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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.

Stu Hall

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

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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 $H_2S$ and CO at JBMI appeared to be associated directly with the start-up of an adjacent motorboat. No other detections of $H_2S$ that appeared unrelated to the start-up of the boat were noted during the 60 days of air testing at JBMI.
- Elevated $H_2S$ 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 ($O_2$), and hydrogen sulfide vapor ($H_2S$), 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 $H_2S$ 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 $H_2S$ 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), polycylic 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", "acrid", 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 ($H_2S$) vapor
- Chemical(s) consistent with chlorine ($Cl_2$) vapor
- Chemical(s) consistent with ammonia ($NH_3$) 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 ($NH_3$), 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, $H_2S$, LEL, $O_2$, and CO, chlorine ($Cl_2$), $NH_3$, hydrogen cyanide (HCN), sulfur dioxide ($SO_2$), 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 ($SO_2$) readings, the equipment and sensors specific to $SO_2$ 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, $H_2S$, LEL, $O_2$, 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, $H_2S$ 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 JMBI (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.

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 $H_2S$, 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 $H_2S$ 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 $H_2S$ 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 HLGC (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 HLGC. 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 ($H_2S$) (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. Theses 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 [µg/$m^3$] detected), chloroform (up to 0.38 µg/$m^3$ detected), 1,4-dioxane (up to 0.98 µg/$m^3$ detected), and naphthalene (up to 0.86 µg/$m^3$ 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, $H_2S$ was detected. START believes that

the $H_2S$ 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 $H_2S$ and CO at JBMI appeared to be associated directly with the start-up of an adjacent motorboat. No other detections of $H_2S$ that appeared unrelated to the start-up of the boat were noted during the 60 days of air testing at JBMI.
- Elevated $H_2S$ 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 $H_2S$ 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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# FIGURES

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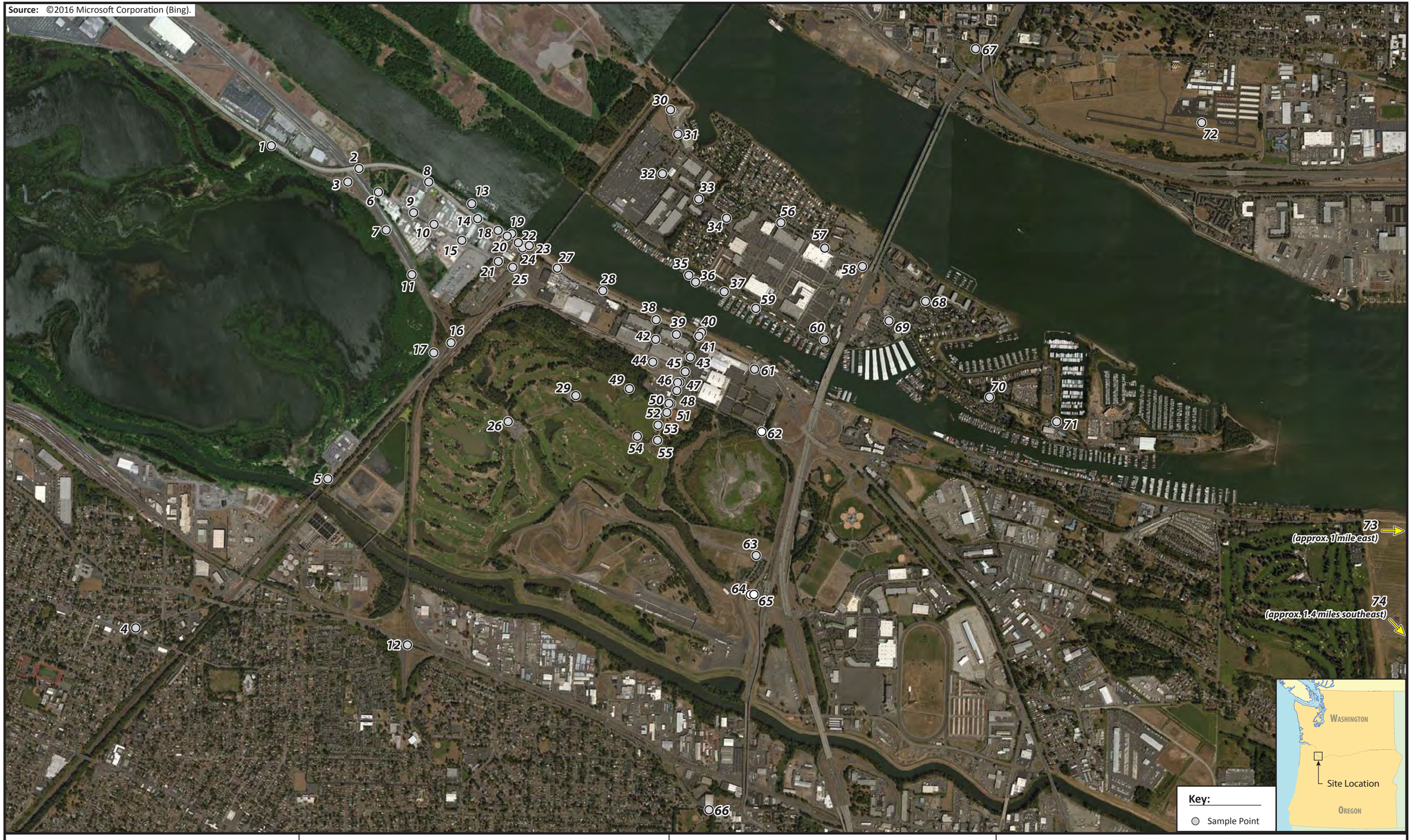
N

0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 1
AIR MONITORING EVENT
SITE ORIENTATION MAP

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 1 |

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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 2
AIR MONITORING EVENT LOCATIONS

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

| 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 Entance |
| 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 |

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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)

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 3 |

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6
25
28
49
52
53
62
64
65
73
(approx. 1 mile east)
74
(approx. 1.4 miles southeast)

**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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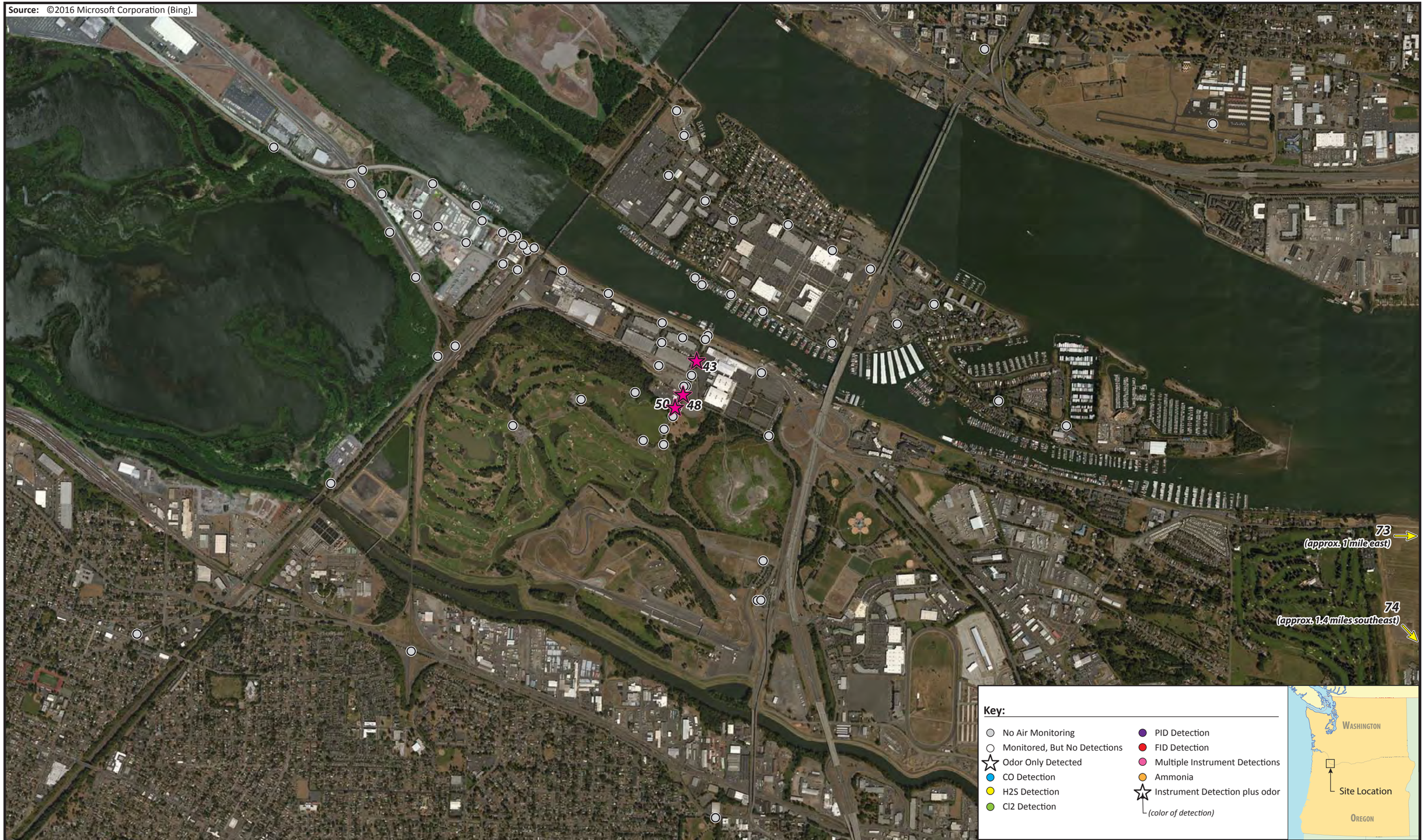
0 2,000 4,000
Approximate Scale in Feet

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 |

**Source:** ©2016 Microsoft Corporation (Bing).




**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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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

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

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

**Source:** ©2016 Microsoft Corporation (Bing).


**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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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 6
AIR MONITORING LOCATION SCOUTING EVENT
NOVEMBER 10, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 6 |

**Source:** ©2016 Microsoft Corporation (Bing).


**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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0 2,000 4,000
Approximate Scale in Feet

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 |


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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 8
AIR MONITORING HERON LAKES GOLF COURSE MAINTENANCE VISIT
NOVEMBER 18, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 8 |

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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)*




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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 9
AIR MONITORING MOBILE EVENT
NOVEMBER 27, 2015

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

**Source:** ©2016 Microsoft Corporation (Bing).


**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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N

0 2,000 4,000
Approximate Scale in Feet

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 |


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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 11
AIR MONITORING MOBILE EVENT
DECEMBER 7, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 11 |

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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)




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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 12
AIR MONITORING MOBILE EVENT
DECEMBER 9, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 12 |

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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)




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0 2,000 4,000
Approximate Scale in Feet

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 |

1 2 3 6 7 8 9 10 11 14 15 16 17 18 21 22 23 24 25 27 28 38 41 43 45 48 50 52 53 55 61

73 (approx. 1 mile east)

74 (approx. 1.4 miles southeast)

**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)*

Washington

Site Location

Oregon

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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 14

AIR MONITORING MOBILE EVENT
DECEMBER 11, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 14 |


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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 15
AIR MONITORING MOBILE EVENT
DECEMBER 15, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 15 |


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N

0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 16
AIR MONITORING MOBILE EVENT
DECEMBER 18, 2015

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

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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)




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N

0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 17
AIR MONITORING MOBILE EVENT
DECEMBER 22, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 17 |

**Source:** ©2016 Microsoft Corporation (Bing).


**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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0 2,000 4,000
Approximate Scale in Feet

JANTZEN BEACH AIR RELEASE
Portland, Oregon

Figure 18
AIR MONITORING MOBILE EVENT
DECEMBER 27, 2015

| Date: | Drawn by: | |
|---|---|---|
| 5/2/16 | AES | 10:START IV\15090003\fig 18 |

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# TABLES

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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:<br>• $NH_3$ (1ppm)<br>• CO (3ppm)<br>• Cl2 (0.05ppm)<br>• LEL (1%)<br>• Odor (caustic, glycol, acrid, hydrocarbon) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, 02, Gamma)<br>• TVA-1000B A59291 (PID-10.6, FID)<br>• Dräger PAC-7000 ($NH_3$, 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:<br>• PID-10.6 (7,900ppb)<br>• FID (13,140ppb)<br>• Odor (acrid, alcohol, glycol, hydrocarbon, propane, peanut butter) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, 02, Gamma)<br>• TVA-1000B 897895 (PID-10.6, FID)<br>• Dräger PAC-7000 ($NH_3$, HCN, Cl2)<br>• 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:<br>• PID-10.6 (110ppb)<br>• $H_2S$ (1.4ppm)<br>• Odors (burnt-oil, propane, sewer gas/vapor) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, 02, Gamma) Linc 105<br>• Gateway EPAERT80 | Viper system planning. Detections of $H_2S$ 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:<br>• CO (15ppm) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, 02, Gamma) Linc 105<br>• 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:<br>• PID-10.6 (80ppb)<br>• Gamma Radiation<br>• Odor (propane, burnt-oil, solvent, sweet, glycol, nauseating) | • MultiRAE Pro SB6193 (PID-10.6, $H_2S$, CO, LEL, O2, Gamma) Linc 105<br>• Gateway EPAERT80<br>• MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, 02, Gamma) Linc 103 | JB01 Viper system installed. No correlated events were discovered.<br><br>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:<br>• PID-10.6 (110ppb)<br>• CO (4ppm) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• 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:<br>• Odor (propane, burnt-oil, mercaptan) | • 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:<br>• Odor (burnt-oil, propane, sweet, glycol) | • 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:<br>• $H_2S$ (3.1ppm)<br>• CO (360ppm)<br>• PID-10.6 (9,000ppb) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• Gateway EPAERT80<br>• 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:<br>• PID-10.6 (275ppb) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• Gateway EPAERT80<br>• 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:<br>• No elevated detections | • 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:<br>• PID-10.6 (37,400ppb)<br>• CO (340ppm)<br>• $H_2S$ (2.5ppm) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• Gateway EPAERT80<br>• 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:<br>• PID-11.7 (28ppb) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• 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:<br>• Odor (burnt-oil) | • UltraRAE SB6189 (PID-11.7) | No correlated events were discovered. | Reported to EPA |
| Chart 8<br><br><br>Chart 9<br><br><br>Chart 10 | 12/3/2015 (7:24p.m. to 10:24p.m.)<br><br>12/4/2015 (0:00a.m. to 0:10a.m.)<br><br>12/4/2015 (11:36a.m. to 2:36p.m.) | HLGC (JB02) | Viper Detections:<br>• PID-10.6 (140ppb) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• Snapper, 6L vacuum container | No correlated events were discovered. | Reported to EPA |
| Chart 11 | 12/4/2015 (0:09a.m. to 9:55p.m.) | JBMI (JB01) | Viper Alarm:<br>• No alarm triggered at time of engine starting | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• 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:<br>• PID-10.6 (130ppb) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• 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:<br>• PID-10.6 (170ppb) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• Snapper, 6L vacuum container | No correlated events were discovered. | Reported to EPA |
| Chart 14<br><br>Figure 11<br><br>Chart 15 | 12/7/2015 (7:21a.m. to 11:59p.m.)<br><br>12/7/2015 (12:15p.m. to 4:37p.m.)<br><br>12/8/2015 (0:00a.m. to 11:59p.m.) | HLGC (JB02) | Viper Detections:<br>• PID-10.6 (260ppb)<br>• PID-11.7 (111ppb)<br>• CO (3ppm)<br>• $H_2S$ (1.4ppm)<br>• $O_2$ (26.6%)<br><br>Manual Mobile Monitoring:<br>• $Cl_2$ (0.6ppm on Force Avenue, specific position not recorded)<br>• Odors (propane)<br>• Gamma Radiation | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• Snapper, 6L vacuum container<br><br>• MultiRAE Pro B09942 (PID-10.6, Cl2, $NH_3$, LEL, Gamma) | No correlated events were discovered (except bump tests from 13:36 to 13:44).<br><br>High gamma suspected to be due to sensor error (known issue). | Discussed with EPA – decision made to not collect a VOC air sample.<br><br>Plan to return with a dedicated gamma radiation detector (Ludlum model 192).<br><br>PID-10.6 alarm reset to 200ppb (due to sensor drift) |
| Chart 16<br><br>Chart 17<br><br>Chart 18<br><br>Chart 19<br><br>Figure 12<br><br>Chart 20 | 12/9/2015 (0:00a.m. to 6:57a.m.)<br><br>12/9/2015 (8:12a.m. to 9:03a.m.)<br><br>12/9/2015 (10:19a.m. to 10:27a.m.)<br><br>12/9/2015 (11:11a.m. to 8:24p.m.)<br><br>12/9/2015 (8:55p.m. to 10:24p.m.)<br><br>12/9/2015 (11:51p.m. to 11:54p.m.) | HLGC (JB02), Marine Dr, North Portland, Suttle Rd, Vanport | Viper alarm:<br>• PID-10.6 (100ppb).<br><br>Manual Mobile Monitoring:<br>• Odors (propane) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• Snapper, 6L vacuum container<br><br>• MultiRAE Pro SB6193 (PID-10.6, $H_2S$, CO, LEL, O2, Gamma)<br>• UltraRAE 3000 SB6189 (PID-11.&)<br>• Ludlum Model 192 A59251 | No correlated events were discovered. | Reported to EPA. Decision made to not collect a VOC air sample. |
| Chart 21<br><br>Chart 22<br><br>Chart 23<br><br>Chart 24 | 12/10/2015 (0:10a.m. to 0:16a.m.)<br><br>12/10/2015 (6:44a.m. to 6:46a.m.)<br><br>12/10/2015 (12:43p.m. to 12:54p.m.)<br><br>12/10/2015 (1:51p.m. to 2:36p.m.) | HLGC (JB02) | Viper Alarm:<br>• PID-10.6 (160ppb) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• 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:<br>• No elevated detections | • MultiRAE Pro SB6193 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma)<br>• 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:<br>• PID-10.6 (38,000ppb)<br>• FID (1,250ppb)<br>• Odors (propane, solvent, kerosene, citrus)<br>• Eye irritation | • TVA-1000B 897895 (PID-10.6, FID)<br>• MultiRAE Pro SB6193 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma)<br>• 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:<br>• $0_2$ (30%) | • MultiRAE Pro SB6193 (PID-10.6, CO, H2S, LEL, $O_2$, Gamma)<br>• 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:<br>• PID-10.6 (150ppb)<br>• FID (1,700ppb)<br>• Particulates (0.04mg/m3)<br>• Odors (propane, hot-oil, glycol, solvent, citrus, burnt-oil, cyanide) | • TVA-1000B 897895 (PID-10.6, FID)<br>• 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:<br>• PID-11.7 (18ppb)<br>• PID-10.6 (100ppb) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• 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:<br>• Odors (propane, burnt-oil, hot-oil), no instrument detections. | • TVA-1000B A59291 (PID-10.6, FID)<br>• 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:<br>• PID-10.6 (110ppb) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• Snapper, 6L vacuum container | No correlated events were discovered. | Reported to EPA |
| Chart 27<br><br>Figure 17 | 12/22/2015 (08:08a.m. to 08:40a.m.)<br><br>12/22/2015 (09:30a.m. to 11:00a.m.) | Force Ave, HLGC (JB02) | Viper Alarms:<br>• PID-10.6 (630ppb)<br><br>Manual Mobile monitoring:<br>• PID-10.6 (5,000ppb)<br>• Odors (chemical, sewer gas/vapor, propane) | • MultiRAE Pro SB7023 (PID-10.6, CO, $H_2S$, LEL, 02) Linc 105<br>• Gateway EPAERT93<br>• UltraRAE 3000 (PID-11.7) SB7016 Linc 109<br>• Snapper, 6L vacuum container<br><br>• TVA-1000B A59291 (PID-10.6, FID) | No correlated events were discovered. | VOC air samples collected |
| Chart 28<br><br><br>Figure 18<br><br><br>Chart 29 | 12/27/2015 (3:28p.m. to 11:59p.m.)<br><br>12/27/2015 (5:05p.m. to 9:56p.m.)<br><br>12/28/2015 (0:00a.m. to 11:59p.m.) | Force Ave, JBMI (JB01), Vancouver | Viper Alarms:<br>• PID-11.7 (186ppb)<br><br>Manual Mobile Monitoring:<br>• PID-11.7 (350ppb)<br>• Odors (propane, hot-oil, acrid)<br>• Taste | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• Snapper, 6L vacuum container<br><br>• 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:<br>• PID-11.7 (194ppb) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• 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:<br>• PID-11.7 (130ppb) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• 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:<br>• PID-10.6 (9,750ppb)<br>• CO (438ppm)<br>• $H_2S$ (5.0ppm) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• 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:<br>• PID-10.6 (100ppb)<br>• CO (3ppm) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• Snapper, 6L vacuum container | No correlated events were discovered. | Reported to EPA |
| Chart 34<br><br><br>Chart 35<br><br><br>Chart 36 | 1/8/2016 (0:00a.m. to 12:54p.m.)<br><br>1/8/2016 (1:59p.m. to 2:06p.m.)<br><br>1/8/2016 (2:11p.m. to 2:21p.m.) | JBMI (JB01) | Viper Detections:<br>• PID-10.6 (10,100ppb)<br>• $H_2S$ (0.8ppm) | • MultiRAE Pro SB7020 (PID-10.6, CO, $H_2S$, LEL, O2, Gamma) Linc 103<br>• UltraRAE 3000 SB7017 Linc 108<br>• Gateway EPAERT80<br>• Snapper, 6L vacuum container | PID bump test conducted before system shutdown. Ten $H_2S$ 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
$NH_3$ = 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 (µg/m³) | 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 (µg/m³) | 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 MVZVDAGWAAZJPE-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 MVZVDAGWAAZJPE-UHFFFAOYSA-N | 3.1 | 0.72 | U | |
| **Trip Blank** | **15121003** | **m,p-Xylenes** | **InChI Key MVZVDAGWAAZJPE-UHFFFAOYSA-N** | **0.95** | **0.22** | | |
| **Jantzen Beach Moorage, Inc. (JB02)** | **15121011** | **m,p-Xylenes** | **InChI Key MVZVDAGWAAZJPE-UHFFFAOYSA-N** | **1** | **0.23** | | |
| Second Trip Blank | 15121012 | m,p-Xylenes | InChI Key MVZVDAGWAAZJPE-UHFFFAOYSA-N | 0.5 | 0.12 | U | |
| **N. Force Ave. and W. Delta Park** | **15121013** | **m,p-Xylenes** | **InChI Key MVZVDAGWAAZJPE-UHFFFAOYSA-N** | **1.9** | **0.43** | | |
| N. Force Ave. (south end) | 15121014 | m,p-Xylenes | InChI Key MVZVDAGWAAZJPE-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 (µg/m³) | 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.
µg/m$^3$ = micrograms per cubic meter

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# CHARTS

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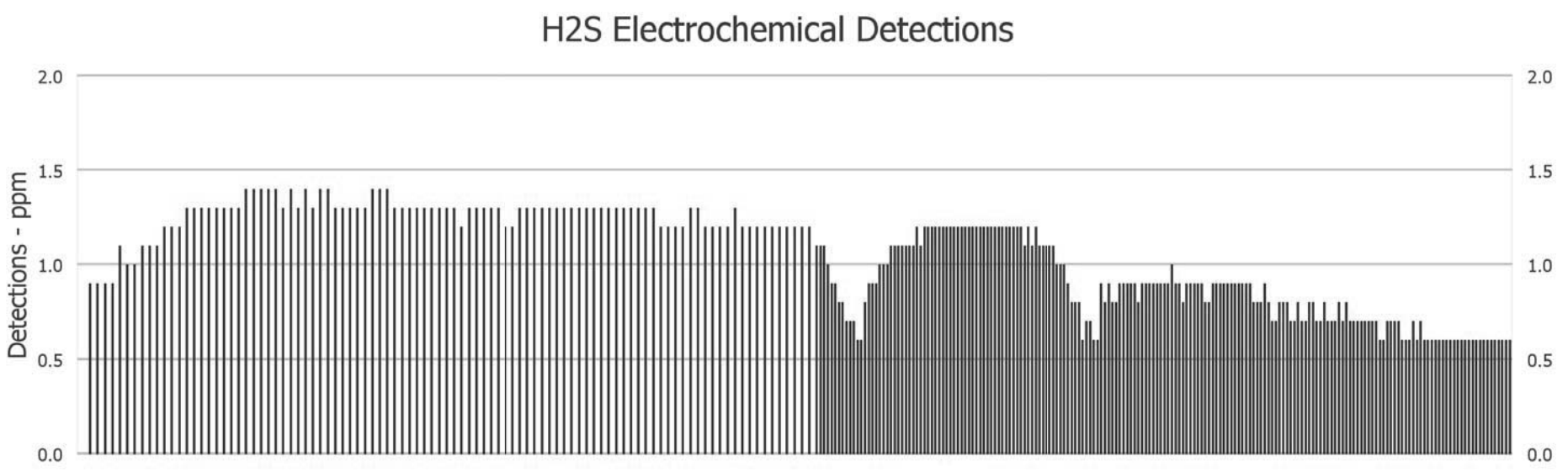
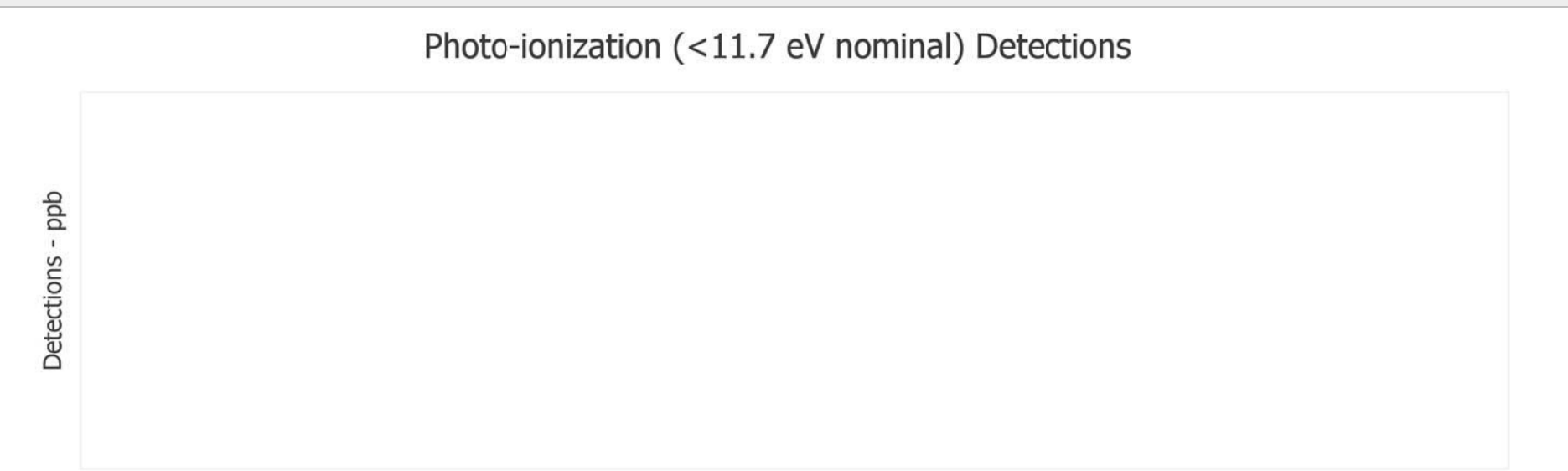
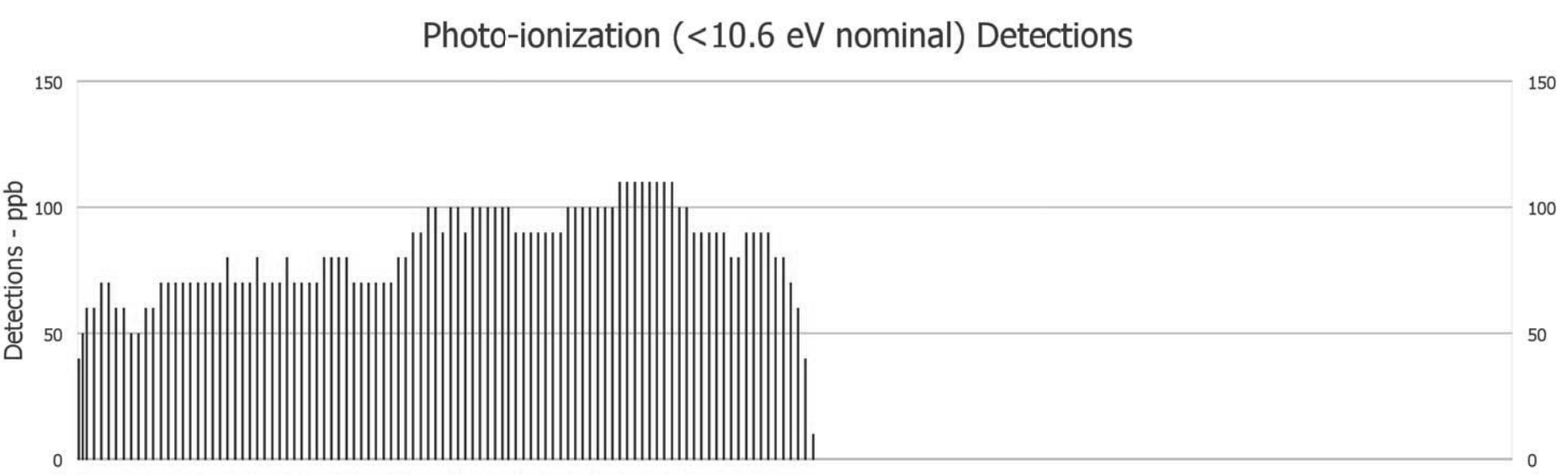
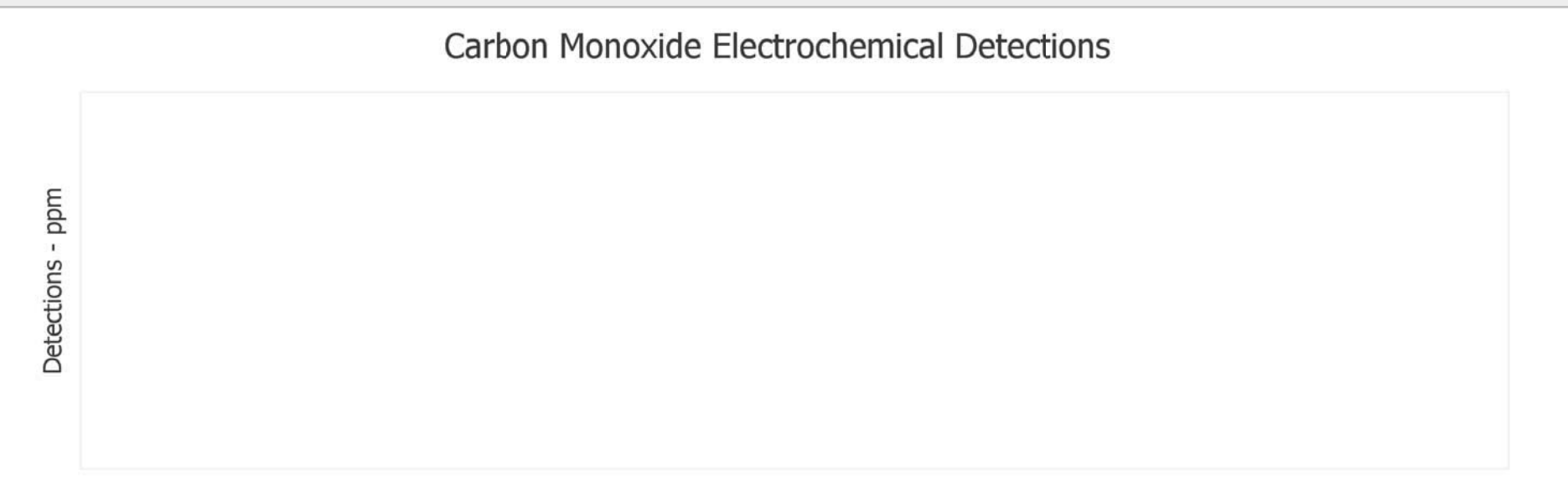
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 1

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



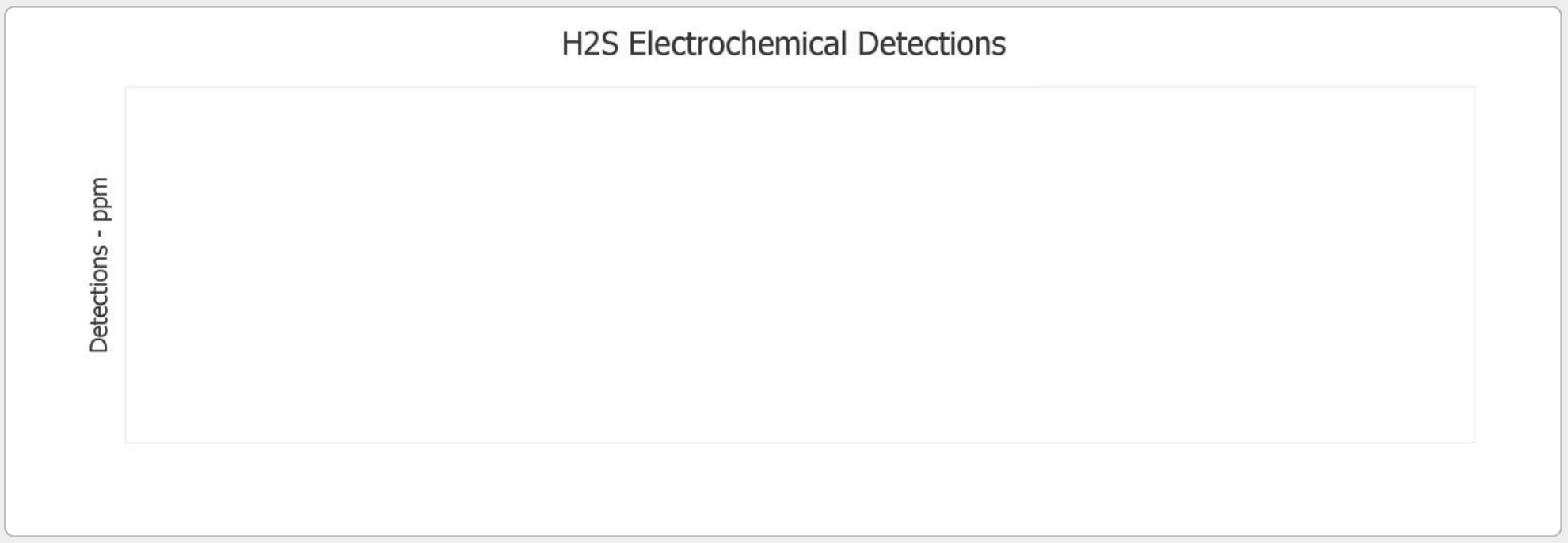



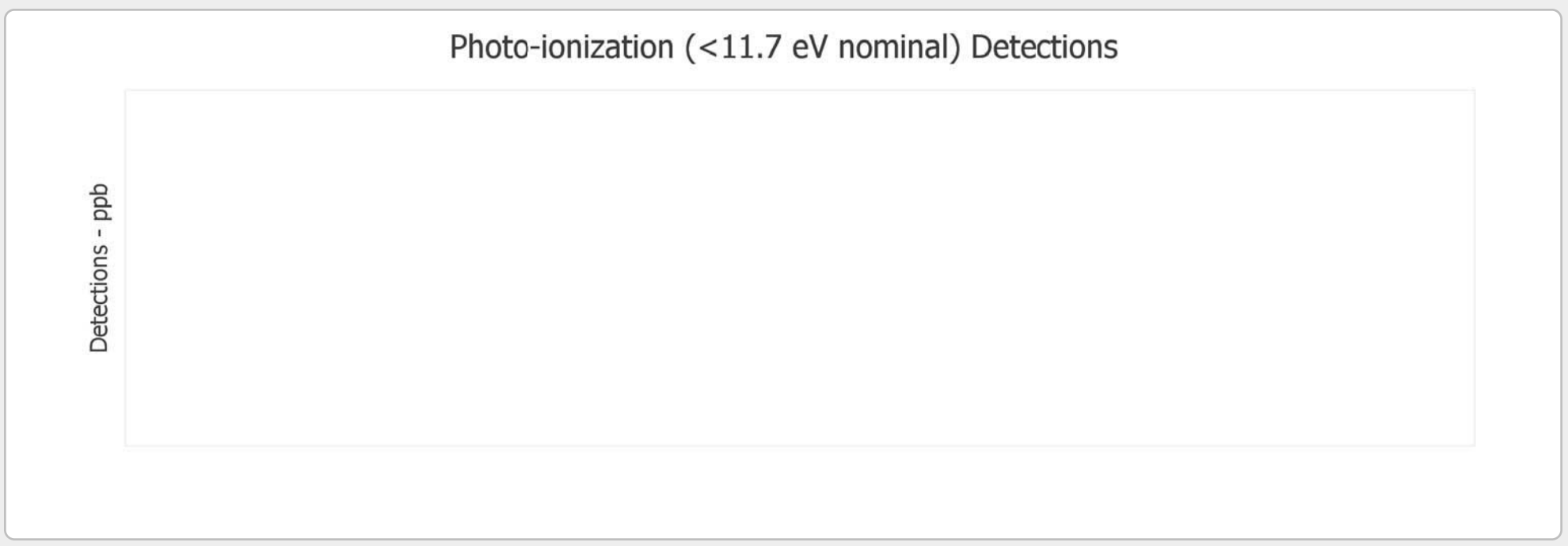



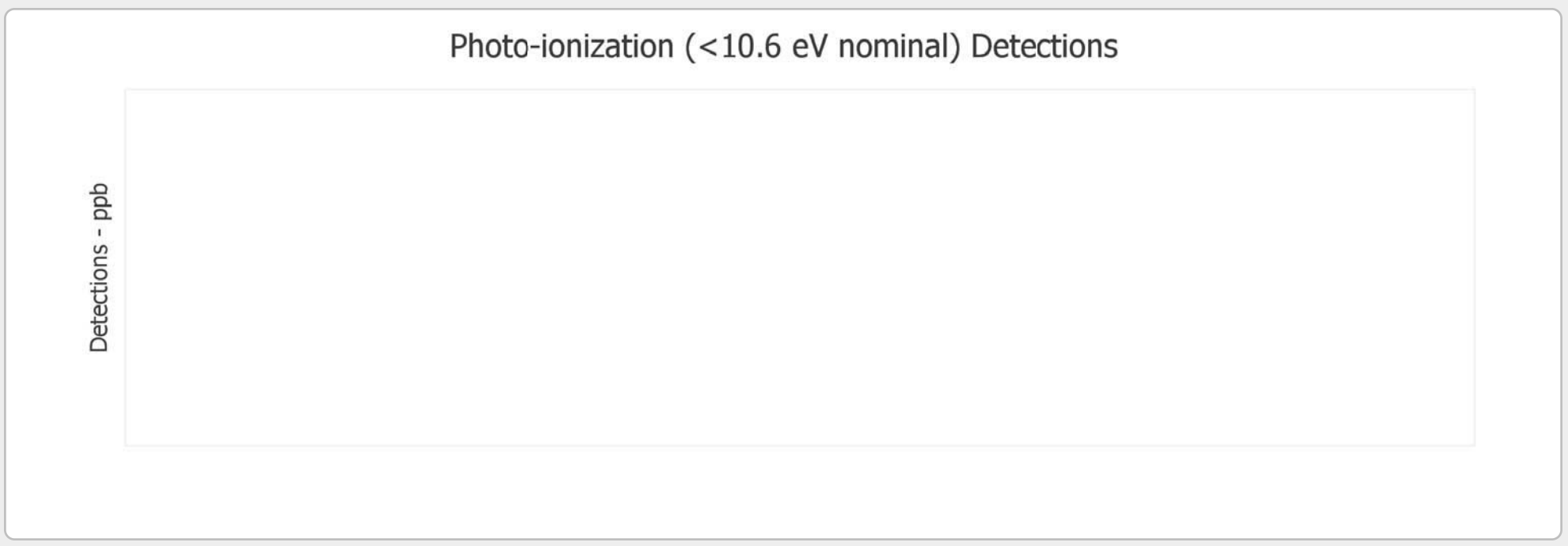



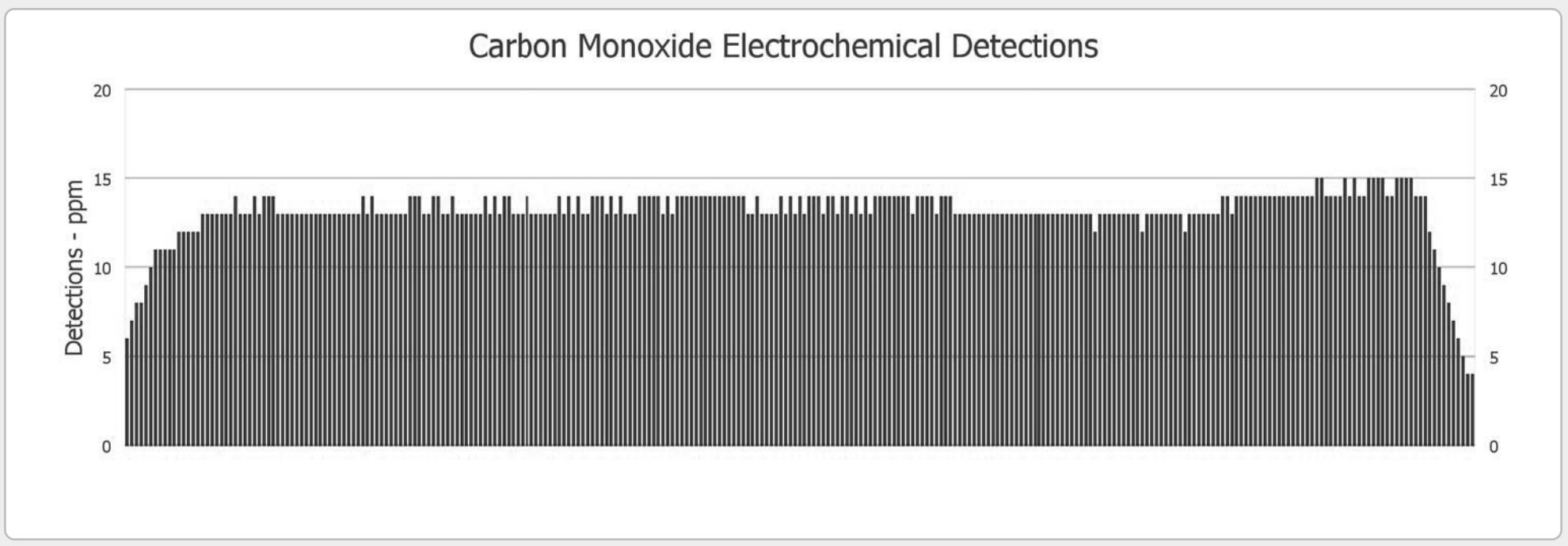
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 2

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



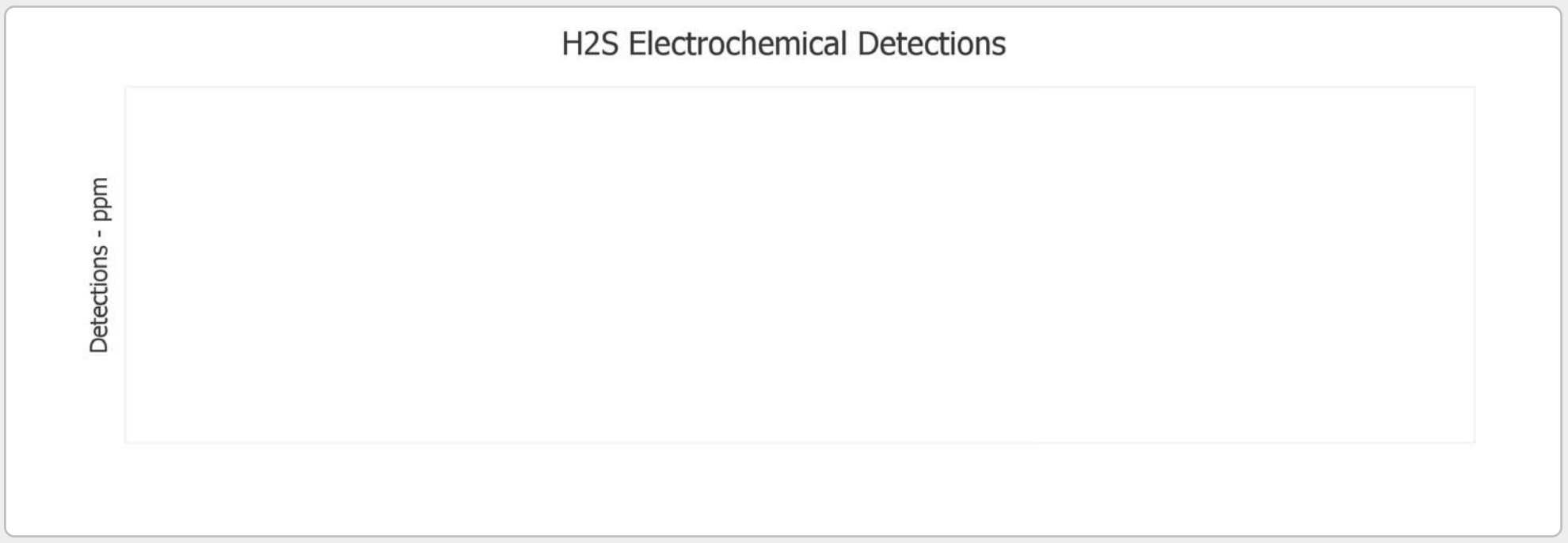



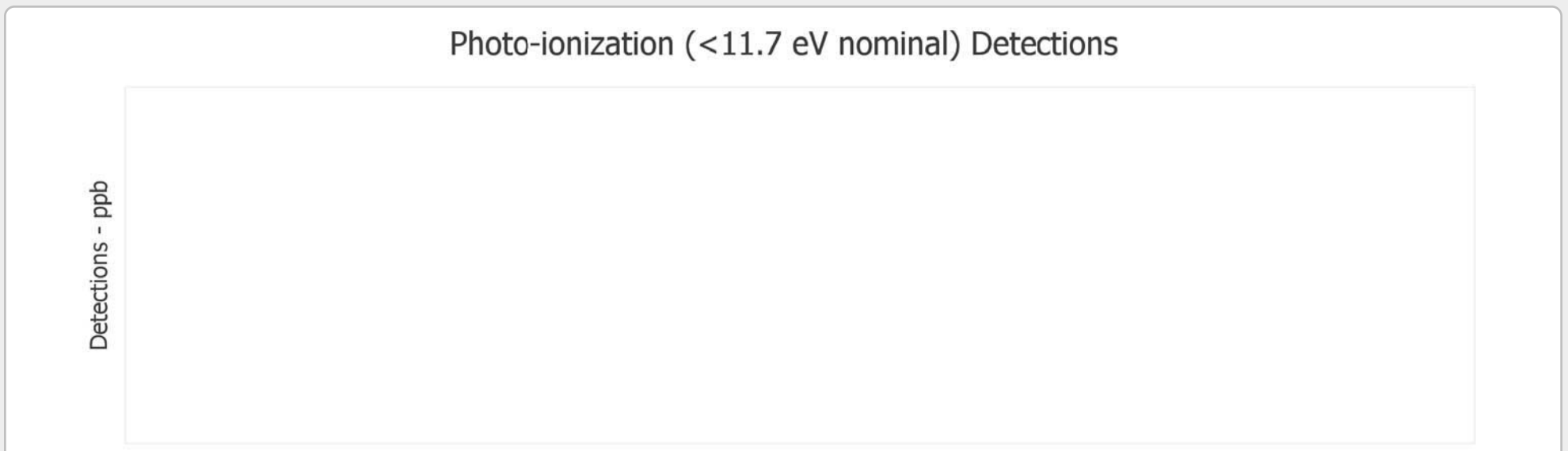



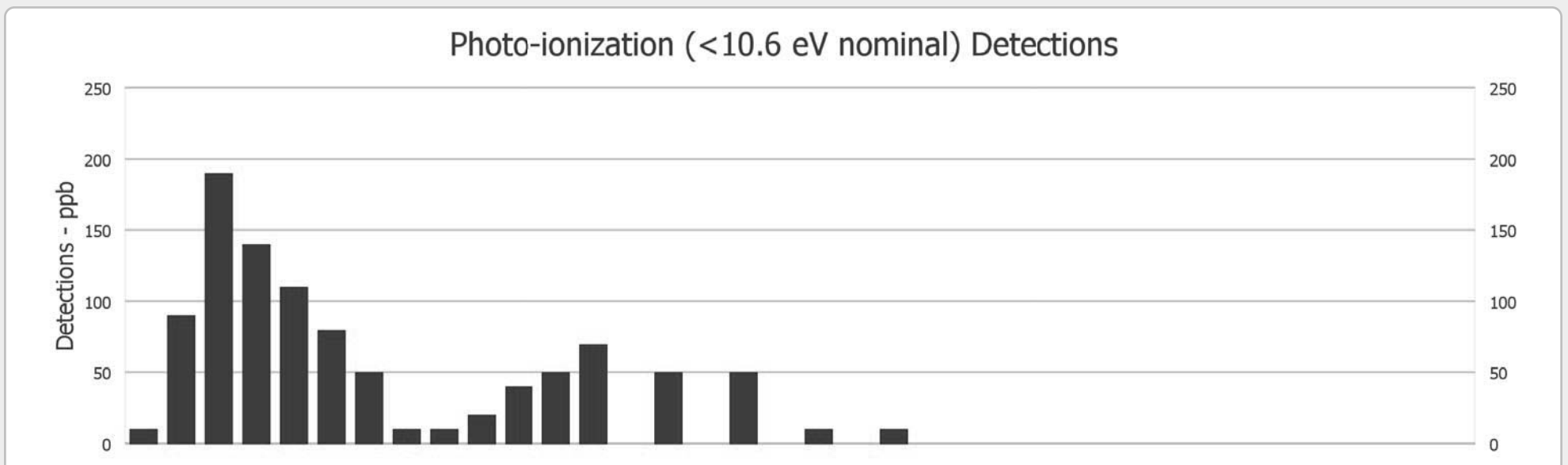



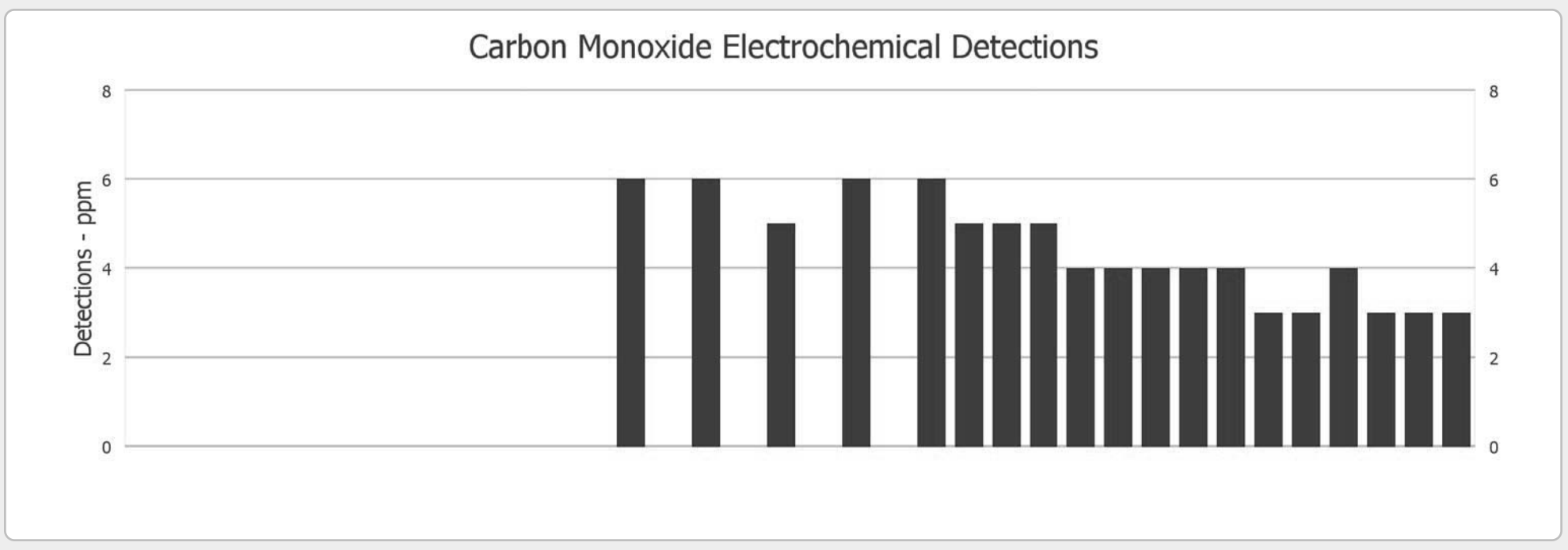
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 3

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



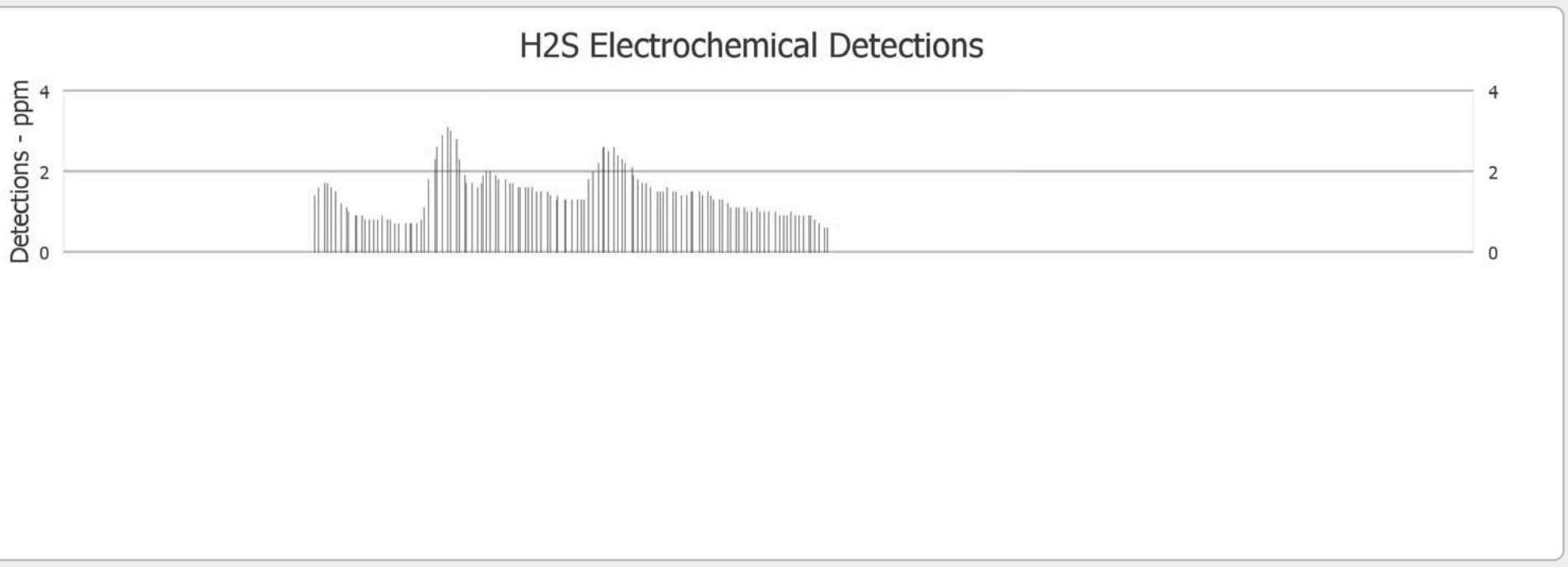



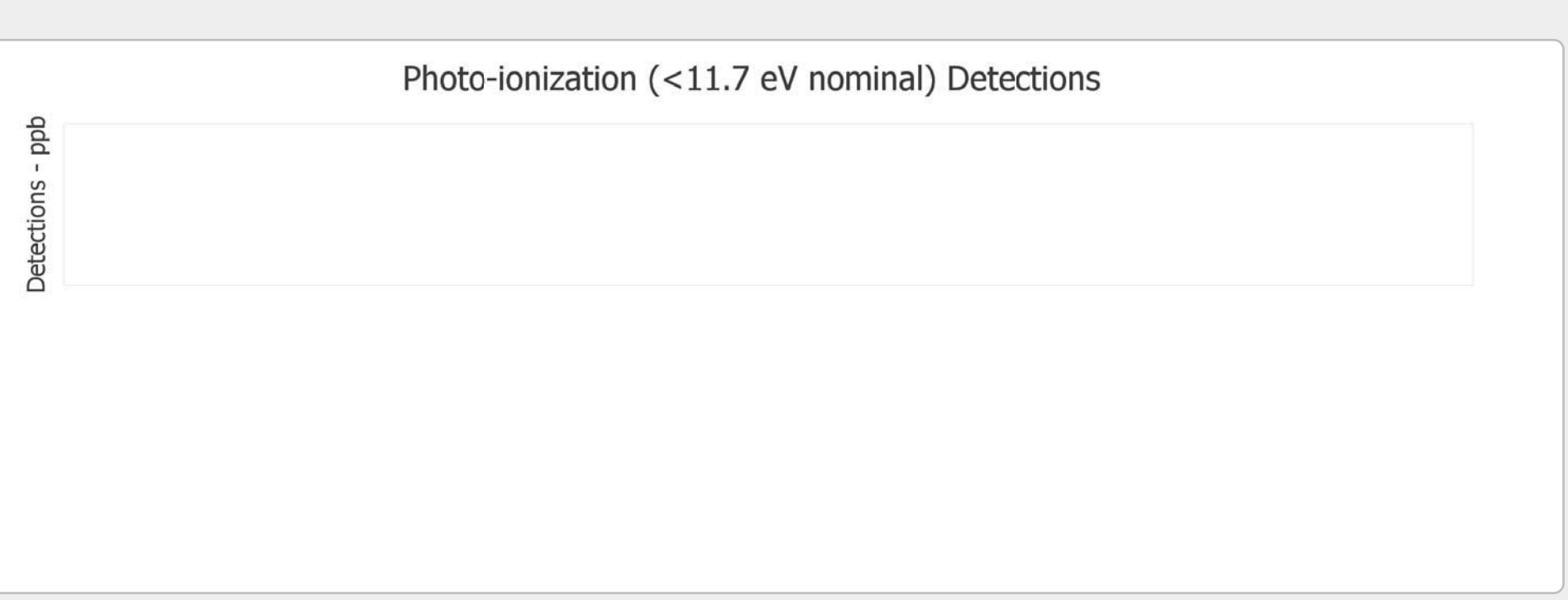



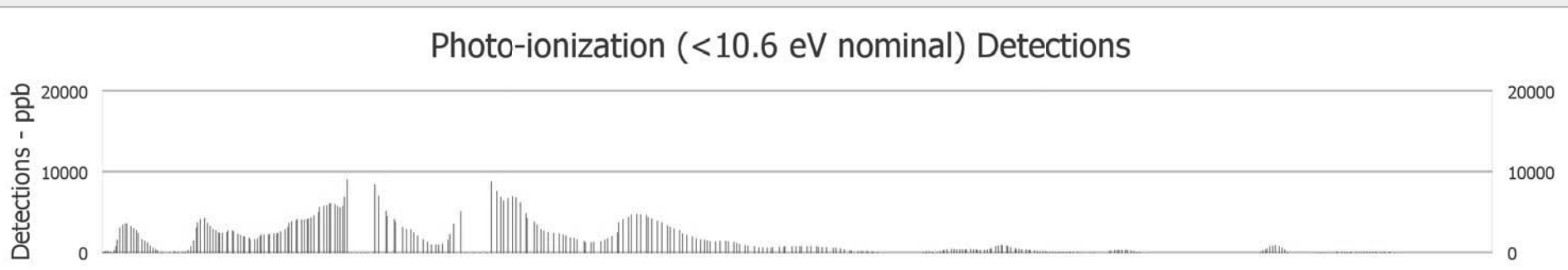



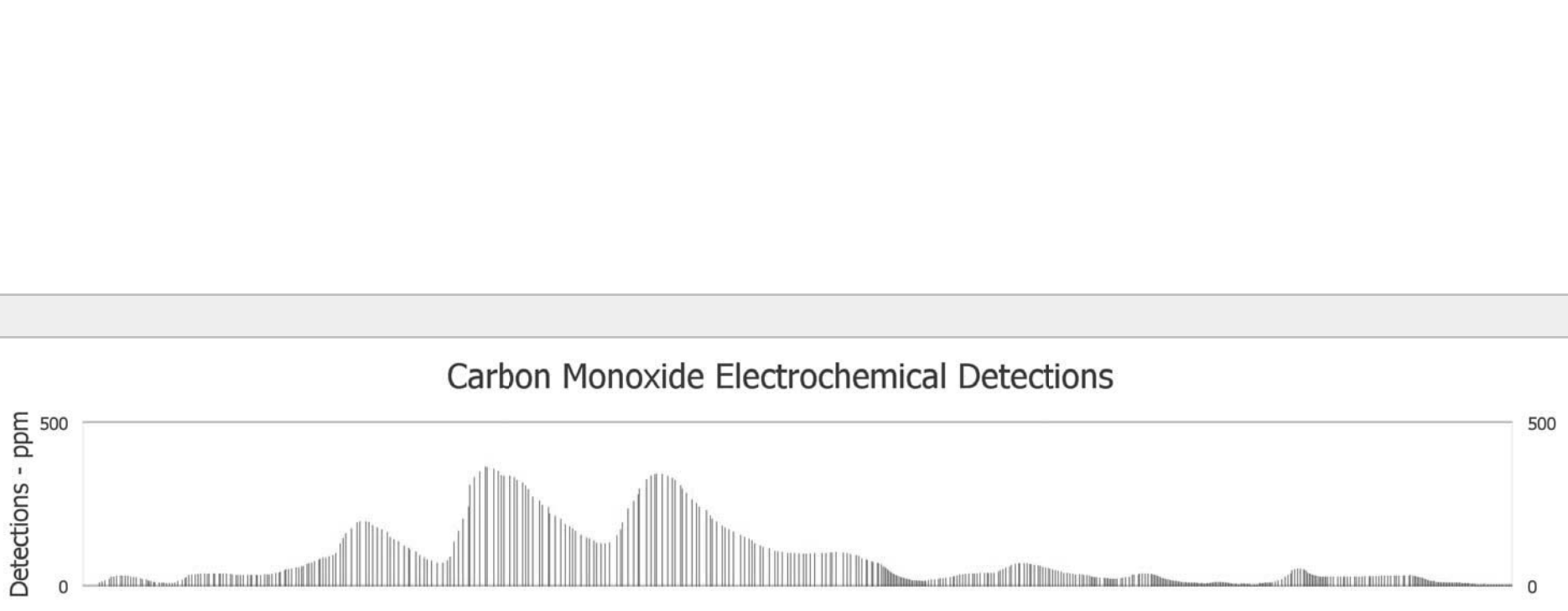
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 4

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



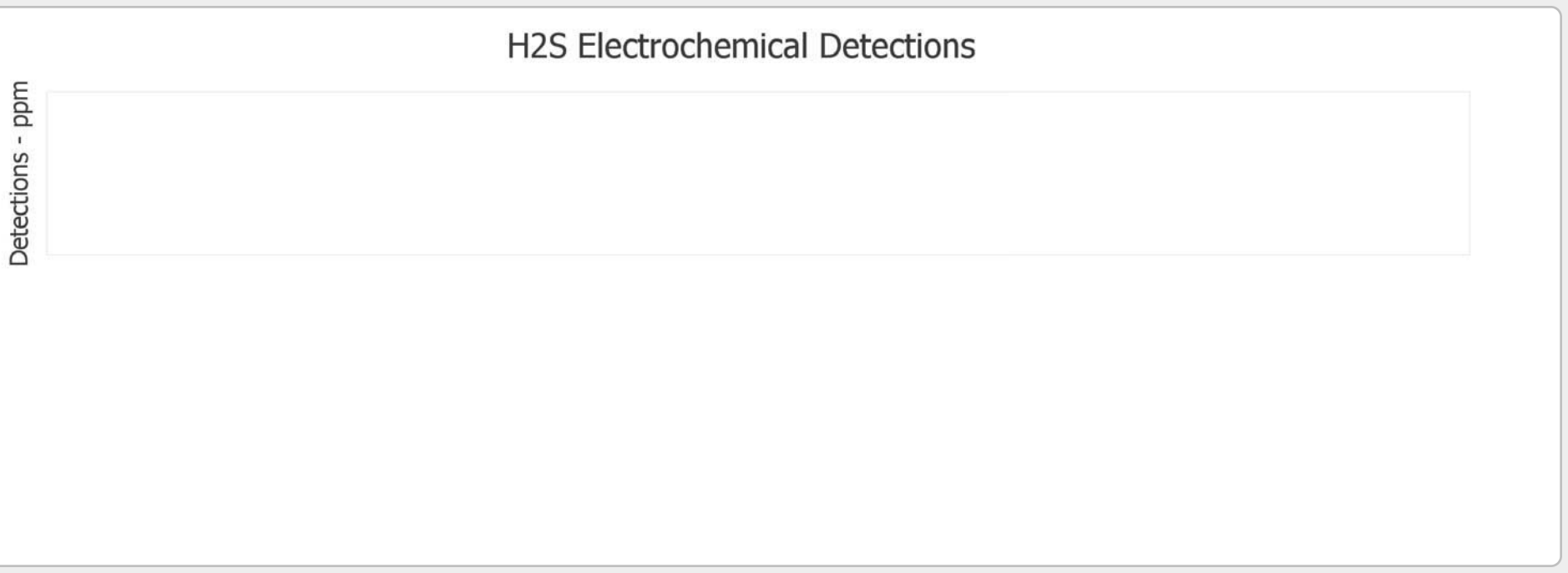



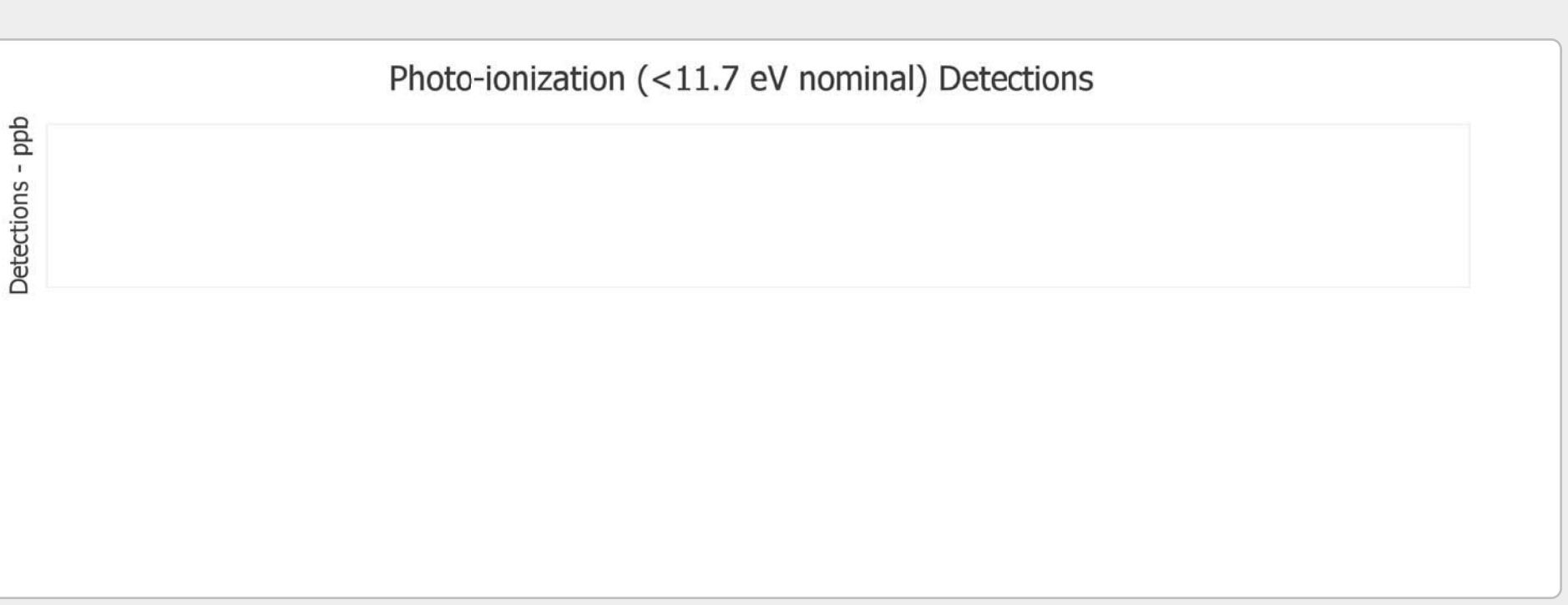



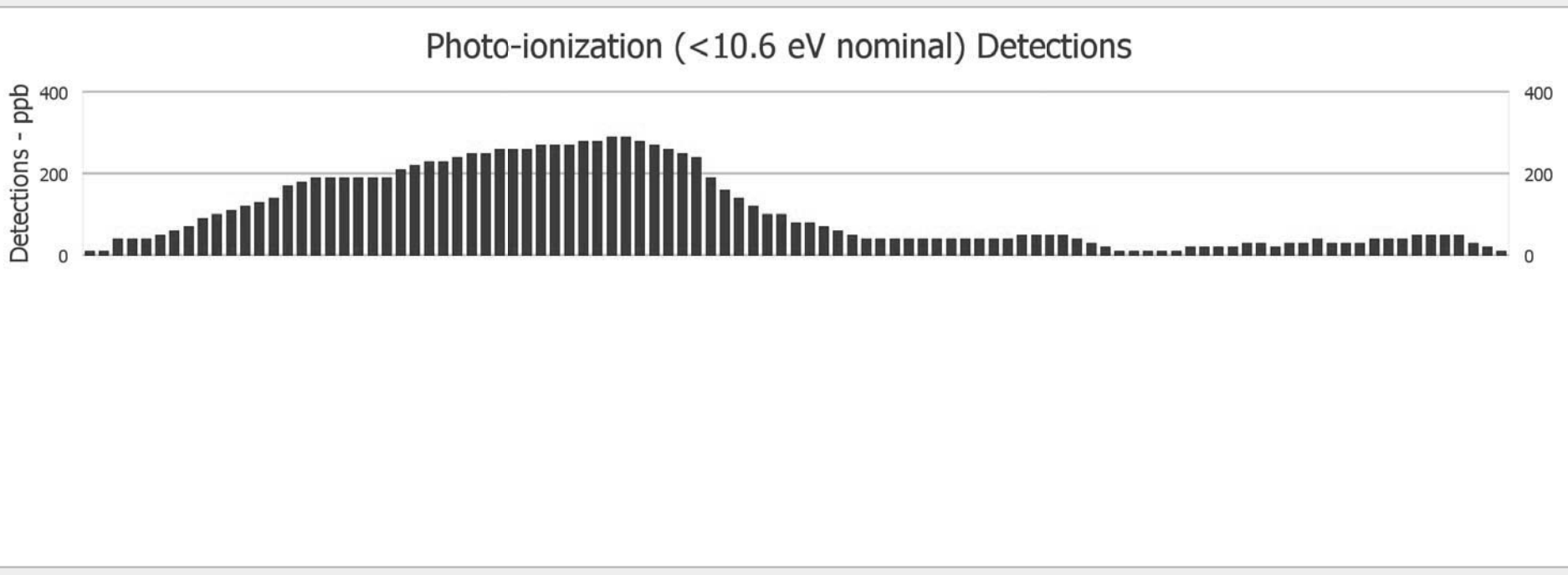



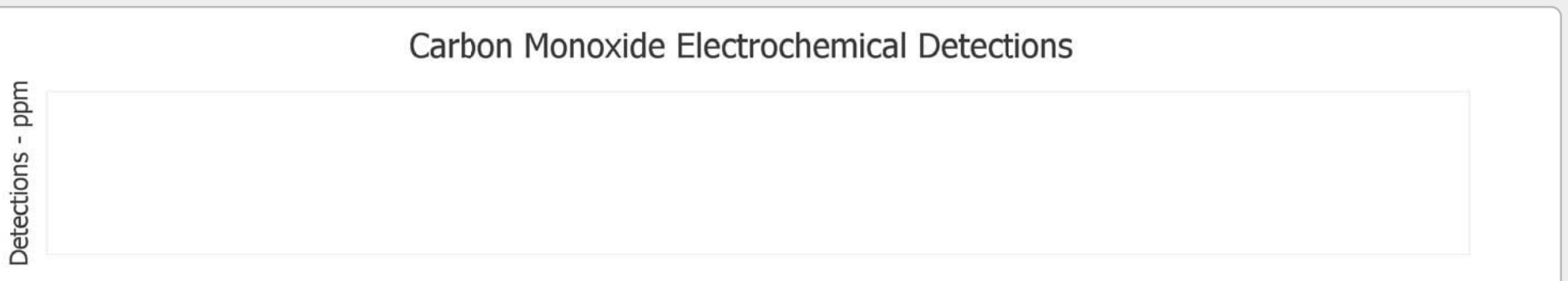
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 5

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



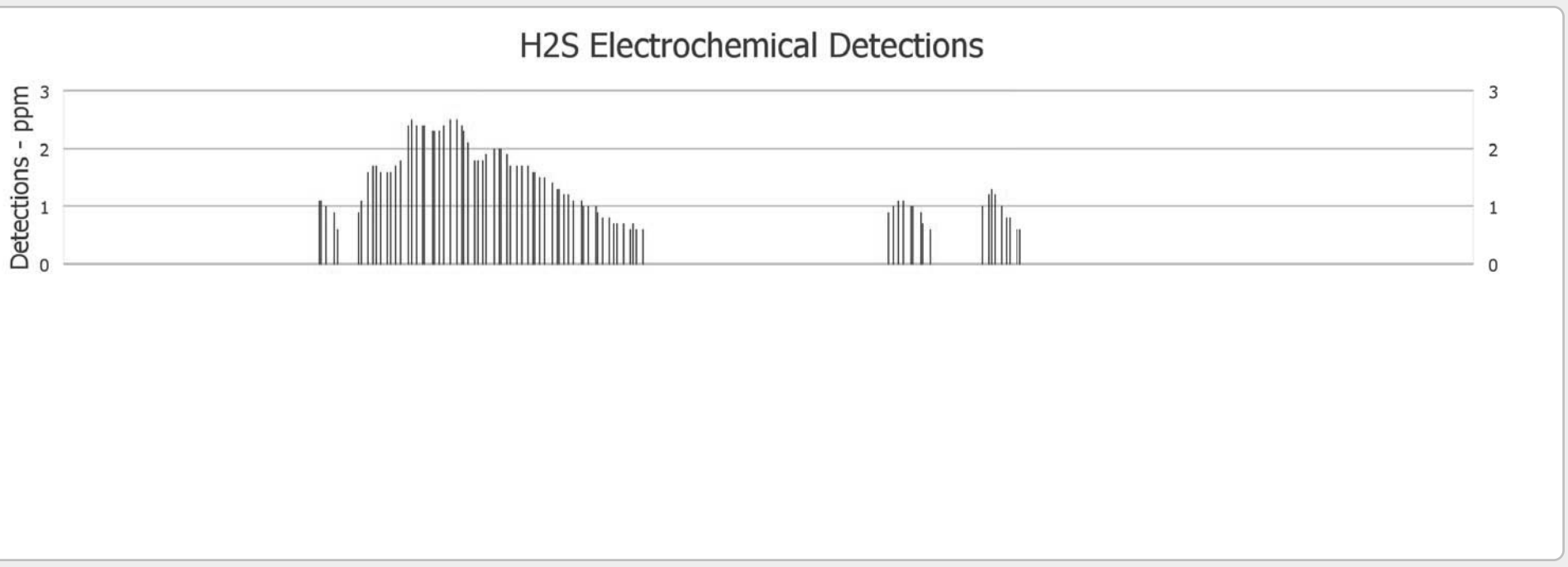



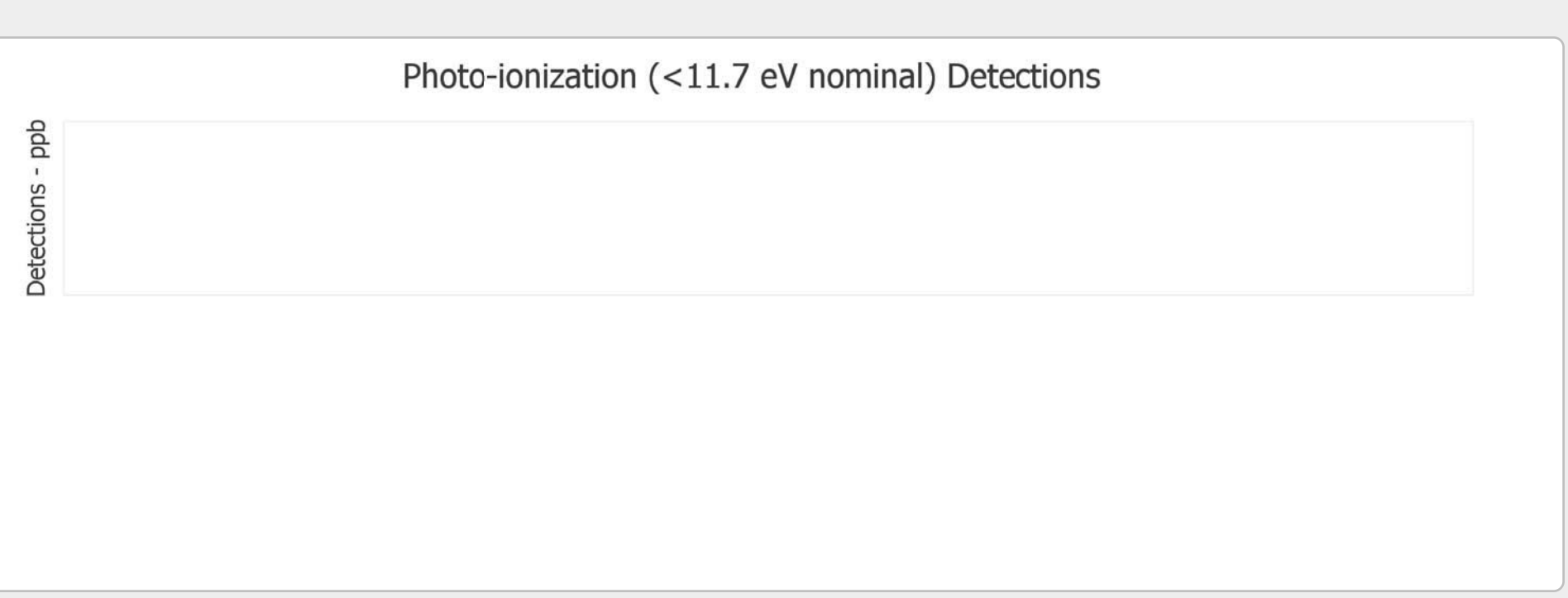



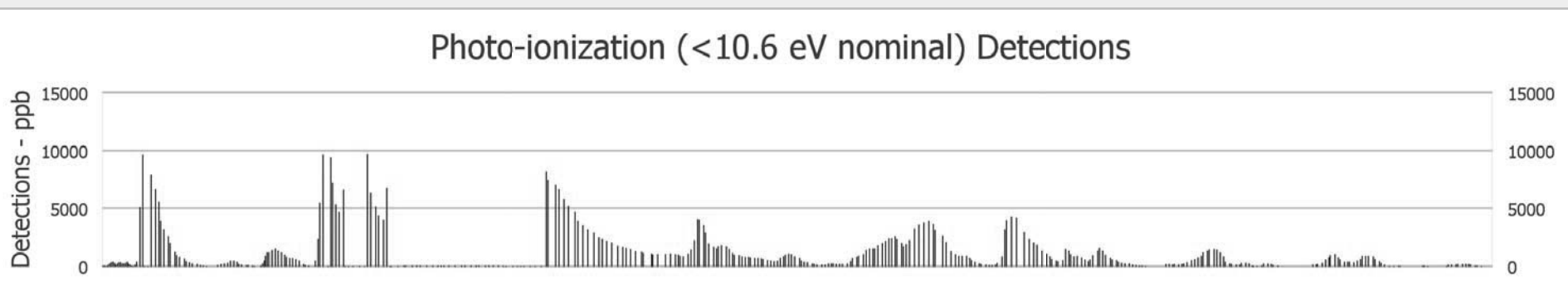



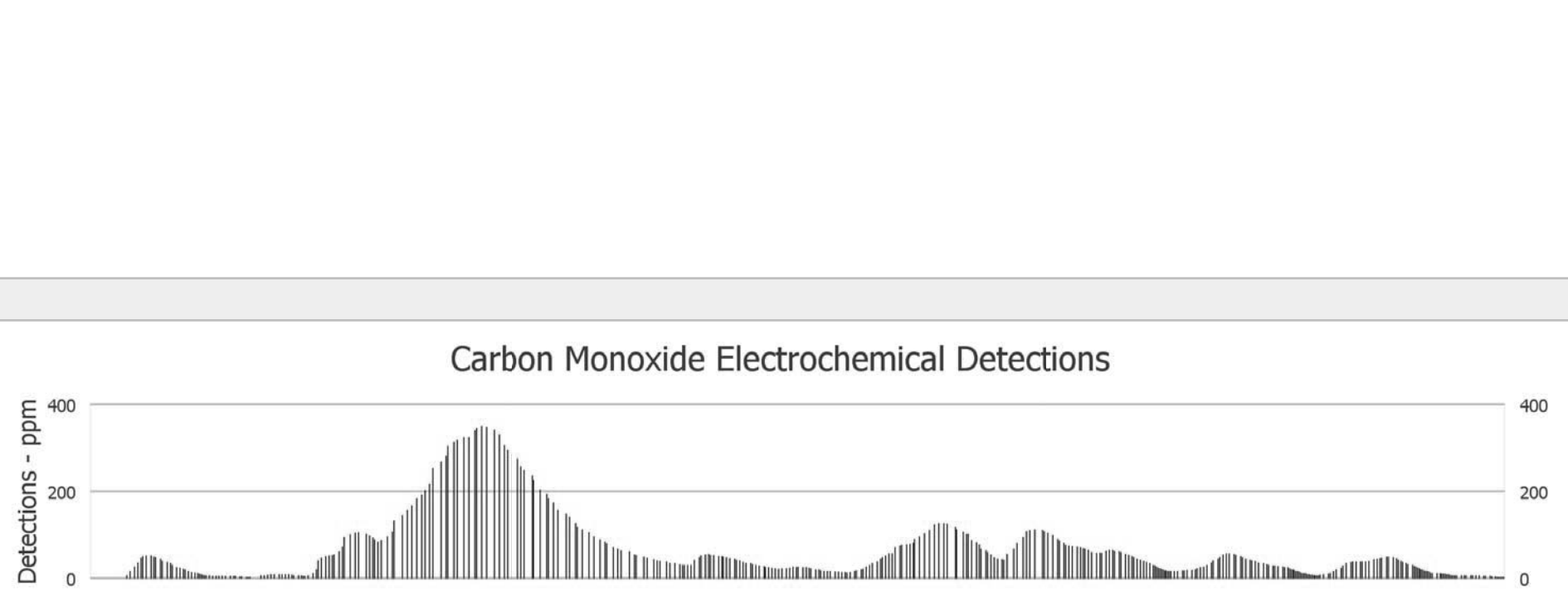
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 6

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



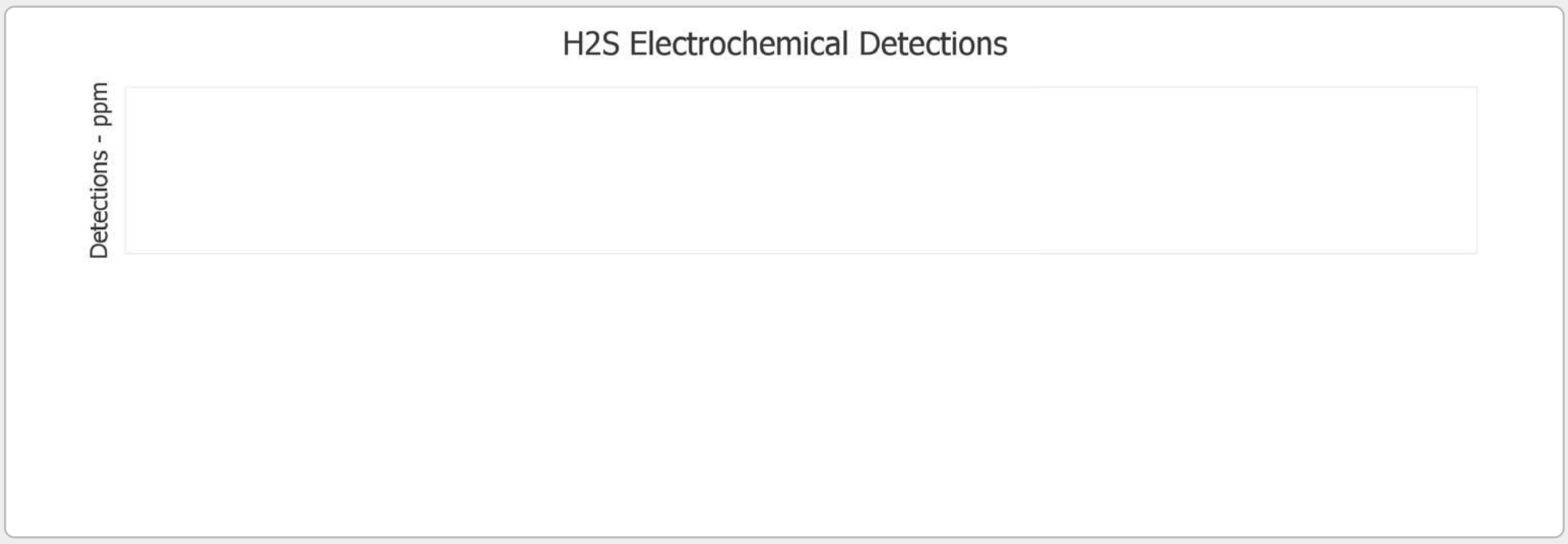



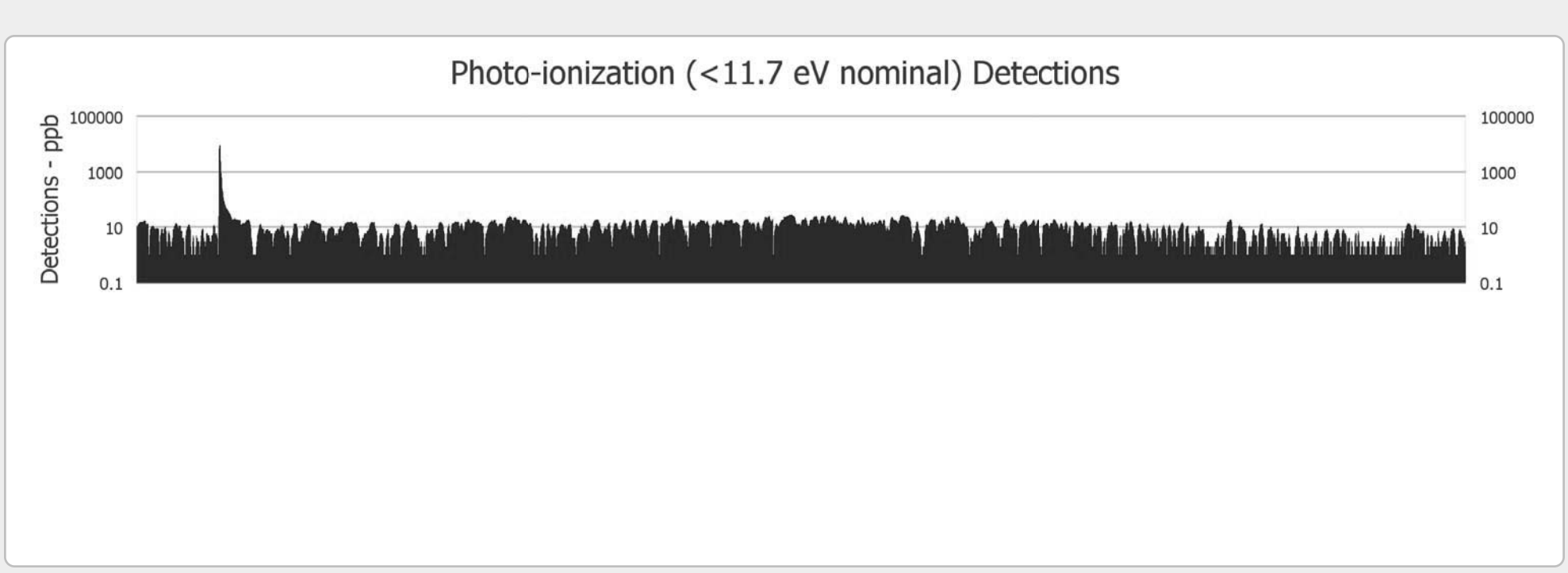



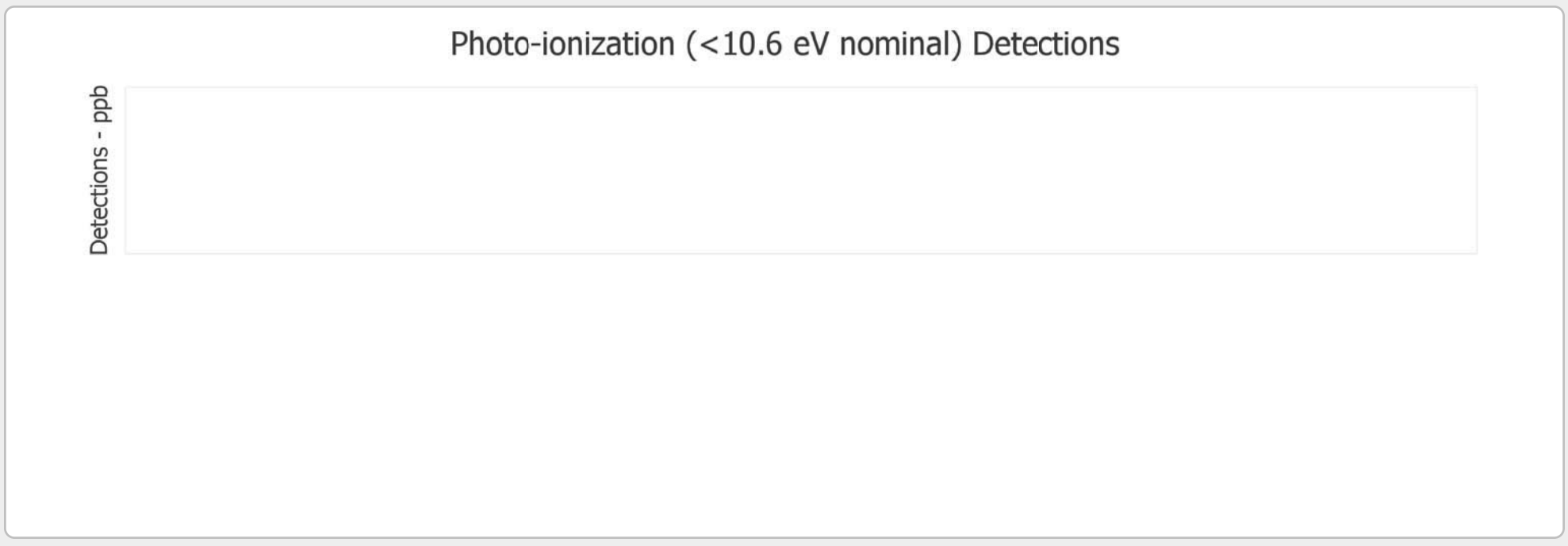



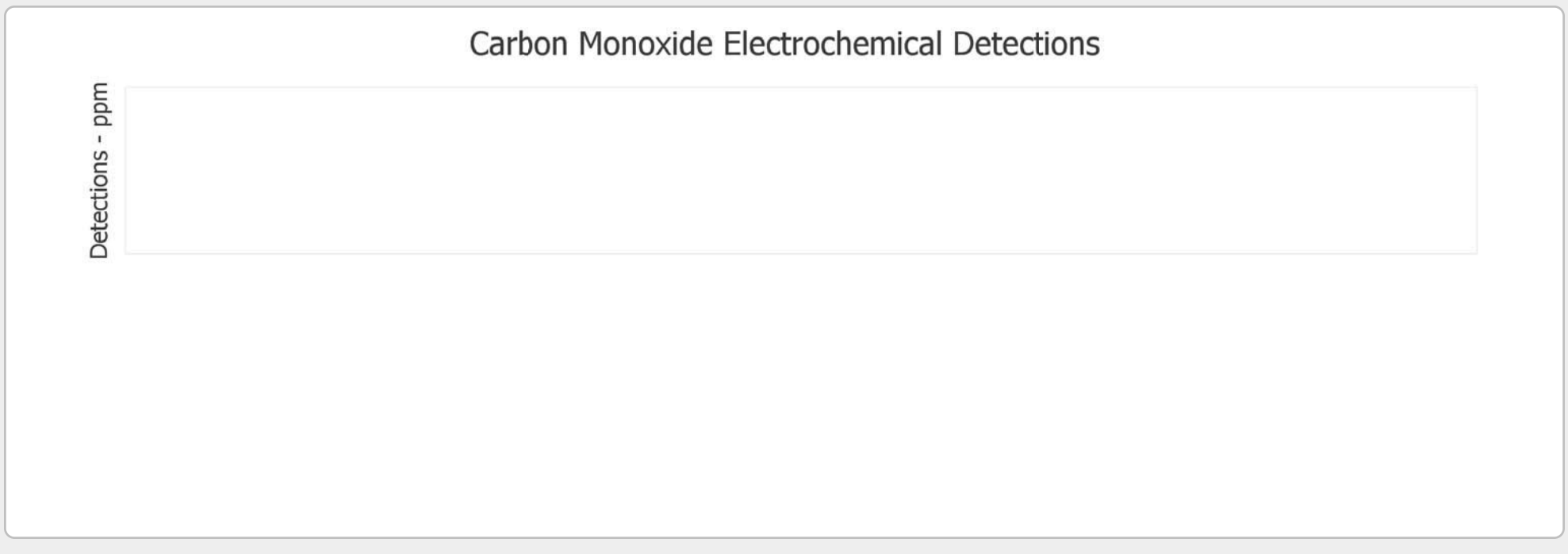
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 7

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



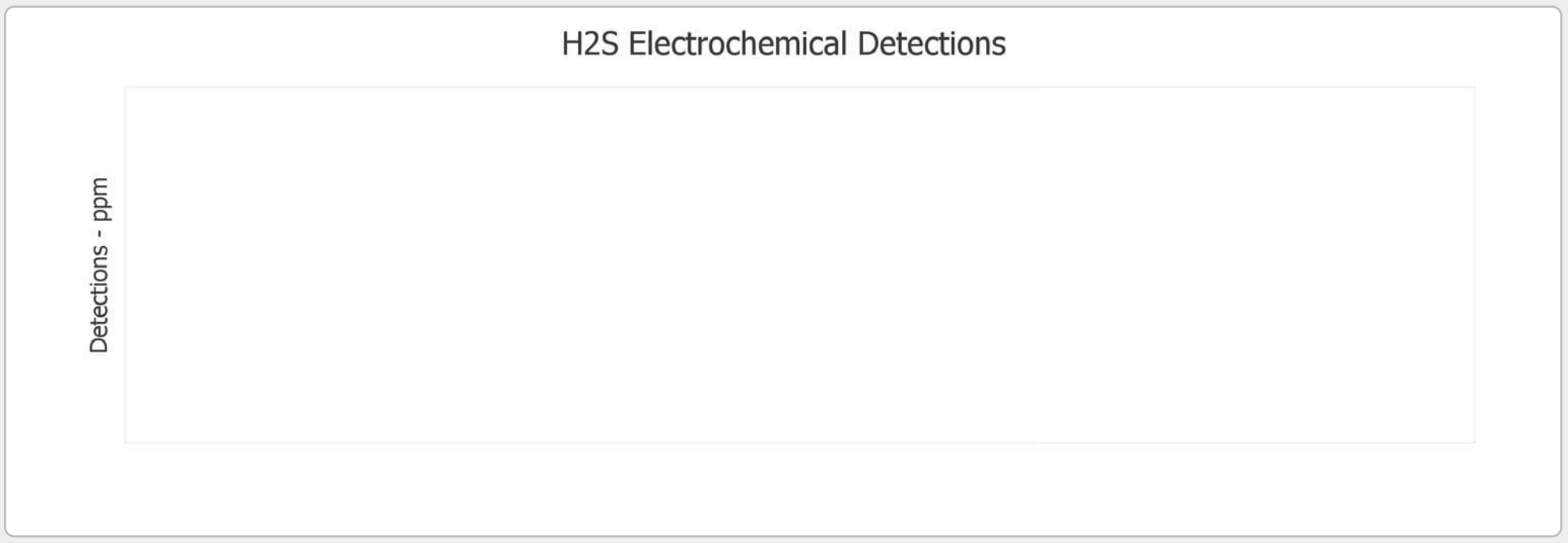



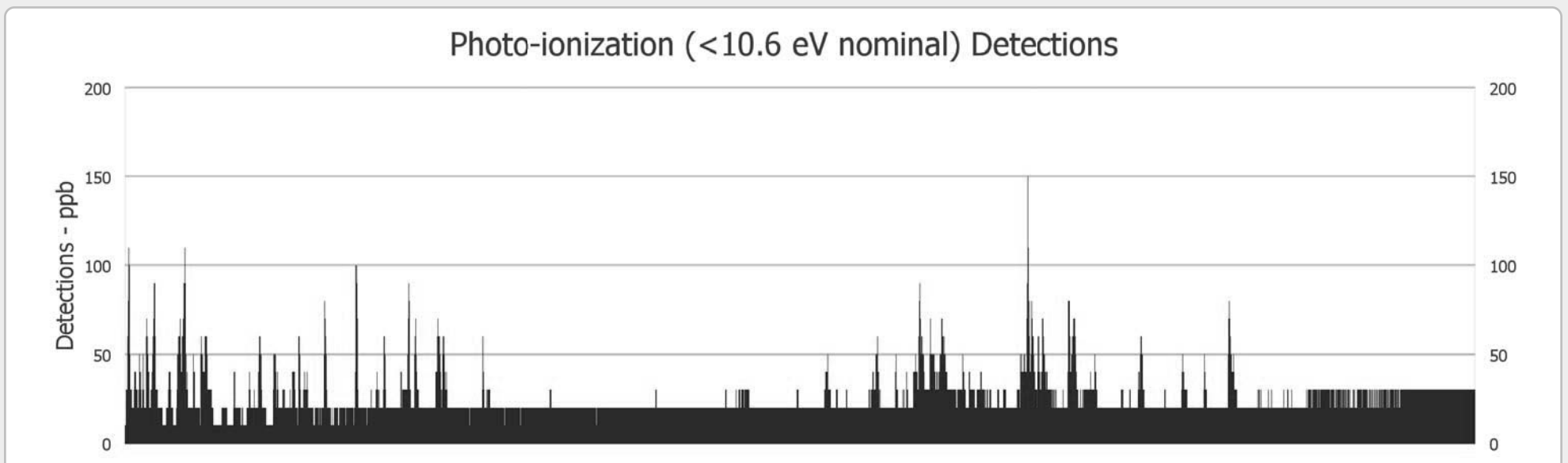



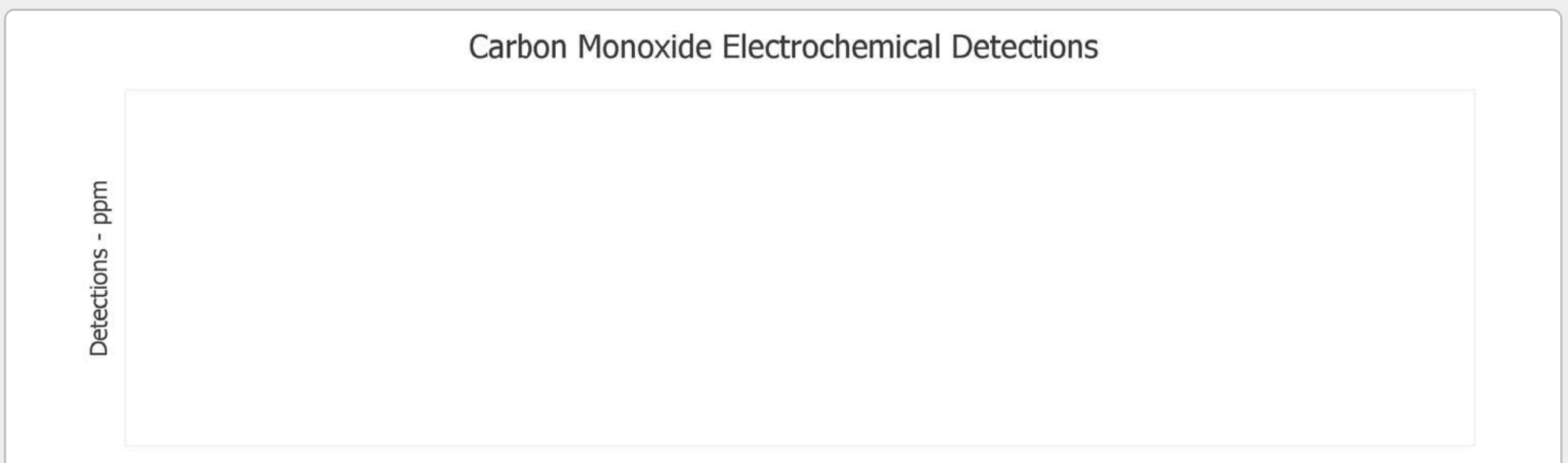
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 8

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



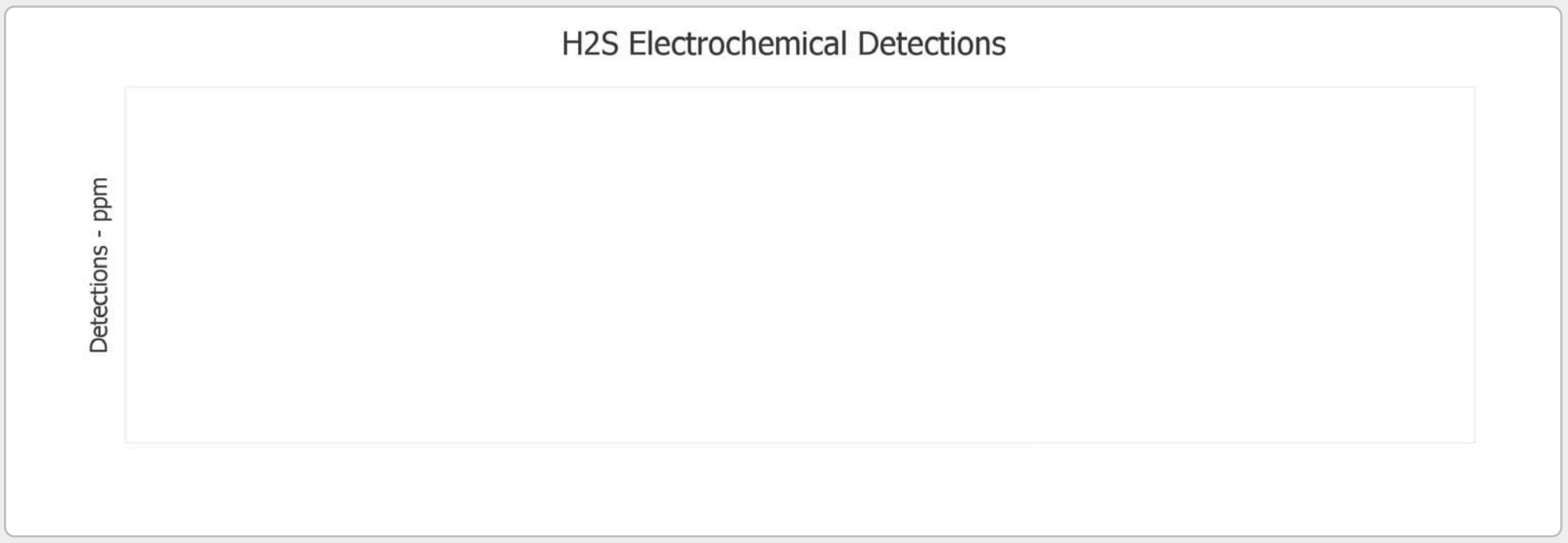


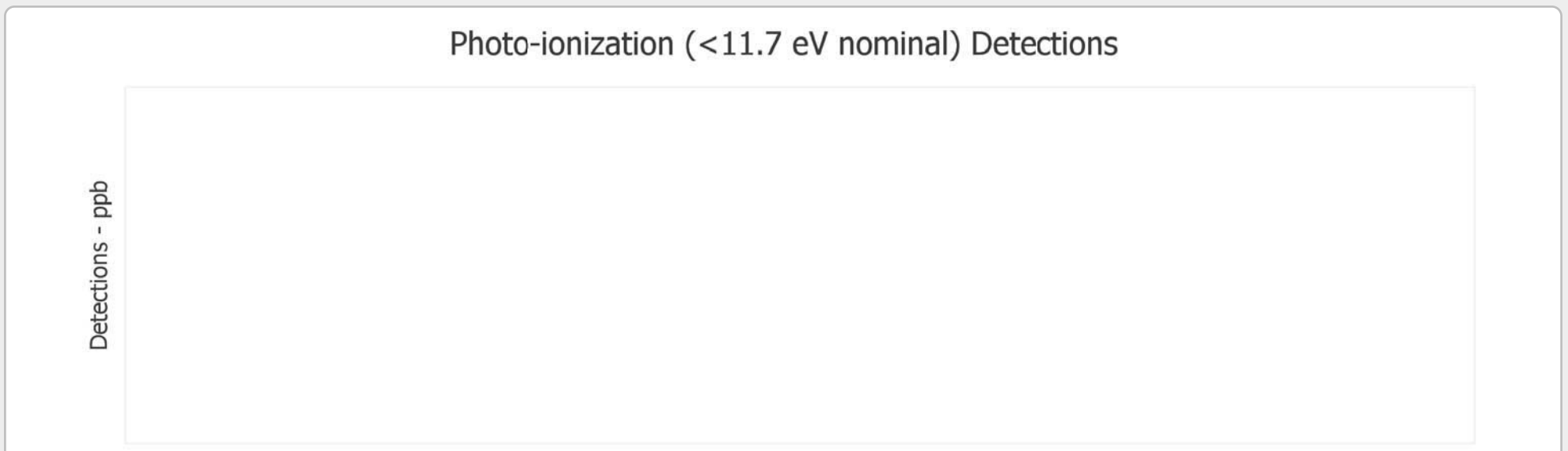


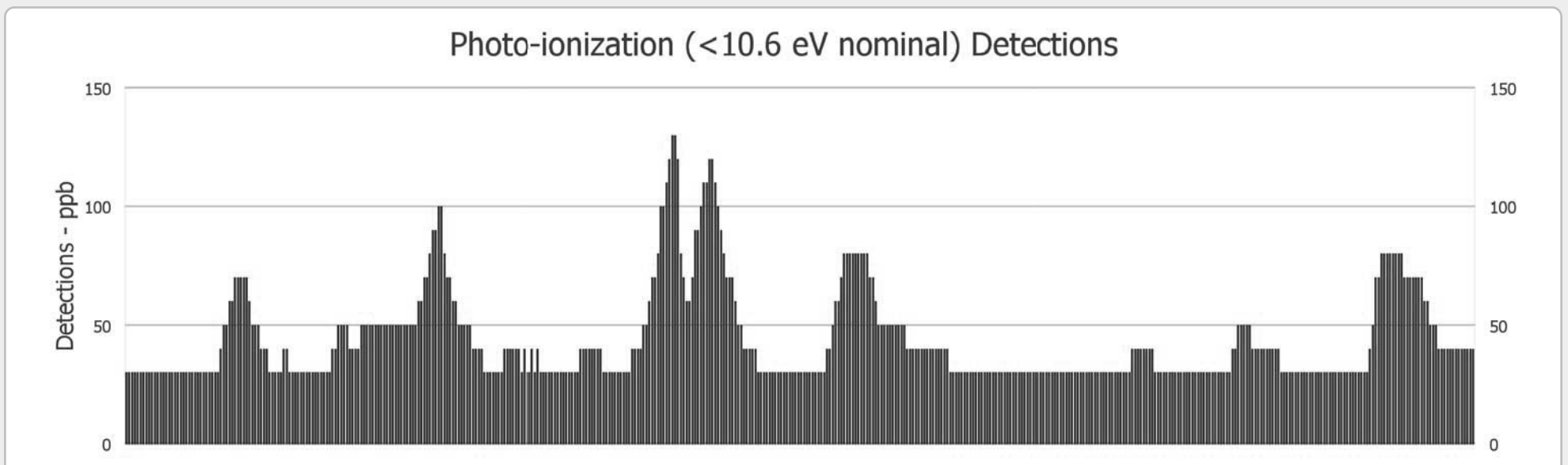



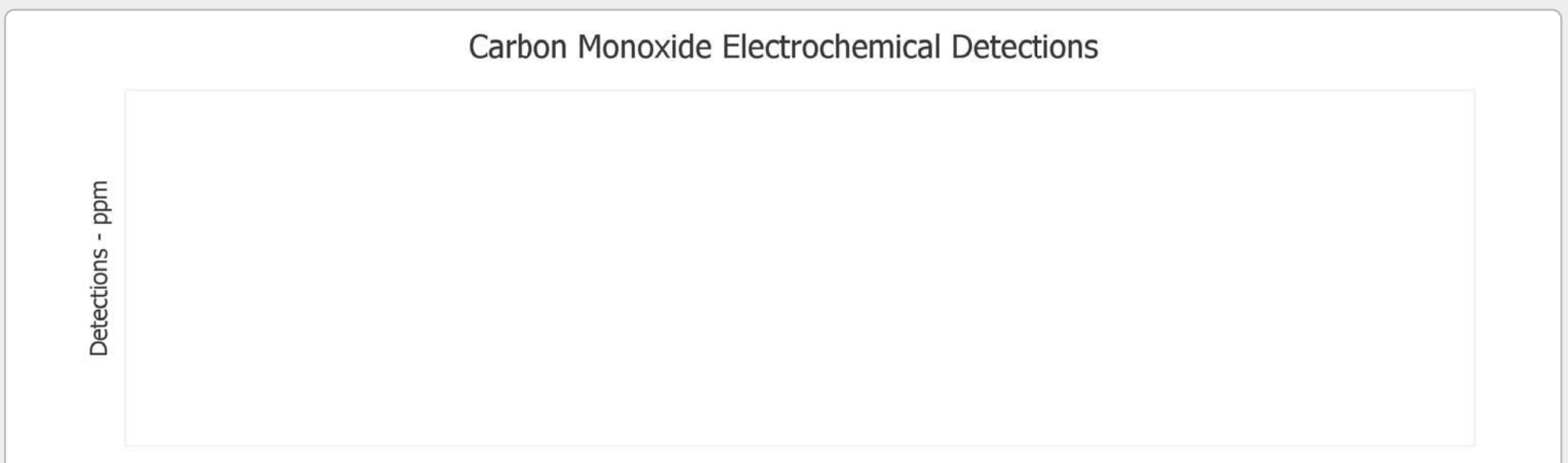
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 9

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



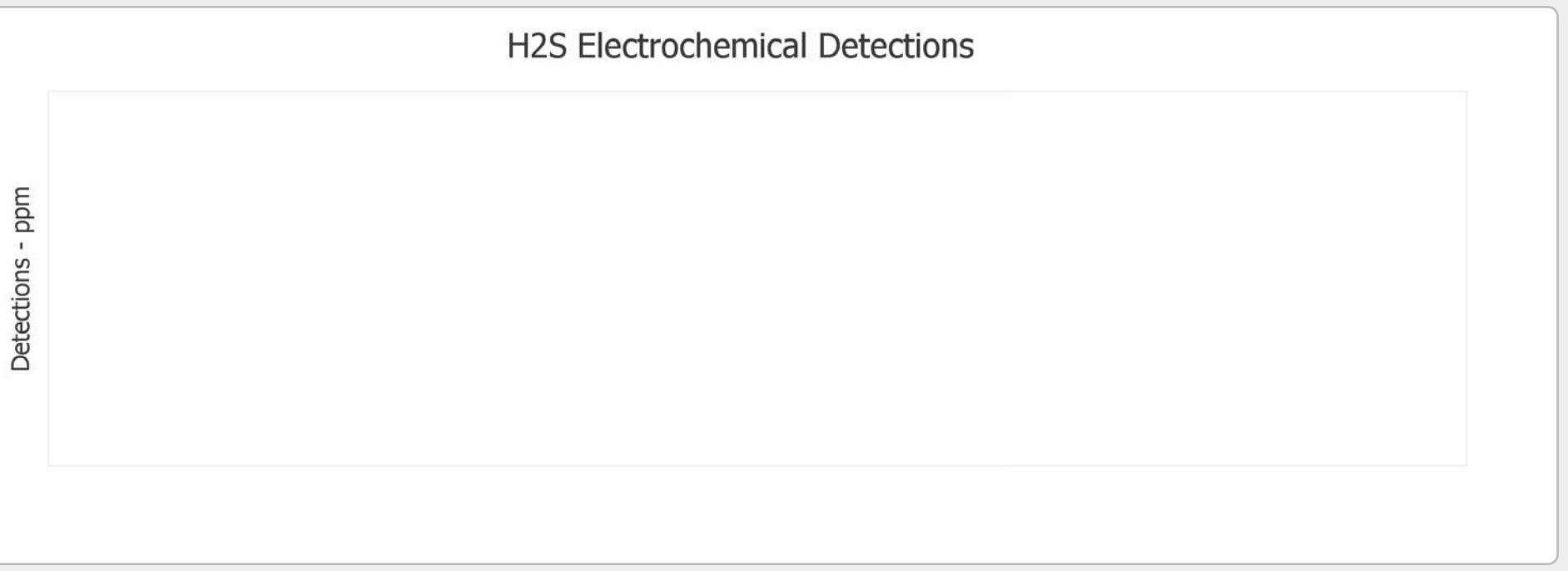



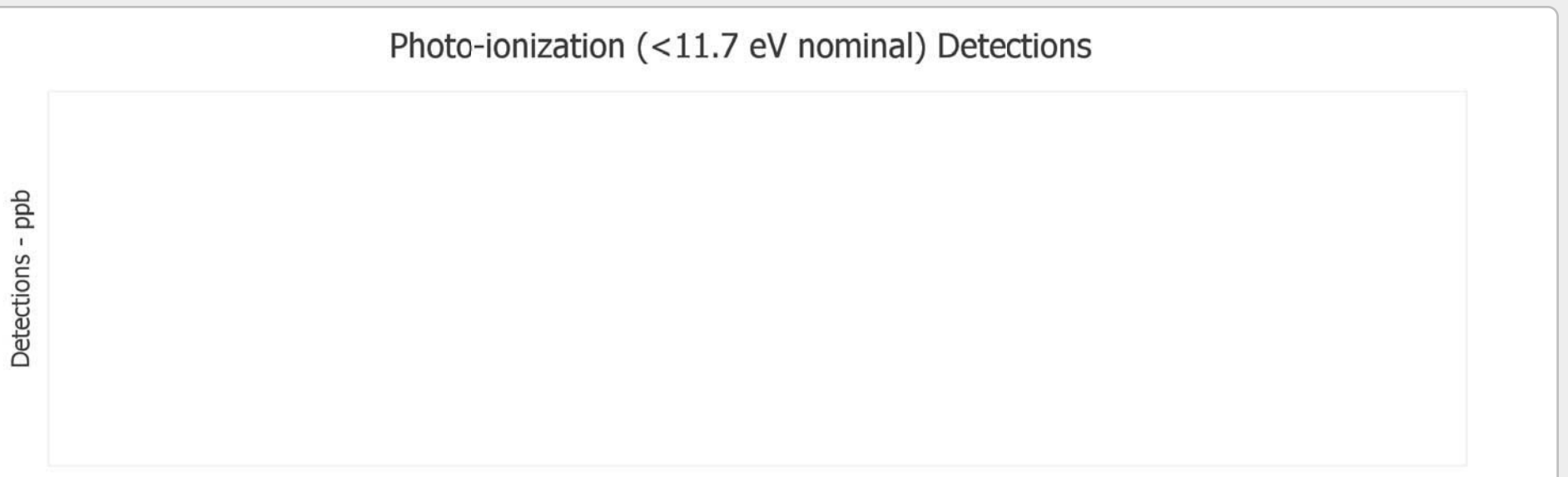



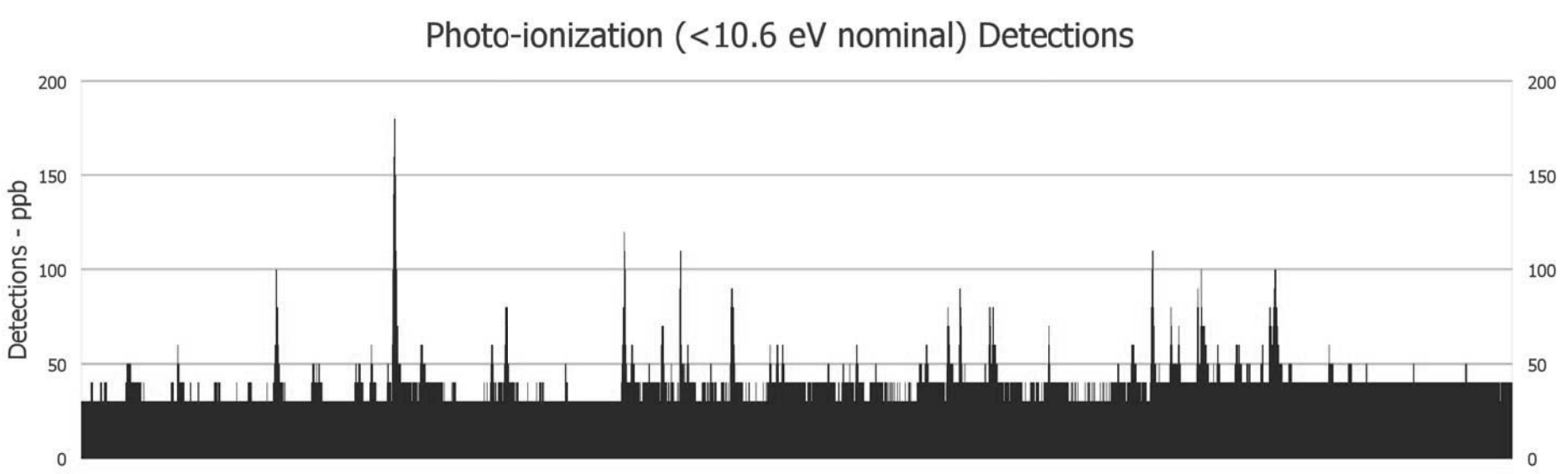



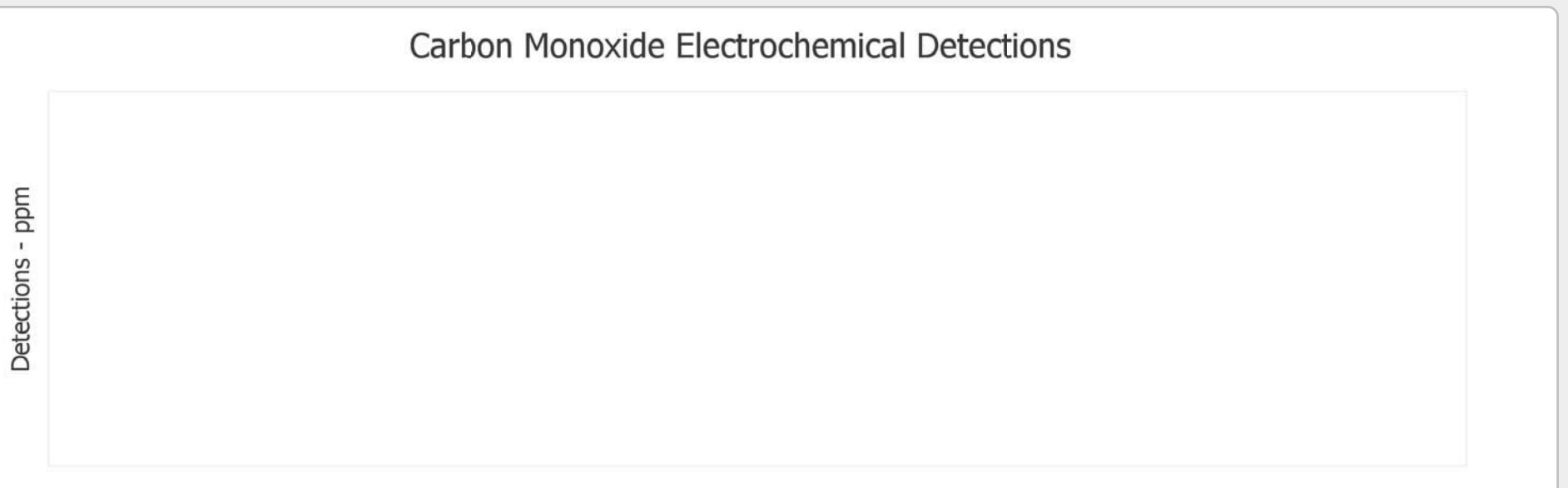
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 10

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



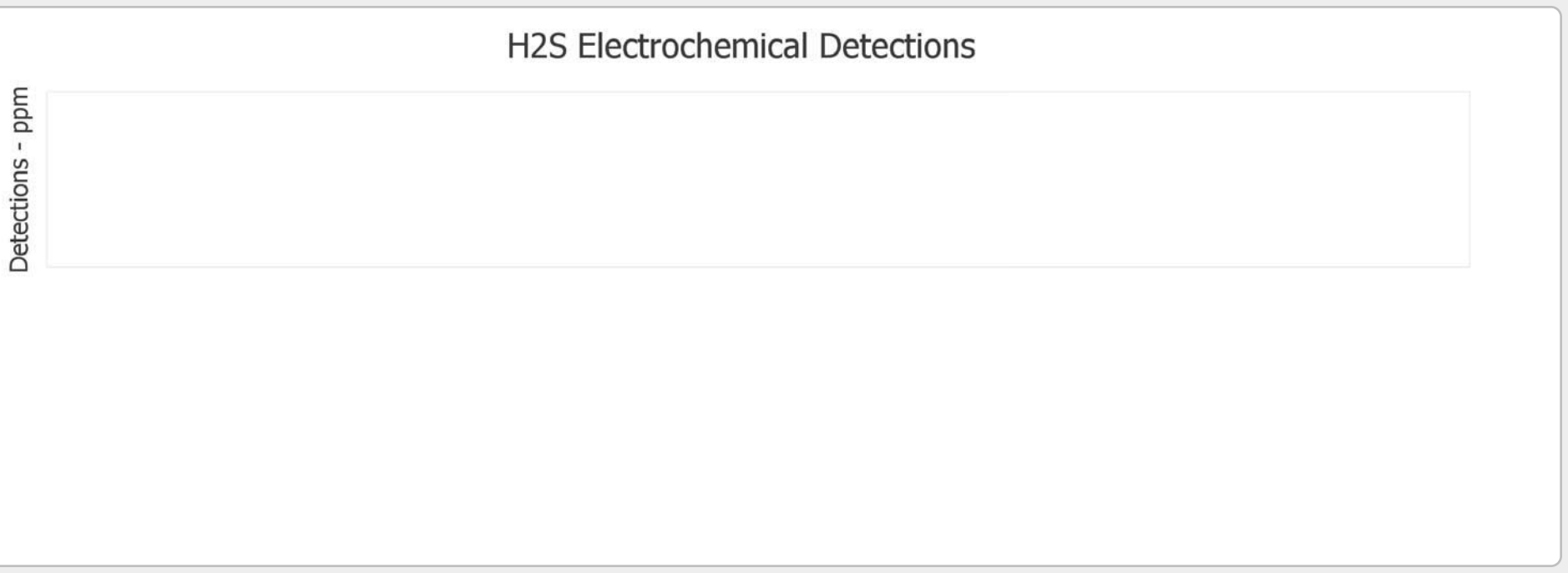



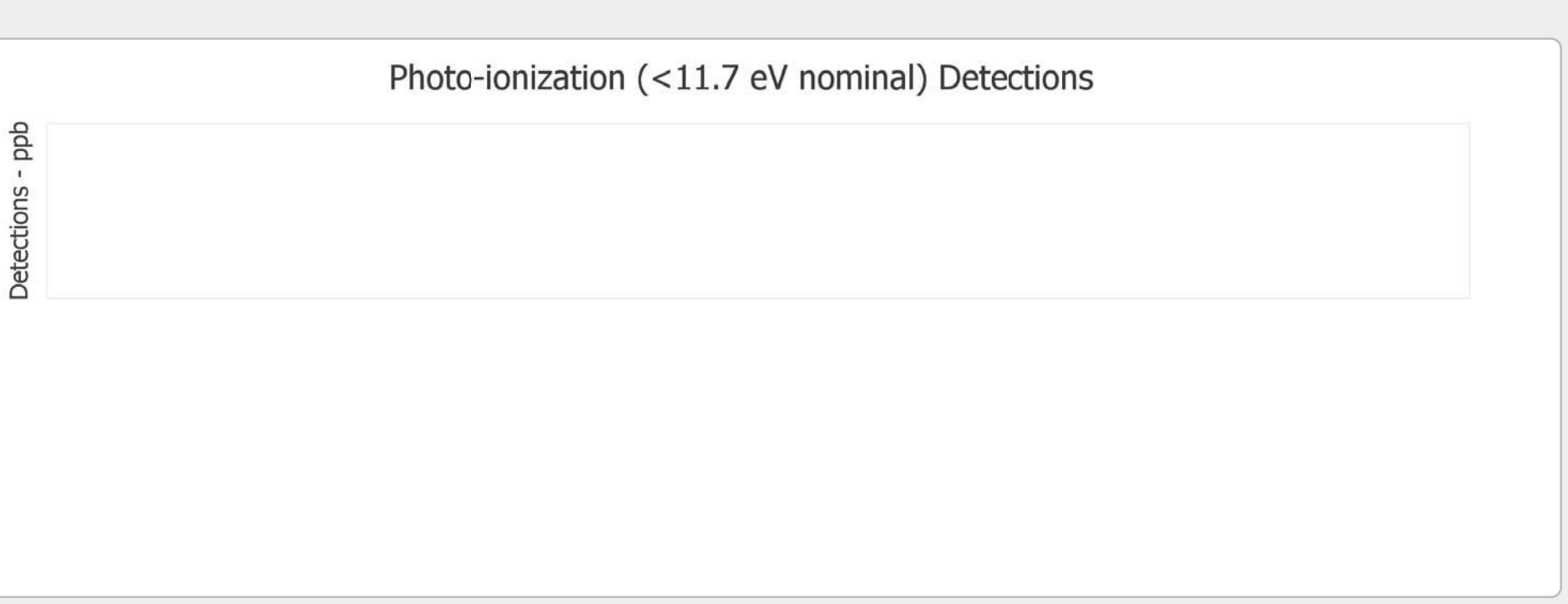



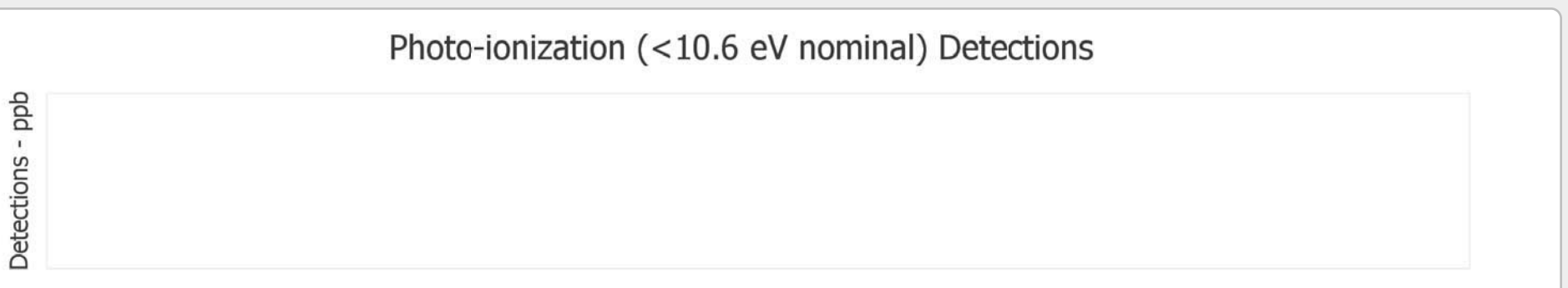



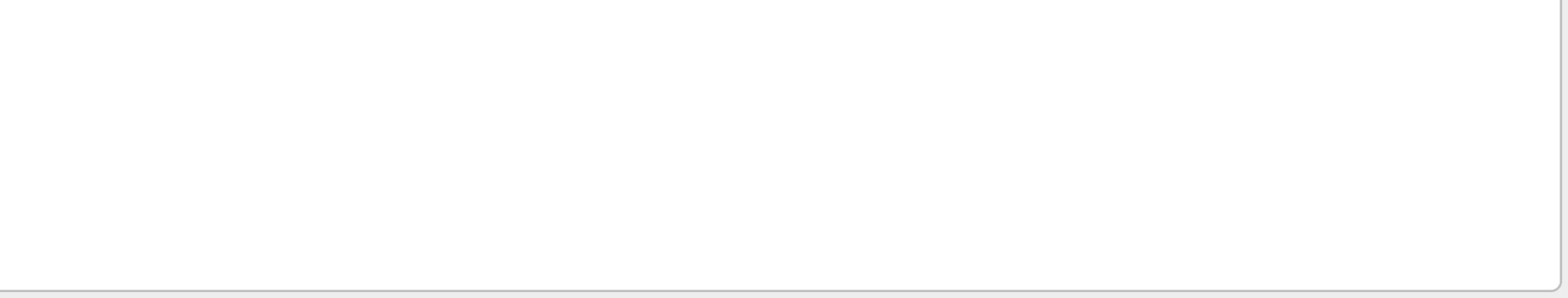
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 11

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



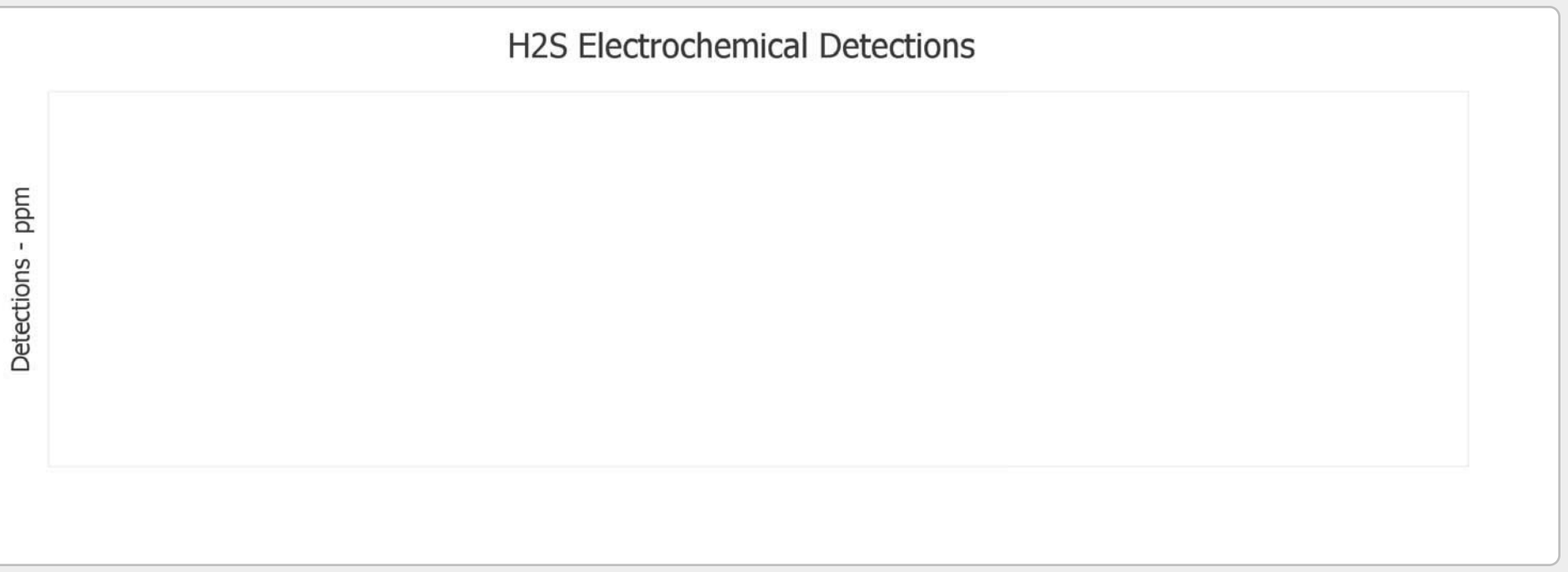



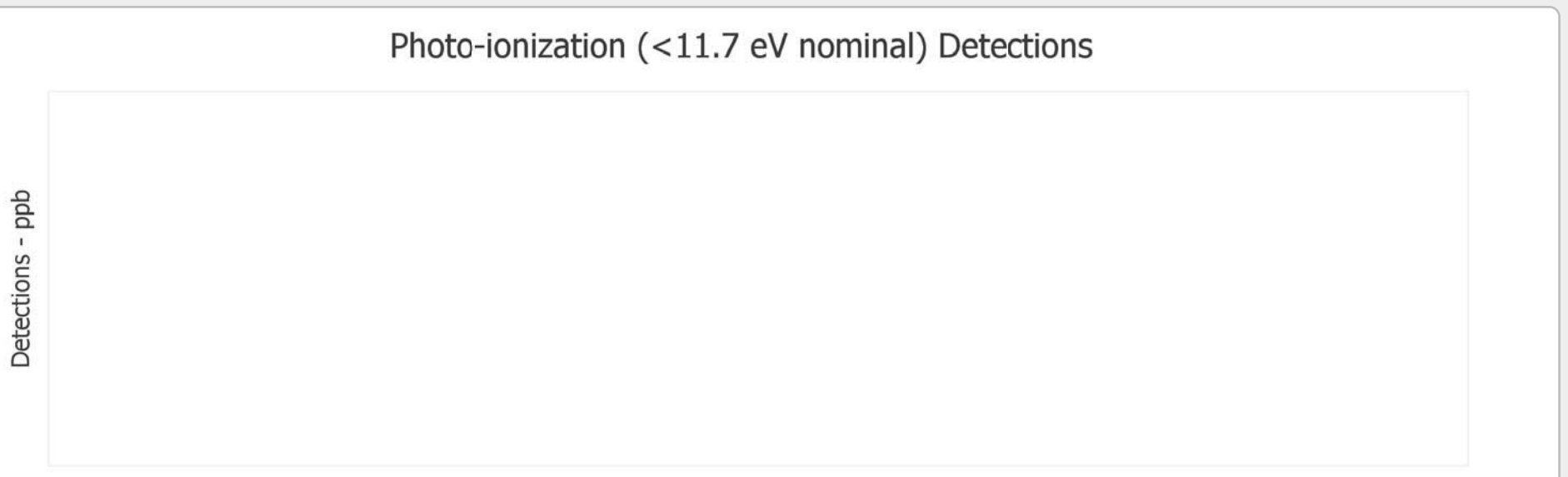



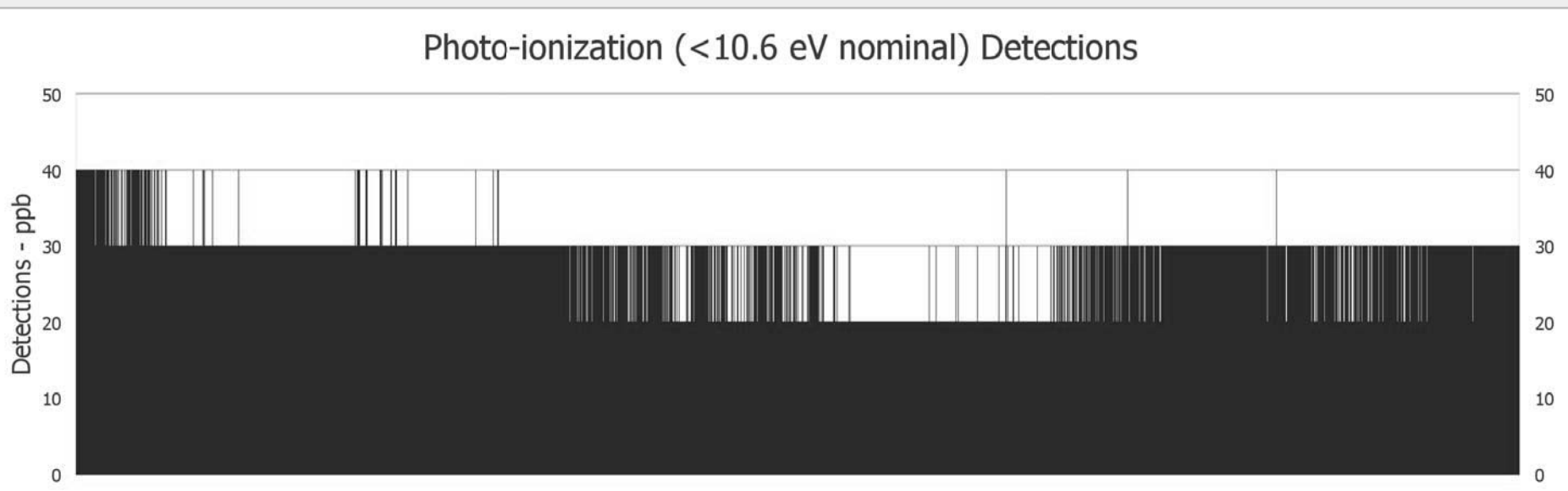



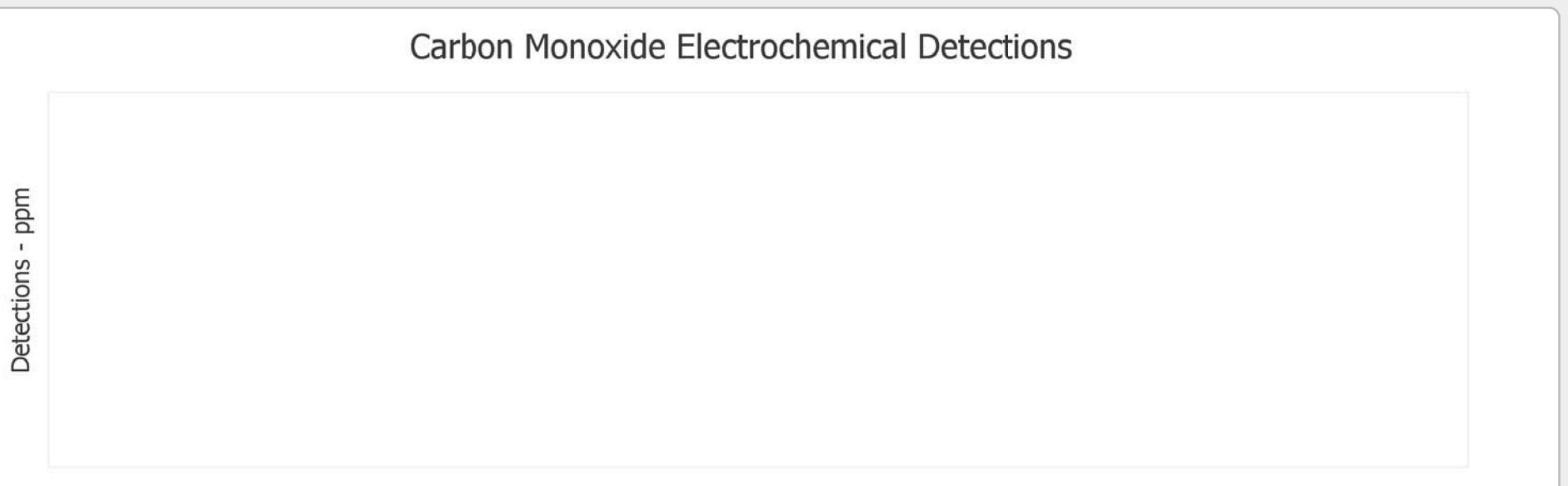
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 12

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



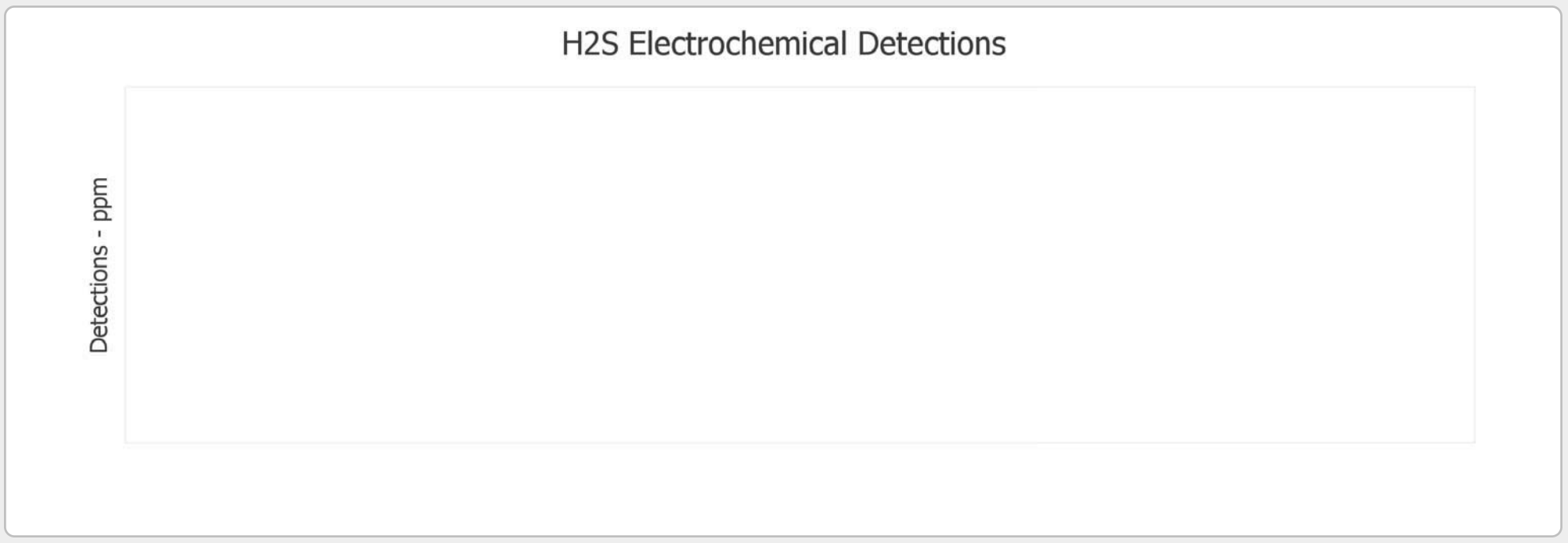



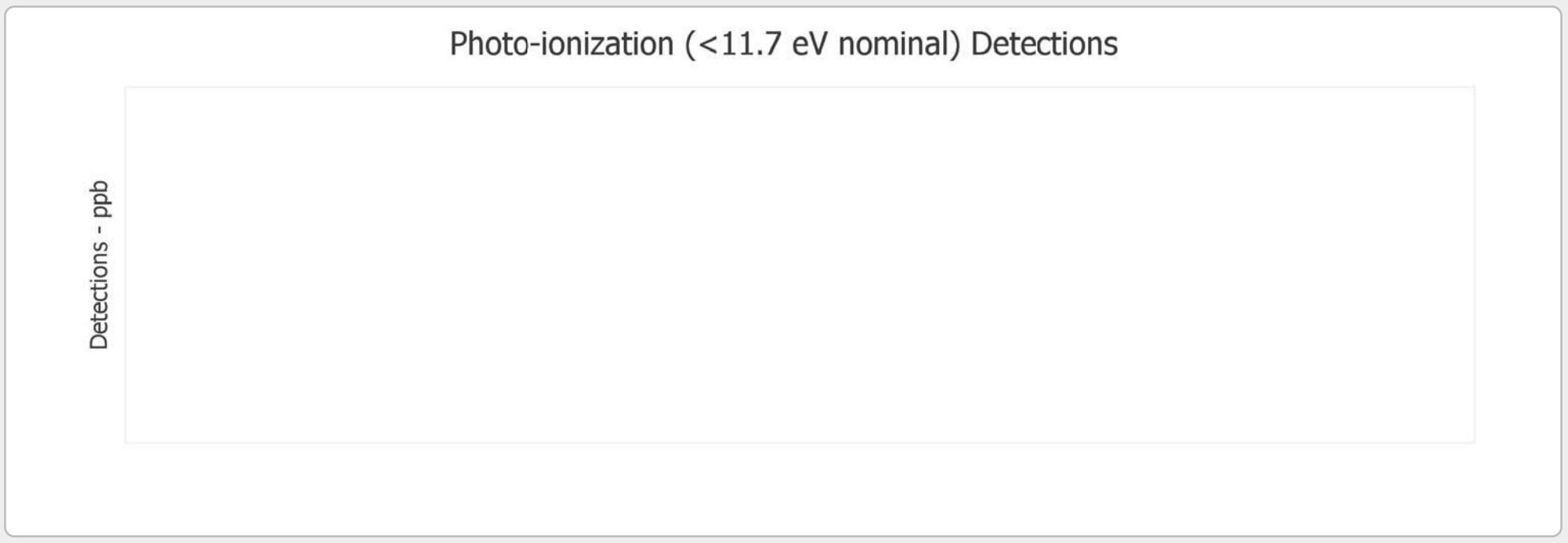



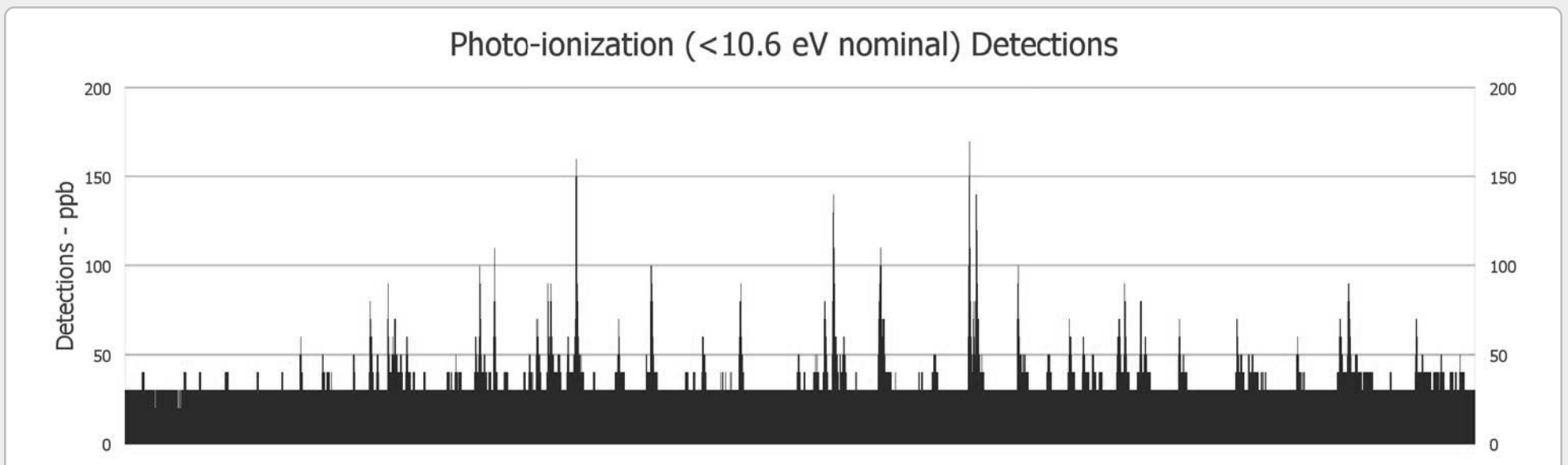



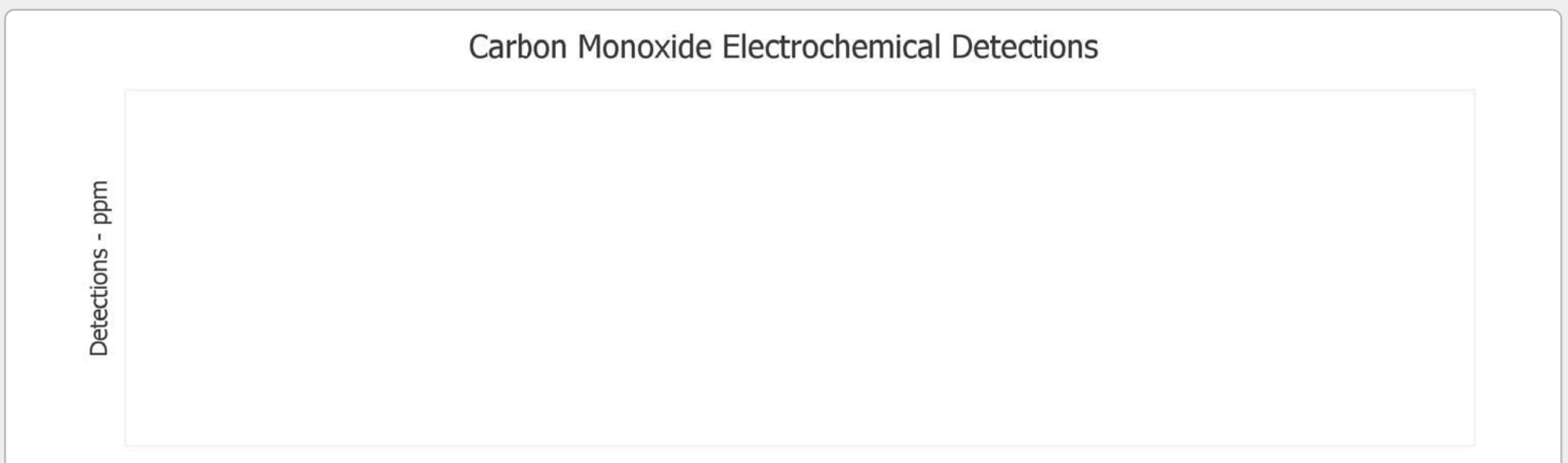
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 13

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



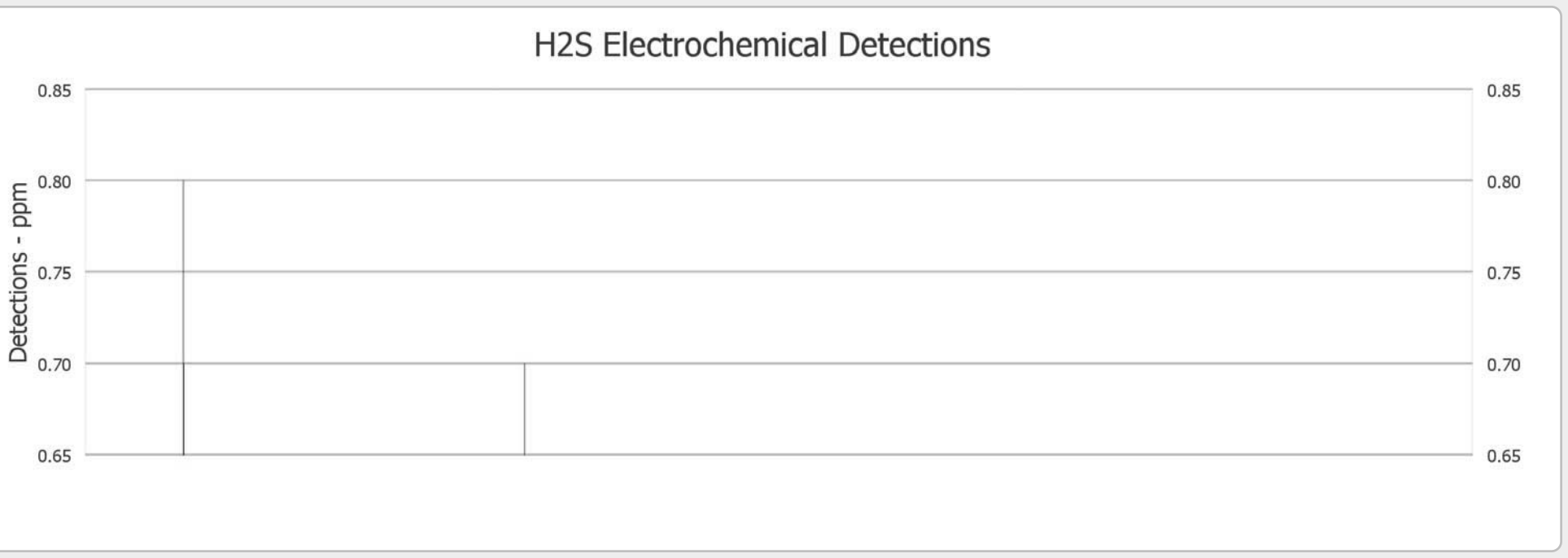



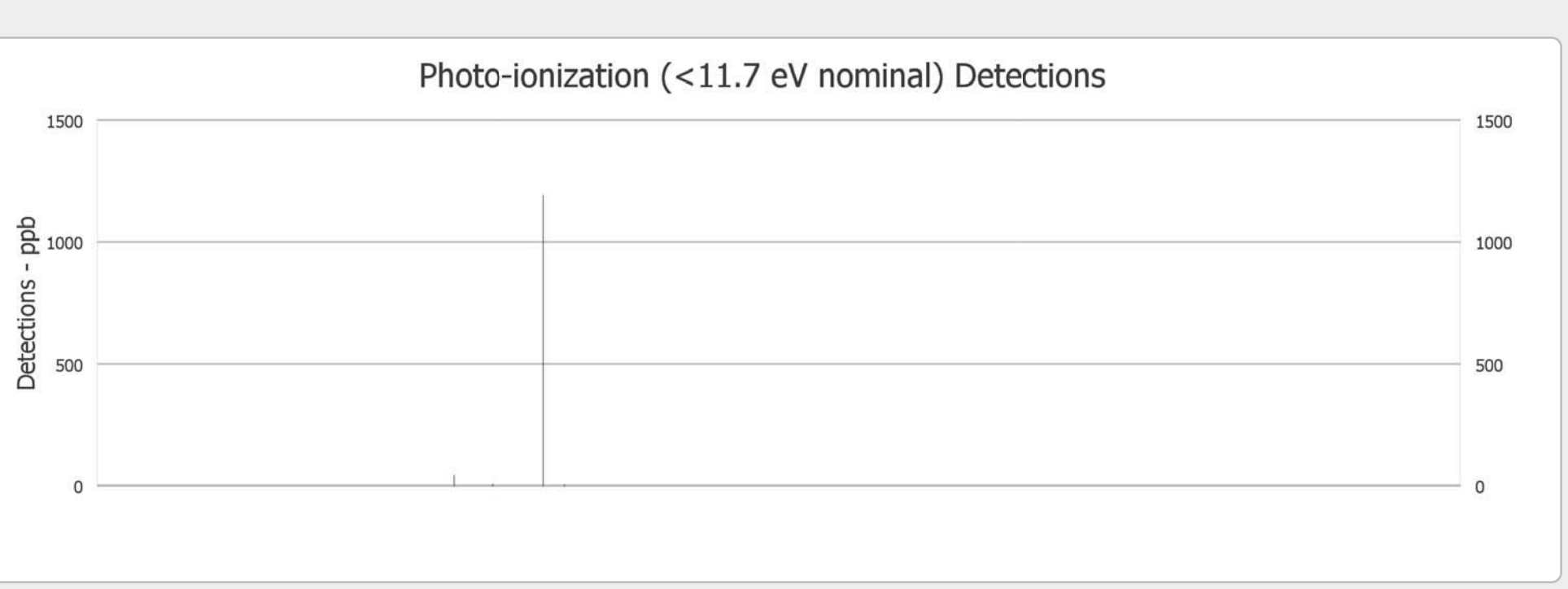



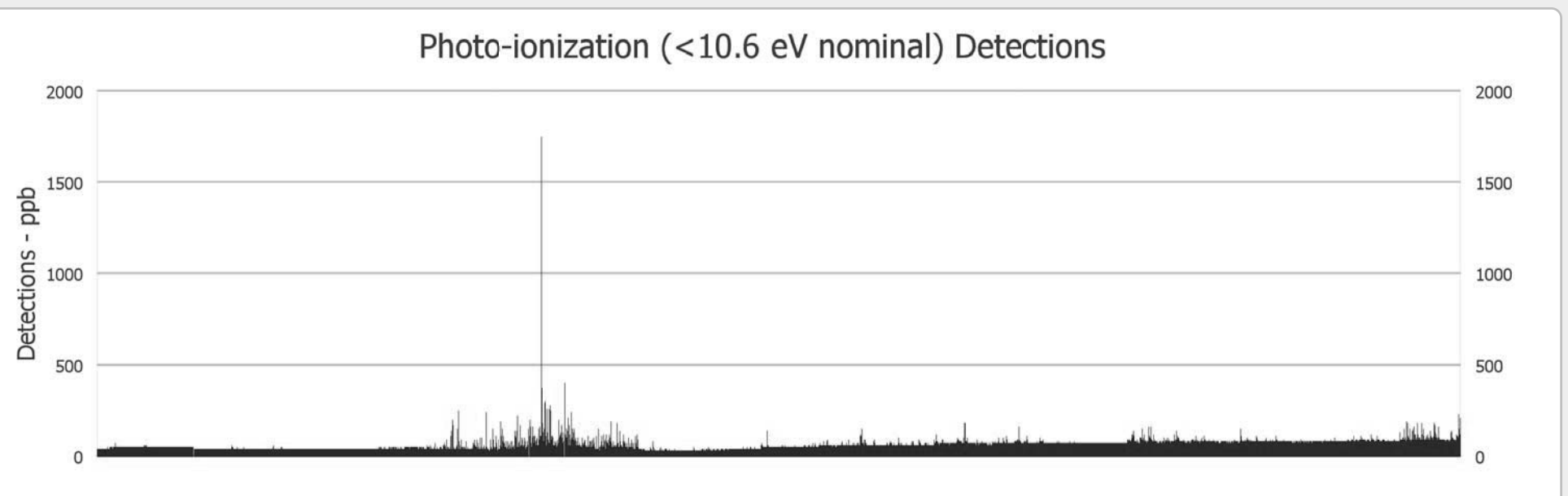



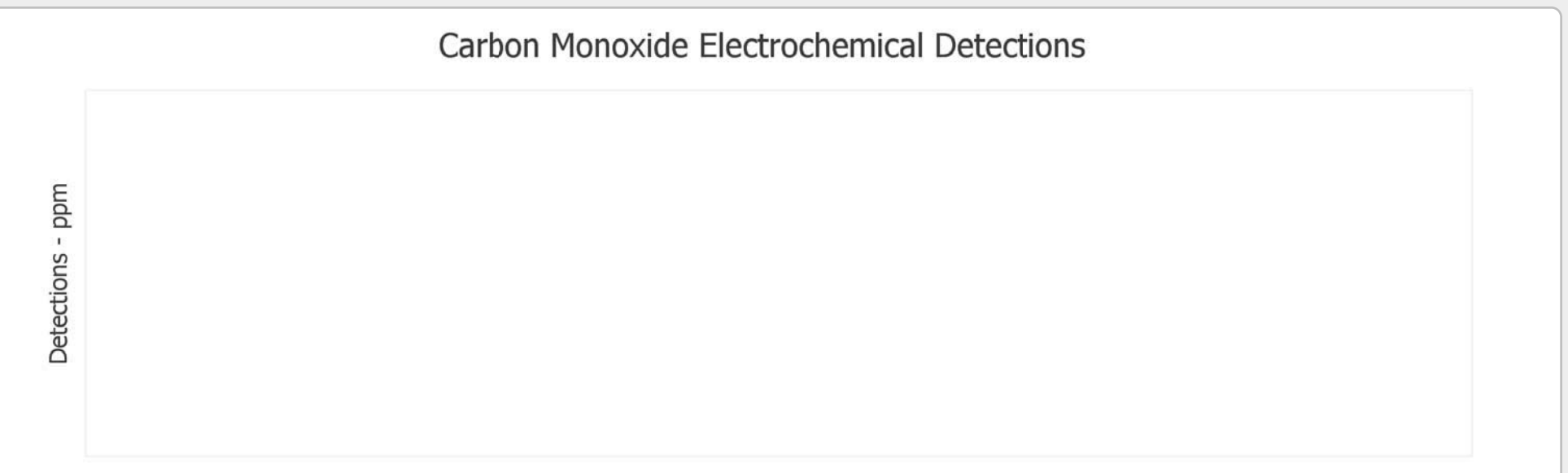
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 14

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



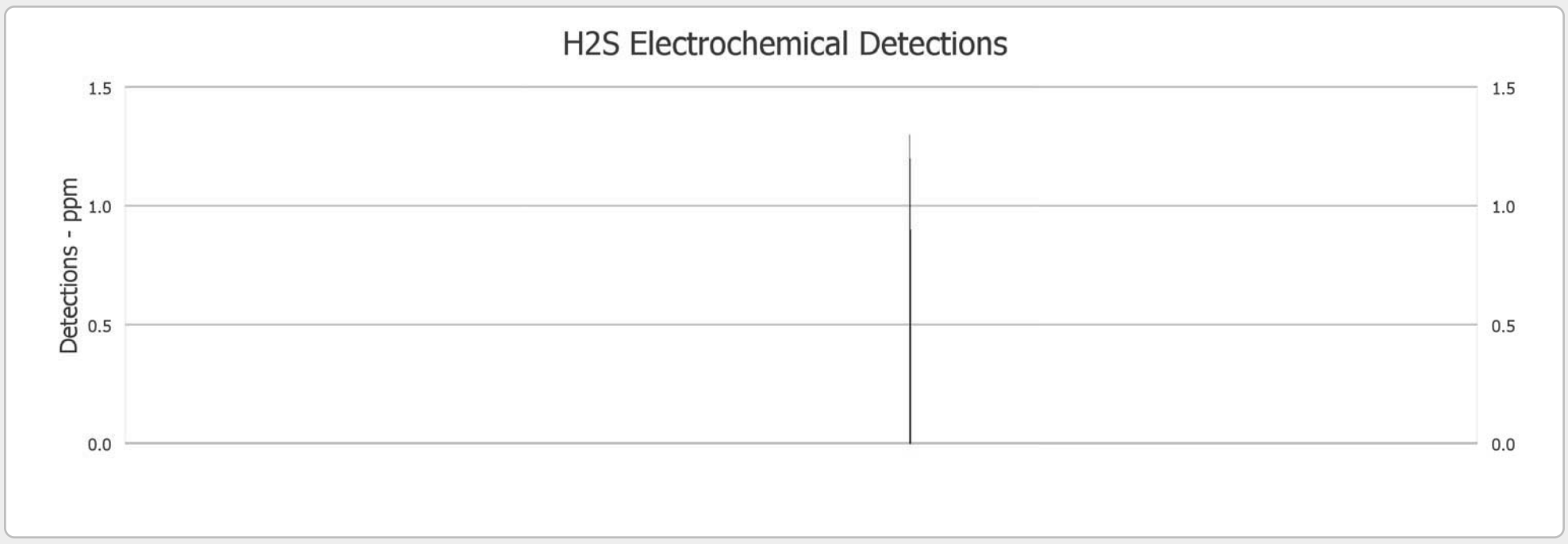



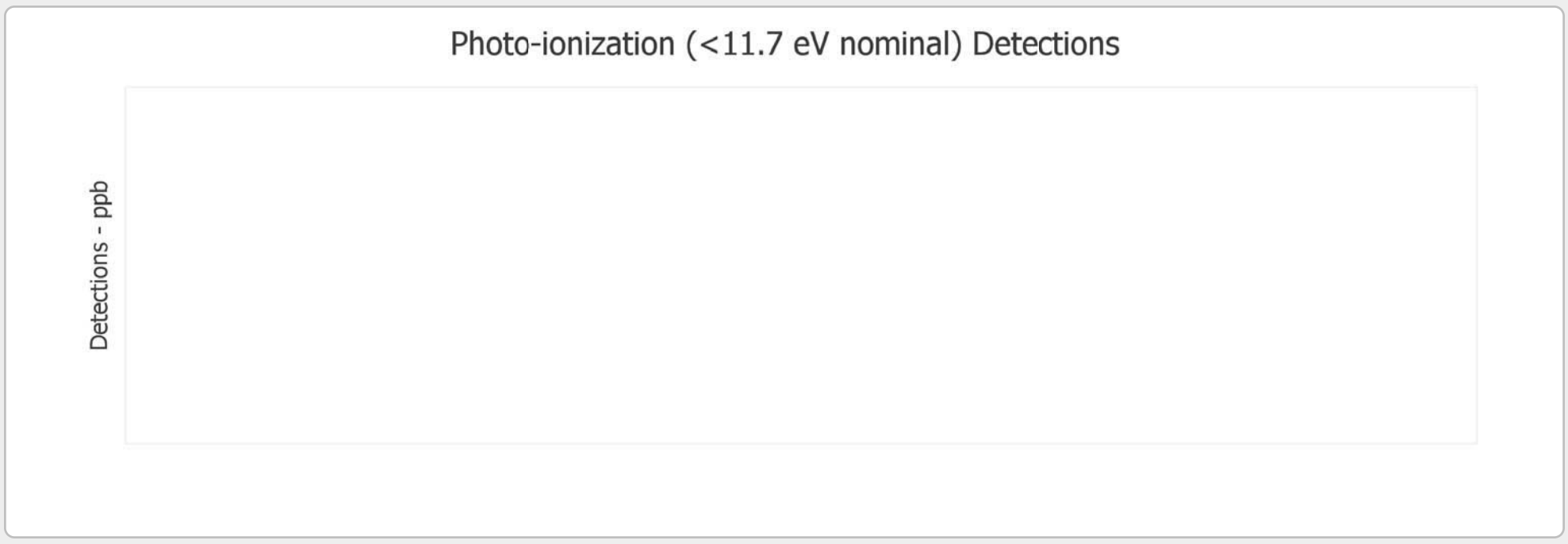



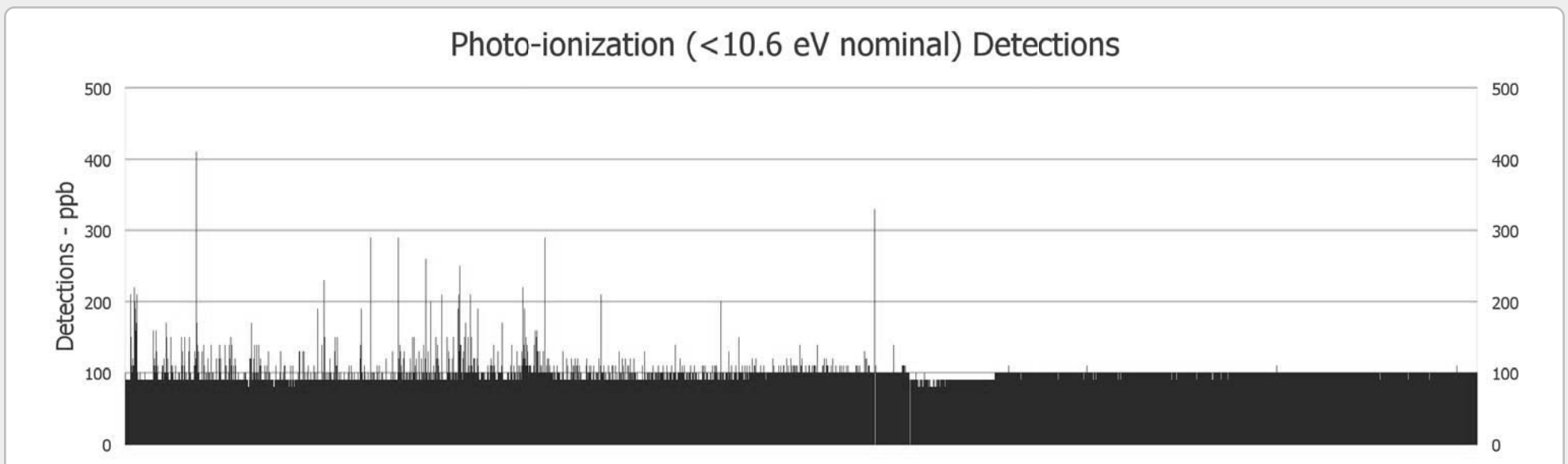



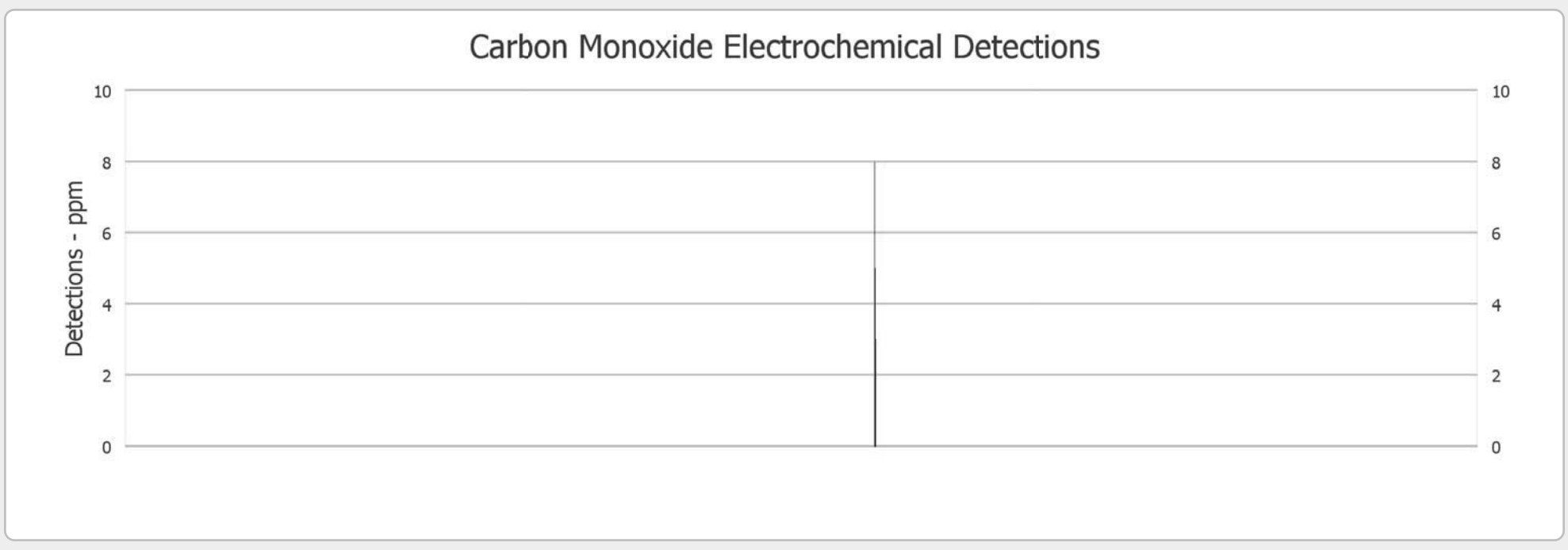
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 15

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



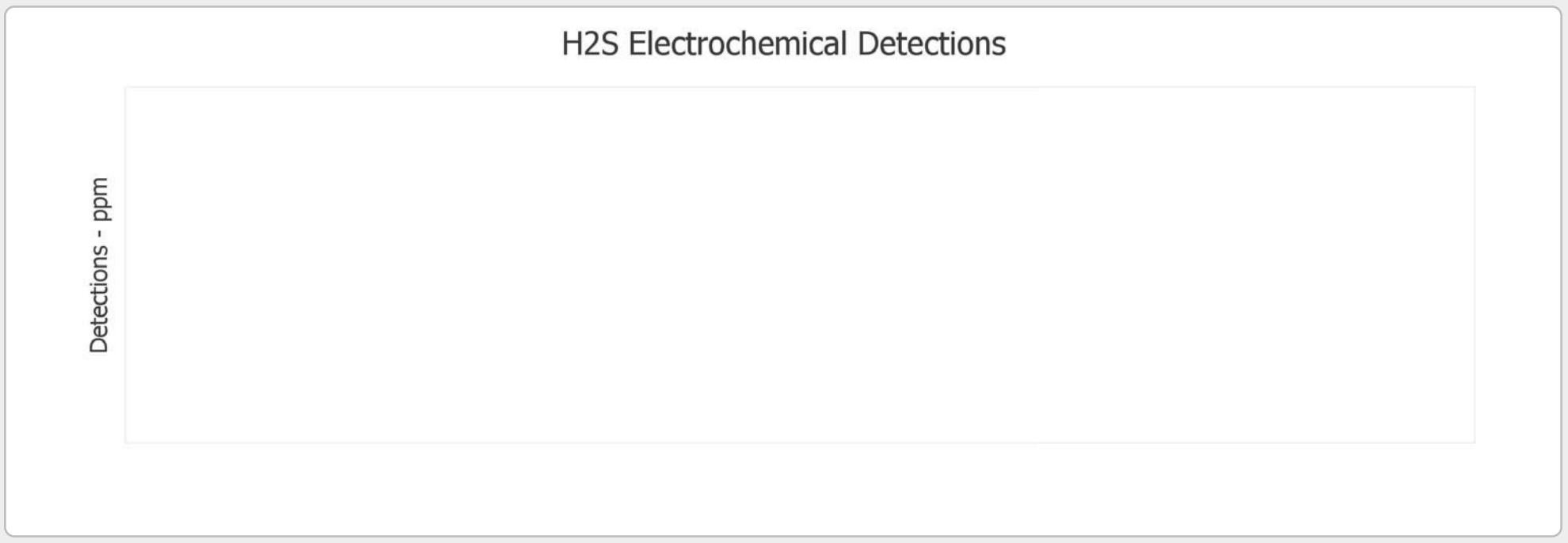



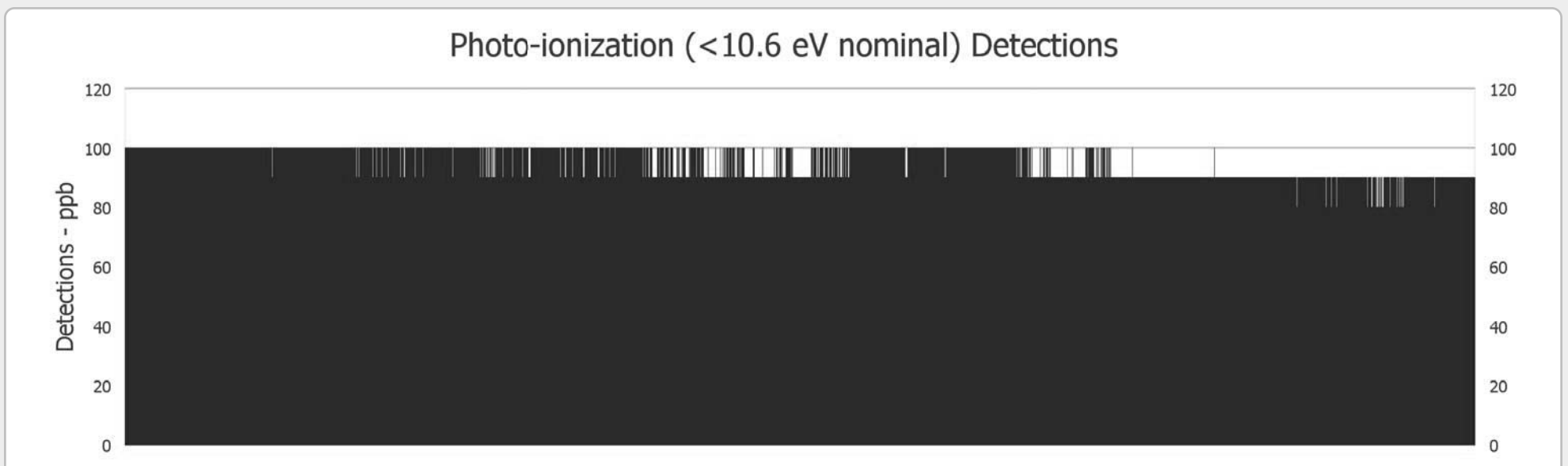



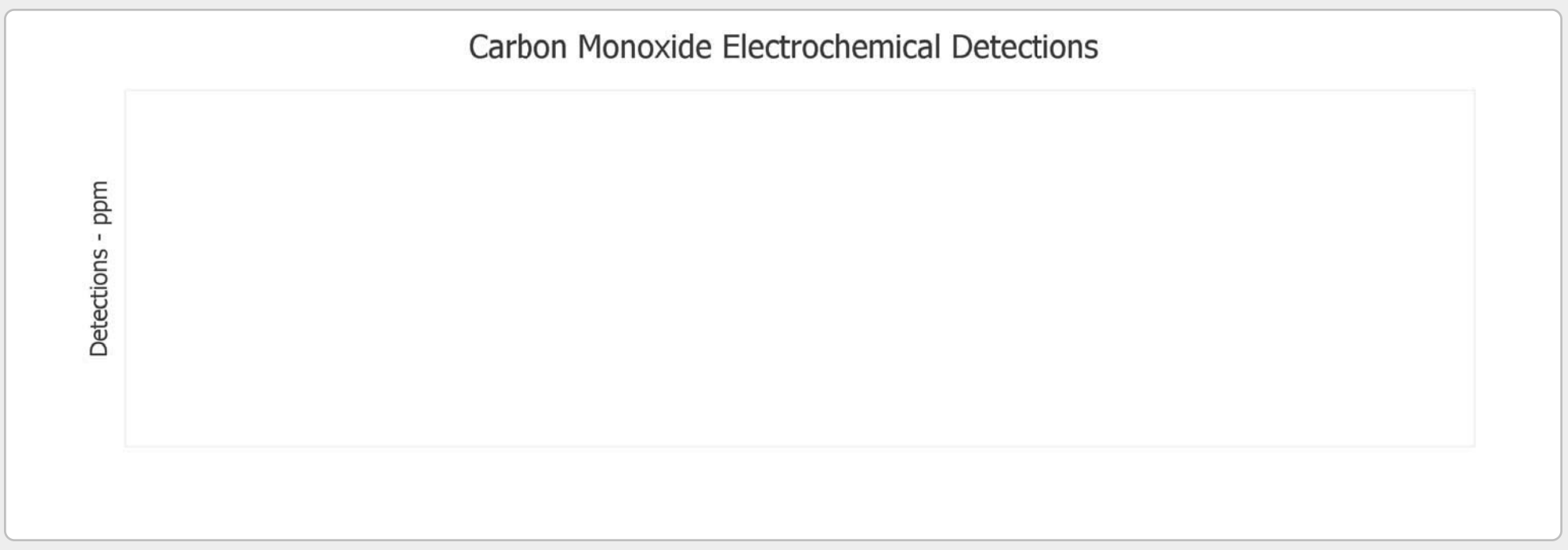
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 16

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



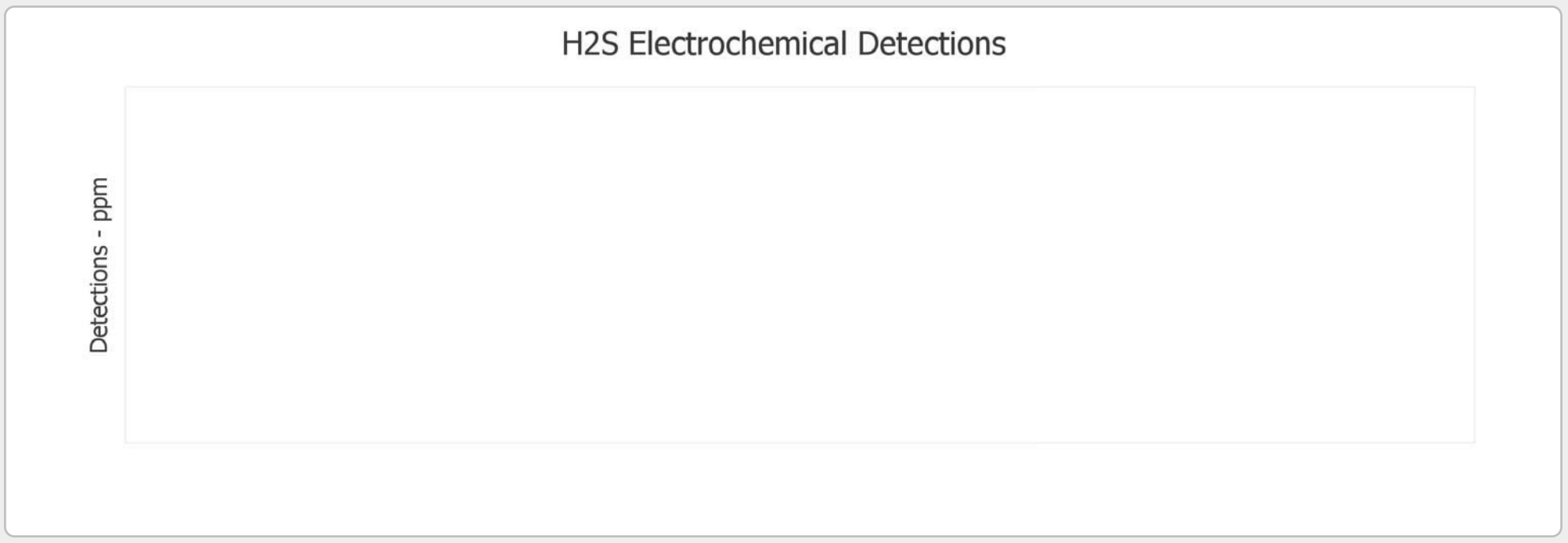


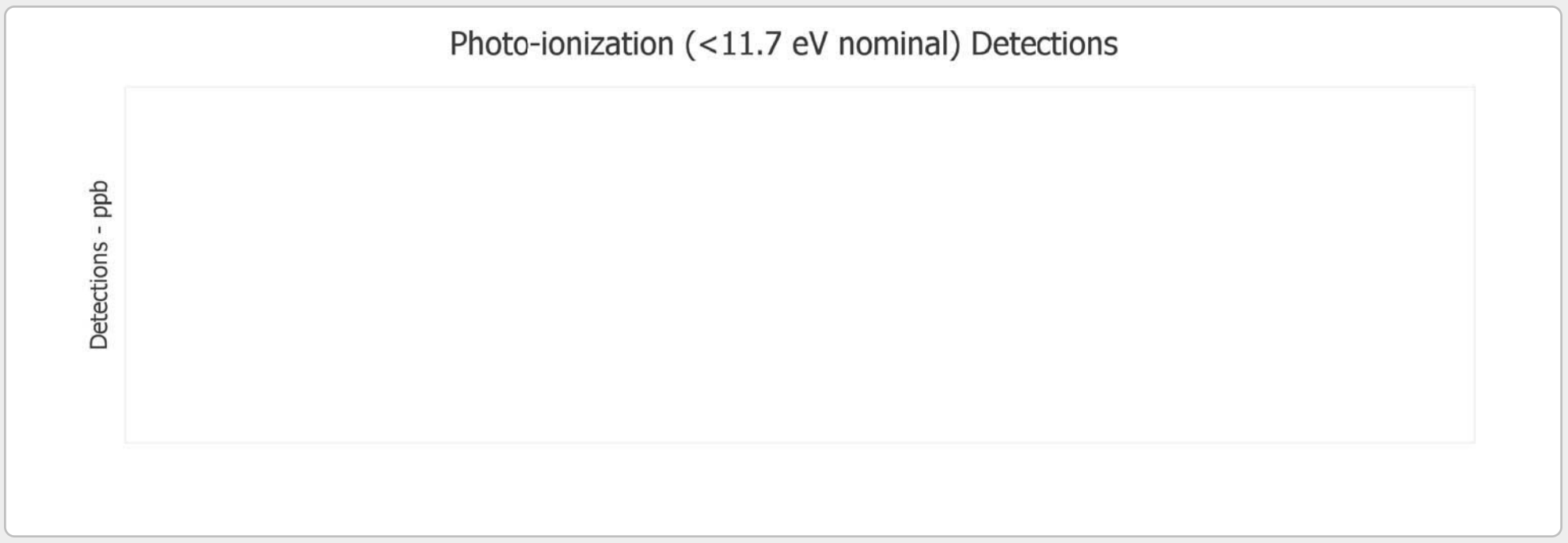


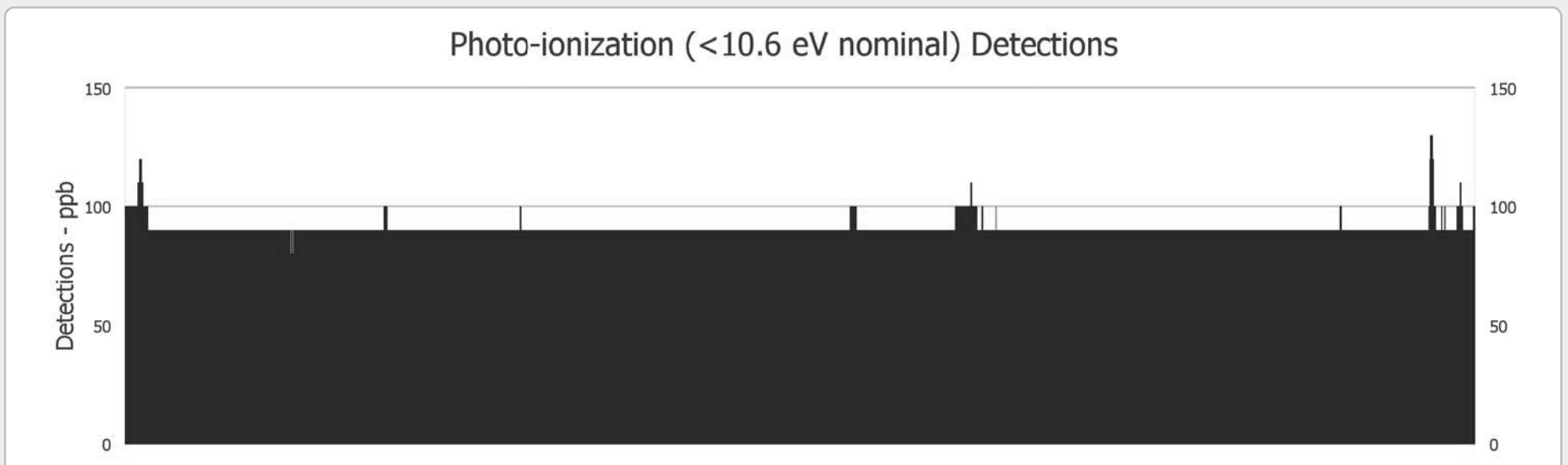



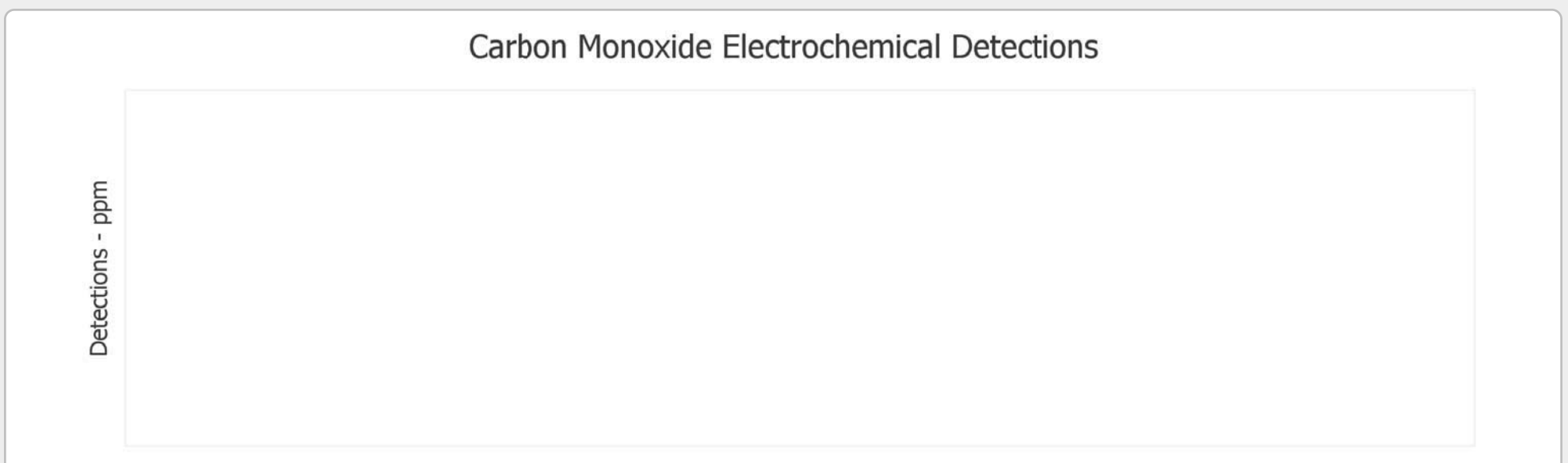
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 17

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



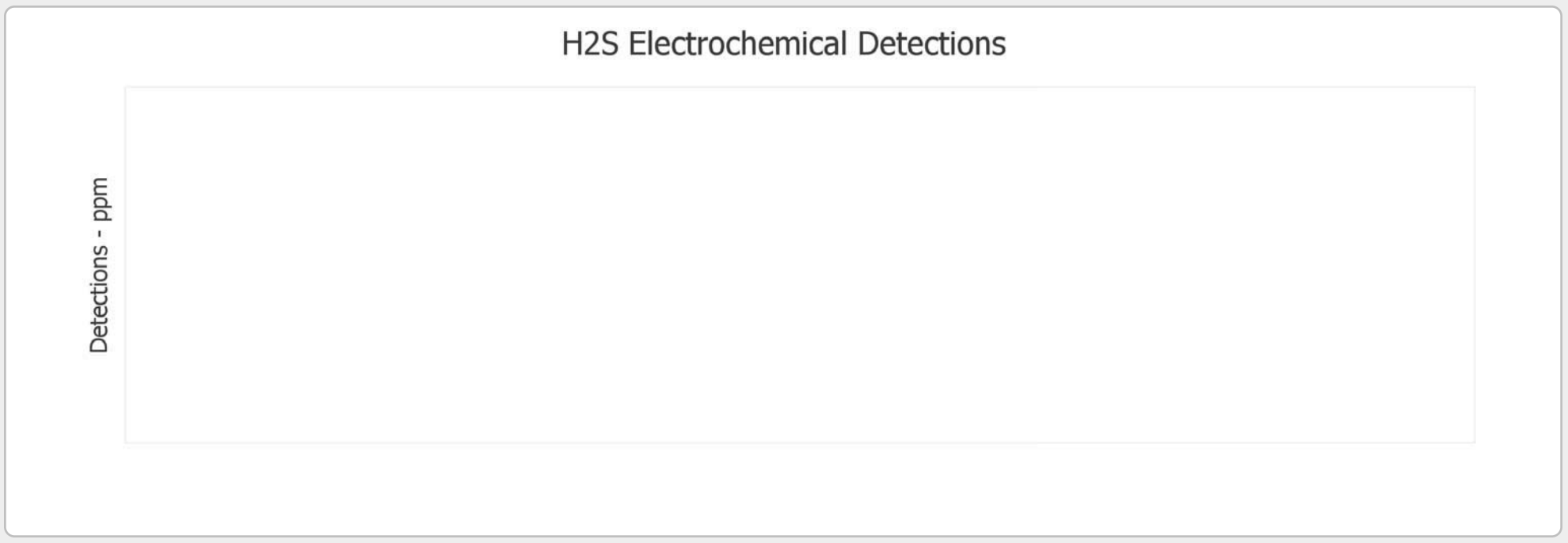



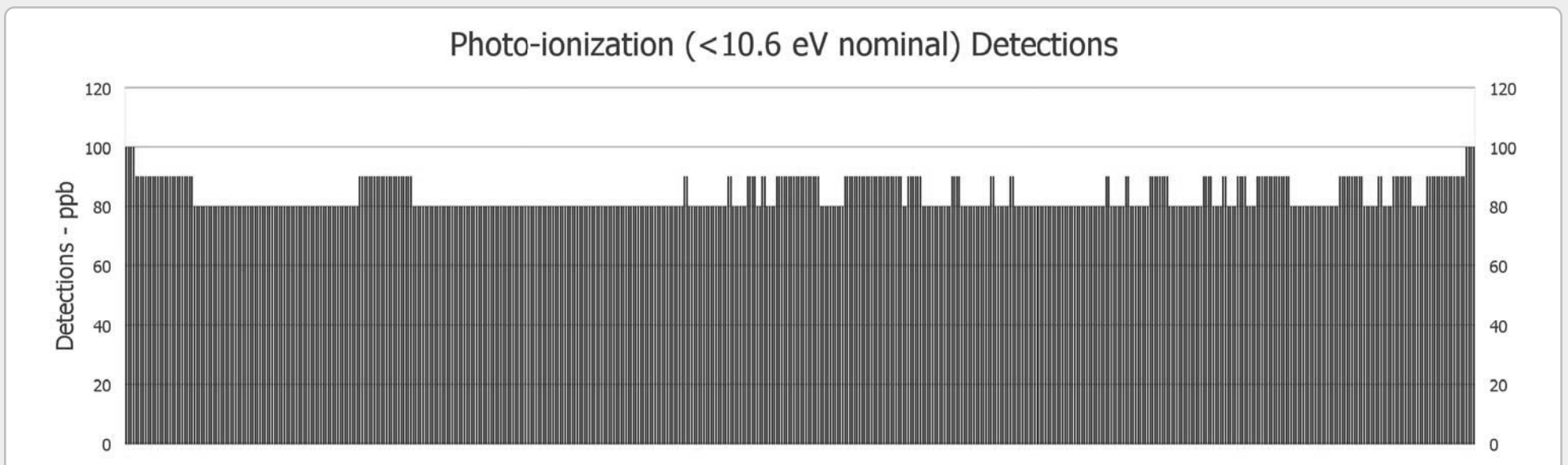



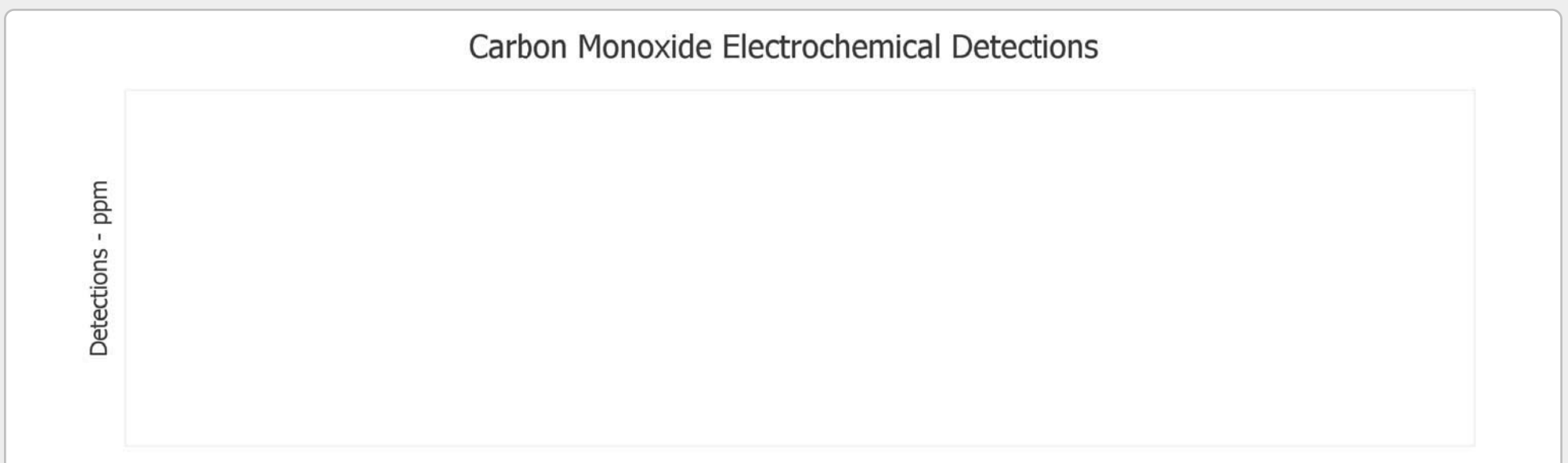
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 18

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



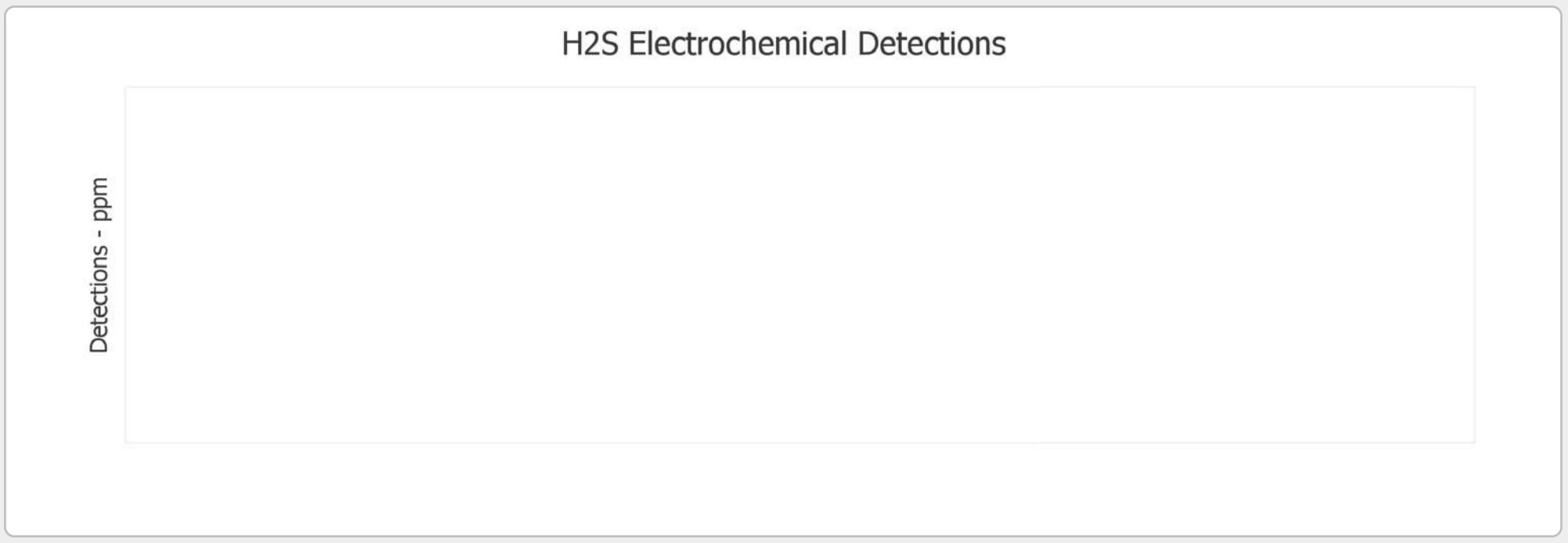


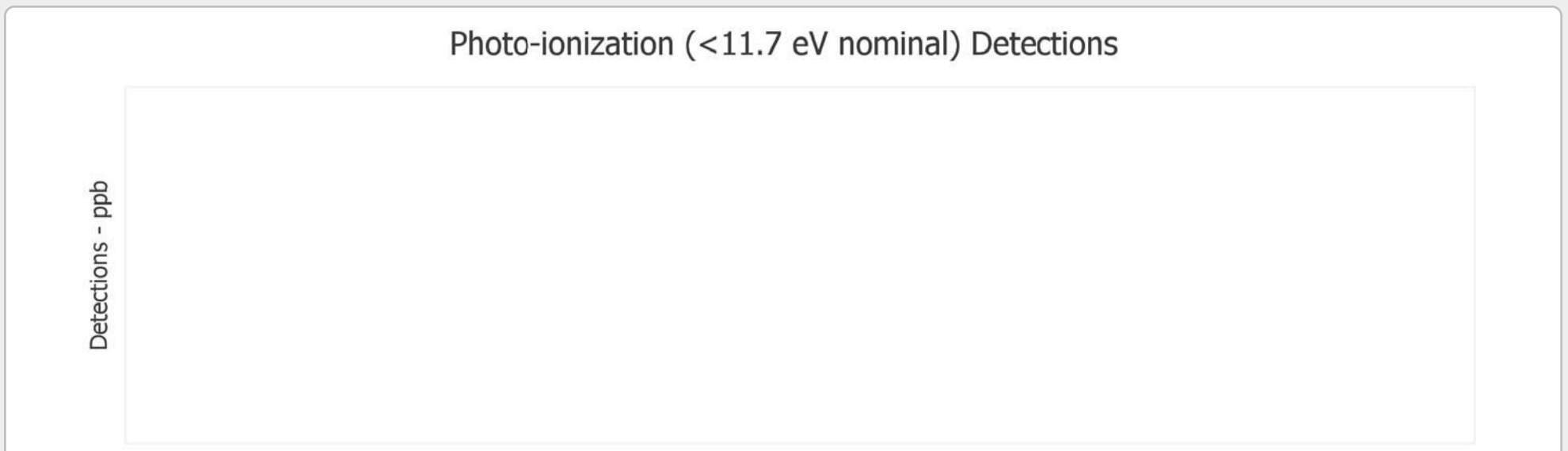


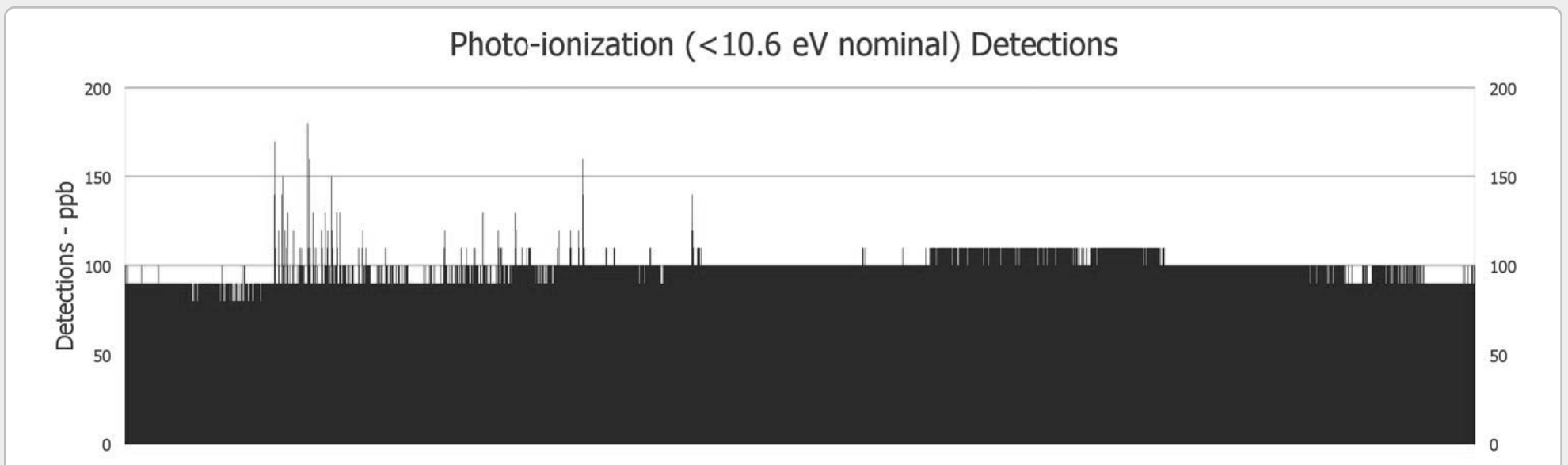



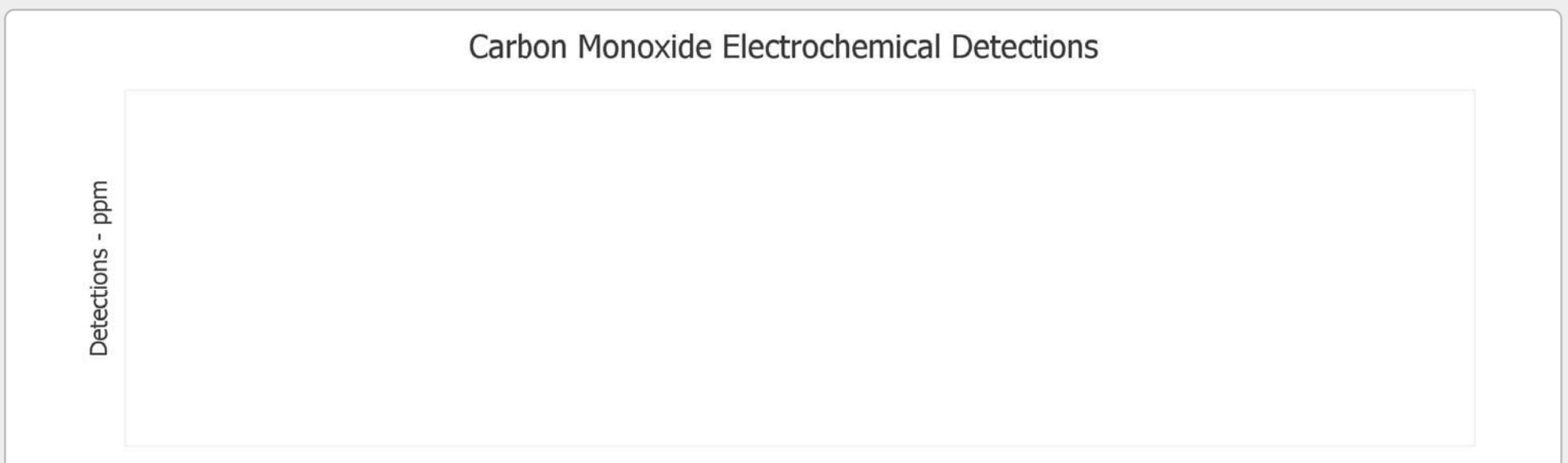
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 19

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



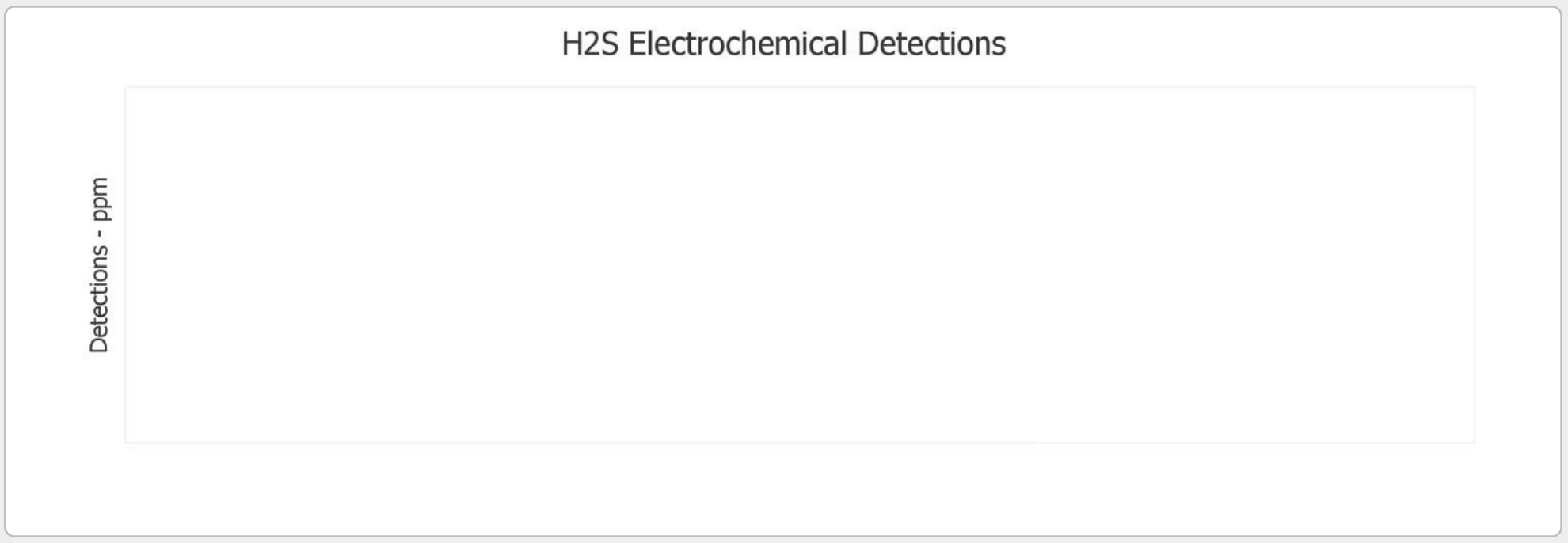



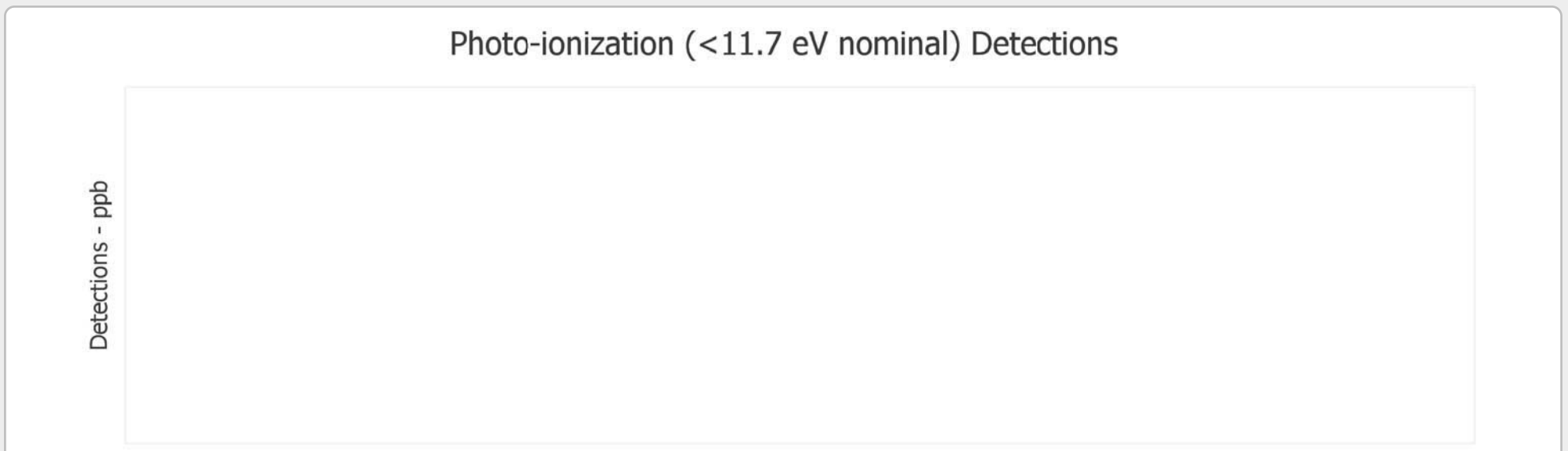



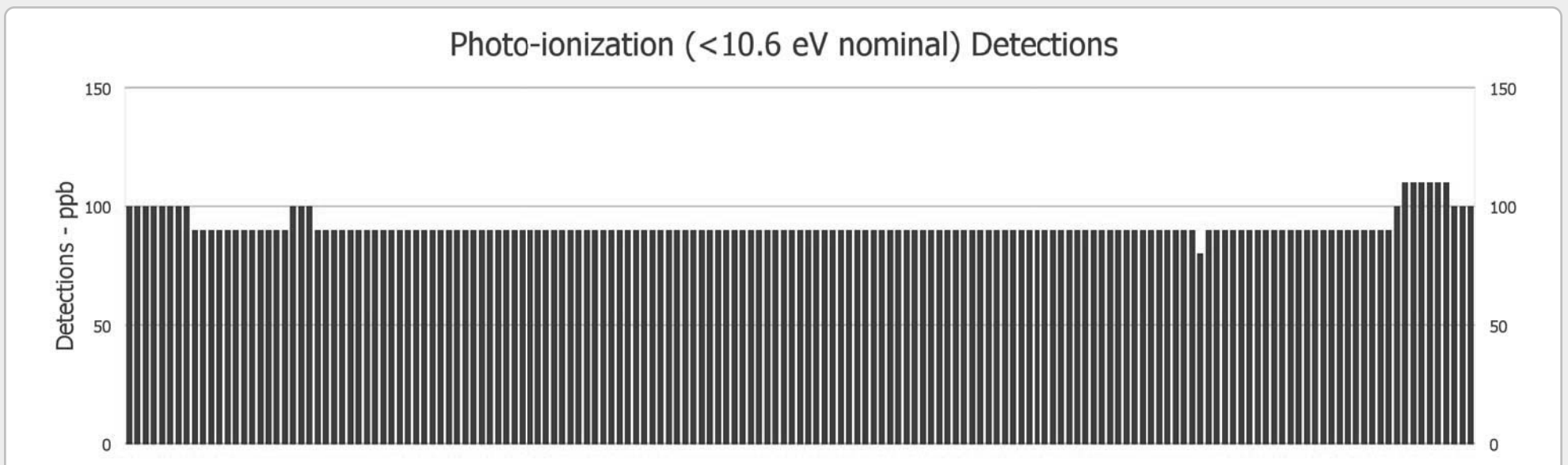



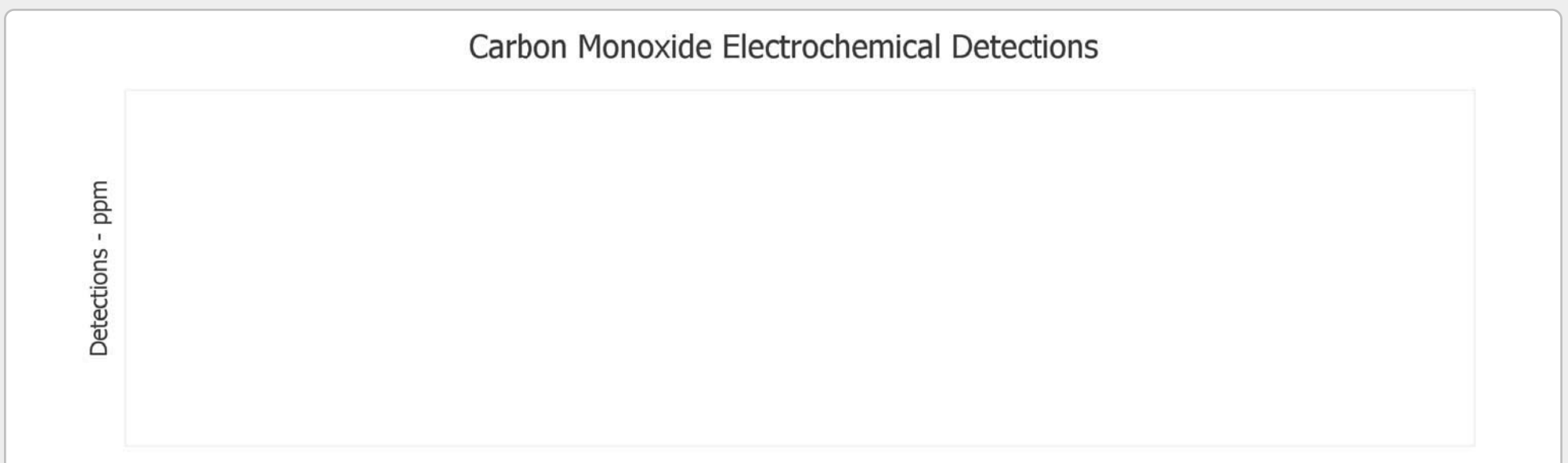
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 20

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



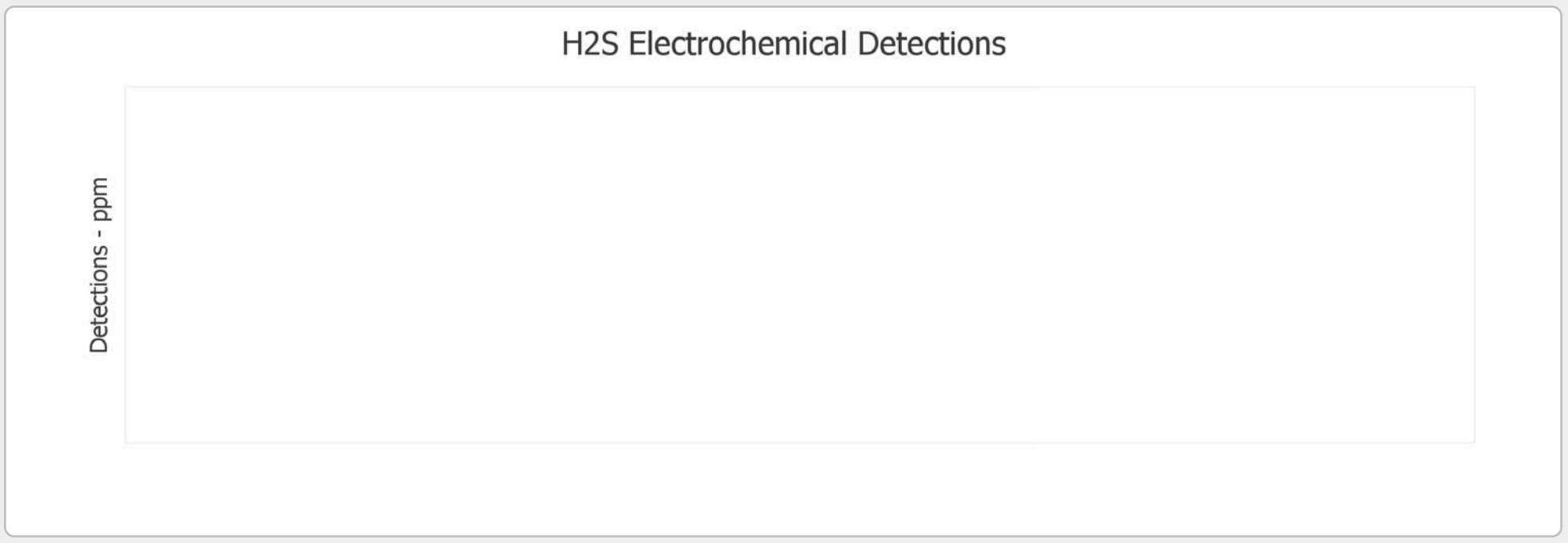



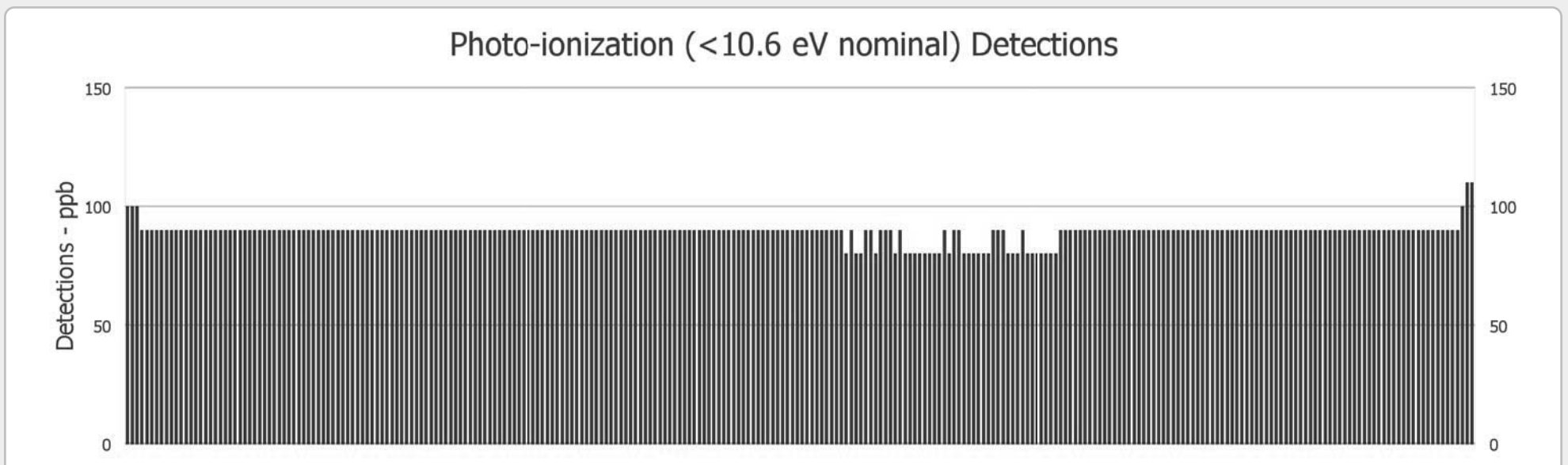



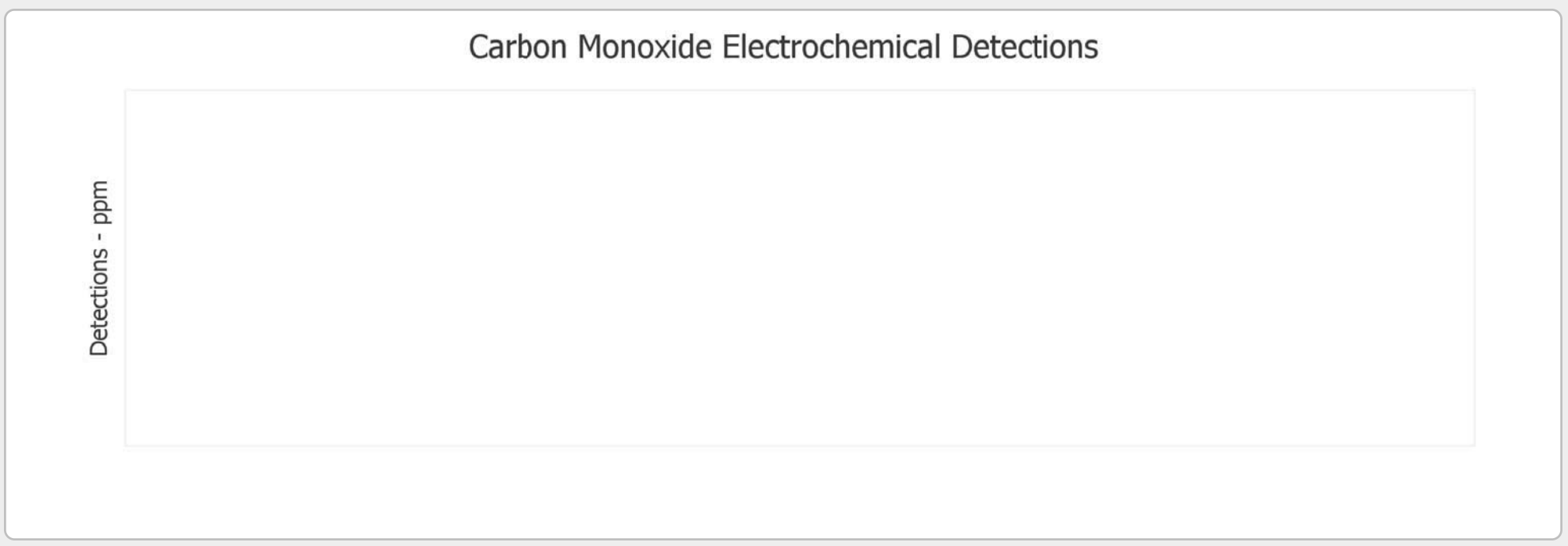
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 21

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



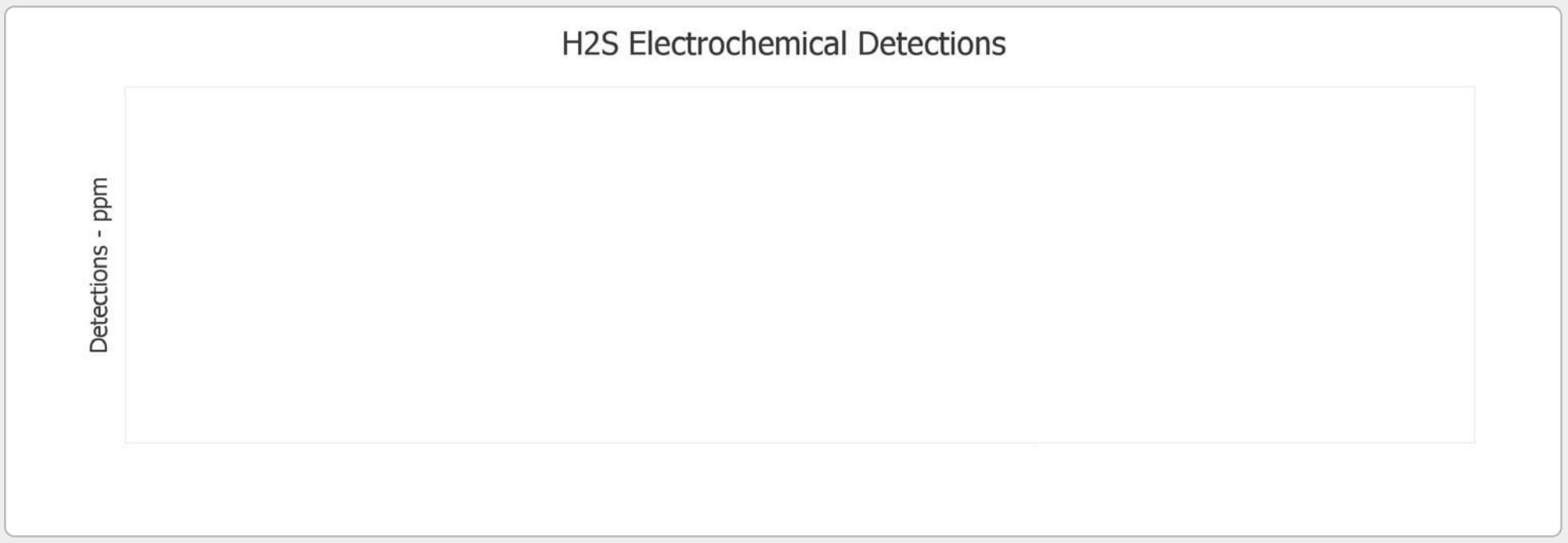




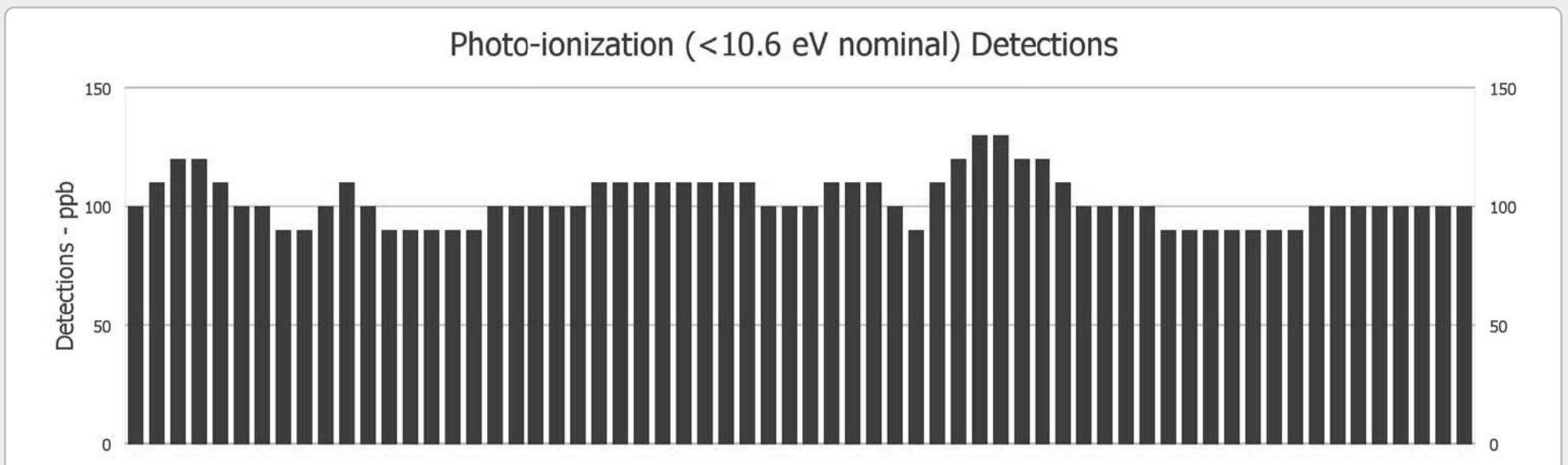



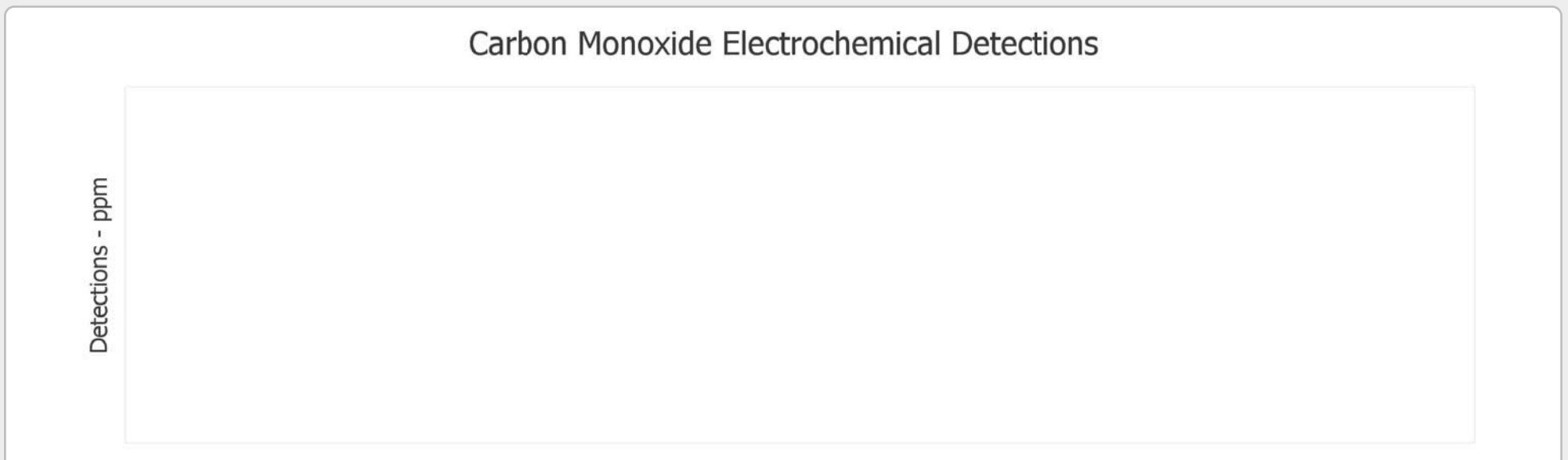
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 22

EventKey 2015/12/10 06:44:16...06:46:10 HLGC 10.6eV Event



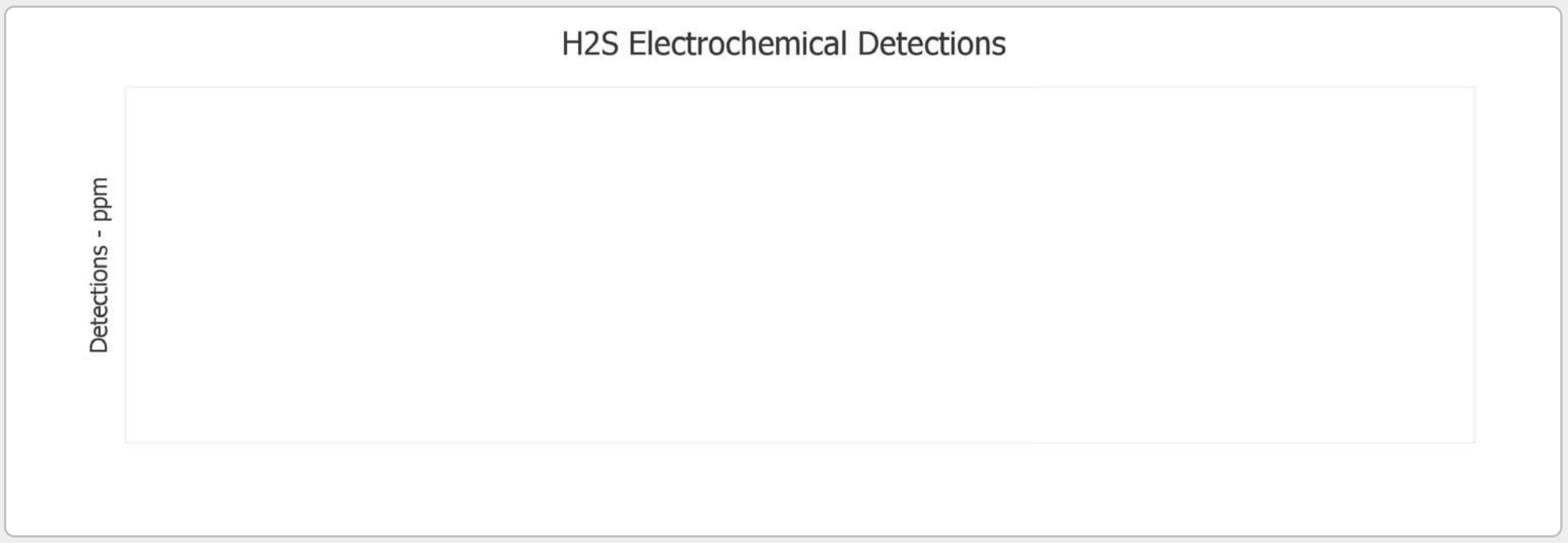




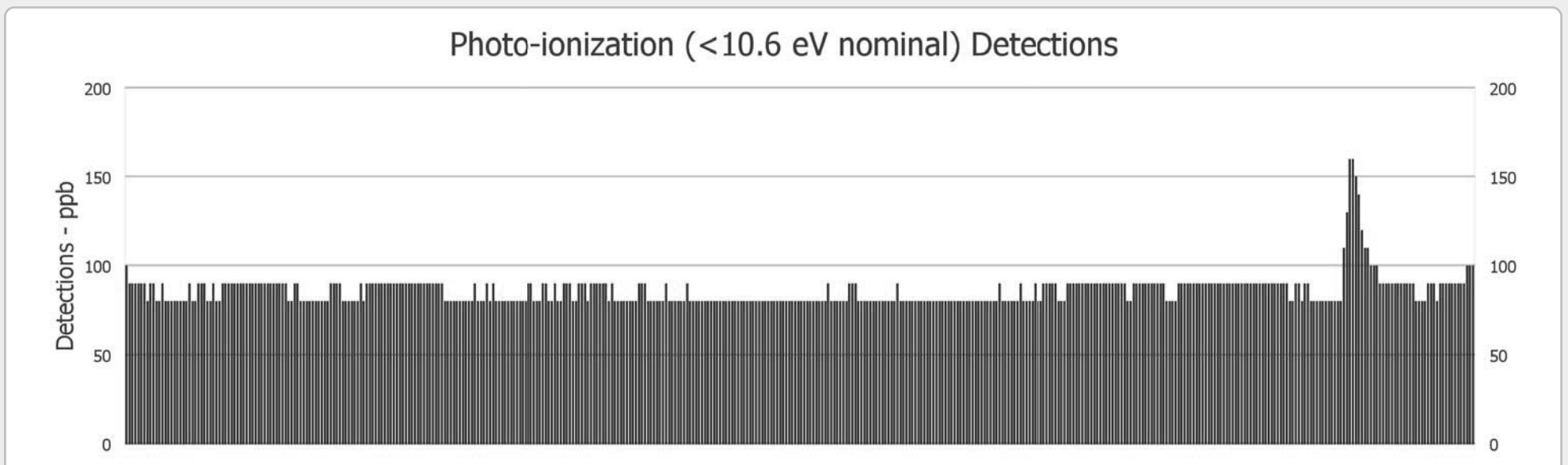



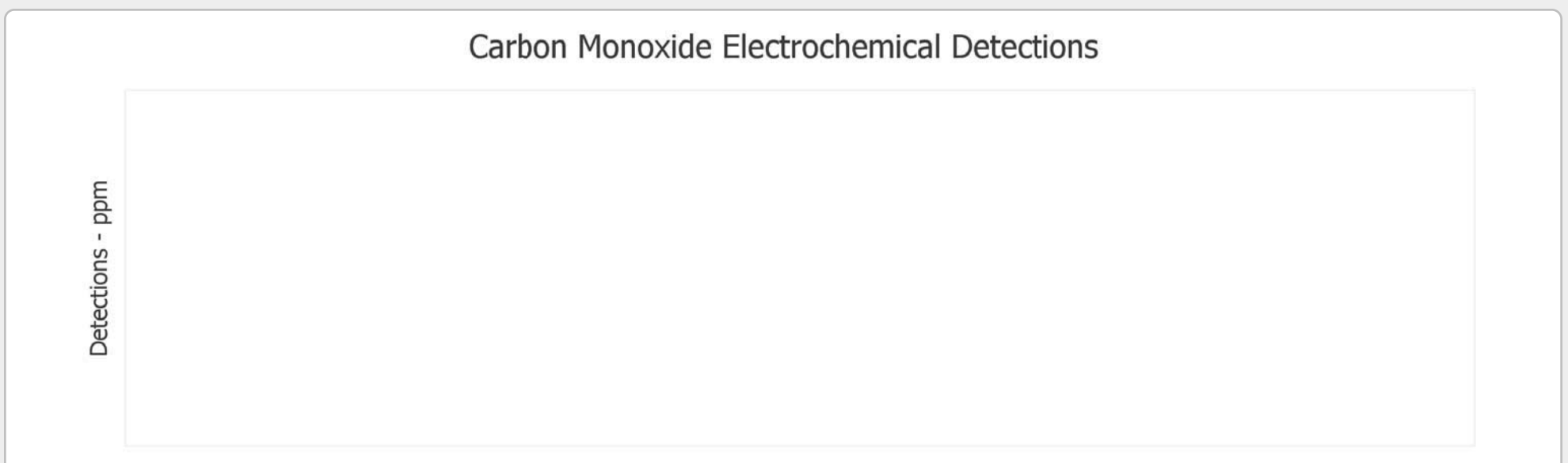
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 23

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



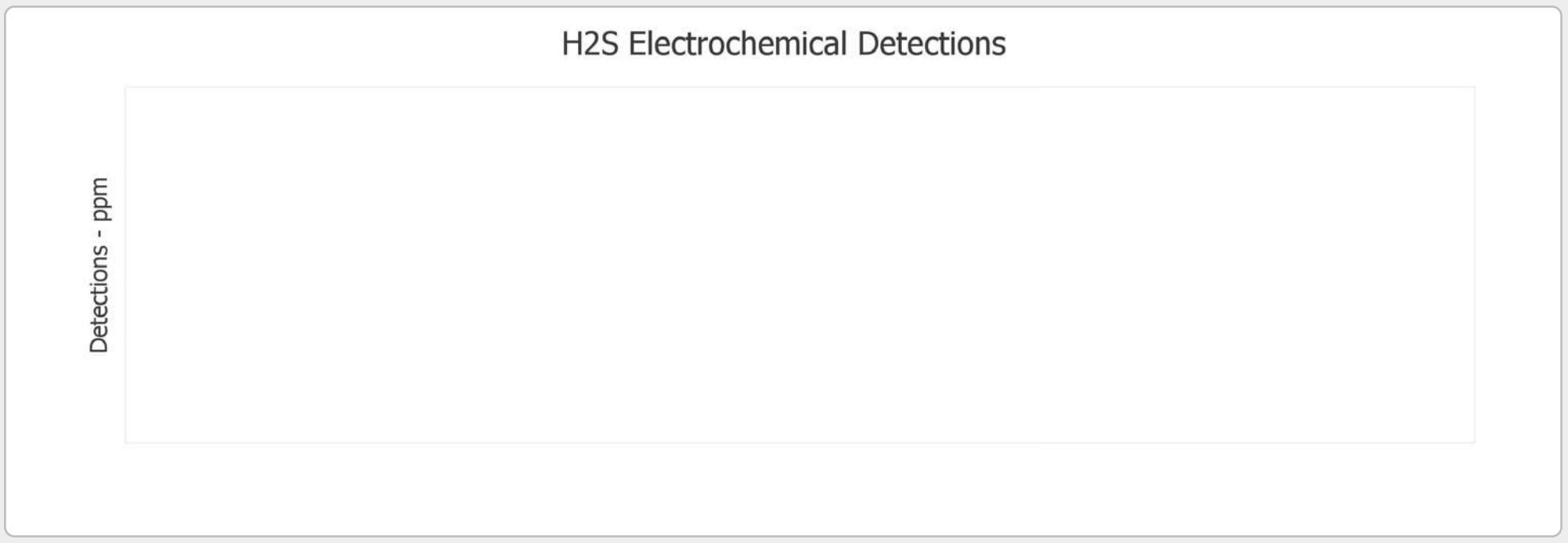




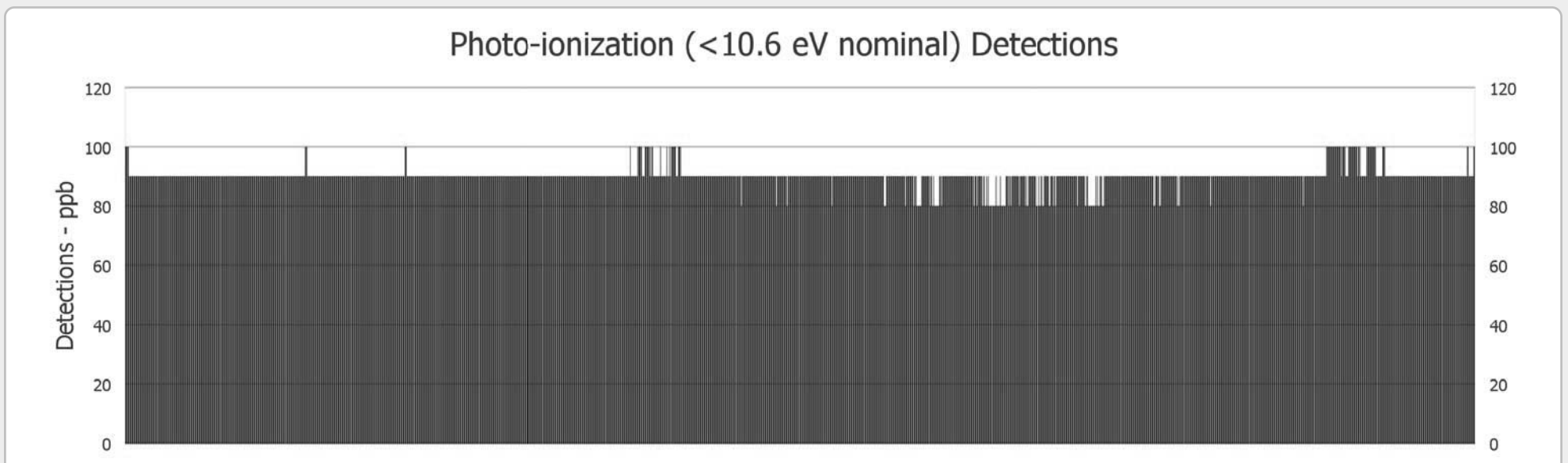



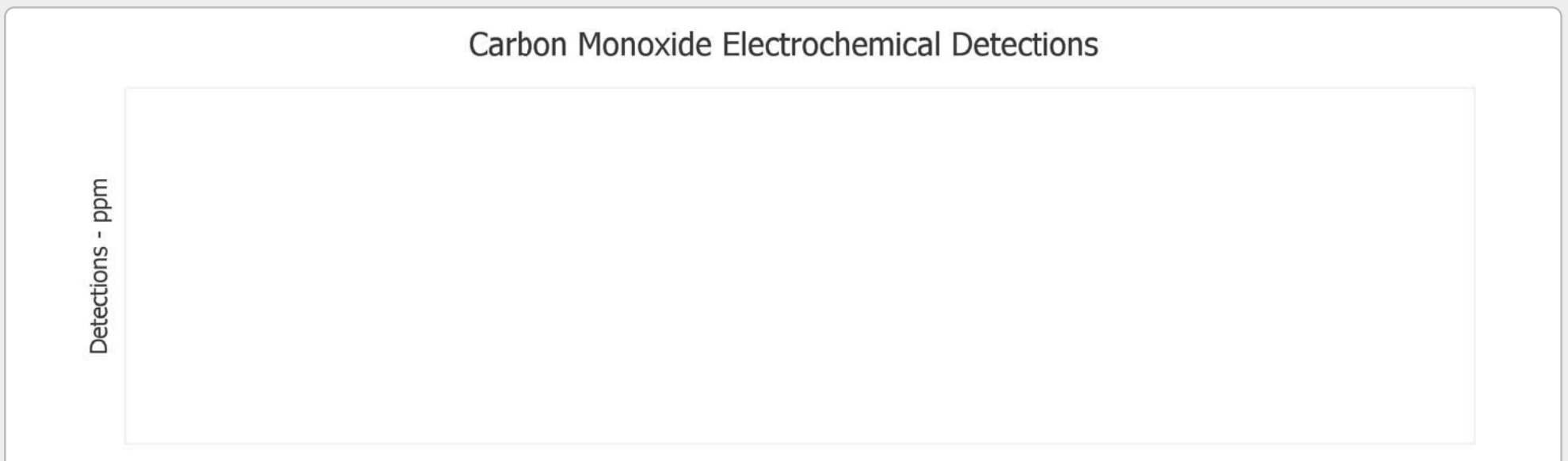
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 24

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



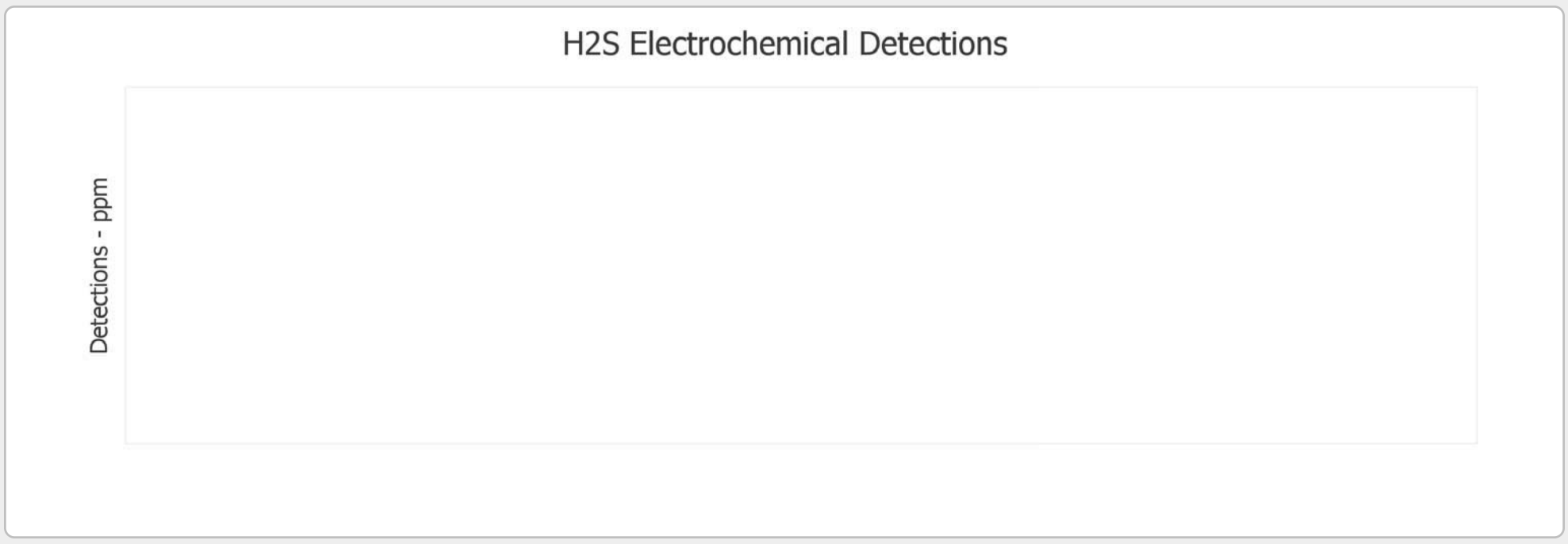


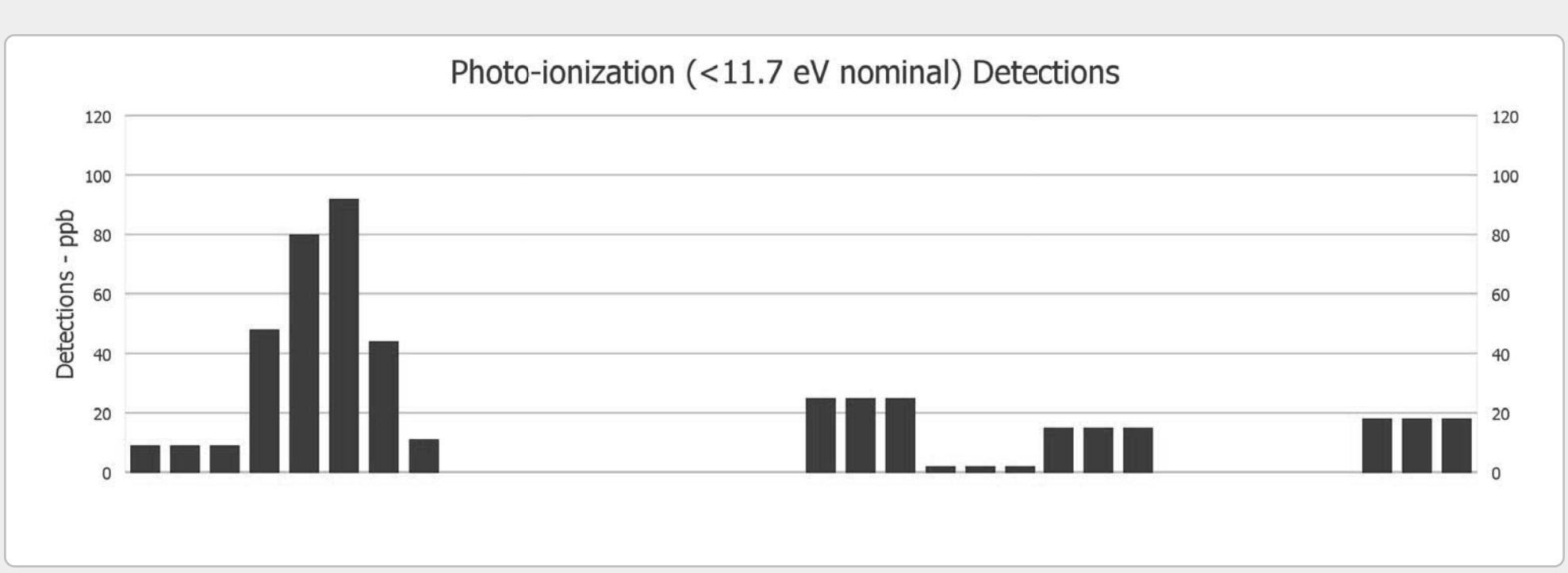


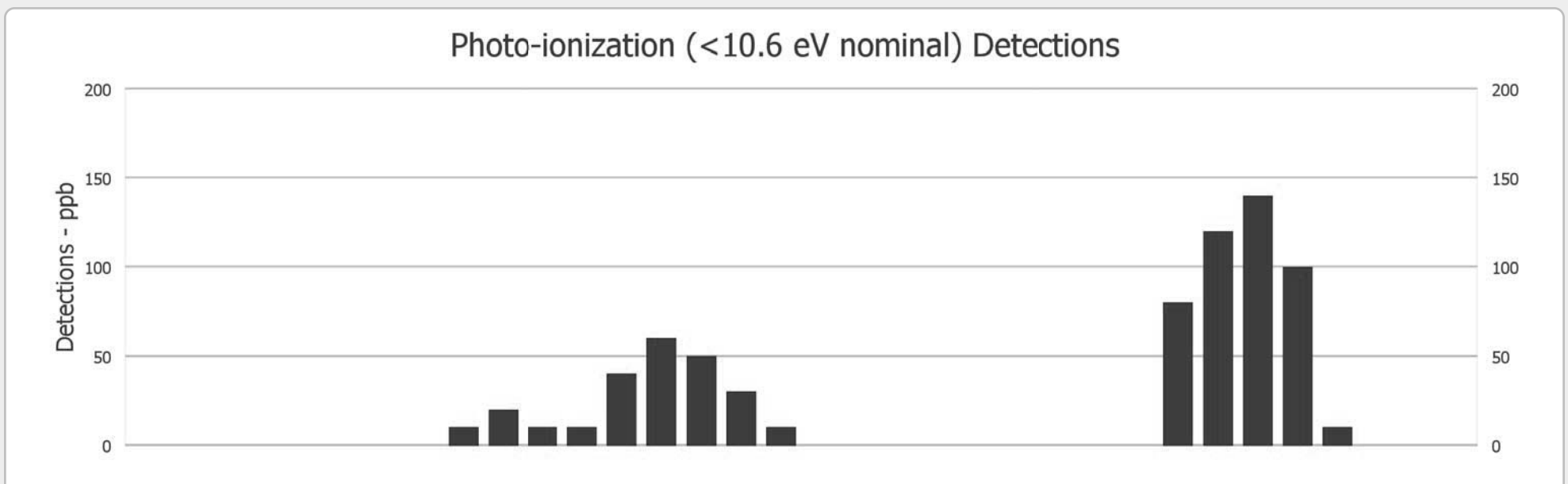



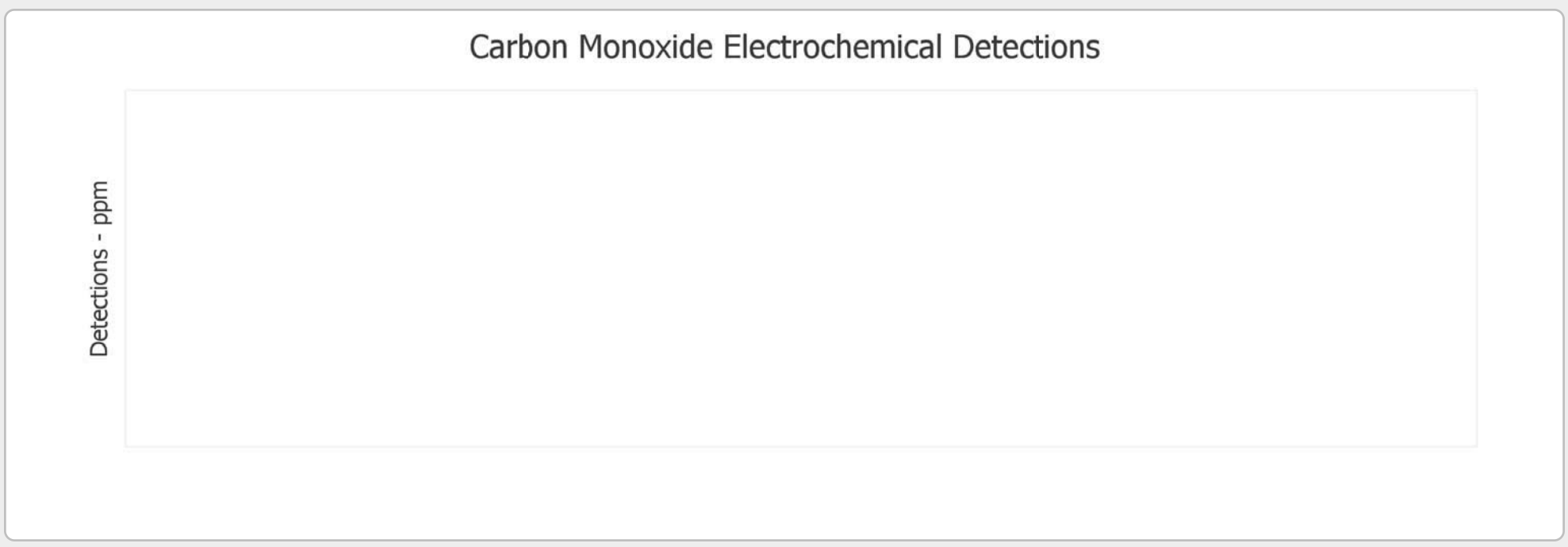
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 25

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



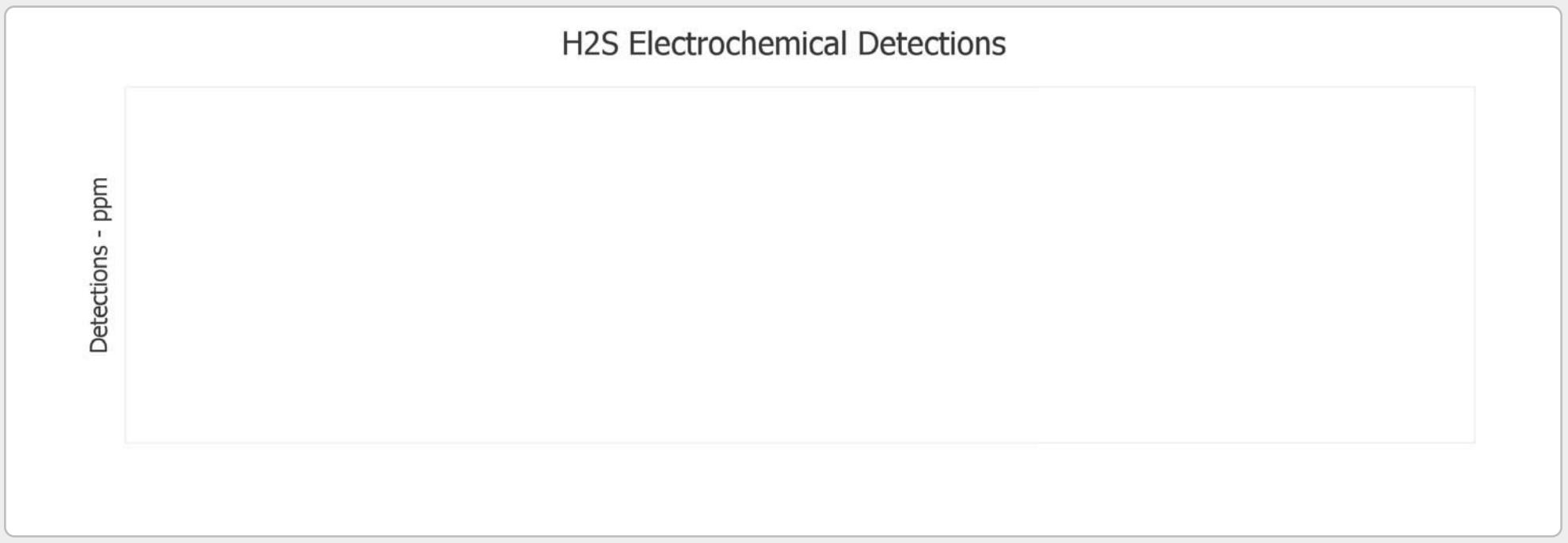



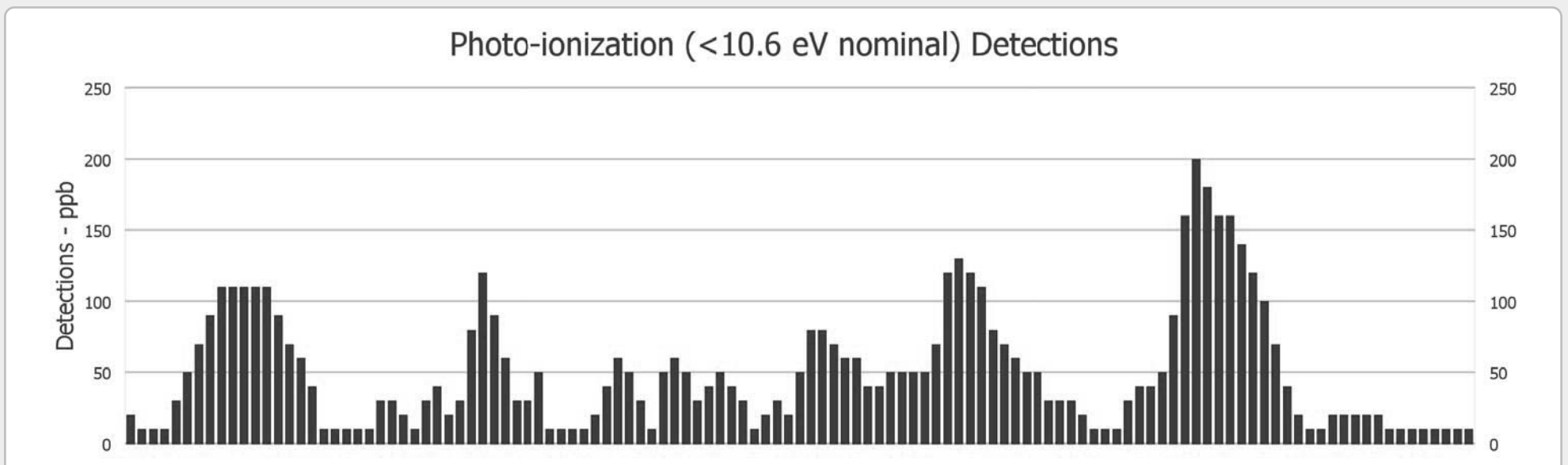



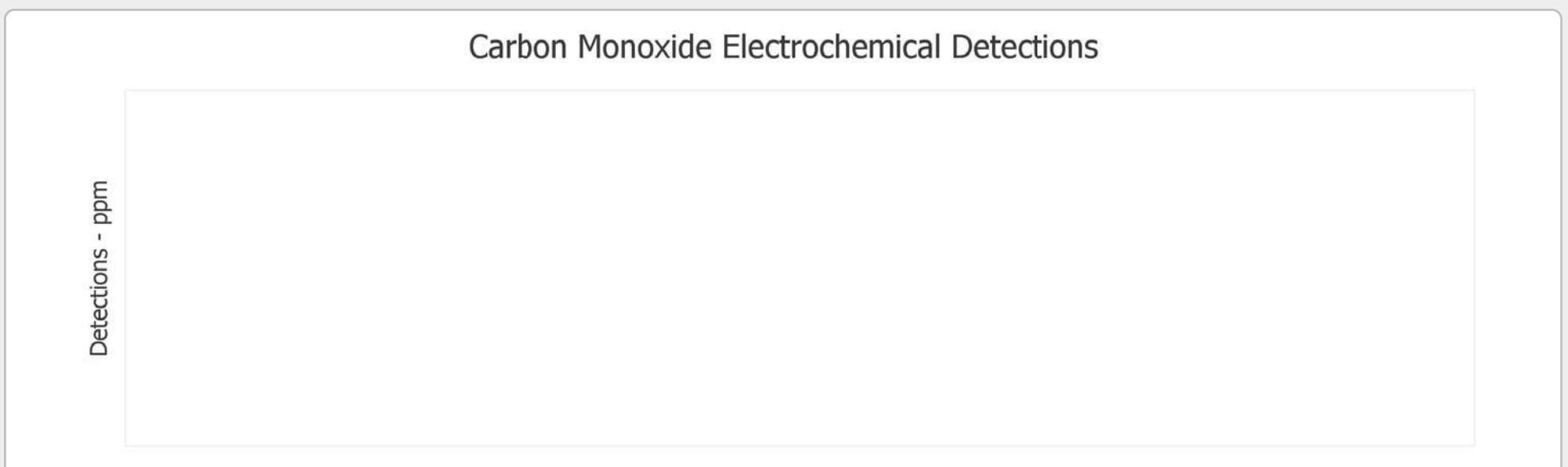
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 26

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



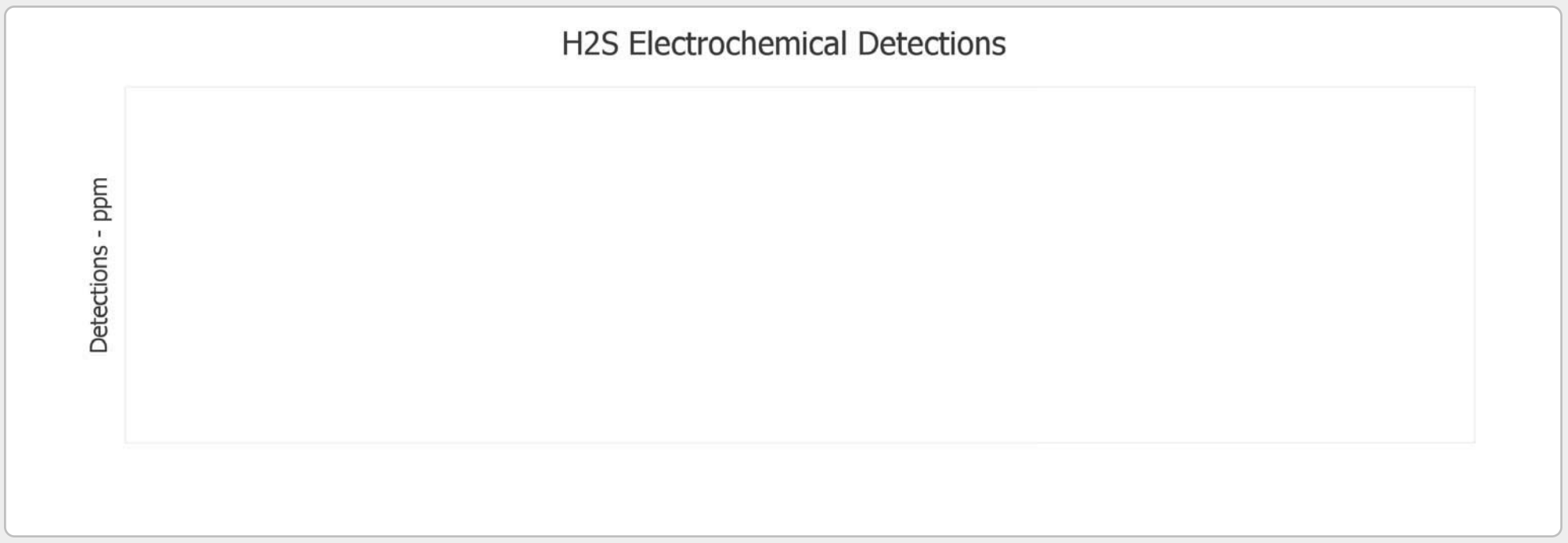


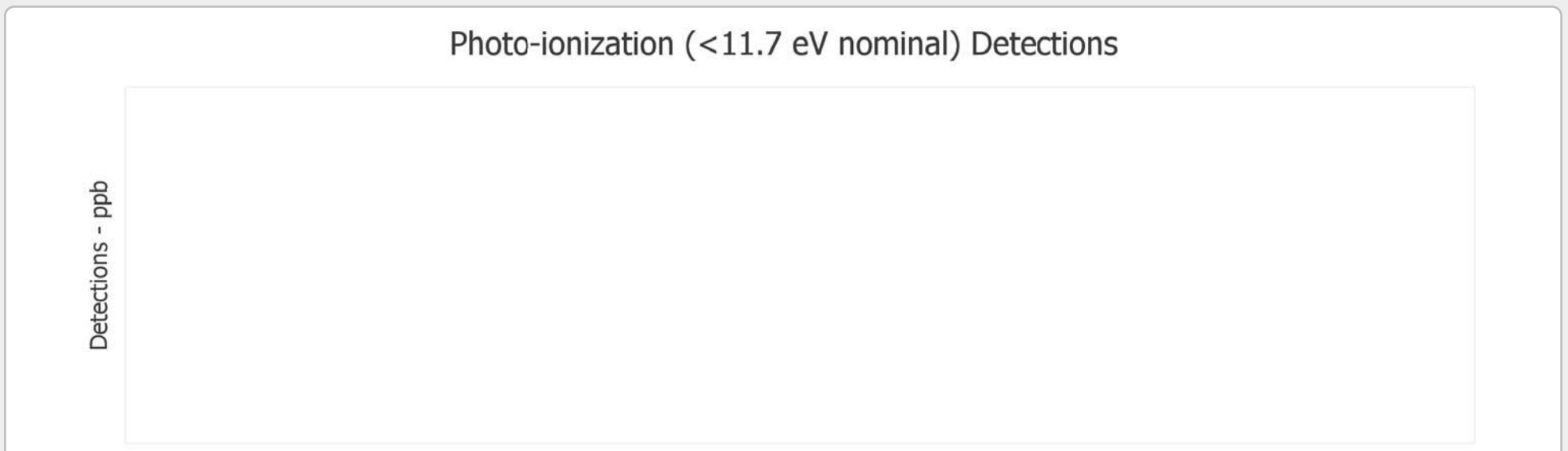


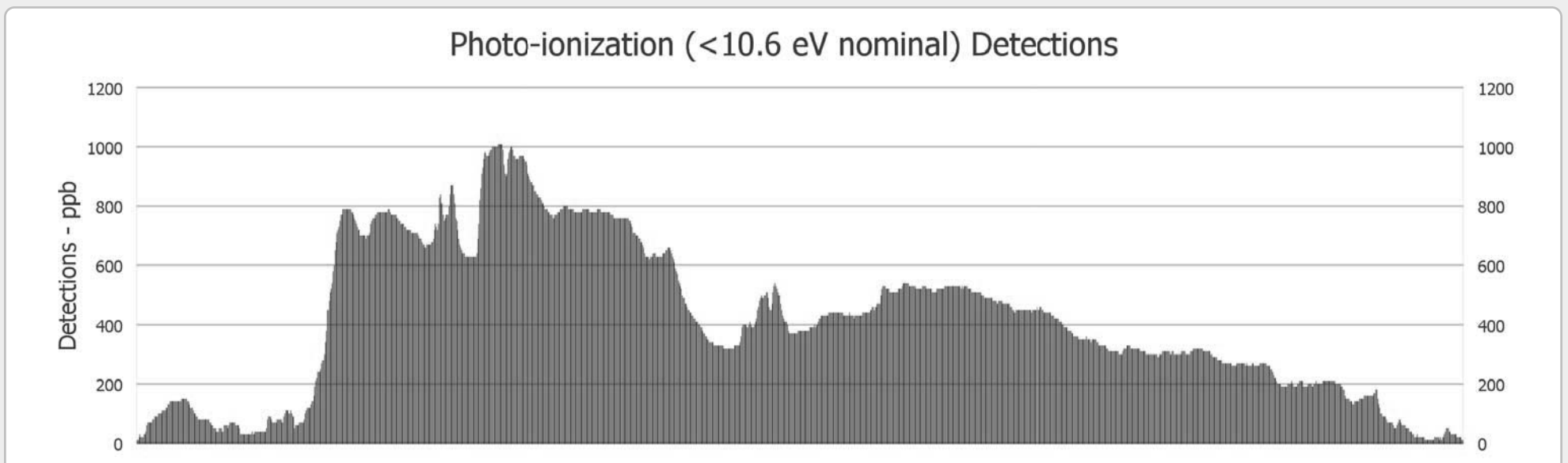



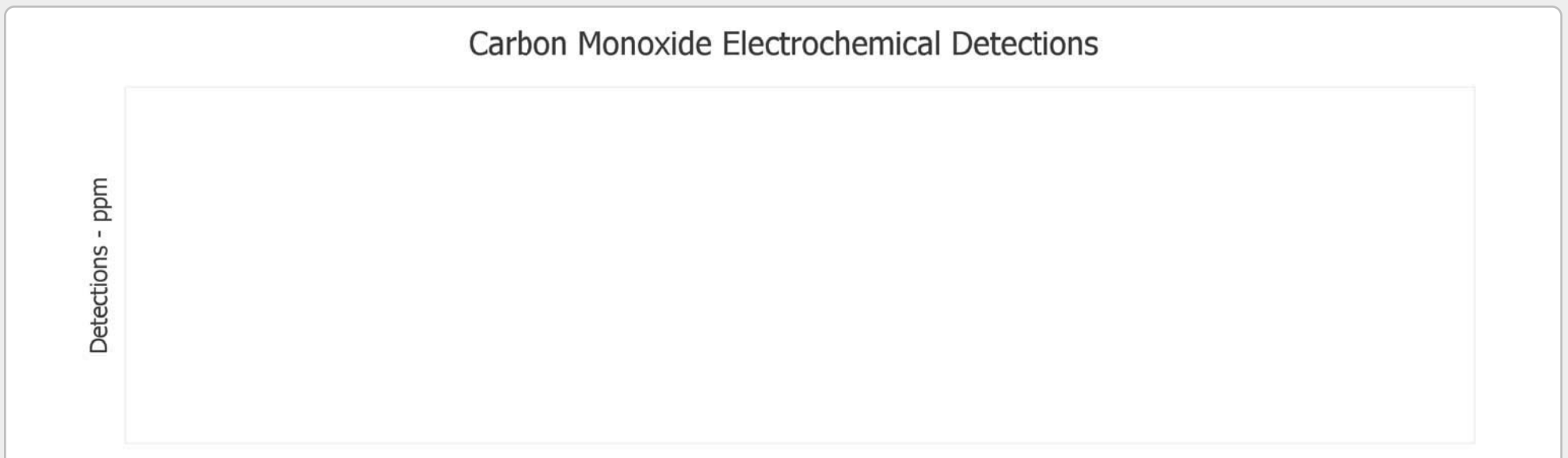
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 27

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



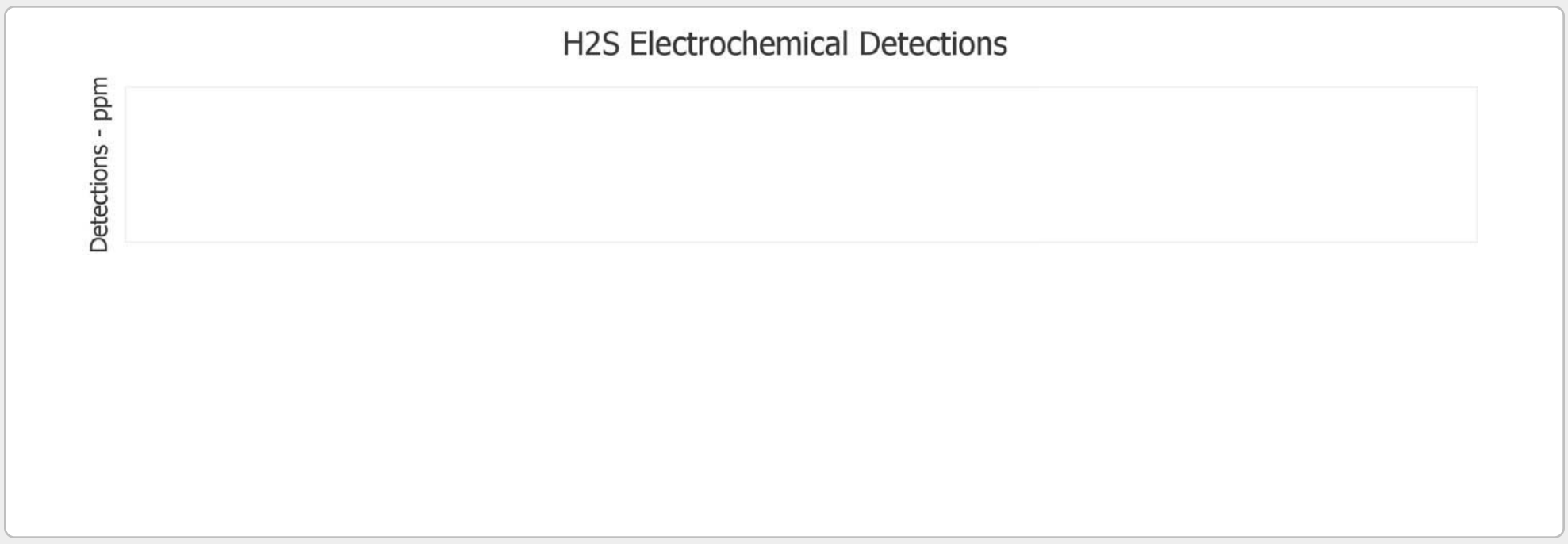



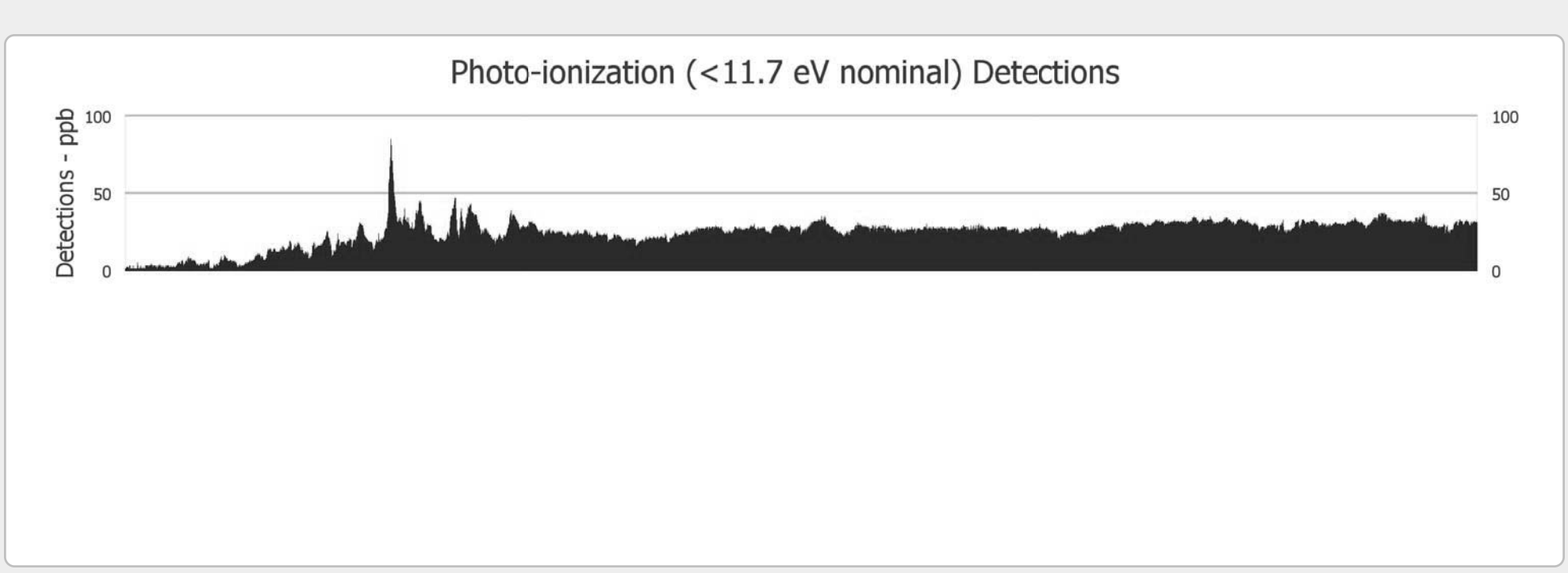



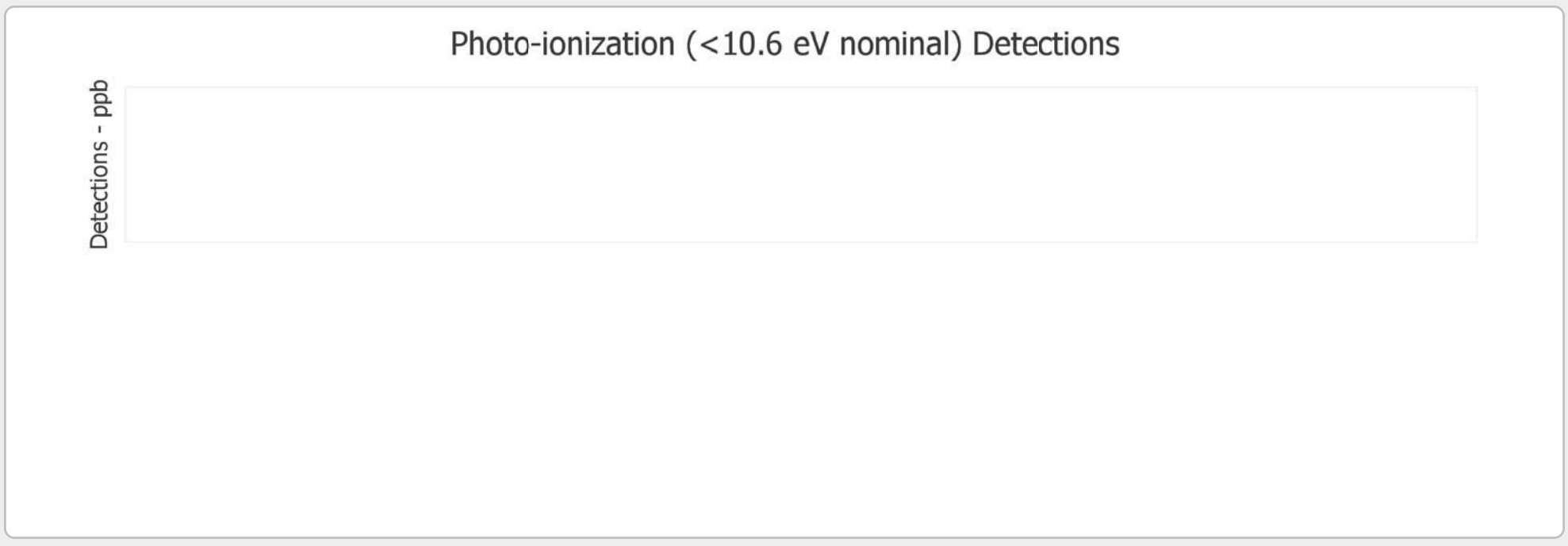



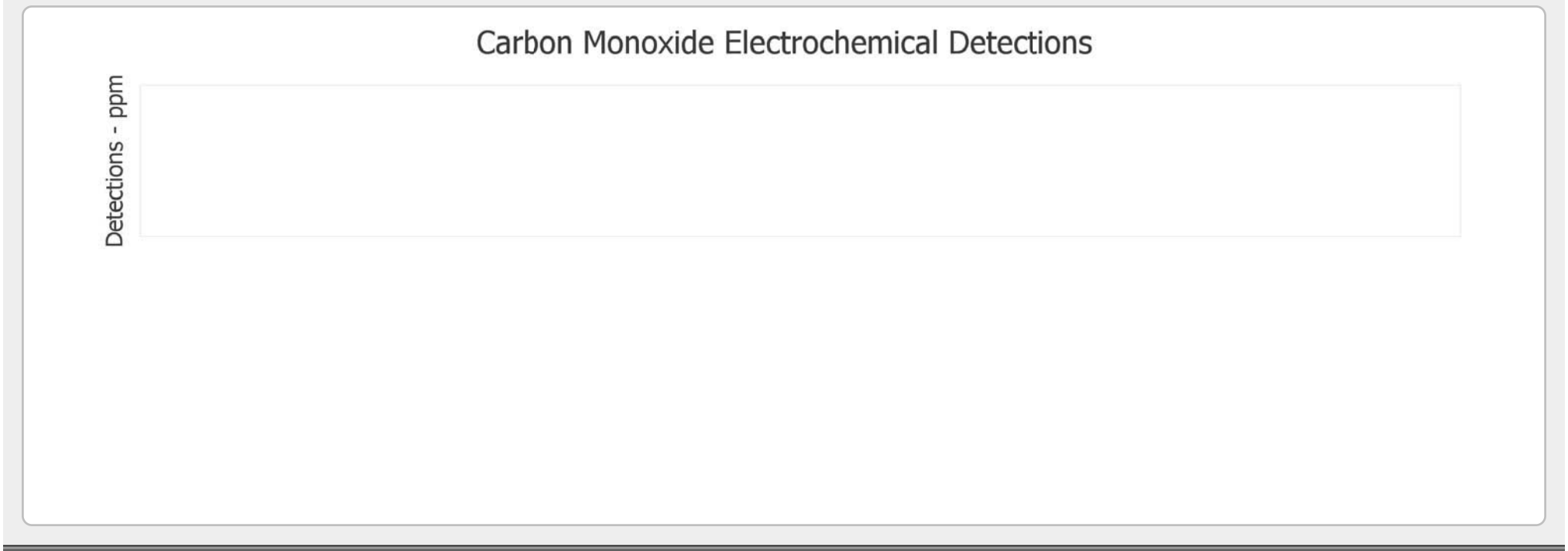
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 28

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



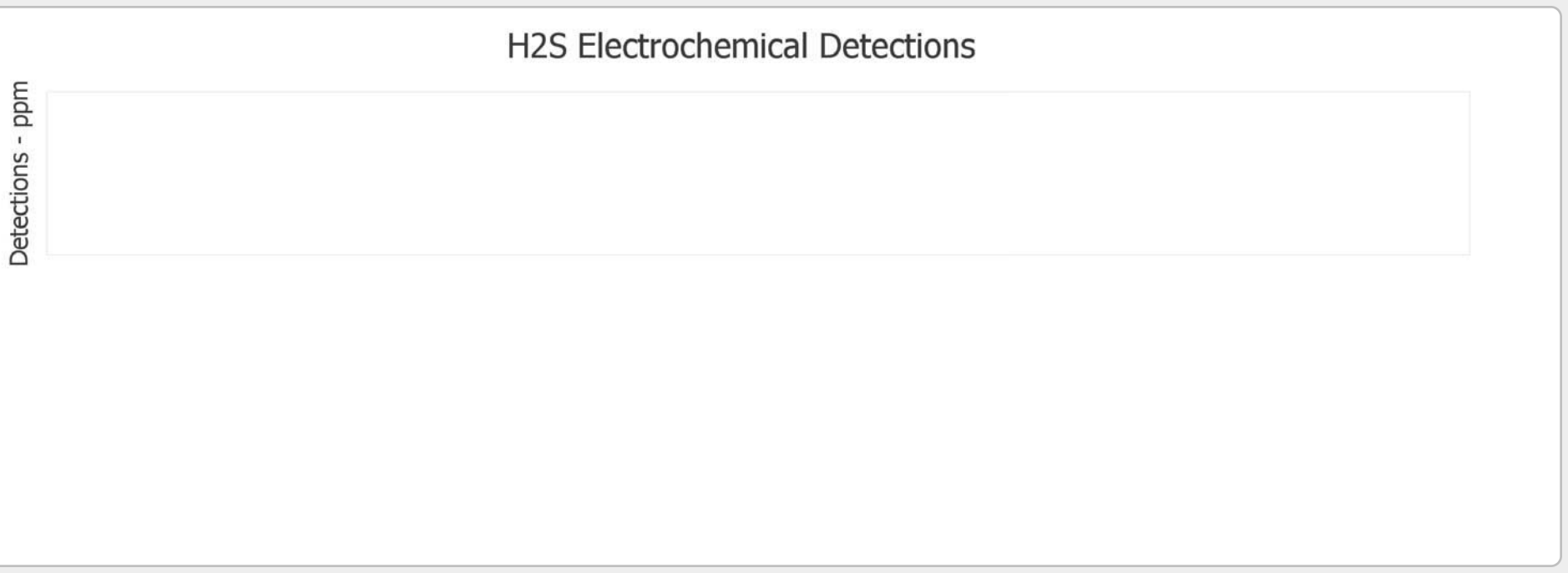



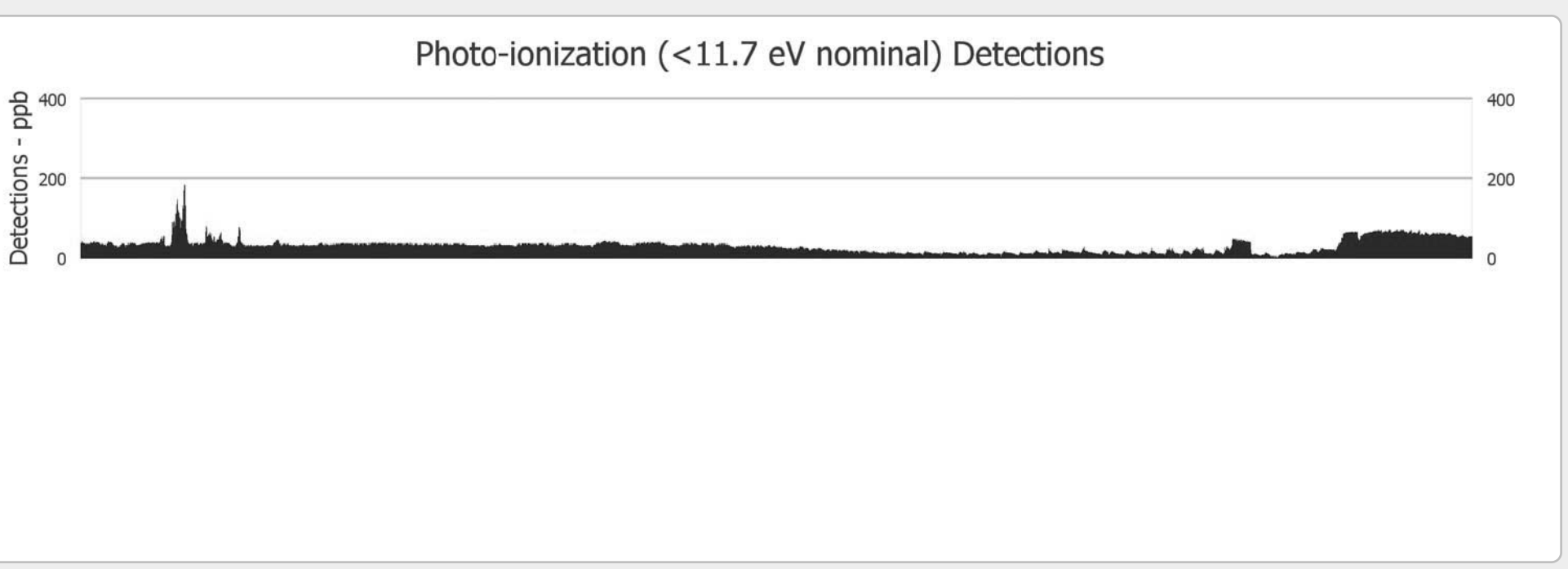



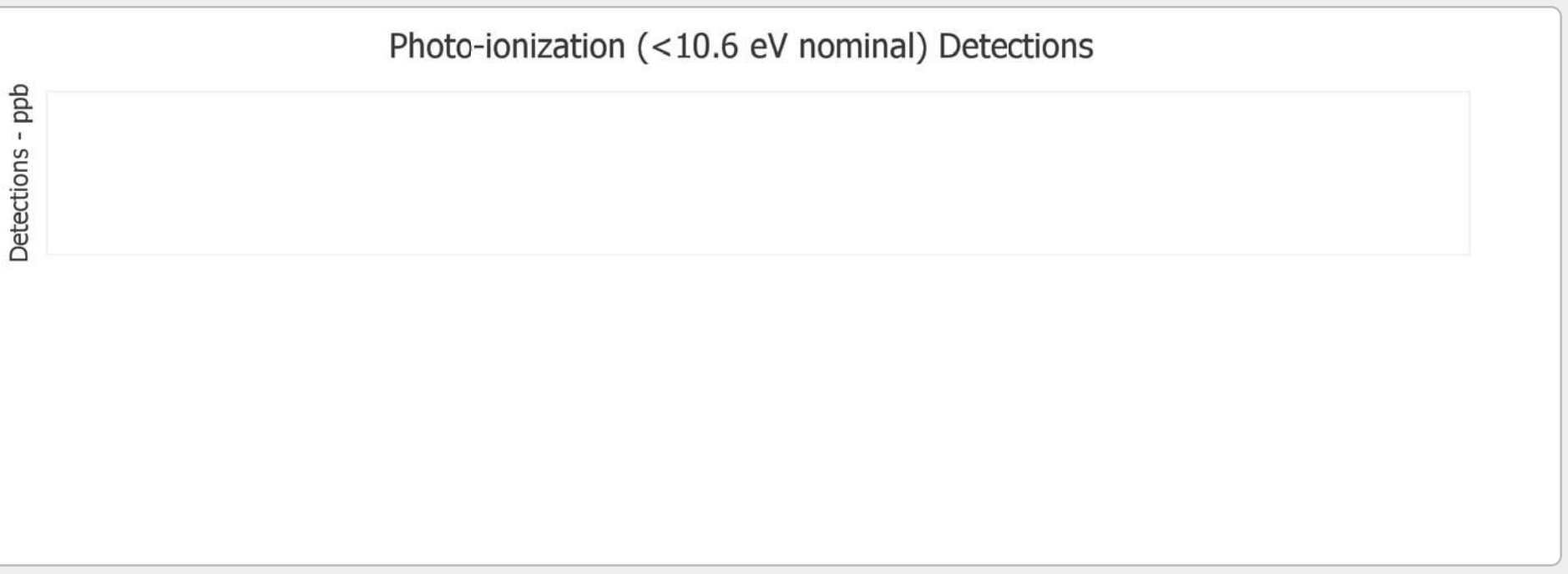



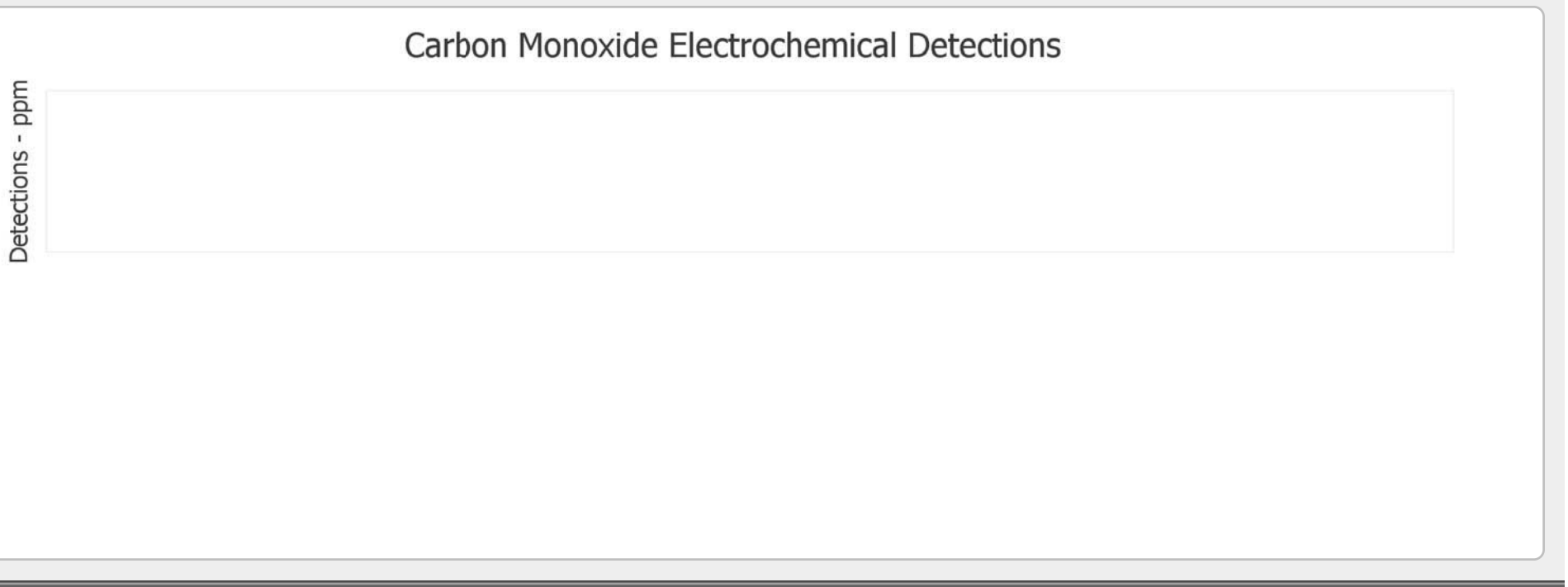
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 29

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



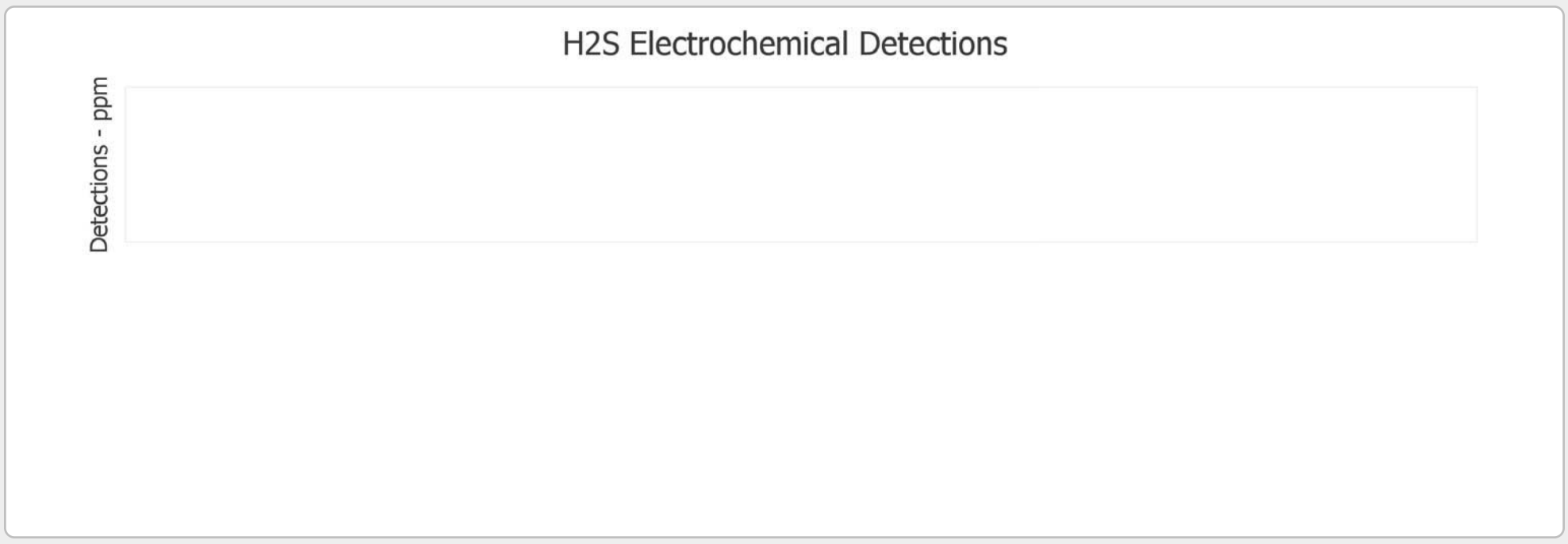



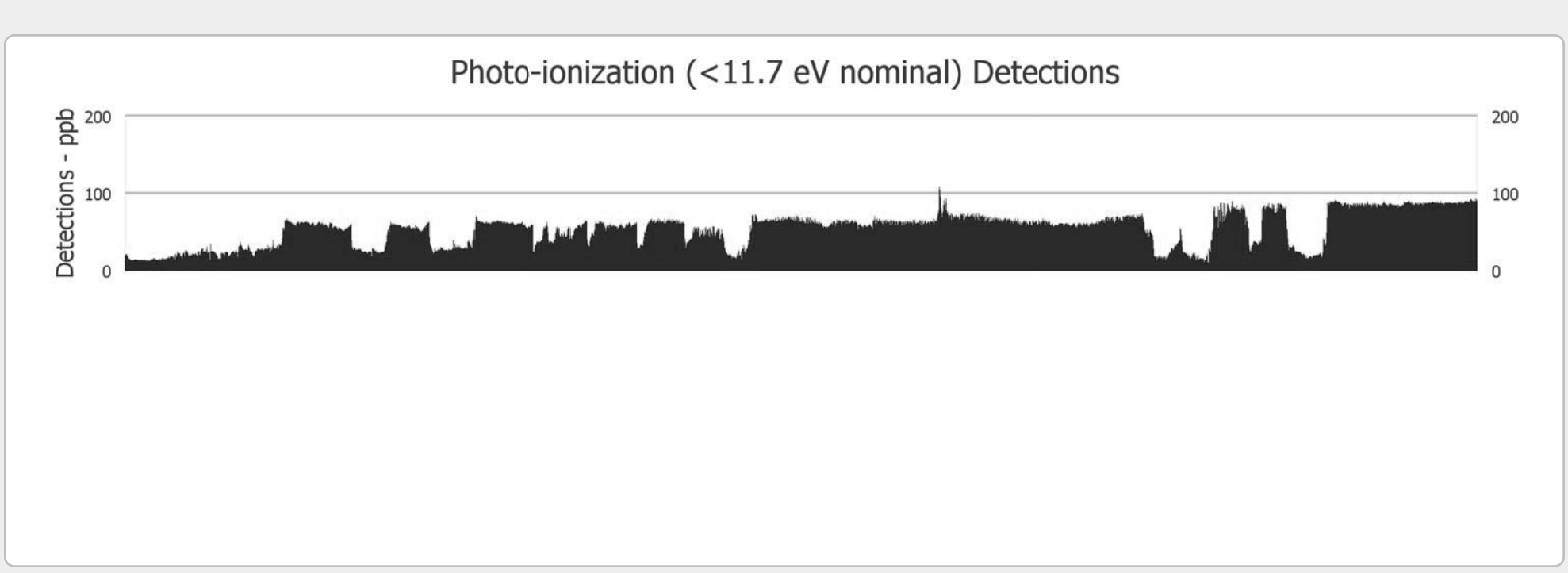



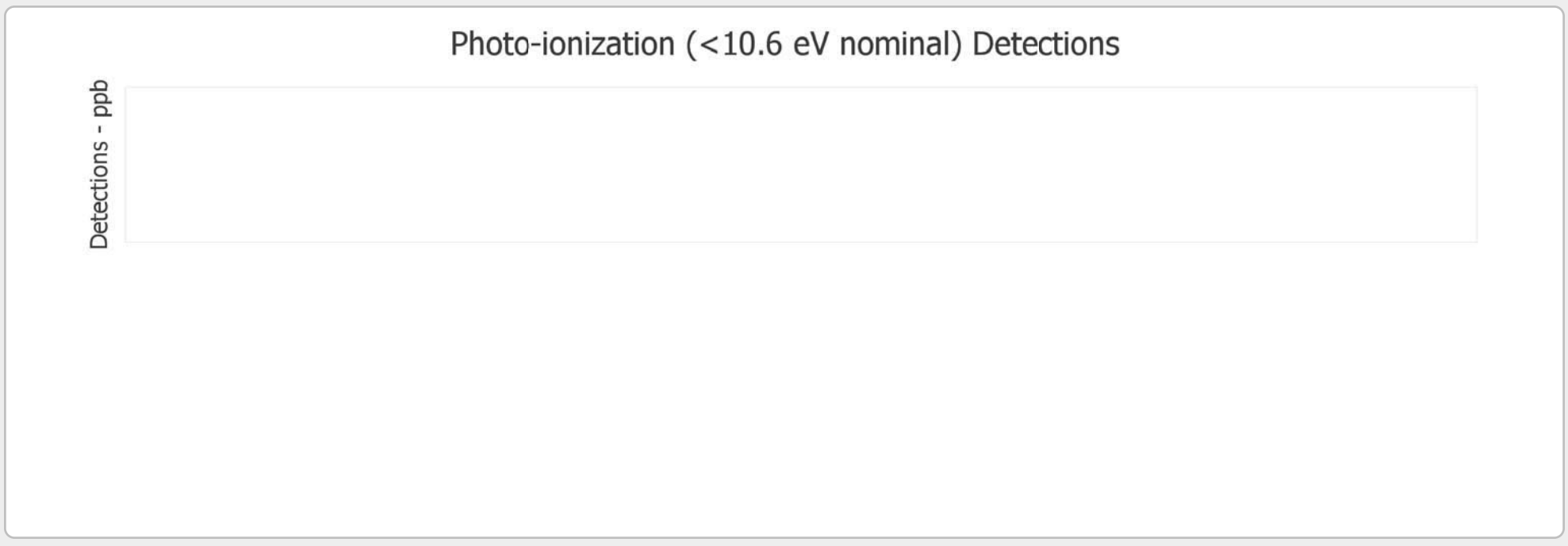



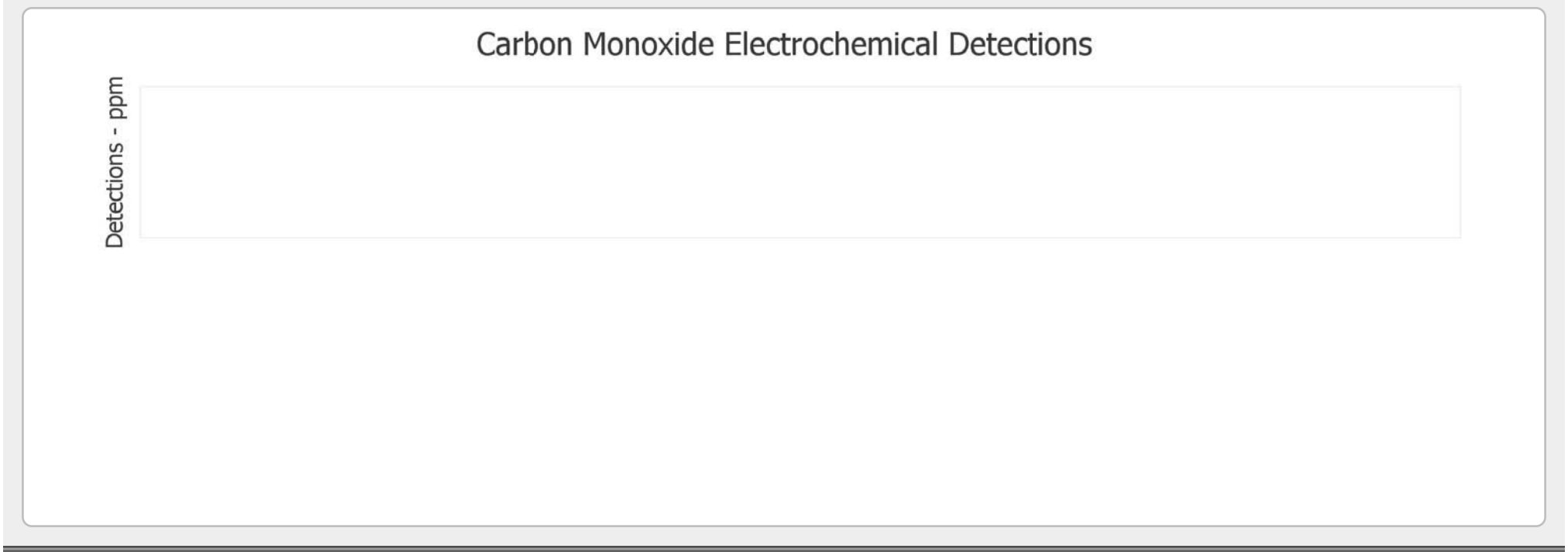
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 30

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



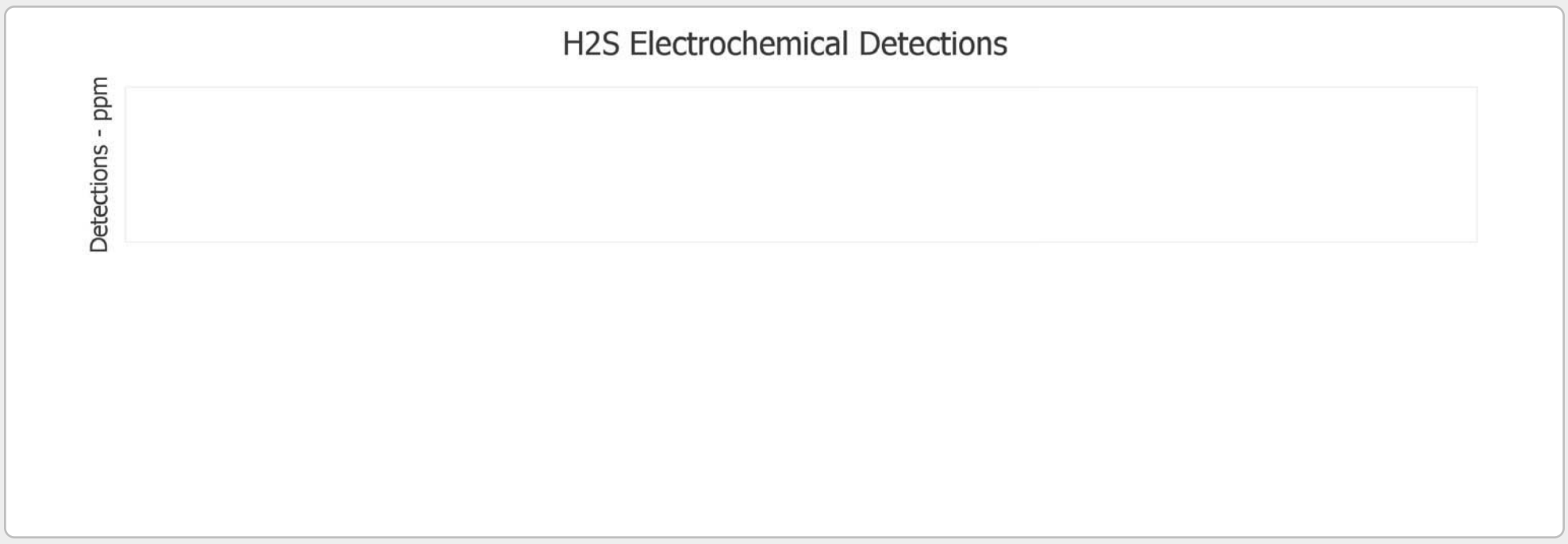



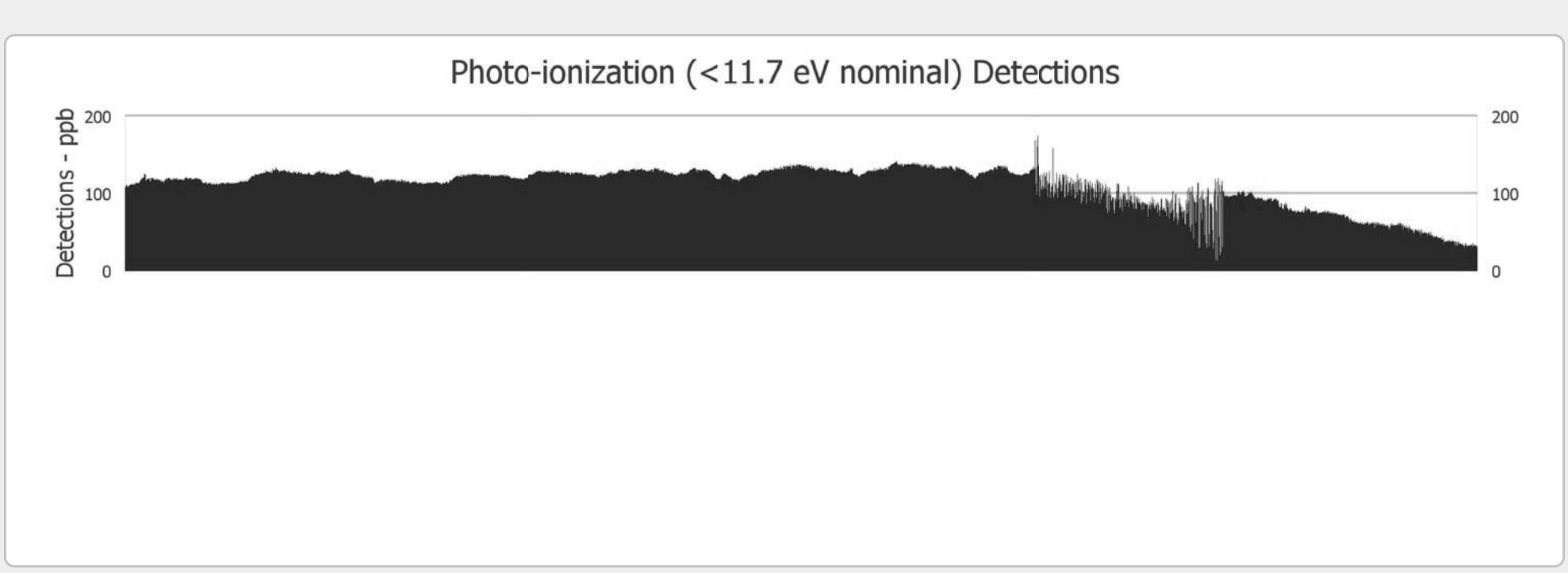



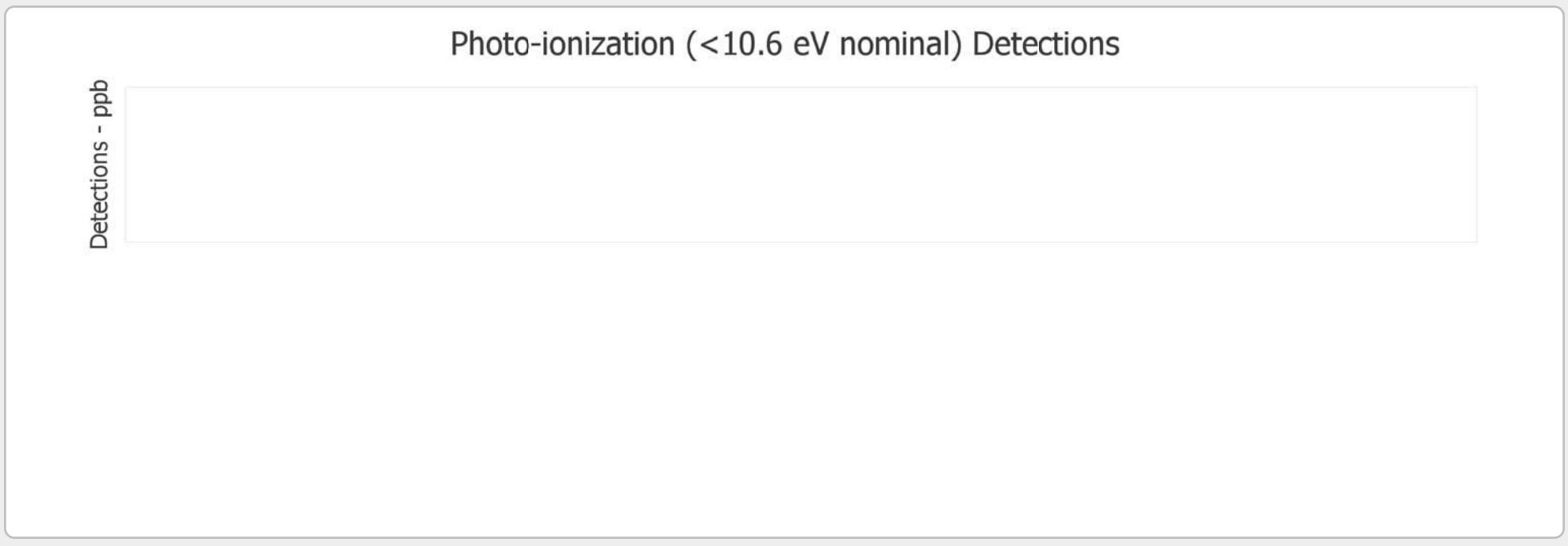



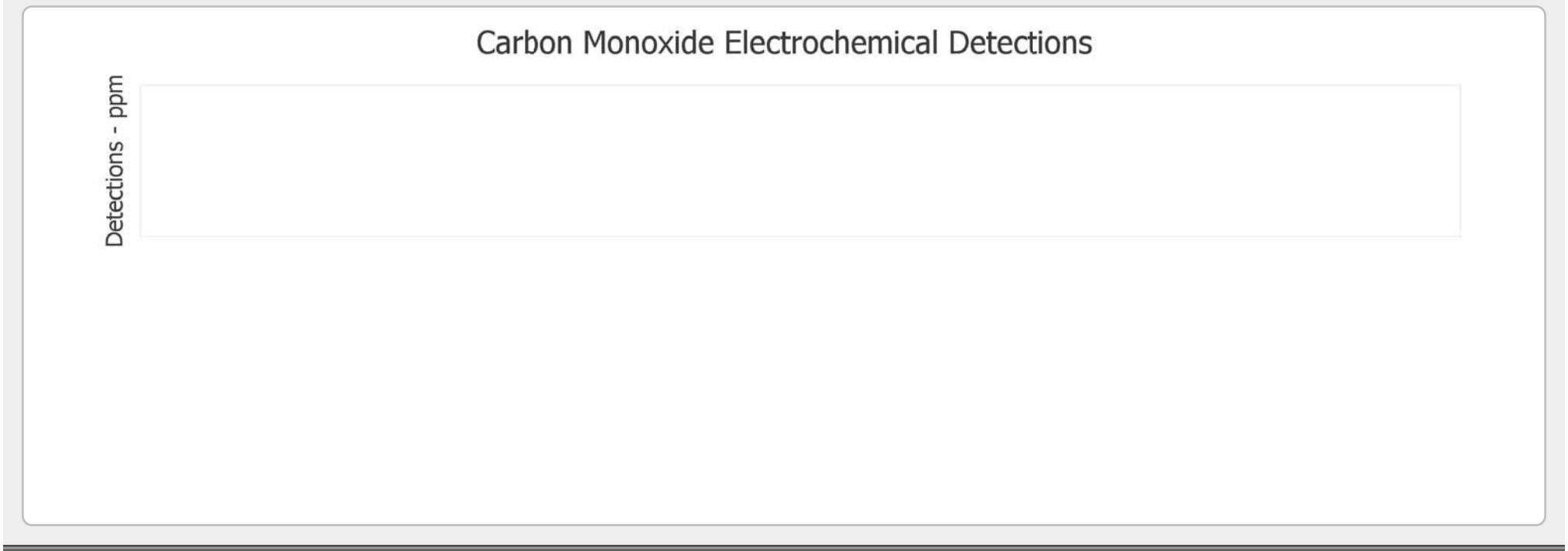
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 31

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



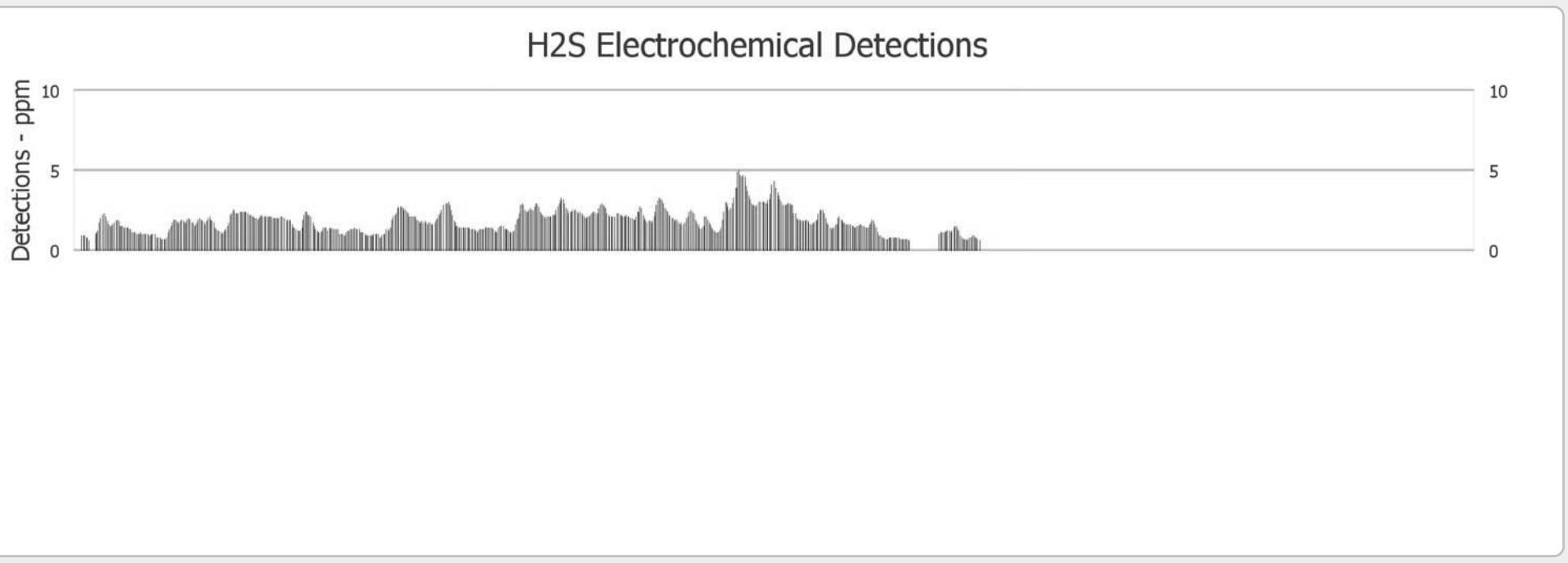



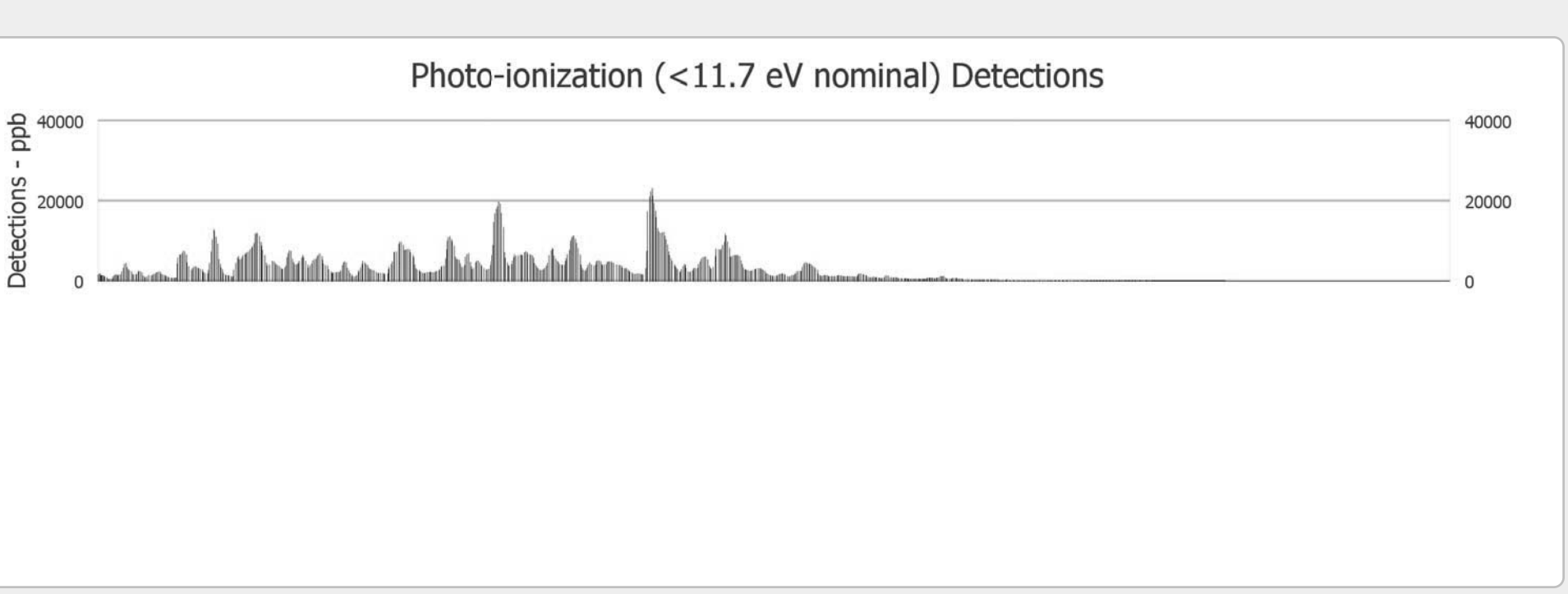



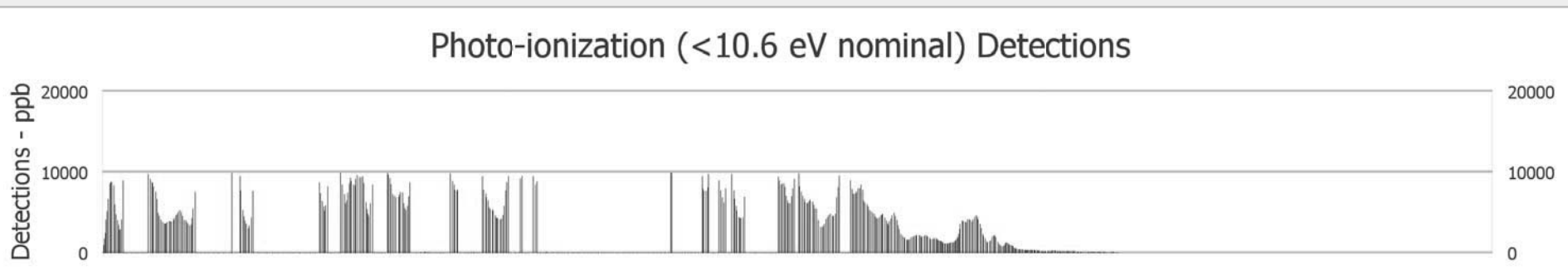



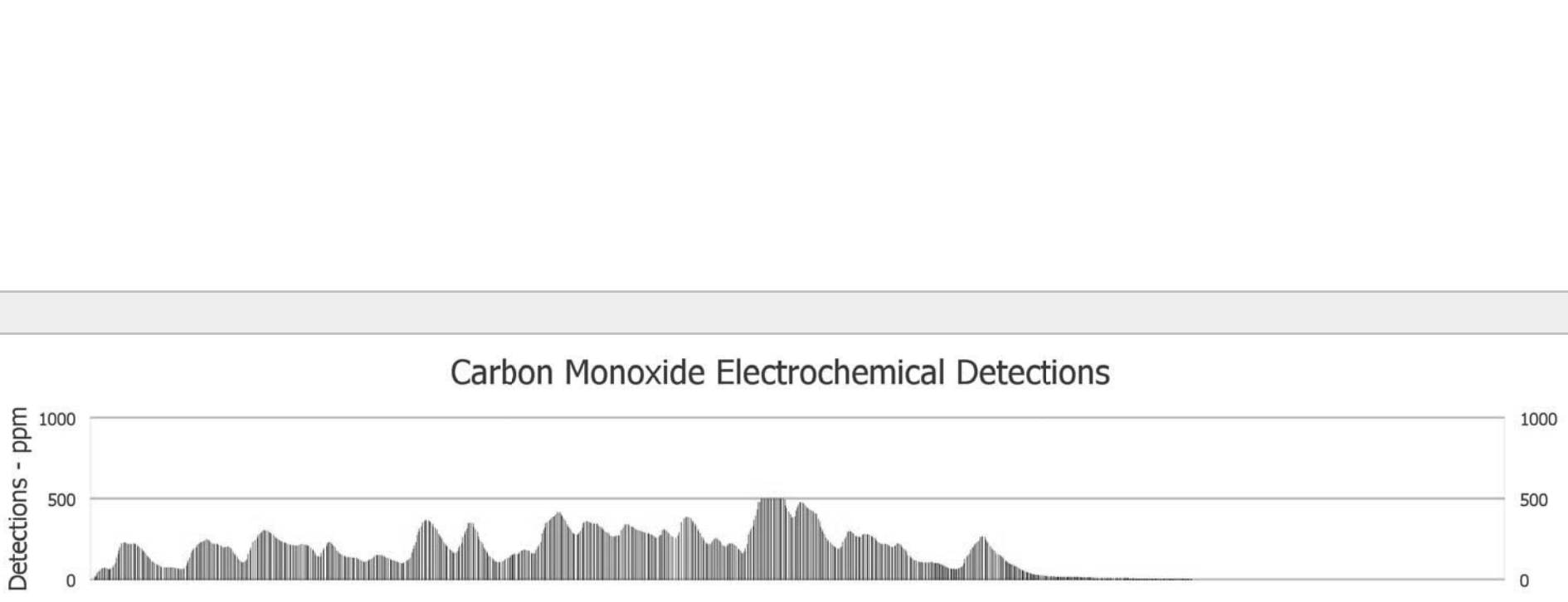
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 32

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



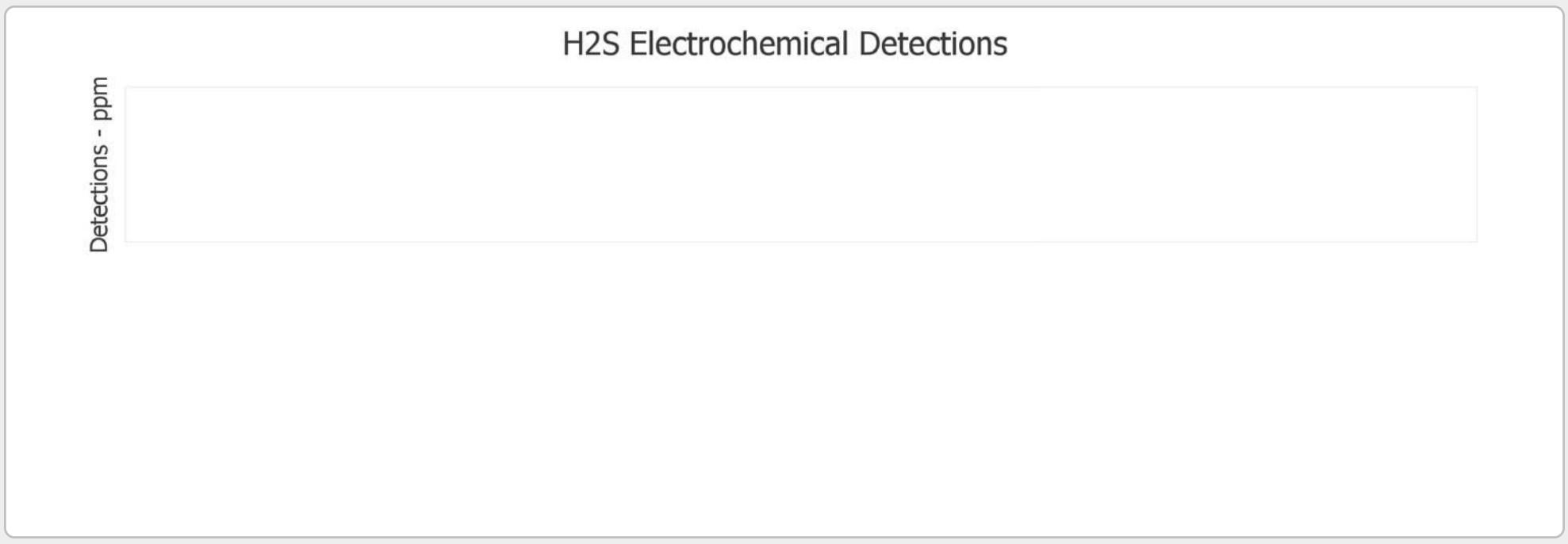



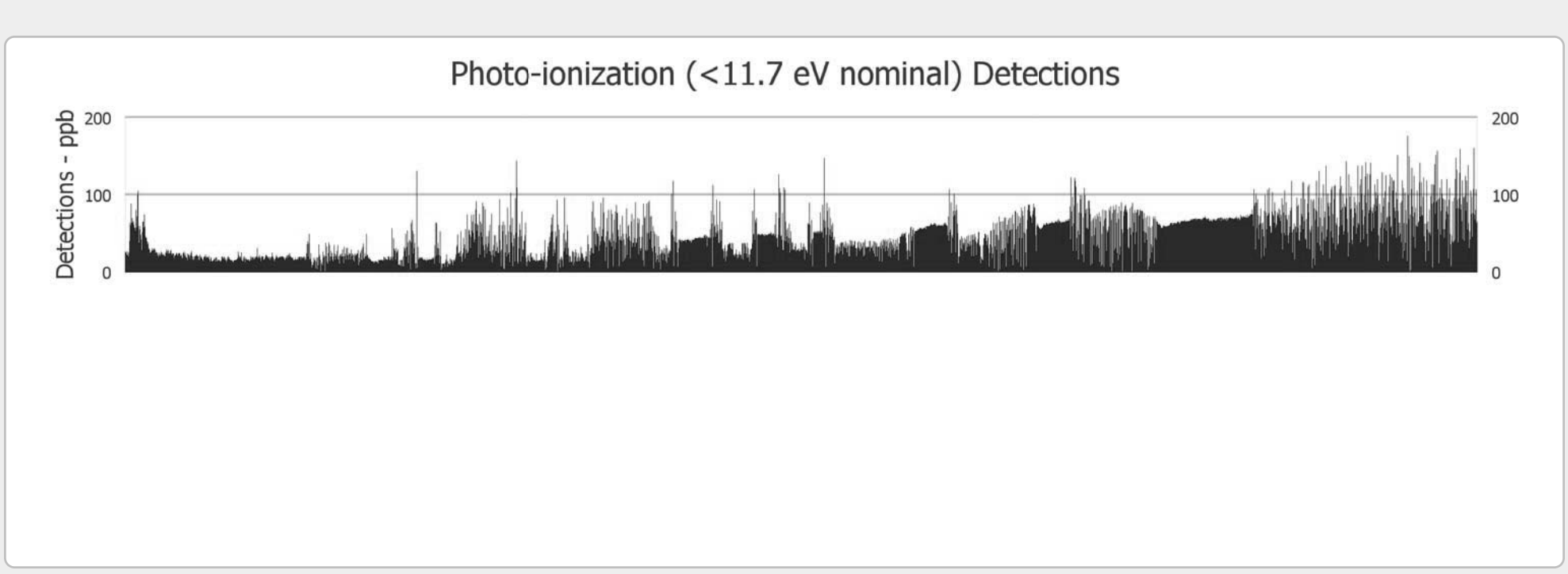



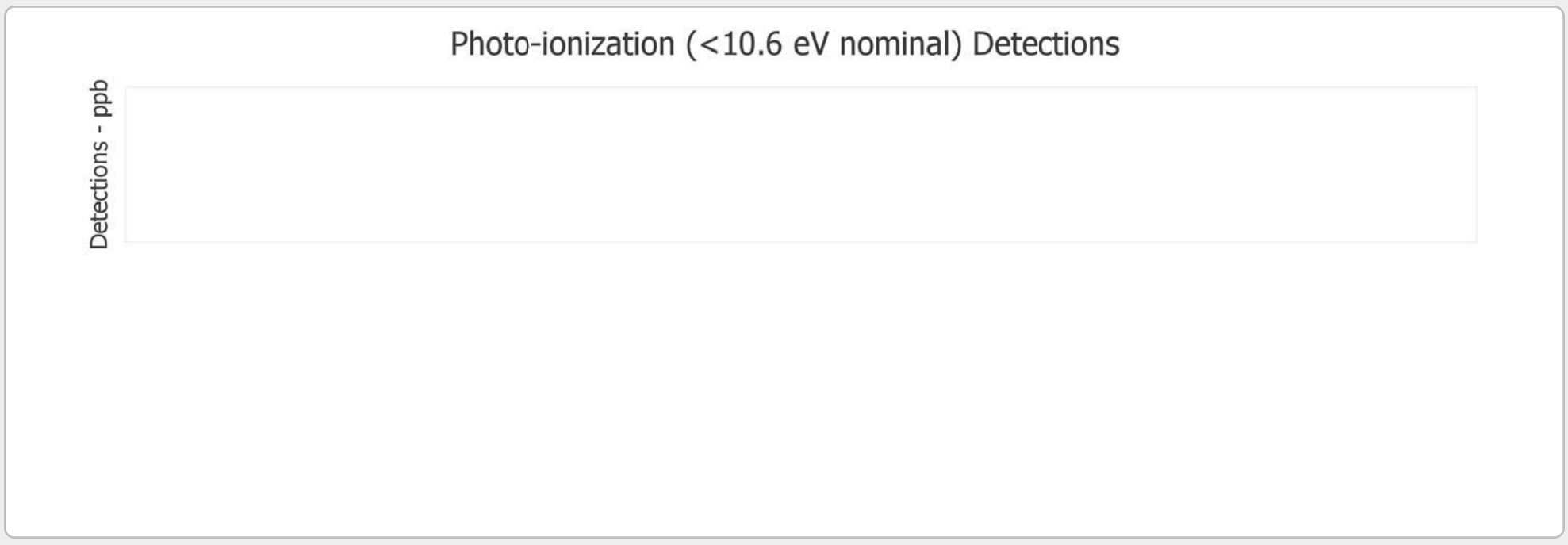



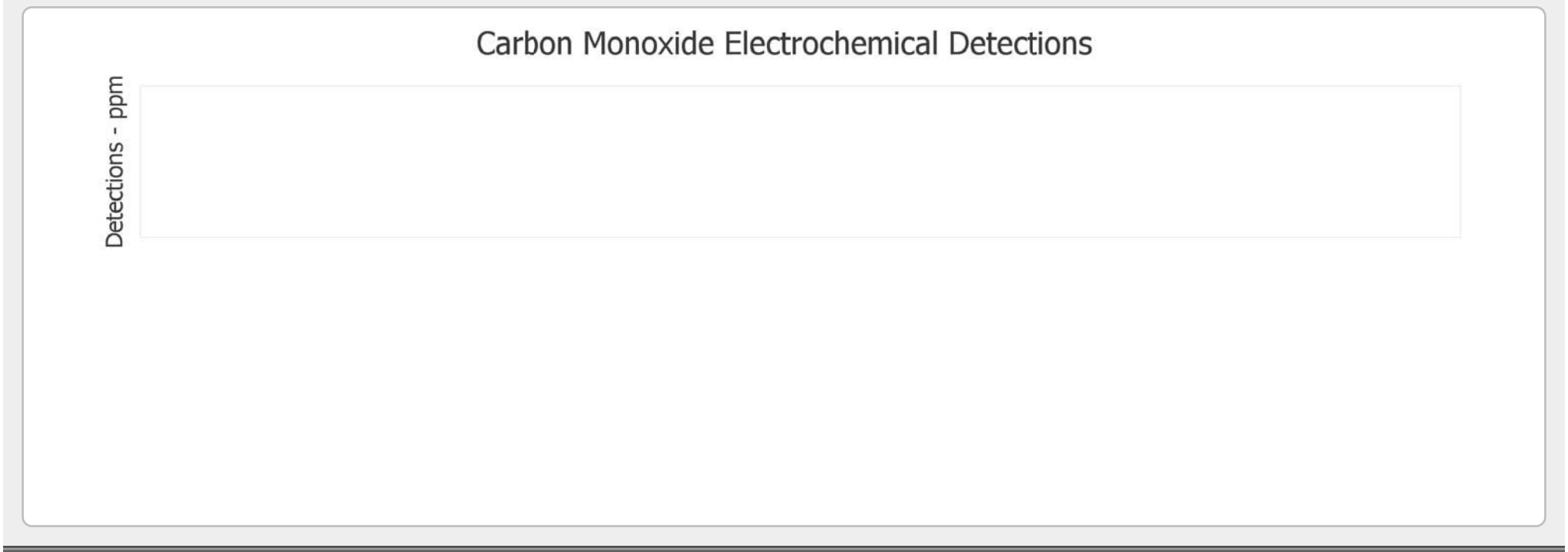
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 33

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



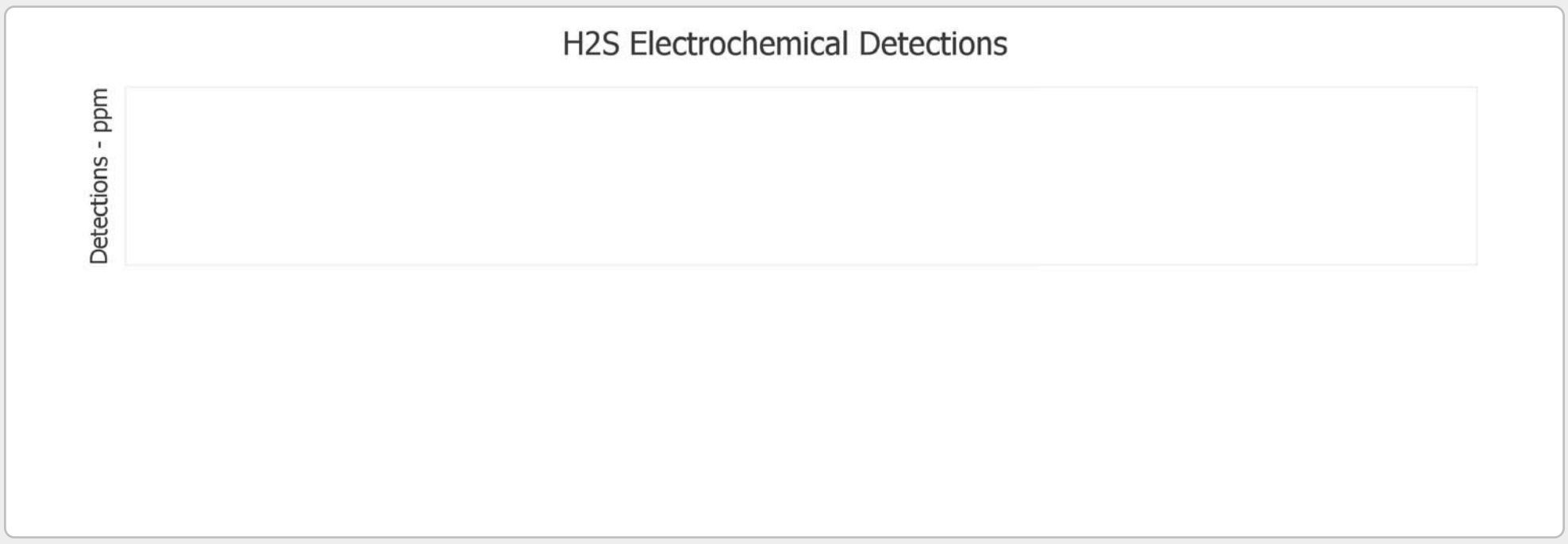



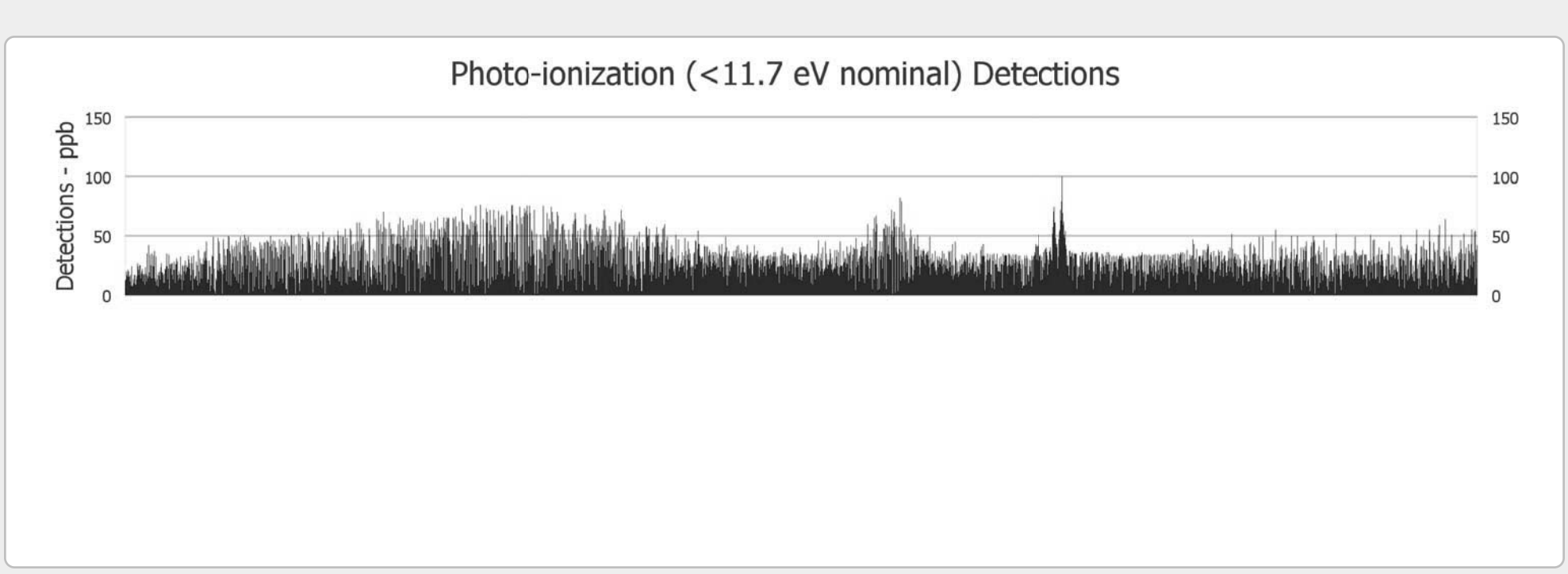



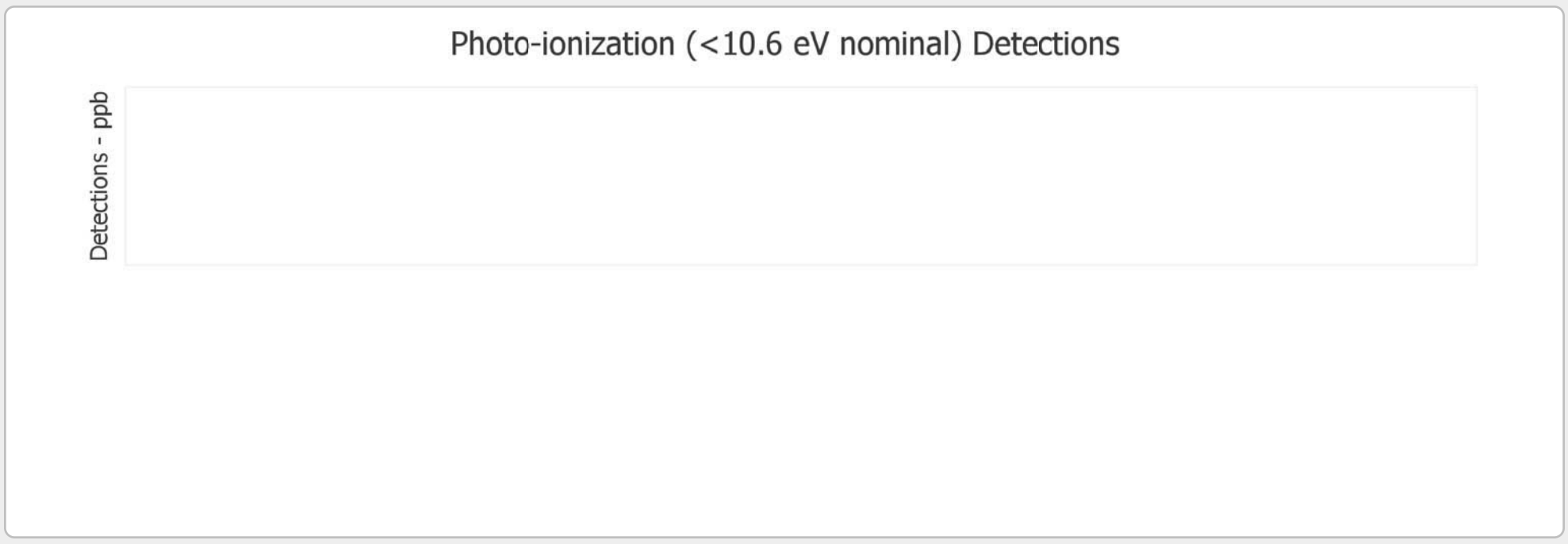



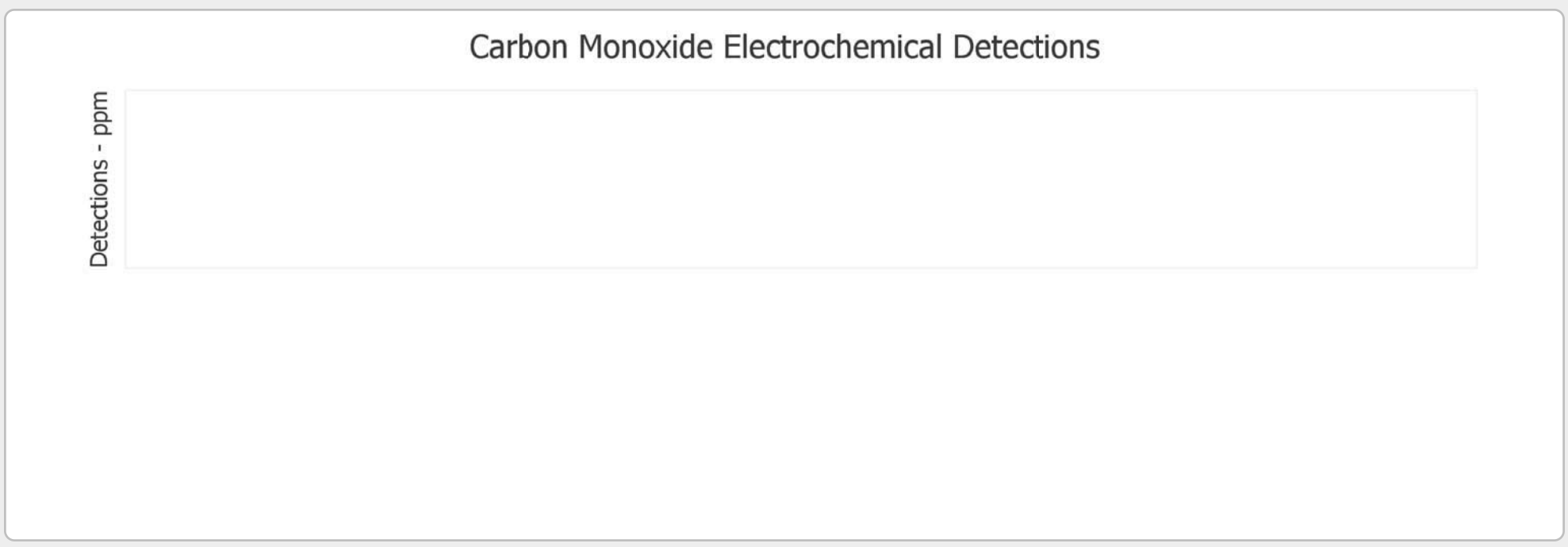
# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 34

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



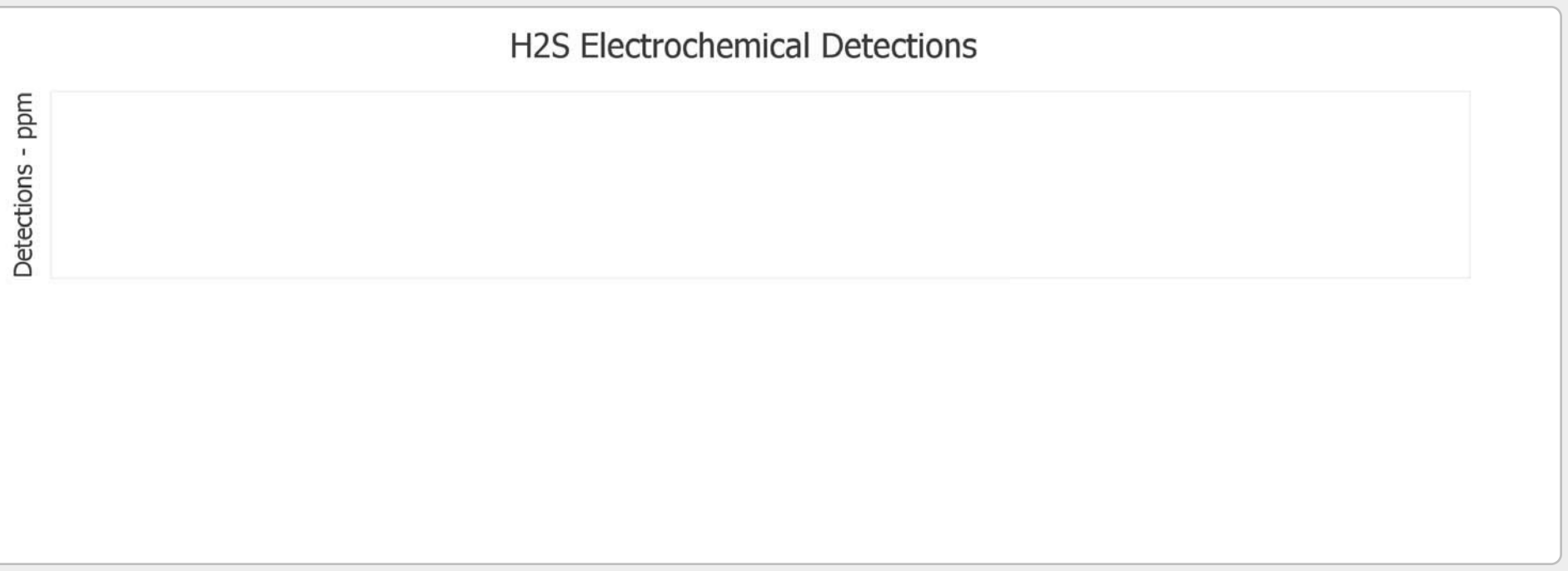



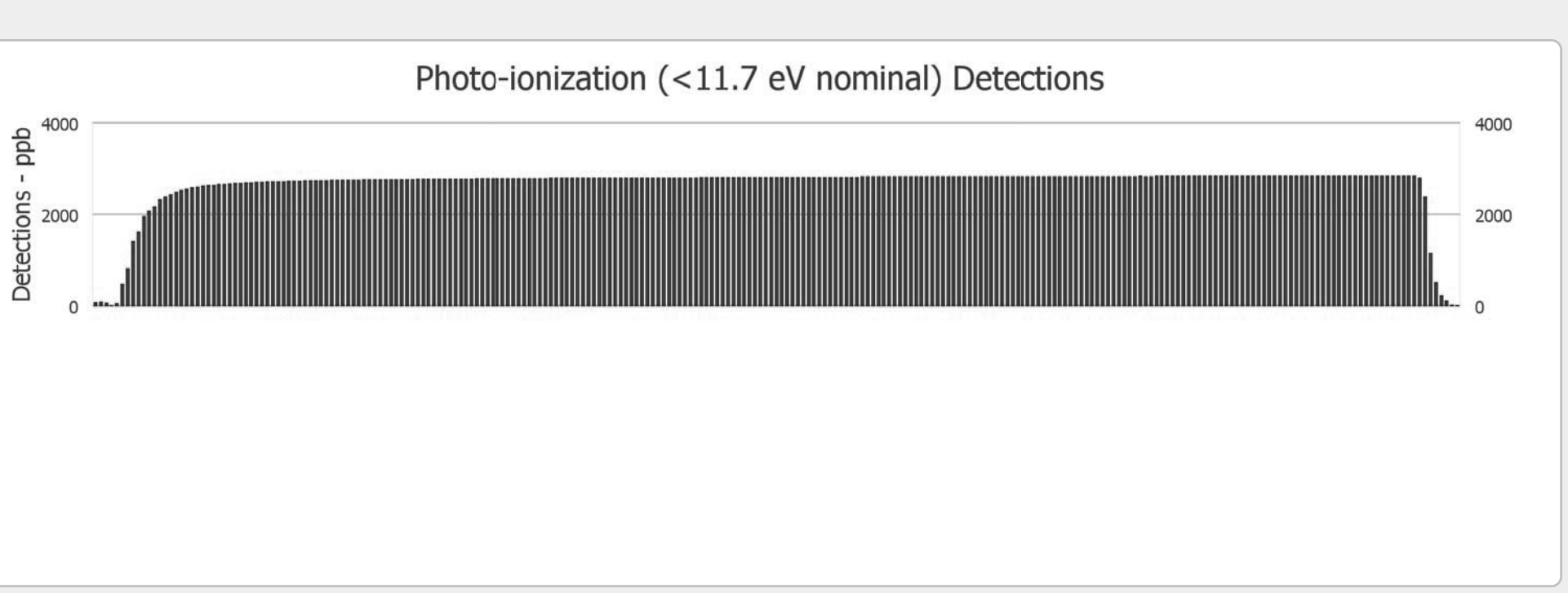



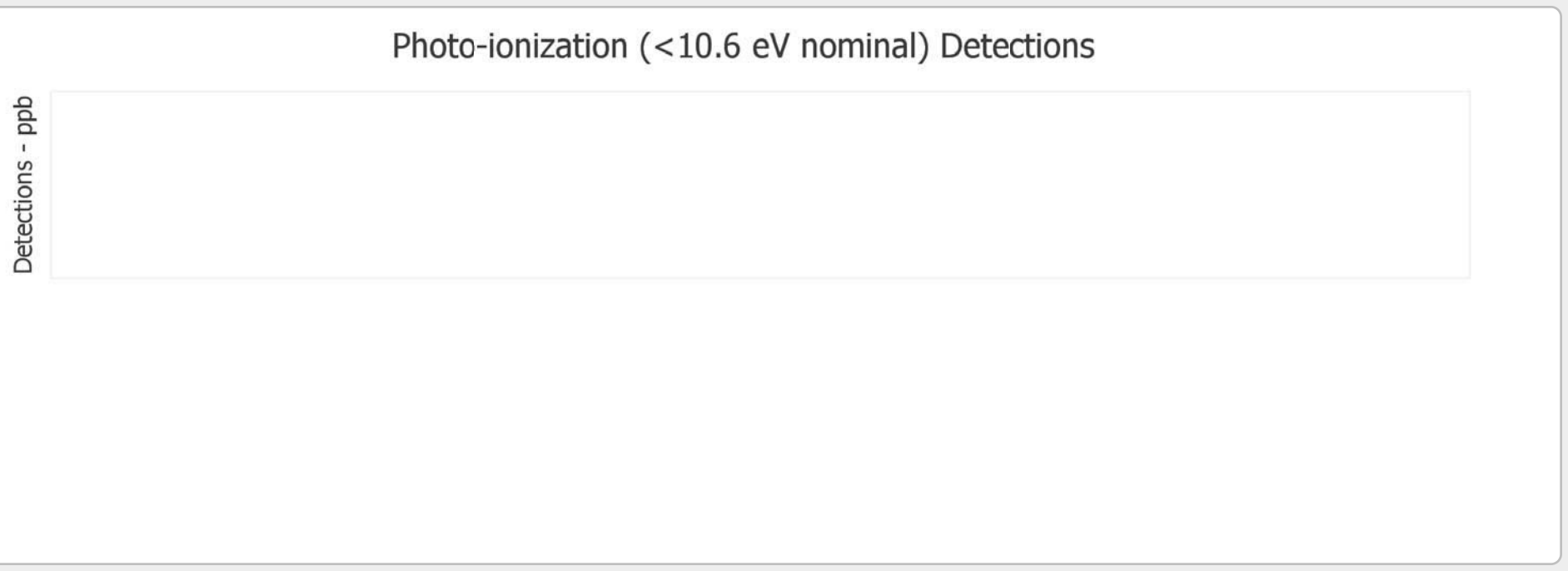



# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 35

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

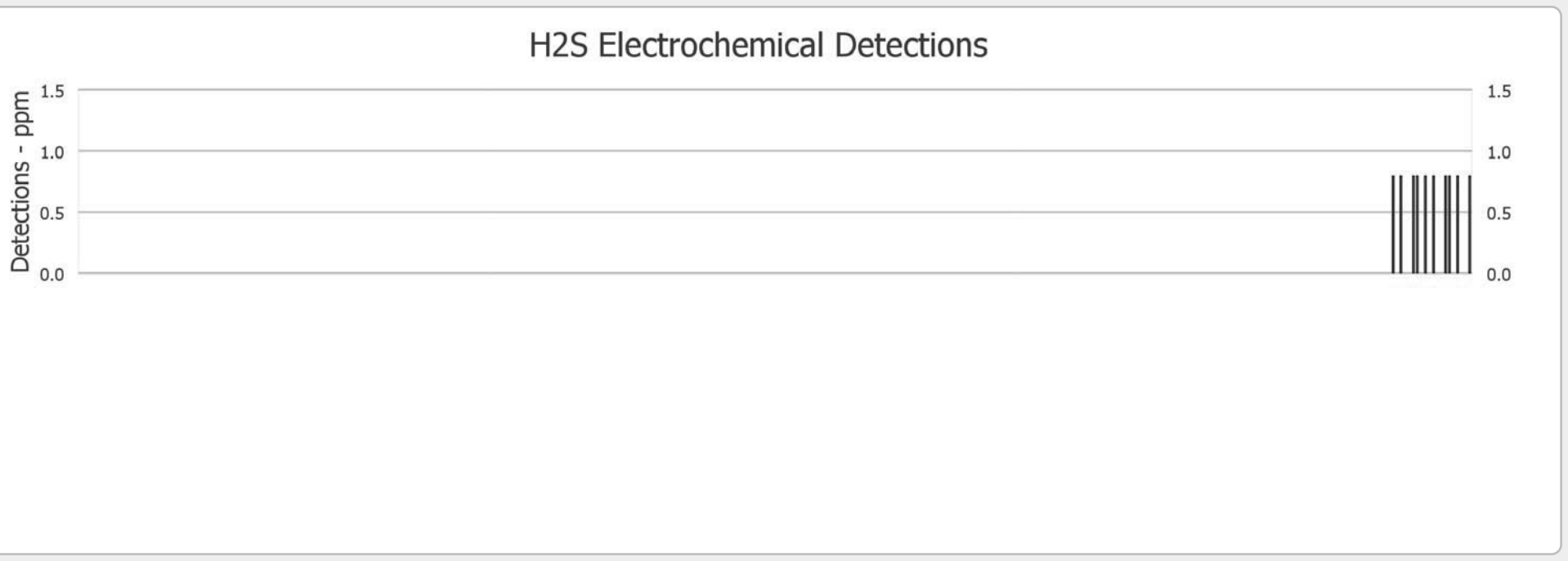


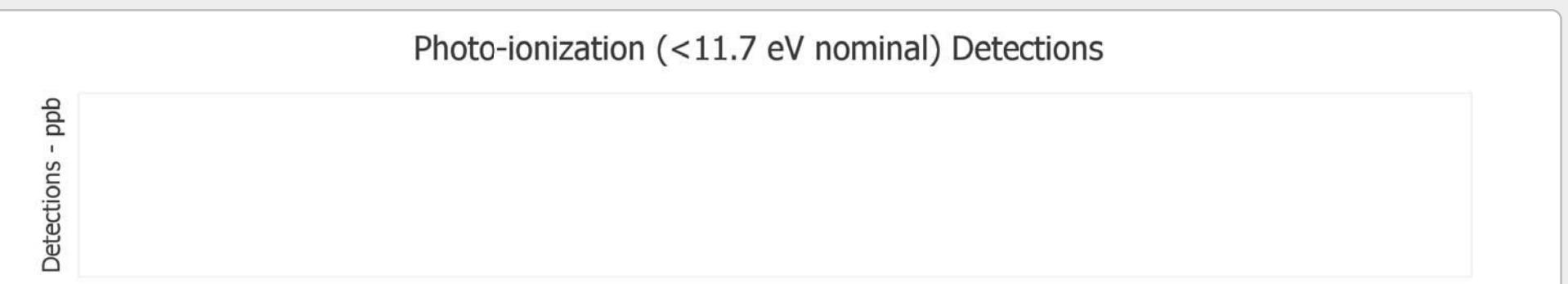



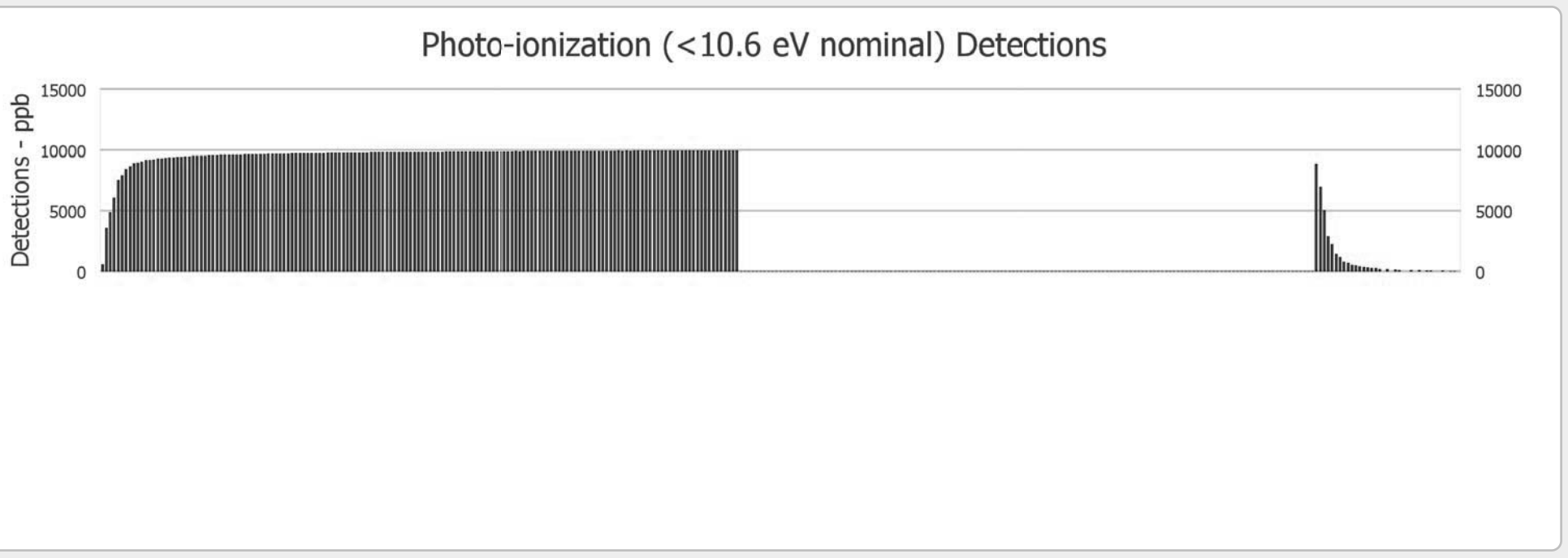



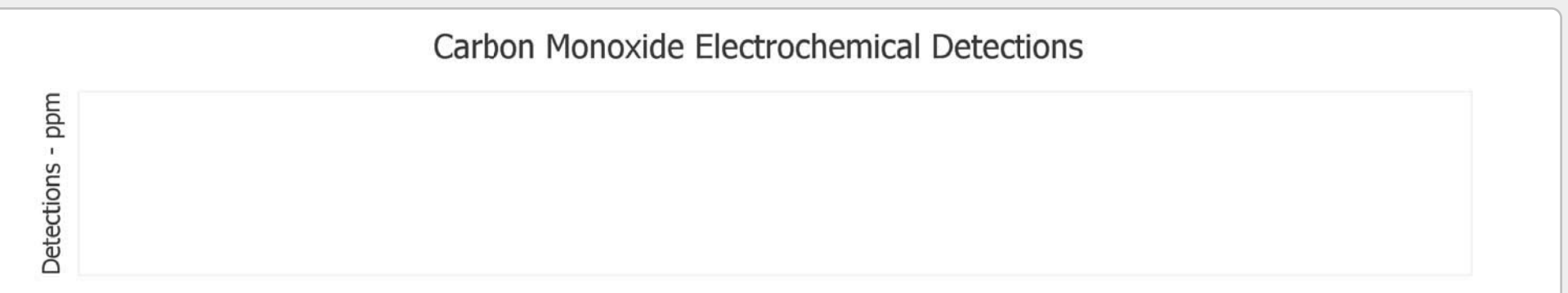

# Jantzen Beach Air Release Site - Selected Viper Network Data
# Chart 36

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



# ATTACHMENT 1

## Photographic Documentation

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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*

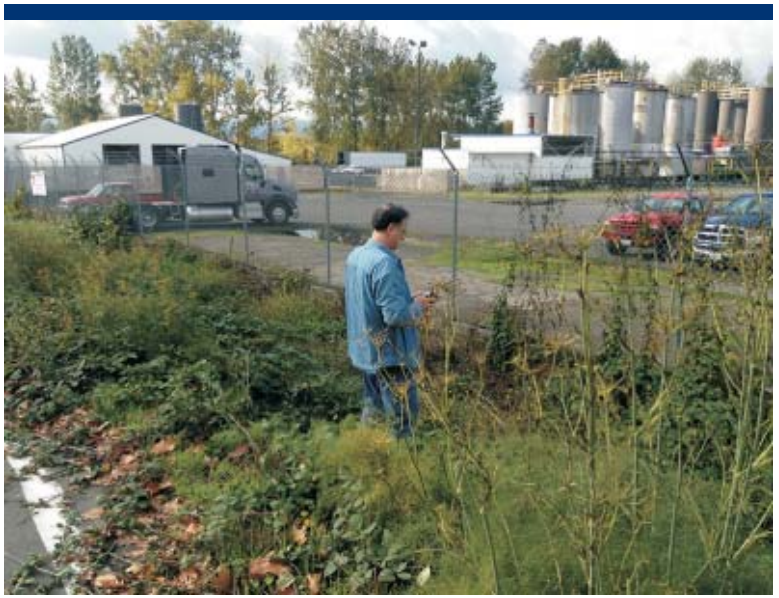

Photo 4 Monitoring effluent vapors from an open pipe on the west shoulder of Force Ave. The City of Portland later determined that it was related to the sewer and had been damaged.

*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*

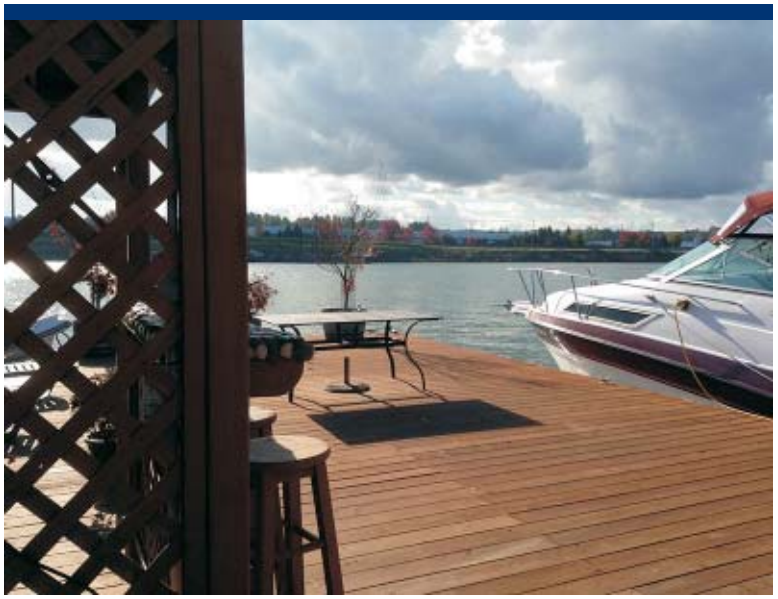

Photo 7 View of Columbia River and a personal vessel from the JB01 Viper fixed monitoring station location.

*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*

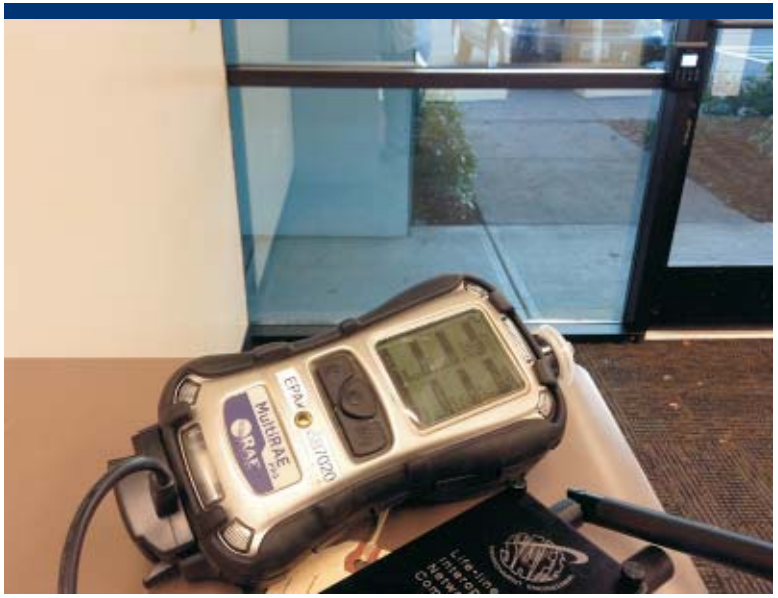


Photo 9 Instrument used for mobile monitoring inside an office used by Expeditors personnel. Elevated CO was detected and the information was shared with their manager.

*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

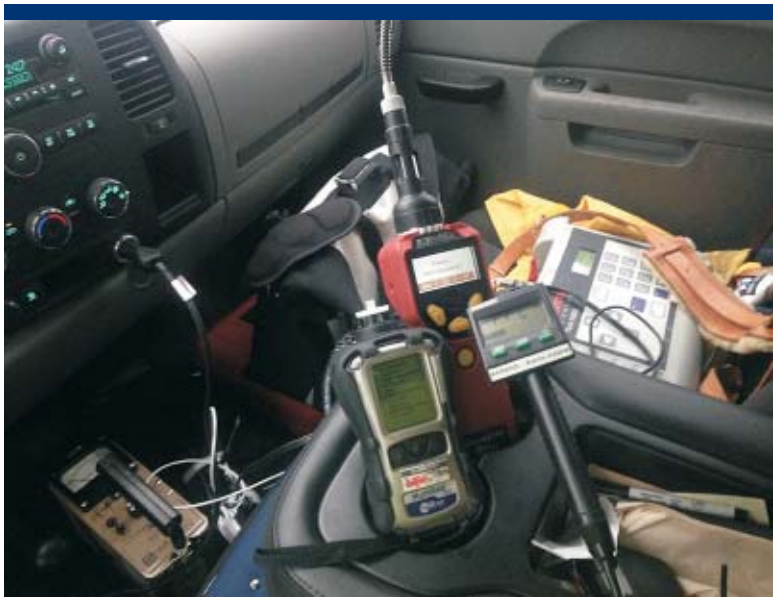

Photo 22 Air monitoring instruments being readied for mobile monitoring event.

*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*

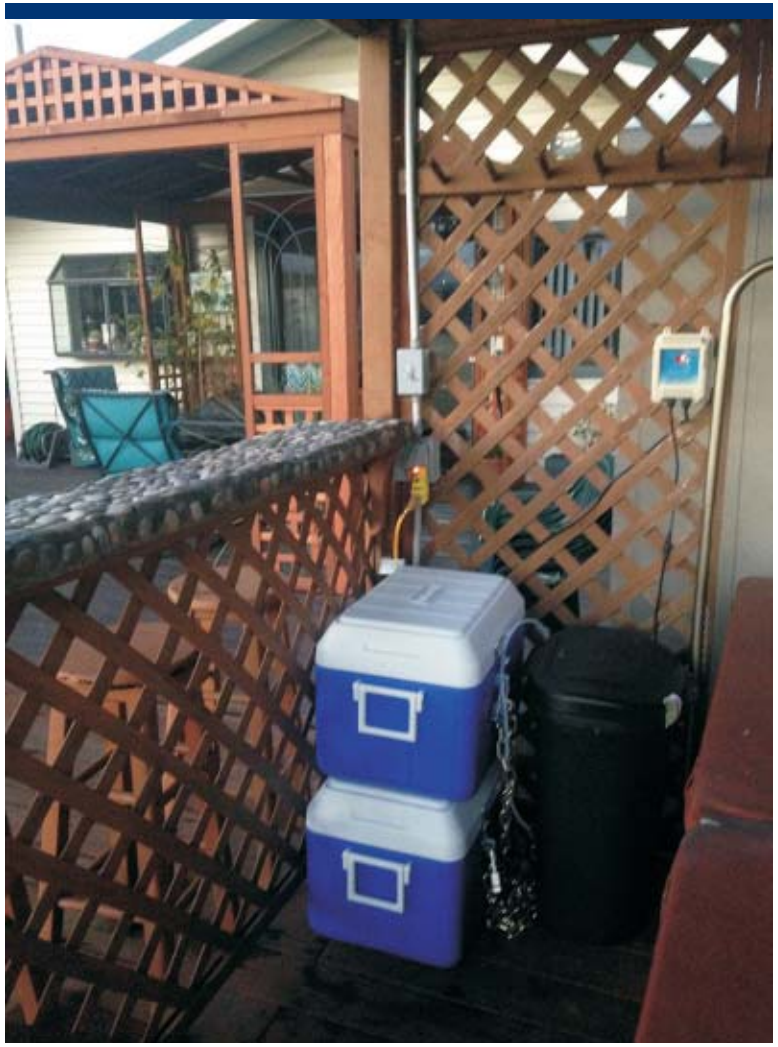

Photo 25 View of Viper Station JB01 at the Jantzen Beach Moorage Inc floating home community.

*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*

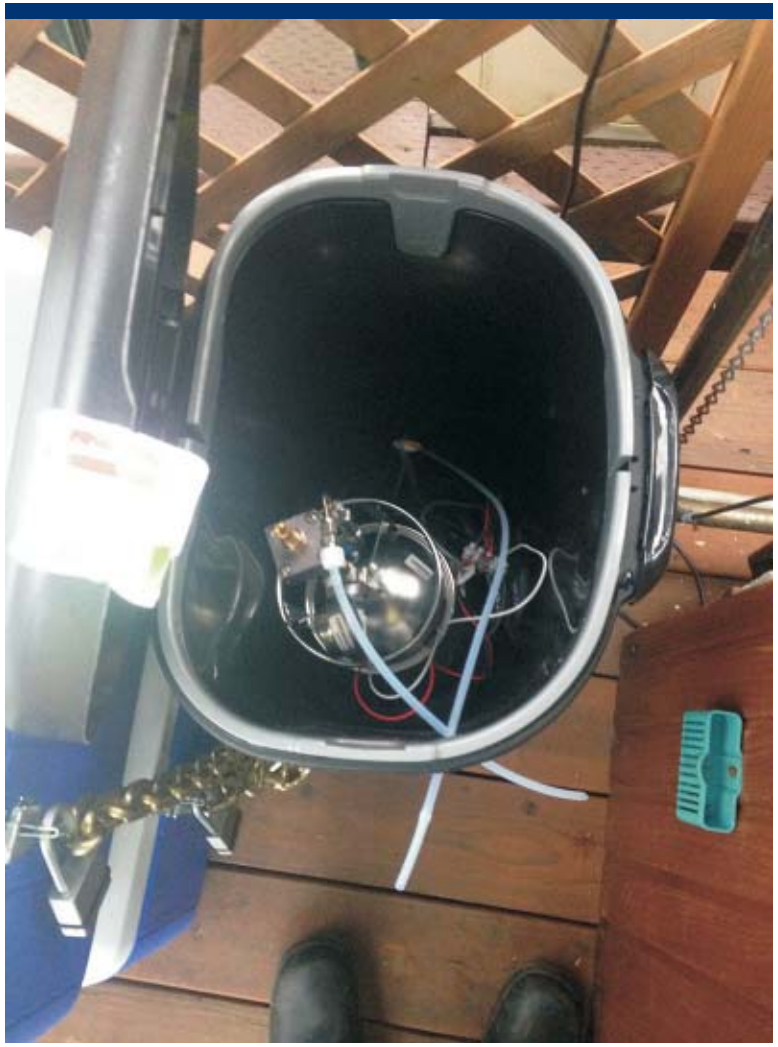

Photo 29 Vacuum canister (connected to Snapper control box) deployed at Jantzen Beach Moorage Inc at Viper station JB01.

*Direction*: Down *Date: 12/15/15* *Time: 15:45*

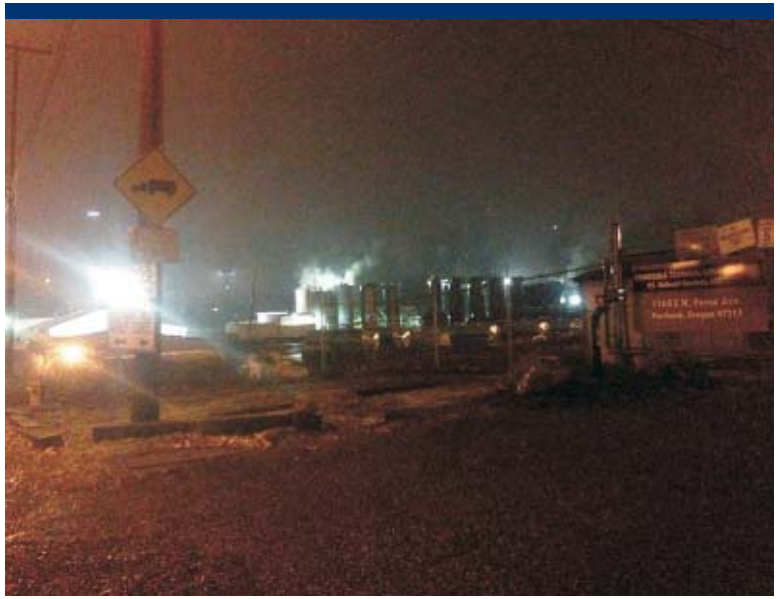

Photo 30 Emission observed from stacks at American Petroleum Environmental Services from a short distance to the northeast on Force Avenue.

*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

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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).

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Ecology And Environment, Incorporated**
**Client Sample ID:** **15121001** ALS Project ID: P1505593
**Client Project ID:** **START-IV-Region 10 / 100.4530.0004.119.01** ALS Sample ID: P1505593-001

Test Code: EPA TO-15 Date Collected: 12/22/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/28/15
Analyst: Lusine Hakobyan Date Analyzed: 12/29/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00549

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 |
|---|---|---|---|---|---|---|
| 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** U | 5.9 | **4.0** U | 3.1 | |
| 75-05-8 | Acetonitrile | ND | 0.59 U | ND | 0.35 U | |
| 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 | 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 1-6-16

**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 | |
| 141-78-6 | Ethyl Acetate | ND | 1.2 | ND | 0.33 | |
| 110-54-3 | n-Hexane | **1.6** | 0.59 | **0.45** | 0.17 | |
| 67-66-3 | Chloroform | **0.12** | 0.12 | **0.025** | 0.024 | |
| 109-99-9 | Tetrahydrofuran (THF) | ND | 0.59 | 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 | **1.5** | 0.12 | **0.46** | 0.037 | |
| 56-23-5 | Carbon Tetrachloride | **0.42** | 0.12 | **0.067** | 0.019 | |
| 110-82-7 | Cyclohexane | ND | 1.2 | ND | 0.34 | |
| 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 | **0.21** | 0.12 | **0.039** | 0.022 | |
| 123-91-1 | 1,4-Dioxane | ND | 0.59 | ND | 0.16 | |
| 80-62-6 | Methyl Methacrylate | ND | 1.2 | ND | 0.29 | |
| 142-82-5 | n-Heptane | **1.0** | 0.59 | **0.25** | 0.14 | |
| 10061-01-5 | cis-1,3-Dichloropropene | ND | 0.59 | ND | 0.13 | |
| 108-10-1 | 4-Methyl-2-pentanone | ND | 0.59 | ND | 0.14 | |
| 10061-02-6 | trans-1,3-Dichloropropene | ND | 0.59 | ND | 0.13 | |
| 79-00-5 | 1,1,2-Trichloroethane | ND | 0.12 | ND | 0.022 | |
| 108-88-3 | Toluene | **4.9** | 0.59 | **1.3** | 0.16 | |
| 591-78-6 | 2-Hexanone | ND | 0.59 | ND | 0.14 | |
| 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 | **1.1** | 0.59 | **0.24** | 0.12 | |

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.

1-6-16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Ecology And Environment, Incorporated**
**Client Sample ID:** **15121001** ALS Project ID: P1505593
**Client Project ID:** **START-IV-Region 10 / 100.4530.0004.119.01** ALS Sample ID: P1505593-001

Test Code: EPA TO-15 Date Collected: 12/22/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/28/15
Analyst: Lusine Hakobyan Date Analyzed: 12/29/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00549

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 U | ND | 0.13 U | |
| 127-18-4 | Tetrachloroethene | **0.19** | 0.12 | **0.029** | 0.017 | |
| 108-90-7 | Chlorobenzene | ND | 0.12 U | ND | 0.026 U | |
| 100-41-4 | Ethylbenzene | **0.87** | 0.59 | **0.20** | 0.14 | |
| 179601-23-1 | m,p-Xylenes | **3.1** U | 0.59 | **0.71** U | 0.14 | |
| 75-25-2 | Bromoform | ND | 0.59 U | ND | 0.057 U | |
| 100-42-5 | Styrene | ND | 0.59 U | 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 U | ND | 0.11 U | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | ND | 0.12 U | ND | 0.017 U | |
| 98-82-8 | Cumene | ND | 0.59 U | 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 U | ND | 0.12 U | |
| 622-96-8 | 4-Ethyltoluene | ND | 0.59 U | ND | 0.12 U | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 0.59 U | 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 U | ND | 0.11 U | |
| 541-73-1 | 1,3-Dichlorobenzene | ND | 0.12 U | ND | 0.020 U | |
| 106-46-7 | 1,4-Dichlorobenzene | ND | 0.12 U | ND | 0.020 U | |
| 95-50-1 | 1,2-Dichlorobenzene | ND | 0.12 U | 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 U | ND | 0.061 U | |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 0.59 U | ND | 0.080 U | |
| 91-20-3 | Naphthalene | ND | 0.59 U | ND | 0.11 U | |
| 87-68-3 | Hexachlorobutadiene | ND | 0.59 U | 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.

1/6/16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Ecology And Environment, Incorporated**
**Client Sample ID:** **15121002** ALS Project ID: P1505593
**Client Project ID:** **START-IV-Region 10 / 100.4530.0004.119.01** ALS Sample ID: P1505593-002

Test Code: EPA TO-15 Date Collected: 12/22/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/28/15
Analyst: Lusine Hakobyan Date Analyzed: 12/29/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00166

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 |
|---|---|---|---|---|---|---|
| 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 U | ND | 0.092 U | |
| 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** U | 3.4 | |
| 75-05-8 | Acetonitrile | ND | 0.65 U | ND | 0.38 U | |
| 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 U | ND | 2.6 U | |
| 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 U | ND | 0.041 U | |
| 76-13-1 | Trichlorotrifluoroethane | **0.50** | 0.13 | **0.065** | 0.017 | |
| 75-15-0 | Carbon Disulfide | ND | 6.5 U | ND | 2.1 U | |
| 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.

**Client:** **Ecology And Environment, Incorporated**
**Client Sample ID:** **15121002** ALS Project ID: P1505593
**Client Project ID:** **START-IV-Region 10 / 100.4530.0004.119.01** ALS Sample ID: P1505593-002

Test Code: EPA TO-15 Date Collected: 12/22/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/28/15
Analyst: Lusine Hakobyan Date Analyzed: 12/29/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00166

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 |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | ND | 0.13 | ND | 0.033 | |
| 141-78-6 | Ethyl Acetate | **10** U | 1.3 | **2.9** U | 0.36 | |
| 110-54-3 | n-Hexane | **1.8** U | 0.65 | **0.50** U | 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** U | 0.13 | **0.45** U | 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** U | 0.65 | **1.3** U | 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.

MW 1-8-16

**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 U | ND | 0.14 U | |
| 127-18-4 | Tetrachloroethene | **0.20** | 0.13 | **0.029** | 0.019 | |
| 108-90-7 | Chlorobenzene | ND | 0.13 U | ND | 0.028 U | |
| 100-41-4 | Ethylbenzene | **0.88** | 0.65 | **0.20** | 0.15 | |
| 179601-23-1 | m,p-Xylenes | **3.1** U | 0.65 | **0.72** U | 0.15 | |
| 75-25-2 | Bromoform | ND | 0.65 U | ND | 0.062 U | |
| 100-42-5 | Styrene | ND | 0.65 U | ND | 0.15 U | |
| 95-47-6 | o-Xylene | **1.1** | 0.65 | **0.26** | 0.15 | |
| 111-84-2 | n-Nonane | ND | 0.65 U | ND | 0.12 U | |
| 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 U | ND | 0.12 U | |
| 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 U | ND | 0.067 U | |
| 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.

1-6-16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Ecology And Environment, Incorporated**
**Client Sample ID:** **15121003** ALS Project ID: P1505593
**Client Project ID:** **START-IV-Region 10 / 100.4530.0004.119.01** ALS Sample ID: P1505593-003

Test Code: EPA TO-15 Date Collected: 12/22/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/28/15
Analyst: Lusine Hakobyan Date Analyzed: 12/29/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01666

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.

1-6-16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Ecology And Environment, Incorporated**
**Client Sample ID:** **15121003** ALS Project ID: P1505593
**Client Project ID:** **START-IV-Region 10 / 100.4530.0004.119.01** ALS Sample ID: P1505593-003

Test Code: EPA TO-15 Date Collected: 12/22/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/28/15
Analyst: Lusine Hakobyan Date Analyzed: 12/29/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01666

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 | **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.

MW 1-6-16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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 |
|---|---|---|---|---|---|---|
| 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 1-6-16

ecology and environment, inc.
Global Environmental Specialists
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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



**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



**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.

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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.

1-8-16

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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 |
|---|---|---|---|---|---|---|
| 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.

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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.

1-8-16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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 |
|---|---|---|---|---|---|---|
| 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.

1-8-16

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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



**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.

MW 1/8/16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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 | |
| 127-18-4 | Tetrachloroethene | ND | 0.13 | ND | 0.018 | |
| 108-90-7 | Chlorobenzene | ND | 0.13 | ND | 0.027 | |
| 100-41-4 | Ethylbenzene | ND | 0.63 | ND | 0.14 | |
| 179601-23-1 | m,p-Xylenes | 1.9 | 0.63 | 0.43 | 0.14 | |
| 75-25-2 | Bromoform | ND | 0.63 | ND | 0.060 | |
| 100-42-5 | Styrene | ND | 0.63 | ND | 0.15 | |
| 95-47-6 | o-Xylene | 0.70 | 0.63 | 0.16 | 0.14 | |
| 111-84-2 | n-Nonane | ND | 0.63 | ND | 0.12 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | ND | 0.13 | ND | 0.018 | |
| 98-82-8 | Cumene | ND | 0.63 | ND | 0.13 | |
| 80-56-8 | alpha-Pinene | ND | 0.63 | ND | 0.11 | |
| 103-65-1 | n-Propylbenzene | ND | 0.63 | ND | 0.13 | |
| 622-96-8 | 4-Ethyltoluene | ND | 0.63 | ND | 0.13 | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 0.63 | ND | 0.13 | |
| 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 | |
| 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 | 1.5 | 0.63 | 0.26 | 0.11 | |
| 96-12-8 | 1,2-Dibromo-3-chloropropane | ND | 0.63 | ND | 0.065 | |
| 120-82-1 | 1,2,4-Trichlorobenzene | ND | 0.63 | ND | 0.084 | |
| 91-20-3 | Naphthalene | 0.86 | 0.63 | 0.16 | 0.12 | |
| 87-68-3 | Hexachlorobutadiene | ND | 0.63 | ND | 0.059 | |

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.

1-8-16

## ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**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.

MW 1-8-16

**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.

MW 1-8-16

**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 |
|---|---|---|---|---|---|---|
| 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.

1-8-16

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