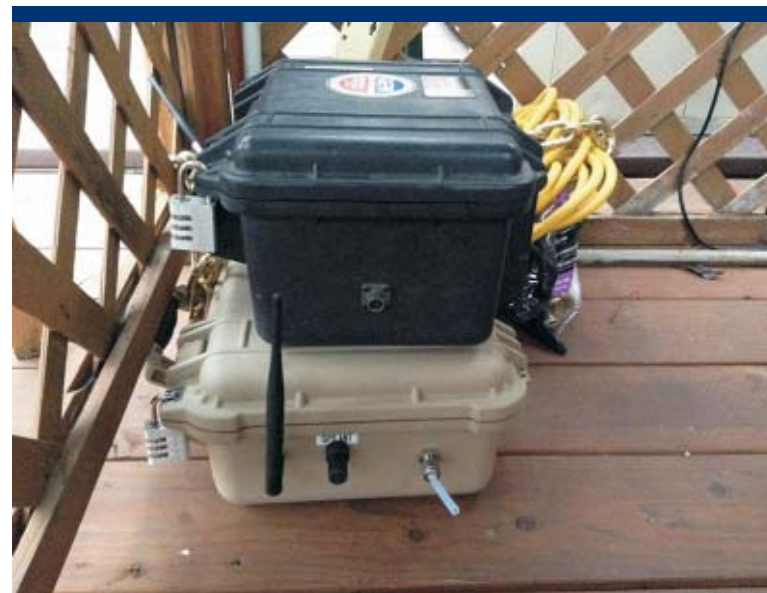


Photo 12 Initial installation of Viper fixed air monitoring station at JB01 at Jantzen Beach Moorage, Inc. (JBMI).

Direction: North Date: 11/10/15 Time: 16:36

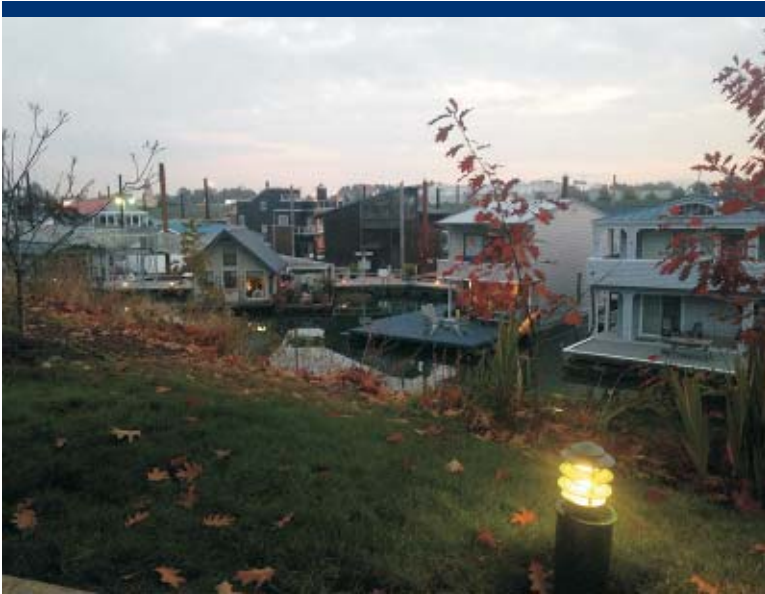


Photo 13 View of JBMI floating home community with Marine Drive areas visible on opposite bank of Columbia River.

Direction: Southeast Date: 11/10/15 Time: 16:55



Photo 14 Initial viper deployment at HLGC maintenance facility.

Direction: East Date: 11/13/15 Time: 11:05



Photo 15 Mobile monitoring on North Hayden Island Drive. Natural gas or mercaptan type odors were noted near here.

Direction: South Date: 11/17/15 Time: 16:22

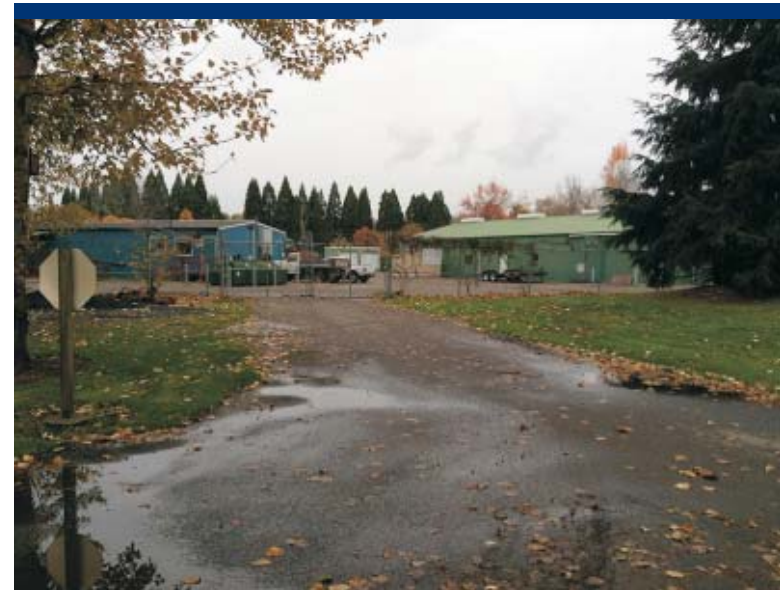


Photo 16 View of Heron Lakes Golf Course maintenance area.

Direction: Northwest Date: 11/18/15 Time: 15:49



Photo 17 View of a facility on Force Avenue.

Direction: West

Date: 11/18/15

Time: 15:53



Photo 19 New AST arriving at APES.

Direction: West

Date: 12/7/15

Time: 14:08



Photo 18 Mobile air monitoring on Force Ave.

Direction: West

Date: 12/7/15

Time: 12:22



Photo 20 APES lot inundated with stormwater.

Direction: West

Date: 12/7/15

Time: 14:09

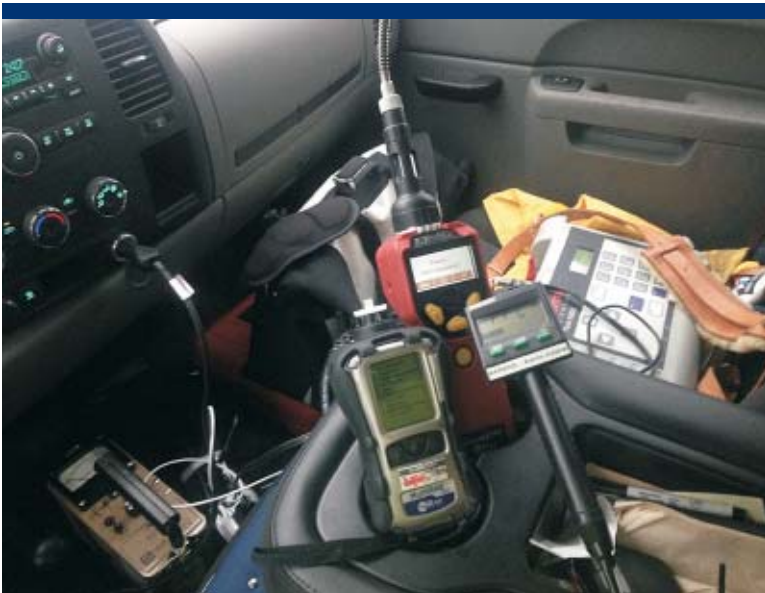


Photo 22 Air monitoring instruments being readied for mobile monitoring event.

Direction: Down

Date: 12/10/15

Time: 14:26



Photo 21 Peak gamma detection believed to be sensor error. Peak VOC due to bump test.

Direction: Down

Date: 12/7/15

Time: 14:48



Photo 23 Umbrella used to protect Viper station while it is opened for maintenance.
Direction: Southwest *Date:* 12/11/15 *Time:* 12:54



Photo 24 Mobile air monitoring west of Suttle Rd at Smith and Bybee Wetland Natural Area on a public access road.
Direction: Northwest *Date:* 12/11/15 *Time:* 15:08



Photo 25 View of Viper Station JB01 at the Jantzen Beach Moorage Inc floating home community.

Direction: Northwest

Date: 12/14/15

Time: 16:42



Photo 26 Heron Lakes Golf Course (HLGC) Viper Station JB02.

Direction: South

Date: 12/15/15

Time: 12:47



Photo 27 Oregon DEQ weather station has been installed on top of storage building at Heron Lakes Golf Course near Viper Station JB02.

Direction: Southwest *Date:* 12/15/15 *Time:* 12:52



Photo 28 Vacuum canister (connected to Snapper control box) deployed at Heron Lakes Golf course at Viper station JB02.

Direction: Down *Date:* 12/15/15 *Time:* 12:56



Photo 29 Vacuum canister (connected to Snapper control box)
deployed at Jantzen Beach Moorage Inc at Viper station JB01.
Direction: Down Date: 12/15/15 Time: 15:45

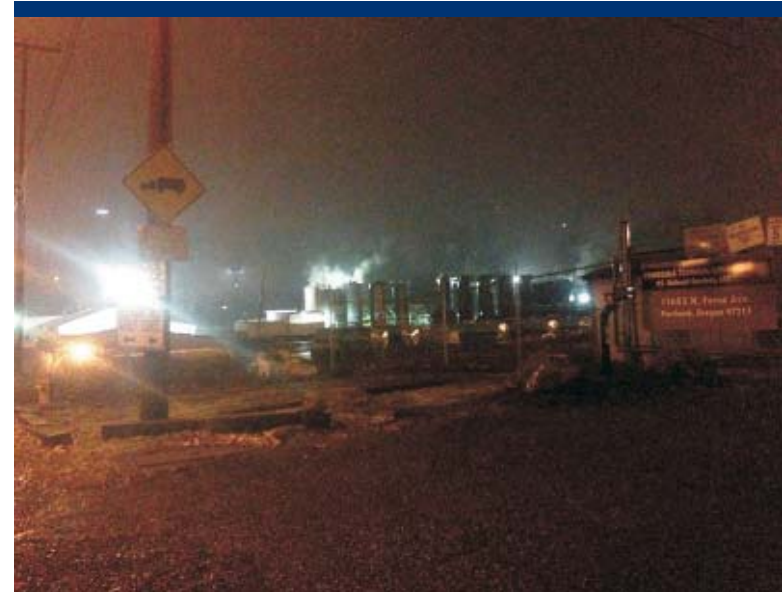


Photo 30 Emission observed from stacks at American Petroleum
Environmental Services from a short distance to the
northeast on Force Avenue.

Direction: Southwest Date: 12/27/15 Time: 18:31



Photo 31 Air samples being prepared for shipment to the analytical laboratory from the EPA Portland Response Center.

Direction: Down

Date: 12/28/15

Time: 09:12



Photo 32 Viper station at JB02 is disassembled and water is visible in bottom of enclosure (not from leakage, but from condensation).

Direction: Down

Date: 1/8/16

Time: 12:42

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ATTACHMENT 2
Laboratory Data and Validation Memoranda

***Jantzen Beach Air Testing
Trip Report***

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ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: January 6, 2016

TO: Ryan Whitchurch, START-IV Project Manager, E & E, Portland, Oregon

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Organic Data Quality Assurance Review, Jantzen Beach Air Release Site, Portland, Oregon**

REF: TDD: 15-09-0003 PAN: 1004530.0004.119.01

The data quality assurance review of three air samples collected from the Jantzen Beach Air Release site in Portland, Oregon, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method TO-15) was performed by ALS, Inc., Simi Valley, California. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered: 15121001 15121002 15121003

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were collected on December 22, 2015, and were analyzed on December 29, 2015, therefore meeting QC criteria of less than 30 days between collection and analysis.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 24-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All Relative Standard Deviations (RSDs) were within the QC limits of $\leq 30\%$.

4. Continuing Calibration: Acceptable.

All % differences were within the QC limits of $\leq 30\%$.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards were within QC limits.

9. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

10. Overall Assessment of Data for Use

Sample 15121003 is a field blank. Positive field sample results less than five times the positive field blank results were qualified as not detected (U).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, August 2014". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

- U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- JH - The result is an estimated quantity, but the result may be biased high.
- JL - The result is an estimated quantity, but the result may be biased low.
- JK - The result is an estimated quantity, but the result may have an unknown bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

- NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.
- UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R - The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- C - The target Pesticide or Aroclor analyte identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

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RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121001
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00549

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.77 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.18

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	1.9 U	0.59	1.1 U	0.34	
75-71-8	Dichlorodifluoromethane (CFC 12)	2.2	0.59	0.45	0.12	
74-87-3	Chloromethane	0.32	0.24	0.15	0.11	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.59 U	ND	0.084 U	
75-01-4	Vinyl Chloride	ND	0.12	ND	0.046	
106-99-0	1,3-Butadiene	ND	0.24	ND	0.11	
74-83-9	Bromomethane	ND	0.24	ND	0.061	
75-00-3	Chloroethane	ND	0.24	ND	0.089	
64-17-5	Ethanol	7.5	5.9	4.0	3.1	
75-05-8	Acetonitrile	ND	0.59 U	ND	0.35	
107-02-8	Acrolein	ND	2.4	ND	1.0	
67-64-1	Acetone	ND	5.9	ND	2.5	
75-69-4	Trichlorofluoromethane	1.3	0.12	0.23	0.021	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.9 U	ND	2.4 U	
107-13-1	Acrylonitrile	ND	0.59	ND	0.27	
75-35-4	1,1-Dichloroethene	ND	0.12	ND	0.030	
75-09-2	Methylene Chloride	1.1	0.59	0.31	0.17	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.12 U	ND	0.038 U	
76-13-1	Trichlorotrifluoroethane	0.45	0.12	0.059	0.015	
75-15-0	Carbon Disulfide	ND	5.9 U	ND	1.9 U	
156-60-5	trans-1,2-Dichloroethene	ND	0.12	ND	0.030	
75-34-3	1,1-Dichloroethane	ND	0.12	ND	0.029	
1634-04-4	Methyl tert-Butyl Ether	ND	0.12	ND	0.033	
108-05-4	Vinyl Acetate	ND	5.9	ND	1.7	
78-93-3	2-Butanone (MEK)	ND	5.9 U	ND	2.0 U	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

MW 1-6-16

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121001
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00549

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.77 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.18

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.12	ND	0.030	U
141-78-6	Ethyl Acetate	ND	1.2	ND	0.33	U
110-54-3	n-Hexane	1.6	0.59	0.45	0.17	U
67-66-3	Chloroform	0.12	0.12	0.025	0.024	U
109-99-9	Tetrahydrofuran (THF)	ND	0.59	ND	0.20	U
107-06-2	1,2-Dichloroethane	ND	0.12	ND	0.029	U
71-55-6	1,1,1-Trichloroethane	ND	0.12	ND	0.022	U
71-43-2	Benzene	1.5	0.12	0.46	0.037	U
56-23-5	Carbon Tetrachloride	0.42	0.12	0.067	0.019	U
110-82-7	Cyclohexane	ND	1.2	ND	0.34	U
78-87-5	1,2-Dichloropropane	ND	0.12	ND	0.026	U
75-27-4	Bromodichloromethane	ND	0.12	ND	0.018	U
79-01-6	Trichloroethene	0.21	0.12	0.039	0.022	U
123-91-1	1,4-Dioxane	ND	0.59	ND	0.16	U
80-62-6	Methyl Methacrylate	ND	1.2	ND	0.29	U
142-82-5	n-Heptane	1.0	0.59	0.25	0.14	U
10061-01-5	cis-1,3-Dichloropropene	ND	0.59	ND	0.13	U
108-10-1	4-Methyl-2-pentanone	ND	0.59	ND	0.14	U
10061-02-6	trans-1,3-Dichloropropene	ND	0.59	ND	0.13	U
79-00-5	1,1,2-Trichloroethane	ND	0.12	ND	0.022	U
108-88-3	Toluene	4.9	0.59	1.3	0.16	U
591-78-6	2-Hexanone	ND	0.59	ND	0.14	U
124-48-1	Dibromochloromethane	ND	0.12	ND	0.014	U
106-93-4	1,2-Dibromoethane	ND	0.12	ND	0.015	U
123-86-4	n-Butyl Acetate	1.1	0.59	0.24	0.12	U

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121001
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00549

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.77 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.18

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.59	ND	0.13	U
127-18-4	Tetrachloroethene	0.19	0.12	0.029	0.017	
108-90-7	Chlorobenzene	ND	0.12	ND	0.026	U
100-41-4	Ethylbenzene	0.87	0.59	0.20	0.14	
179601-23-1	m,p-Xylenes	3.1	0.59	0.71	0.14	U
75-25-2	Bromoform	ND	0.59	ND	0.057	U
100-42-5	Styrene	ND	0.59	ND	0.14	U
95-47-6	o-Xylene	1.1	0.59	0.24	0.14	
111-84-2	n-Nonane	ND	0.59	ND	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.12	ND	0.017	U
98-82-8	Cumene	ND	0.59	ND	0.12	U
80-56-8	alpha-Pinene	0.75	0.59	0.13	0.11	
103-65-1	n-Propylbenzene	ND	0.59	ND	0.12	U
622-96-8	4-Ethyltoluene	ND	0.59	ND	0.12	U
108-67-8	1,3,5-Trimethylbenzene	ND	0.59	ND	0.12	U
95-63-6	1,2,4-Trimethylbenzene	1.0	0.59	0.21	0.12	
100-44-7	Benzyl Chloride	ND	0.59	ND	0.11	U
541-73-1	1,3-Dichlorobenzene	ND	0.12	ND	0.020	U
106-46-7	1,4-Dichlorobenzene	ND	0.12	ND	0.020	U
95-50-1	1,2-Dichlorobenzene	ND	0.12	ND	0.020	U
5989-27-5	d-Limonene	0.79	0.59	0.14	0.11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.59	ND	0.061	U
120-82-1	1,2,4-Trichlorobenzene	ND	0.59	ND	0.080	U
91-20-3	Naphthalene	ND	0.59	ND	0.11	U
87-68-3	Hexachlorobutadiene	ND	0.59	ND	0.055	U

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121002
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00166

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.54 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.29

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	1.9 U	0.65	1.1 U	0.37	
75-71-8	Dichlorodifluoromethane (CFC 12)	2.0	0.65	0.40	0.13	
74-87-3	Chloromethane	0.28	0.26	0.14	0.12	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.65	ND	0.092	
75-01-4	Vinyl Chloride	ND	0.13	ND	0.050	
106-99-0	1,3-Butadiene	ND	0.26	ND	0.12	
74-83-9	Bromomethane	ND	0.26	ND	0.066	
75-00-3	Chloroethane	ND	0.26	ND	0.098	
64-17-5	Ethanol	9.6 U	6.5	5.1	3.4	
75-05-8	Acetonitrile	ND	0.65	ND	0.38	
107-02-8	Acrolein	ND	2.6	ND	1.1	
67-64-1	Acetone	ND	6.5	ND	2.7	
75-69-4	Trichlorofluoromethane	1.2	0.13	0.21	0.023	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	6.5	ND	2.6	
107-13-1	Acrylonitrile	ND	0.65	ND	0.30	
75-35-4	1,1-Dichloroethene	ND	0.13	ND	0.033	
75-09-2	Methylene Chloride	1.8	0.65	0.52	0.19	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.13	ND	0.041	
76-13-1	Trichlorotrifluoroethane	0.50	0.13	0.065	0.017	
75-15-0	Carbon Disulfide	ND	6.5	ND	2.1	
156-60-5	trans-1,2-Dichloroethene	ND	0.13	ND	0.033	
75-34-3	1,1-Dichloroethane	ND	0.13	ND	0.032	
1634-04-4	Methyl tert-Butyl Ether	ND	0.13	ND	0.036	
108-05-4	Vinyl Acetate	ND	6.5	ND	1.8	
78-93-3	2-Butanone (MEK)	ND	6.5	ND	2.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121002
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00166

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.54 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.29

CAS #	Compound	Result	MRL	Result	MRL	Data Qualifier
		µg/m ³	µg/m ³	ppbV	ppbV	
156-59-2	cis-1,2-Dichloroethene	ND	0.13	ND	0.033	
141-78-6	Ethyl Acetate	10	1.3	2.9	0.36	
110-54-3	n-Hexane	1.8	0.65	0.50	0.18	
67-66-3	Chloroform	0.14	0.13	0.028	0.026	
109-99-9	Tetrahydrofuran (THF)	ND	0.65	ND	0.22	
107-06-2	1,2-Dichloroethane	ND	0.13	ND	0.032	
71-55-6	1,1,1-Trichloroethane	ND	0.13	ND	0.024	
71-43-2	Benzene	1.4	0.13	0.45	0.040	
56-23-5	Carbon Tetrachloride	0.44	0.13	0.070	0.021	
110-82-7	Cyclohexane	ND	1.3	ND	0.37	
78-87-5	1,2-Dichloropropane	ND	0.13	ND	0.028	
75-27-4	Bromodichloromethane	ND	0.13	ND	0.019	
79-01-6	Trichloroethene	0.28	0.13	0.051	0.024	
123-91-1	1,4-Dioxane	ND	0.65	ND	0.18	
80-62-6	Methyl Methacrylate	ND	1.3	ND	0.32	
142-82-5	n-Heptane	1.1	0.65	0.28	0.16	
10061-01-5	cis-1,3-Dichloropropene	ND	0.65	ND	0.14	
108-10-1	4-Methyl-2-pentanone	ND	0.65	ND	0.16	
10061-02-6	trans-1,3-Dichloropropene	ND	0.65	ND	0.14	
79-00-5	1,1,2-Trichloroethane	ND	0.13	ND	0.024	
108-88-3	Toluene	5.0	0.65	1.3	0.17	
591-78-6	2-Hexanone	ND	0.65	ND	0.16	
124-48-1	Dibromochloromethane	ND	0.13	ND	0.015	
106-93-4	1,2-Dibromoethane	ND	0.13	ND	0.017	
123-86-4	n-Butyl Acetate	1.2	0.65	0.25	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121002
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00166

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.54 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.29

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.65	ND	0.14	
127-18-4	Tetrachloroethene	0.20	0.13	0.029	0.019	
108-90-7	Chlorobenzene	ND	0.13	ND	0.028	
100-41-4	Ethylbenzene	0.88	0.65	0.20	0.15	
179601-23-1	m,p-Xylenes	3.1	0.65	0.72	0.15	
75-25-2	Bromoform	ND	0.65	ND	0.062	
100-42-5	Styrene	ND	0.65	ND	0.15	
95-47-6	o-Xylene	1.1	0.65	0.26	0.15	
111-84-2	n-Nonane	ND	0.65	ND	0.12	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.13	ND	0.019	
98-82-8	Cumene	ND	0.65	ND	0.13	
80-56-8	alpha-Pinene	ND	0.65	ND	0.12	
103-65-1	n-Propylbenzene	ND	0.65	ND	0.13	
622-96-8	4-Ethyltoluene	ND	0.65	ND	0.13	
108-67-8	1,3,5-Trimethylbenzene	ND	0.65	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	1.2	0.65	0.24	0.13	
100-44-7	Benzyl Chloride	ND	0.65	ND	0.12	
541-73-1	1,3-Dichlorobenzene	ND	0.13	ND	0.021	
106-46-7	1,4-Dichlorobenzene	ND	0.13	ND	0.021	
95-50-1	1,2-Dichlorobenzene	ND	0.13	ND	0.021	
5989-27-5	d-Limonene	0.68	0.65	0.12	0.12	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.65	ND	0.067	
120-82-1	1,2,4-Trichlorobenzene	ND	0.65	ND	0.087	
91-20-3	Naphthalene	ND	0.65	ND	0.12	
87-68-3	Hexachlorobutadiene	ND	0.65	ND	0.060	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121003
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC01666

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	0.53	0.50	0.31	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.20	ND	0.097	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.10	ND	0.039	
106-99-0	1,3-Butadiene	ND	0.20	ND	0.090	
74-83-9	Bromomethane	ND	0.20	ND	0.052	
75-00-3	Chloroethane	ND	0.20	ND	0.076	
64-17-5	Ethanol	7.2	5.0	3.8	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	2.0	ND	0.87	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.10	ND	0.018	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	ND	2.0	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.10	ND	0.025	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.10	ND	0.032	
76-13-1	Trichlorotrifluoroethane	ND	0.10	ND	0.013	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.025	
75-34-3	1,1-Dichloroethane	ND	0.10	ND	0.025	
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.



ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121003
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC01666

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.10	ND	0.025	
141-78-6	Ethyl Acetate	3.1	1.0	0.85	0.28	
110-54-3	n-Hexane	1.3	0.50	0.36	0.14	
67-66-3	Chloroform	ND	0.10	ND	0.020	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.10	ND	0.025	
71-55-6	1,1,1-Trichloroethane	ND	0.10	ND	0.018	
71-43-2	Benzene	0.37	0.10	0.12	0.031	
56-23-5	Carbon Tetrachloride	ND	0.10	ND	0.016	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.10	ND	0.022	
75-27-4	Bromodichloromethane	ND	0.10	ND	0.015	
79-01-6	Trichloroethene	ND	0.10	ND	0.019	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.10	ND	0.018	
108-88-3	Toluene	4.8	0.50	1.3	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.10	ND	0.012	
106-93-4	1,2-Dibromoethane	ND	0.10	ND	0.013	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 3 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121003
 Client Project ID: START-IV-Region 10 / 100.4530.0004.119.01

ALS Project ID: P1505593
 ALS Sample ID: P1505593-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
 Analyst: Lusine Hakobyan
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC01666

Date Collected: 12/22/15
 Date Received: 12/28/15
 Date Analyzed: 12/29/15
 Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.10	ND	0.015	
108-90-7	Chlorobenzene	ND	0.10	ND	0.022	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	0.95	0.50	0.22	0.12	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.10	ND	0.015	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.10	ND	0.017	
106-46-7	1,4-Dichlorobenzene	ND	0.10	ND	0.017	
95-50-1	1,2-Dichlorobenzene	ND	0.10	ND	0.017	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

MW H610



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: January 8, 2016

TO: Ryan Whitchurch, START-IV Project Manager, E & E, Portland, Oregon

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review, Jantzen Beach Air Release Site, Portland, Oregon**

REF: TDD: 15-09-0003 PAN: 1004530.0004.119.01

The data quality assurance review of four air samples collected from the Jantzen Beach Air Release site in Portland, Oregon, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method TO-15) was performed by ALS, Inc., Simi Valley, California. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered: 15121011 15121012 15121013 15121014

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were collected on December 27, 2015, and were analyzed by January 5, 2016, therefore meeting QC criteria of less than 30 days between collection and analysis.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 24-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All Relative Standard Deviations (RSDs) were within the QC limits of $\leq 30\%$.

4. Continuing Calibration: Acceptable.

All % differences were within the QC limits of $\leq 30\%$.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards were within QC limits.

9. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

10. Overall Assessment of Data for Use

Sample 15121012 is a field blank. Positive field sample results less than five times the positive field blank results were qualified as not detected (U).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, August 2014". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

- U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- JH - The result is an estimated quantity, but the result may be biased high.
- JL - The result is an estimated quantity, but the result may be biased low.
- JK - The result is an estimated quantity, but the result may have an unknown bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

- NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.
- UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R - The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- C - The target Pesticide or Aroclor analyte identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121011
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC01458

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/4/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.84 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.19

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	1.3	0.60	0.78	0.35	
75-71-8	Dichlorodifluoromethane (CFC 12)	2.0	0.60	0.40	0.12	
74-87-3	Chloromethane	0.35	0.24	0.17	0.12	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.60	ND	0.085	
75-01-4	Vinyl Chloride	ND	0.12	ND	0.047	
106-99-0	1,3-Butadiene	ND	0.24	ND	0.11	
74-83-9	Bromomethane	ND	0.24	ND	0.061	
75-00-3	Chloroethane	ND	0.24	ND	0.090	
64-17-5	Ethanol	ND	6.0	ND	3.2	
75-05-8	Acetonitrile	ND	0.60	ND	0.35	
107-02-8	Acrolein	ND	2.4	ND	1.0	
67-64-1	Acetone	ND	6.0	ND	2.5	
75-69-4	Trichlorofluoromethane	1.3	0.12	0.23	0.021	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	6.0	ND	2.4	
107-13-1	Acrylonitrile	ND	0.60	ND	0.27	
75-35-4	1,1-Dichloroethene	ND	0.12	ND	0.030	
75-09-2	Methylene Chloride	0.63	0.60	0.18	0.17	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.12	ND	0.038	
76-13-1	Trichlorotrifluoroethane	0.47	0.12	0.061	0.016	
75-15-0	Carbon Disulfide	ND	6.0	ND	1.9	
156-60-5	trans-1,2-Dichloroethene	ND	0.12	ND	0.030	
75-34-3	1,1-Dichloroethane	ND	0.12	ND	0.029	
1634-04-4	Methyl tert-Butyl Ether	ND	0.12	ND	0.033	
108-05-4	Vinyl Acetate	ND	6.0	ND	1.7	
78-93-3	2-Butanone (MEK)	ND	6.0	ND	2.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Mw 1-8-16

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121011
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC01458

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/4/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.84 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.19

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.12	ND	0.030	
141-78-6	Ethyl Acetate	ND	1.2	ND	0.33	
110-54-3	n-Hexane	12	0.60	3.5	0.17	
67-66-3	Chloroform	0.38	0.12	0.078	0.024	
109-99-9	Tetrahydrofuran (THF)	ND	0.60	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	0.12	ND	0.029	
71-55-6	1,1,1-Trichloroethane	ND	0.12	ND	0.022	
71-43-2	Benzene	3.0	0.12	0.93	0.037	
56-23-5	Carbon Tetrachloride	0.45	0.12	0.071	0.019	
110-82-7	Cyclohexane	3.7	1.2	1.1	0.35	
78-87-5	1,2-Dichloropropane	ND	0.12	ND	0.026	
75-27-4	Bromodichloromethane	ND	0.12	ND	0.018	
79-01-6	Trichloroethene	ND	0.12	ND	0.022	
123-91-1	1,4-Dioxane	ND	0.60	ND	0.17	
80-62-6	Methyl Methacrylate	ND	1.2	ND	0.29	
142-82-5	n-Heptane	2.6	0.60	0.64	0.15	
10061-01-5	cis-1,3-Dichloropropene	ND	0.60	ND	0.13	
108-10-1	4-Methyl-2-pentanone	ND	0.60	ND	0.15	
10061-02-6	trans-1,3-Dichloropropene	ND	0.60	ND	0.13	
79-00-5	1,1,2-Trichloroethane	ND	0.12	ND	0.022	
108-88-3	Toluene	5.0	0.60	1.3	0.16	
591-78-6	2-Hexanone	ND	0.60	ND	0.15	
124-48-1	Dibromochloromethane	ND	0.12	ND	0.014	
106-93-4	1,2-Dibromoethane	ND	0.12	ND	0.015	
123-86-4	n-Butyl Acetate	ND	0.60	ND	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 3 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121011
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-001

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC01458

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/4/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.84 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.19

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.60	ND	0.13	
127-18-4	Tetrachloroethene	0.12	0.12	0.018	0.018	
108-90-7	Chlorobenzene	ND	0.12	ND	0.026	
100-41-4	Ethylbenzene	ND	0.60	ND	0.14	
179601-23-1	m,p-Xylenes	1.0	0.60	0.23	0.14	
75-25-2	Bromoform	ND	0.60	ND	0.058	
100-42-5	Styrene	ND	0.60	ND	0.14	
95-47-6	o-Xylene	ND	0.60	ND	0.14	
111-84-2	n-Nonane	ND	0.60	ND	0.11	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.12	ND	0.017	
98-82-8	Cumene	ND	0.60	ND	0.12	
80-56-8	alpha-Pinene	ND	0.60	ND	0.11	
103-65-1	n-Propylbenzene	ND	0.60	ND	0.12	
622-96-8	4-Ethyltoluene	ND	0.60	ND	0.12	
108-67-8	1,3,5-Trimethylbenzene	ND	0.60	ND	0.12	
95-63-6	1,2,4-Trimethylbenzene	ND	0.60	ND	0.12	
100-44-7	Benzyl Chloride	ND	0.60	ND	0.11	
541-73-1	1,3-Dichlorobenzene	ND	0.12	ND	0.020	
106-46-7	1,4-Dichlorobenzene	ND	0.12	ND	0.020	
95-50-1	1,2-Dichlorobenzene	ND	0.12	ND	0.020	
5989-27-5	d-Limonene	ND	0.60	ND	0.11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.60	ND	0.062	
120-82-1	1,2,4-Trichlorobenzene	ND	0.60	ND	0.080	
91-20-3	Naphthalene	ND	0.60	ND	0.11	
87-68-3	Hexachlorobutadiene	ND	0.60	ND	0.056	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang 1-8-16

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121012
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00736

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	ND	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.20	ND	0.097	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.10	ND	0.039	
106-99-0	1,3-Butadiene	ND	0.20	ND	0.090	
74-83-9	Bromomethane	ND	0.20	ND	0.052	
75-00-3	Chloroethane	ND	0.20	ND	0.076	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	2.0	ND	0.87	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.10	ND	0.018	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	ND	2.0	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.10	ND	0.025	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.10	ND	0.032	
76-13-1	Trichlorotrifluoroethane	ND	0.10	ND	0.013	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.10	ND	0.025	
75-34-3	1,1-Dichloroethane	ND	0.10	ND	0.025	
1634-04-4	Methyl tert-Butyl Ether	ND	0.10	ND	0.028	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
 MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

mw H&B

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121012
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00736

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.10	ND	0.025	
141-78-6	Ethyl Acetate	ND	1.0	ND	0.28	
110-54-3	n-Hexane	ND	0.50	ND	0.14	
67-66-3	Chloroform	ND	0.10	ND	0.020	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.10	ND	0.025	
71-55-6	1,1,1-Trichloroethane	ND	0.10	ND	0.018	
71-43-2	Benzene	ND	0.10	ND	0.031	
56-23-5	Carbon Tetrachloride	ND	0.10	ND	0.016	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.10	ND	0.022	
75-27-4	Bromodichloromethane	ND	0.10	ND	0.015	
79-01-6	Trichloroethene	ND	0.10	ND	0.019	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.10	ND	0.018	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.10	ND	0.012	
106-93-4	1,2-Dibromoethane	ND	0.10	ND	0.013	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Handwritten signature: Wida Ang 1-8-16

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 3 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121012
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-002

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00736

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.10	ND	0.015	
108-90-7	Chlorobenzene	ND	0.10	ND	0.022	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	0.50	ND	0.12	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.10	ND	0.015	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.10	ND	0.017	
106-46-7	1,4-Dichlorobenzene	ND	0.10	ND	0.017	
95-50-1	1,2-Dichlorobenzene	ND	0.10	ND	0.017	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121013
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00646

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.07 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.25

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	1.3	0.63	0.76	0.36	
75-71-8	Dichlorodifluoromethane (CFC 12)	2.0	0.63	0.41	0.13	
74-87-3	Chloromethane	0.32	0.25	0.16	0.12	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.63	ND	0.089	
75-01-4	Vinyl Chloride	ND	0.13	ND	0.049	
106-99-0	1,3-Butadiene	ND	0.25	ND	0.11	
74-83-9	Bromomethane	ND	0.25	ND	0.064	
75-00-3	Chloroethane	ND	0.25	ND	0.095	
64-17-5	Ethanol	ND	6.3	ND	3.3	
75-05-8	Acetonitrile	ND	0.63	ND	0.37	
107-02-8	Acrolein	ND	2.5	ND	1.1	
67-64-1	Acetone	ND	6.3	ND	2.6	
75-69-4	Trichlorofluoromethane	1.3	0.13	0.23	0.022	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	6.3	ND	2.5	
107-13-1	Acrylonitrile	ND	0.63	ND	0.29	
75-35-4	1,1-Dichloroethene	ND	0.13	ND	0.032	
75-09-2	Methylene Chloride	ND	0.63	ND	0.18	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.13	ND	0.040	
76-13-1	Trichlorotrifluoroethane	0.51	0.13	0.067	0.016	
75-15-0	Carbon Disulfide	ND	6.3	ND	2.0	
156-60-5	trans-1,2-Dichloroethene	ND	0.13	ND	0.032	
75-34-3	1,1-Dichloroethane	ND	0.13	ND	0.031	
1634-04-4	Methyl tert-Butyl Ether	ND	0.13	ND	0.035	
108-05-4	Vinyl Acetate	ND	6.3	ND	1.8	
78-93-3	2-Butanone (MEK)	ND	6.3	ND	2.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

mw 1-8-16

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121013
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00646

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.07 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.25

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.13	ND	0.032	
141-78-6	Ethyl Acetate	ND	1.3	ND	0.35	
110-54-3	n-Hexane	0.82	0.63	0.23	0.18	
67-66-3	Chloroform	ND	0.13	ND	0.026	
109-99-9	Tetrahydrofuran (THF)	ND	0.63	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.13	ND	0.031	
71-55-6	1,1,1-Trichloroethane	ND	0.13	ND	0.023	
71-43-2	Benzene	0.93	0.13	0.29	0.039	
56-23-5	Carbon Tetrachloride	0.46	0.13	0.074	0.020	
110-82-7	Cyclohexane	ND	1.3	ND	0.36	
78-87-5	1,2-Dichloropropane	ND	0.13	ND	0.027	
75-27-4	Bromodichloromethane	ND	0.13	ND	0.019	
79-01-6	Trichloroethene	ND	0.13	ND	0.023	
123-91-1	1,4-Dioxane	0.98	0.63	0.27	0.17	
80-62-6	Methyl Methacrylate	ND	1.3	ND	0.31	
142-82-5	n-Heptane	0.72	0.63	0.18	0.15	
10061-01-5	cis-1,3-Dichloropropene	ND	0.63	ND	0.14	
108-10-1	4-Methyl-2-pentanone	ND	0.63	ND	0.15	
10061-02-6	trans-1,3-Dichloropropene	ND	0.63	ND	0.14	
79-00-5	1,1,2-Trichloroethane	ND	0.13	ND	0.023	
108-88-3	Toluene	3.6	0.63	0.96	0.17	
591-78-6	2-Hexanone	ND	0.63	ND	0.15	
124-48-1	Dibromochloromethane	ND	0.13	ND	0.015	
106-93-4	1,2-Dibromoethane	ND	0.13	ND	0.016	
123-86-4	n-Butyl Acetate	ND	0.63	ND	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang
1/8/16

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 3 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121013
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-003

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: AS00646

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.07 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.25

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.63	ND	0.13	U
127-18-4	Tetrachloroethene	ND	0.13	ND	0.018	U
108-90-7	Chlorobenzene	ND	0.13	ND	0.027	U
100-41-4	Ethylbenzene	ND	0.63	ND	0.14	U
179601-23-1	m,p-Xylenes	1.9	0.63	0.43	0.14	
75-25-2	Bromoform	ND	0.63	ND	0.060	U
100-42-5	Styrene	ND	0.63	ND	0.15	U
95-47-6	o-Xylene	0.70	0.63	0.16	0.14	
111-84-2	n-Nonane	ND	0.63	ND	0.12	U
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.13	ND	0.018	U
98-82-8	Cumene	ND	0.63	ND	0.13	U
80-56-8	alpha-Pinene	ND	0.63	ND	0.11	U
103-65-1	n-Propylbenzene	ND	0.63	ND	0.13	U
622-96-8	4-Ethyltoluene	ND	0.63	ND	0.13	U
108-67-8	1,3,5-Trimethylbenzene	ND	0.63	ND	0.13	U
95-63-6	1,2,4-Trimethylbenzene	1.1	0.63	0.22	0.13	
100-44-7	Benzyl Chloride	ND	0.63	ND	0.12	U
541-73-1	1,3-Dichlorobenzene	ND	0.13	ND	0.021	U
106-46-7	1,4-Dichlorobenzene	ND	0.13	ND	0.021	U
95-50-1	1,2-Dichlorobenzene	ND	0.13	ND	0.021	U
5989-27-5	d-Limonene	1.5	0.63	0.26	0.11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.63	ND	0.065	U
120-82-1	1,2,4-Trichlorobenzene	ND	0.63	ND	0.084	U
91-20-3	Naphthalene	0.86	0.63	0.16	0.12	
87-68-3	Hexachlorobutadiene	ND	0.63	ND	0.059	U

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121014
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-004

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC00794

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.65 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.20

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.60	ND	0.35	
75-71-8	Dichlorodifluoromethane (CFC 12)	2.0	0.60	0.40	0.12	
74-87-3	Chloromethane	0.33	0.24	0.16	0.12	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.60	ND	0.086	
75-01-4	Vinyl Chloride	ND	0.12	ND	0.047	
106-99-0	1,3-Butadiene	ND	0.24	ND	0.11	
74-83-9	Bromomethane	ND	0.24	ND	0.062	
75-00-3	Chloroethane	ND	0.24	ND	0.091	
64-17-5	Ethanol	ND	6.0	ND	3.2	
75-05-8	Acetonitrile	ND	0.60	ND	0.36	
107-02-8	Acrolein	ND	2.4	ND	1.0	
67-64-1	Acetone	ND	6.0	ND	2.5	
75-69-4	Trichlorofluoromethane	1.3	0.12	0.23	0.021	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	6.0	ND	2.4	
107-13-1	Acrylonitrile	ND	0.60	ND	0.28	
75-35-4	1,1-Dichloroethene	ND	0.12	ND	0.030	
75-09-2	Methylene Chloride	ND	0.60	ND	0.17	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.12	ND	0.038	
76-13-1	Trichlorotrifluoroethane	0.49	0.12	0.064	0.016	
75-15-0	Carbon Disulfide	ND	6.0	ND	1.9	
156-60-5	trans-1,2-Dichloroethene	ND	0.12	ND	0.030	
75-34-3	1,1-Dichloroethane	ND	0.12	ND	0.030	
1634-04-4	Methyl tert-Butyl Ether	ND	0.12	ND	0.033	
108-05-4	Vinyl Acetate	ND	6.0	ND	1.7	
78-93-3	2-Butanone (MEK)	ND	6.0	ND	2.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 2 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121014
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-004

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC00794

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.65 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.20

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.12	ND	0.030	
141-78-6	Ethyl Acetate	ND	1.2	ND	0.33	
110-54-3	n-Hexane	ND	0.60	ND	0.17	
67-66-3	Chloroform	ND	0.12	ND	0.025	
109-99-9	Tetrahydrofuran (THF)	ND	0.60	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	0.12	ND	0.030	
71-55-6	1,1,1-Trichloroethane	ND	0.12	ND	0.022	
71-43-2	Benzene	0.59	0.12	0.19	0.038	
56-23-5	Carbon Tetrachloride	0.46	0.12	0.073	0.019	
110-82-7	Cyclohexane	ND	1.2	ND	0.35	
78-87-5	1,2-Dichloropropane	ND	0.12	ND	0.026	
75-27-4	Bromodichloromethane	ND	0.12	ND	0.018	
79-01-6	Trichloroethene	ND	0.12	ND	0.022	
123-91-1	1,4-Dioxane	ND	0.60	ND	0.17	
80-62-6	Methyl Methacrylate	ND	1.2	ND	0.29	
142-82-5	n-Heptane	ND	0.60	ND	0.15	
10061-01-5	cis-1,3-Dichloropropene	ND	0.60	ND	0.13	
108-10-1	4-Methyl-2-pentanone	ND	0.60	ND	0.15	
10061-02-6	trans-1,3-Dichloropropene	ND	0.60	ND	0.13	
79-00-5	1,1,2-Trichloroethane	ND	0.12	ND	0.022	
108-88-3	Toluene	0.82	0.60	0.22	0.16	
591-78-6	2-Hexanone	ND	0.60	ND	0.15	
124-48-1	Dibromochloromethane	ND	0.12	ND	0.014	
106-93-4	1,2-Dibromoethane	ND	0.12	ND	0.016	
123-86-4	n-Butyl Acetate	ND	0.60	ND	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 3 of 3

Client: Ecology And Environment, Incorporated
 Client Sample ID: 15121014
 Client Project ID: START-IV REGION 10 / 1004530.0004.119.01

ALS Project ID: P1505613
 ALS Sample ID: P1505613-004

Test Code: EPA TO-15
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
 Analyst: Wida Ang
 Sample Type: 6.0 L Summa Canister
 Test Notes:
 Container ID: AC00794

Date Collected: 12/27/15
 Date Received: 12/29/15
 Date Analyzed: 1/5/16
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): 0.65 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.20

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.60	ND	0.13	
127-18-4	Tetrachloroethene	ND	0.12	ND	0.018	
108-90-7	Chlorobenzene	ND	0.12	ND	0.026	
100-41-4	Ethylbenzene	ND	0.60	ND	0.14	
179601-23-1	m,p-Xylenes	ND	0.60	ND	0.14	
75-25-2	Bromoform	ND	0.60	ND	0.058	
100-42-5	Styrene	ND	0.60	ND	0.14	
95-47-6	o-Xylene	ND	0.60	ND	0.14	
111-84-2	n-Nonane	ND	0.60	ND	0.11	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.12	ND	0.017	
98-82-8	Cumene	ND	0.60	ND	0.12	
80-56-8	alpha-Pinene	ND	0.60	ND	0.11	
103-65-1	n-Propylbenzene	ND	0.60	ND	0.12	
622-96-8	4-Ethyltoluene	ND	0.60	ND	0.12	
108-67-8	1,3,5-Trimethylbenzene	ND	0.60	ND	0.12	
95-63-6	1,2,4-Trimethylbenzene	ND	0.60	ND	0.12	
100-44-7	Benzyl Chloride	ND	0.60	ND	0.12	
541-73-1	1,3-Dichlorobenzene	ND	0.12	ND	0.020	
106-46-7	1,4-Dichlorobenzene	ND	0.12	ND	0.020	
95-50-1	1,2-Dichlorobenzene	ND	0.12	ND	0.020	
5989-27-5	d-Limonene	ND	0.60	ND	0.11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.60	ND	0.062	
120-82-1	1,2,4-Trichlorobenzene	ND	0.60	ND	0.081	
91-20-3	Naphthalene	ND	0.60	ND	0.11	
87-68-3	Hexachlorobutadiene	ND	0.60	ND	0.056	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Wida Ang

***Jantzen Beach Air Testing
Trip Report***

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