



Monthly Report: Richmond Community Air Monitoring Program

Report Number: RCAMP_MO_3
Date: June 2013

Table of Contents

Table of Contents	2
Executive Summary	4
1 Report Document Control.....	6
2 Introduction	7
3 Results	8
3.1 Monthly Maximum Fence Line Detections.....	8
3.2 Monthly Fence Line Detections.....	10
3.2.1 Point Richmond.....	11
3.2.2 Atchison Village.....	13
3.2.3 North Richmond.....	15
3.3 QA/QC Checks	18
4 Operational Performance Events.....	20
5 Maintenance Activities	21
6 Summary of Findings.....	22
Appendix A: Maintenance and Calibration Activities	23
Appendix B: Website Message Board Logs	24
Appendix C: Equipment Location.....	25

TABLES

Table 2.1: Target Compounds Measured by Fence Line System	7
Table 3.1: Maximum Detected Concentrations Measured by the Fence Line Monitoring Equipment Located Adjacent to Point Richmond.....	8
Table 3.2: Maximum Detected Concentrations Measured by the Fence Line Monitoring Equipment Located Adjacent to Atchison Village.....	9
Table 3.3: Maximum Detected Concentrations Measured by the Fence Line Monitoring Equipment Located Adjacent to North Richmond	10

FIGURES

Figure 3.1: Point Richmond Toluene Monitored by UV	11
Figure 3.2: Point Richmond p-Xylene Monitored by UV	12
Figure 3.3: Point Richmond Sulfur Dioxide Monitored by UV	12
Figure 3.4: Atchison Village Benzene Monitored by UV	13
Figure 3.5: Atchison Village Toluene Monitored by UV	14
Figure 3.6: Atchison Village p-Xylene Monitored by UV.....	15
Figure 3.7: North Richmond Toluene Monitored by UV	16
Figure 3.8: North Richmond p-Xylene Monitored by UV	16
Figure 3.9: North Richmond Sulfur Dioxide Monitored by UV.....	17
Figure 3.10: North Richmond Wind Speed	17
Figure 3.11: North Richmond Wind Direction	18
Figure 3.12: Point Richmond Ozone by UV	18
Figure 3.13: Atchison Village Ozone by UV.....	19
Figure 3.14: North Richmond Ozone by UV.....	19

Executive Summary

The following report summarizes the monthly data generated as part of the Richmond Community Air Monitoring Program (RCAMP). RCAMP is an independent initiative designed to provide air quality readings to the general public and educate the community about what is in the air. The air quality monitoring equipment and its installation was funded by Chevron in consultation with the City of Richmond. Ongoing operation, maintenance and data reporting is managed by Argos Scientific, Inc., with direction from the City Manager's Office, and input from Chevron and community representatives.

This report details the information collected by the operation of the open path fence line monitoring systems installed near the perimeter of Chevron's Richmond Refinery. The report explains the data and measurements of target compounds (benzene, toluene, sulfur dioxide, p-xylene, carbon disulfide and hydrogen sulfide) for the month of June 2013, at the fence line monitoring locations located near the Richmond Refinery perimeter, adjacent to Point Richmond, Atchison Village and North Richmond.

Operational Performance Events

On June 03, 2013 there was a scheduled power outage for maintenance between 6:30 AM and 4:17 PM that affected the monitoring system on the refinery perimeter adjacent to North Richmond. An Argos field technician was dispatched to Chevron and restarted the workstation that operates the Open Path Ultra Violet (Open Path UV) and Tunable Diode Laser (TDL) systems. Both systems were back on line at 4:17 PM.

Replacement of the meteorological station at the monitoring system on the refinery perimeter adjacent to Atchison Village and Point Richmond that was damaged in May was delayed due to requests for information from the supplier of the equipment regarding an upgrade of the meteorological station.

Maintenance Activities

Routine maintenance and quality assurance/quality control (QA/QC) for the open path fence line monitoring systems occurred on June 19, 2013.

Summary Findings

The following was noted from the monthly results of the monitoring activities:

- The monitoring results indicated that there were detections of sulfur dioxide, toluene and p-xylene to the south of the refinery perimeter that is adjacent to Point Richmond. These occurred when the winds were from the South and Southeast;
- The maximum detections of benzene and p-xylene at the refinery perimeter that is adjacent to Atchison Village were recorded when the winds were from the South-to-southeast. The maximum toluene value was recorded when winds were from the South-to-southwest;
- The monitoring results indicated that there were detections of sulfur dioxide, toluene and p-xylene to the south of the refinery perimeter that is adjacent to North Richmond. These occurred when the winds were from the South and Southeast.

1 Report Document Control

PROJECT REFERENCE:	RCAMP_MO_3
REPORT TITLE:	Monthly Report: Richmond Community Air Monitoring Program
DATE SUBMITTED:	08 June 2013
PREPARED BY:	Don Gamiles Argos Scientific Inc.
STATUS	DRAFT
NOTICE	

2 Introduction

Table 2.1 lists the target compounds monitored during the month of June 2013, at the fence line monitoring systems near the refinery perimeter and adjacent to Point Richmond, Atchison Village and North Richmond. Each site has an open path Ultra Violet (Open Path UV) air monitoring system and an open path tunable diode laser (TDL) air monitoring system, see Appendix C for an equipment location map.

Table 2.1: Target Compounds Measured by Fence Line System

Compound	Instrument
Benzene	Open Path UV
Toluene	Open Path UV
Sulfur Dioxide	Open Path UV
p-Xylene	Open Path UV
Carbon Disulfide	Open Path UV
Hydrogen Sulfide	TDL

In addition each site is equipped with a meteorological station measuring the following parameters:

- Wind speed
- Wind direction
- Temperature
- Relative humidity

The results of the measurements performed by the system for the month of June 2013, are presented in the sections that follow.

3 Results

3.1 Monthly Maximum Fence Line Detections

This section of the report presents the results for the monitoring performed for the month of May 2013. Tables 3.1, 3.2 and 3.3 list the maximum monthly concentrations measured at each of the sites for the monitoring period.

Table 3.1: Maximum Detected Concentrations Measured by the Fence Line Monitoring Equipment Located Adjacent to Point Richmond

Compound	Date	Time	Concentration (ppb)	Toxicity Summary (ppb)	Wind Direction
Benzene	Nothing Detected	Nothing Detected	Nothing Detected	Short-term/acute (for a 6-hour exposure) ¹ : 433 Long-term/chronic ² : 20	Nothing Detected
Sulfur Dioxide	06/08/13	2:23 PM	11	Short-term/acute (for a 1-hour exposure) ¹ : 230	South
Toluene	06/01/13	5:55 PM	6	Short-term/acute (for a 1-hour exposure) ¹ : 8600 Long-term/chronic ² : 70	Southeast
p-Xylene	06/11/13	8:39 PM	14	Short-term/acute (for a 1-hour exposure) ¹ : 6285 Long-term/chronic ² : 200	Southeast
Carbon Disulfide	Nothing Detected	Nothing Detected	Nothing Detected	Currently there are no standards set for evaluating risks of exposure to carbon disulfide	Nothing Detected
Hydrogen Sulfide	Nothing Detected	Nothing Detected	Nothing Detected	Long-term/chronic ² : 8	Nothing Detected

¹ California Office of Environmental Health Hazard Assessment, Acute Toxicity Summary (http://oehha.ca.gov/air/hot_spots/2008/AppendixD2_final.pdf)

² California Office of Environmental Health Hazard Assessment, Chronic Toxicity Summary (http://oehha.ca.gov/air/hot_spots/2008/AppendixD3_final.pdf)

Table 3.2: Maximum Detected Concentrations Measured by the Fence Line Monitoring Equipment Located Adjacent to Atchison Village

Compound	Date	Time	Concentration (ppb)	Toxicity Summary (ppb)	Wind Direction
Benzene	06/19/13	2:03 PM	6	Short-term/acute (for a 6-hour exposure) ³ : 433 Long-term/chronic ⁴ : 20	South-to-southeast
Sulfur Dioxide	Nothing Detected	Nothing Detected	Nothing Detected	Short-term/acute (for a 1-hour exposure) ³ : 230	Nothing Detected
Toluene	06/26/13	4:07 PM	19	Short-term/acute (for a 1-hour exposure) ³ : 8600 Long-term/chronic ⁴ : 70	South-to-southwest
p-Xylene	06/02/13	1:27 PM	6	Short-term/acute (for a 1-hour exposure) ³ : 6285 Long-term/chronic ⁴ : 200	South-to-southeast
Carbon Disulfide	Nothing Detected	Nothing Detected	Nothing Detected	Currently there are no standards set for evaluating risks of exposure to carbon disulfide	Nothing Detected
Hydrogen Sulfide	Nothing Detected	Nothing Detected	Nothing Detected	Long-term/chronic ⁴ : 8	Nothing Detected

³ California Office of Environmental Health Hazard Assessment, Acute Toxicity Summary (http://oehha.ca.gov/air/hot_spots/2008/AppendixD2_final.pdf)

⁴ California Office of Environmental Health Hazard Assessment, Chronic Toxicity Summary (http://oehha.ca.gov/air/hot_spots/2008/AppendixD3_final.pdf)

Table 3.3: Maximum Detected Concentrations Measured by the Fence Line Monitoring Equipment Located Adjacent to North Richmond

Compound	Date	Time	Concentration (ppb)	Toxicity Summary (ppb)	Wind Direction
Benzene	Nothing Detected	Nothing Detected	Nothing Detected	Short-term/acute (for a 6-hour exposure) ⁵ : 433 Long-term/chronic ⁶ : 20	Nothing Detected
Sulfur Dioxide	06/27/13	5:14:18	14	Short-term/acute (for a 1-hour exposure) ⁵ : 230	South
Toluene	06/25/13	0:21:07	8	Short-term/acute (for a 1-hour exposure) ⁵ : 8600 Long-term/chronic ⁶ : 70	Southeast
p-Xylene	06/27/13	7:49:06	6	Short-term/acute (for a 1-hour exposure) ⁵ : 6285 Long-term/chronic ⁶ : 200	Southeast
Carbon Disulfide	Nothing Detected	Nothing Detected	Nothing Detected	Currently there are no standards set for evaluating risks of exposure to carbon disulfide	Nothing Detected
Hydrogen Sulfide	Nothing Detected	Nothing Detected	Nothing Detected	Long-term/chronic ⁶ : 8	Nothing Detected

Tables 3.1, 3.2 and 3.3 above indicate that the fence line equipment detected compounds at each location. The concentrations of these compounds were significantly lower than the toxicity standards established by the State of California.

3.2 Monthly Fence Line Detections

The sections below detail the compounds detected at each of the monitoring locations. Where there were no detections for the month these graphs are not included. The data is grouped by sampling site with the associated meteorological data included.

⁵ California Office of Environmental Health Hazard Assessment, Acute Toxicity Summary (http://oehha.ca.gov/air/hot_spots/2008/AppendixD2_final.pdf)

⁶ California Office of Environmental Health Hazard Assessment, Chronic Toxicity Summary (http://oehha.ca.gov/air/hot_spots/2008/AppendixD3_final.pdf)

3.2.1 Point Richmond

Figures 3.1 to 3.3 show the gas detections for the month of June 2013 at the fence line monitoring system near the refinery perimeter and adjacent to Point Richmond. In addition wind speed and wind direction data measured by the system is reported. For the month of June 2013, benzene and carbon disulfide were not detected by the system. The data is plotted on a logarithmic scale.

Figure 3.1: Point Richmond Toluene Monitored by UV

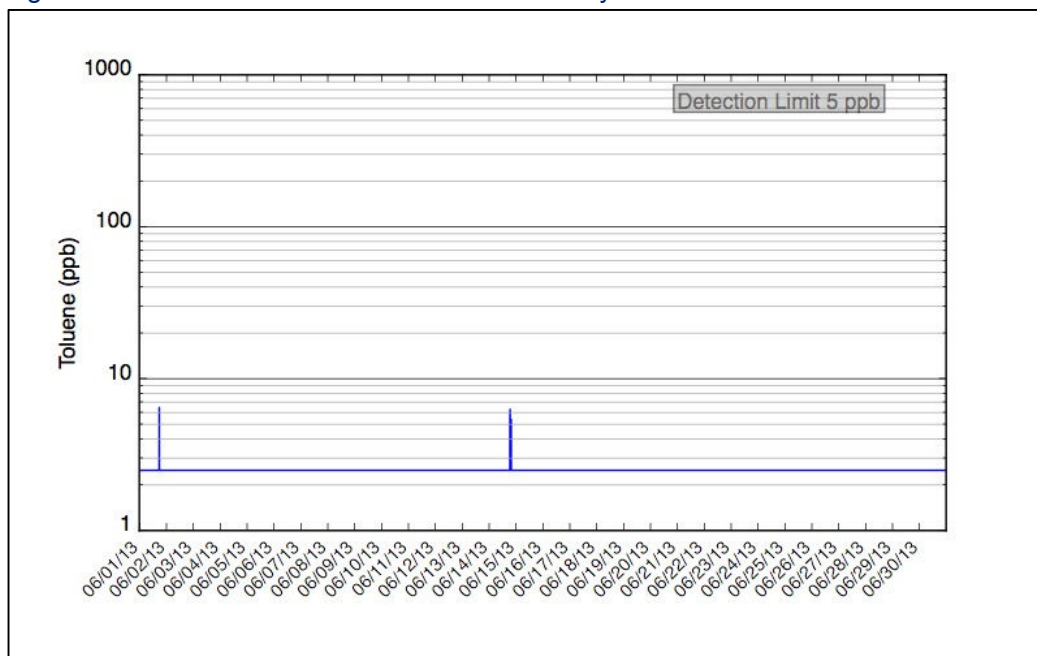


Figure 3.1 shows that the maximum concentration of 6 ppb was detected on June 01, 2013 at 5:55 PM. Toxicity levels established by the State of California are listed in tables 3.1 above.

Figure 3.2: Point Richmond p-Xylene Monitored by UV

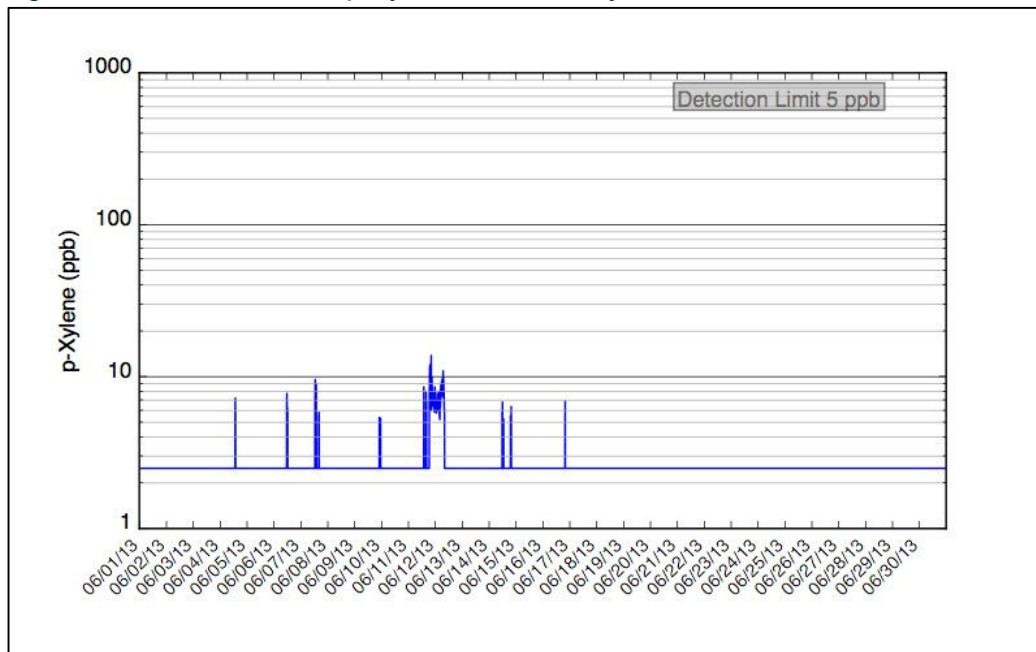


Figure 3.2 shows that the maximum concentration of 14 ppb was detected on June 11, 2013 at 8:39 PM. Toxicity levels established by the State of California are listed in tables 3.1 above.

Figure 3.3: Point Richmond Sulfur Dioxide Monitored by UV

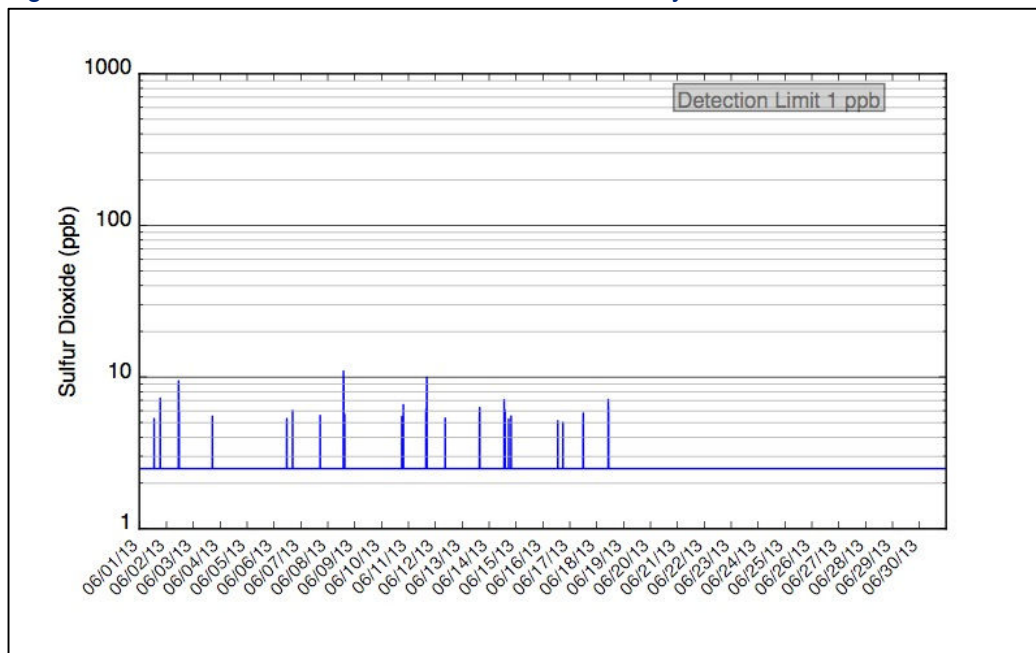


Figure 3.3 shows that the maximum concentration of 11 ppb was detected on June 08, 2013 at 2:23 PM. Toxicity levels established by the State of California are listed in tables 3.1 above.

3.2.1.1 Point Richmond Wind Speed and Wind Direction

There was no meteorological data for this site as the wind sensor was damaged in May 2013. The meteorological stations are in the process of being upgraded, with the assistance of the equipment suppliers, as a result of this damage. The data from the meteorological station located near the refinery perimeter and adjacent to North Richmond was used for analysis.

3.2.2 Atchison Village

Figures 3.4 to 3.6 show the gas detections for the month of June 2013 at the fence line monitoring location located near the refinery perimeter and adjacent to Atchison Village as well as the wind speed and wind direction data measured by the system. For the month of June 2013, sulfur dioxide and carbon disulfide were not detected. The gas data is plotted on a logarithmic scale.

Figure 3.4: Atchison Village Benzene Monitored by UV

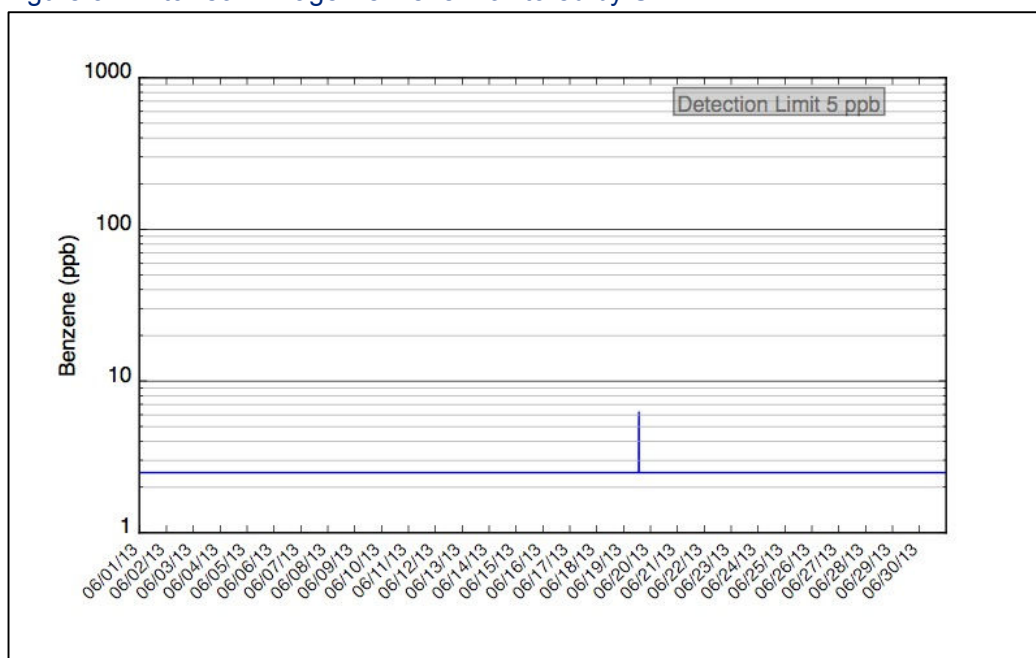


Figure 3.4 shows that the maximum concentration of 6 ppb was detected on June 19, 2013 at 2:03 PM. Toxicity levels established by the State of California are listed in tables 3.2 above.

Figure 3.5: Atchison Village Toluene Monitored by UV

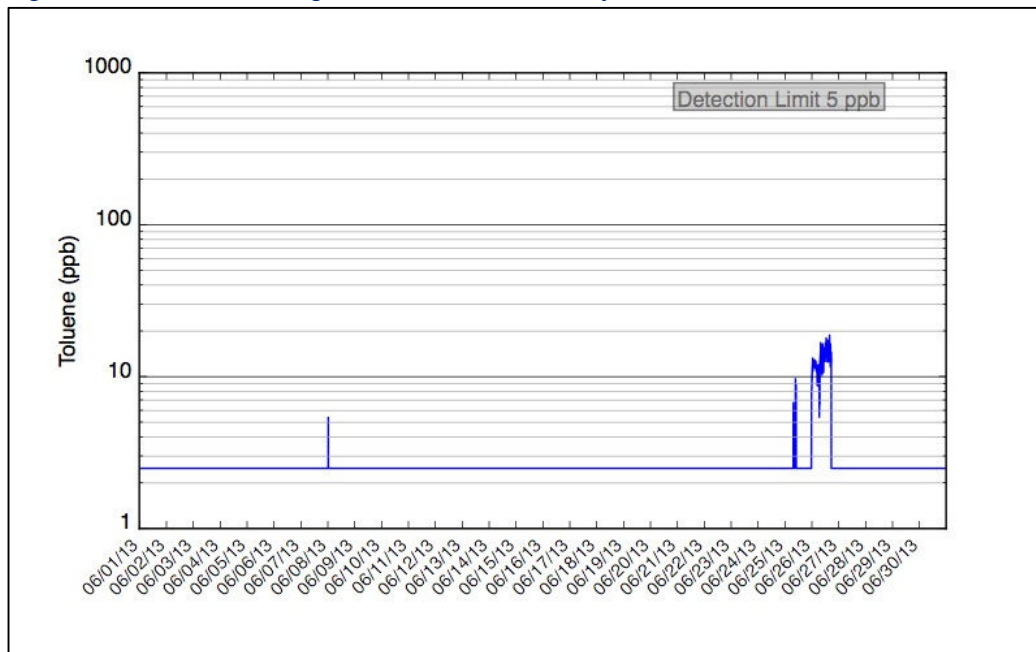


Figure 3.5 shows that the maximum concentration of 19 ppb was detected on June 26, 2013 at 4:07 PM. Toxicity levels established by the State of California are listed in tables 3.2 above.

Figure 3.6: Atchison Village p-Xylene Monitored by UV

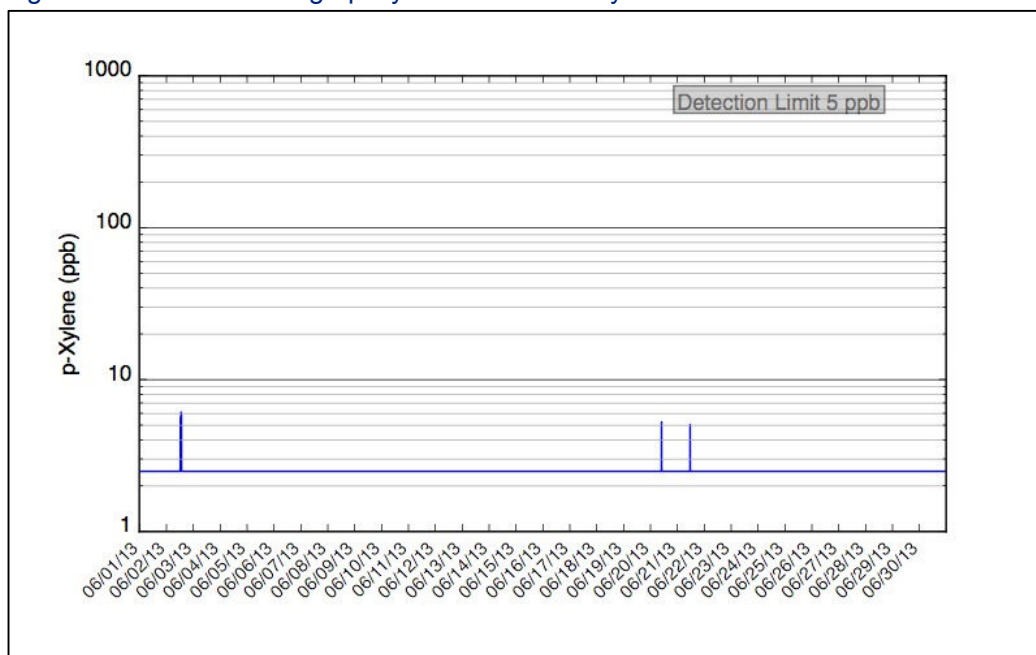


Figure 3.6 shows that the maximum concentration of 6 ppb was detected on June 02, 2013 at 1:27 PM. Toxicity levels established by the State of California are listed in tables 3.2 above.

3.2.2.1 Atchison Village Wind Speed and Wind Direction

There was no meteorological data for this site as the wind sensor was damaged in May 2013. The meteorological stations are in the process of being upgraded, with the assistance of the equipment suppliers, as a result of this damage. The data from the meteorological station located near the refinery perimeter and adjacent to North Richmond was used for analysis.

3.2.3 North Richmond

Figures 3.7 to 3.11 show the gas detections for the month of June 2013 at the fence line monitoring location located near the refinery perimeter and adjacent to North Richmond as well as the wind speed and wind direction data measured by the system. For the month of June 2013, benzene and carbon disulfide were not detected. The gas data is plotted on a logarithmic scale.

Figure 3.7: North Richmond Toluene Monitored by UV

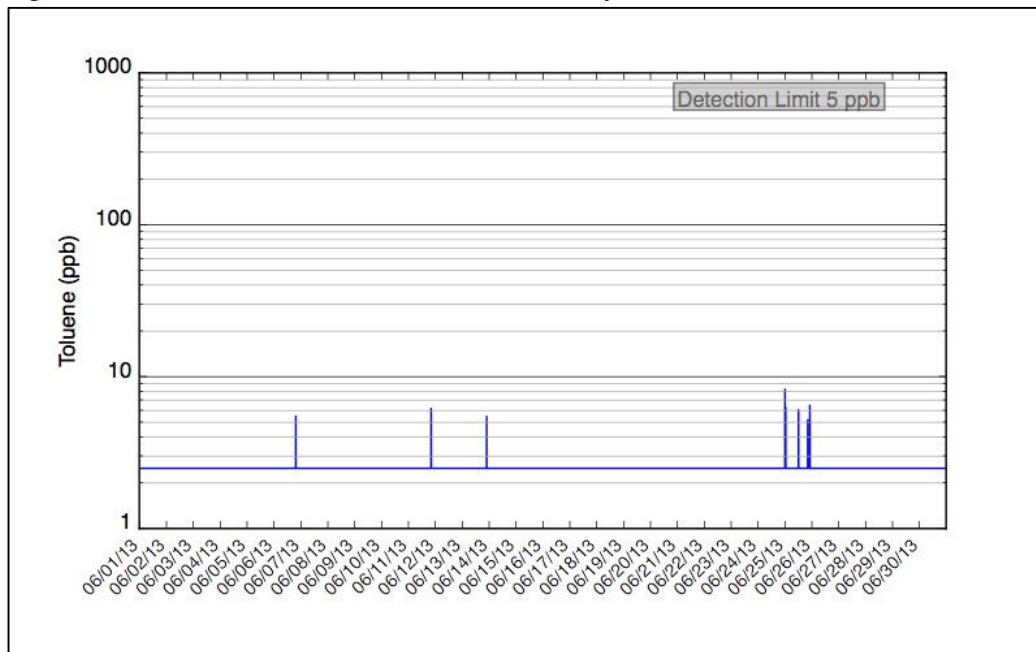


Figure 3.7 shows that the maximum concentration of 8 ppb was detected on June 25, 2013 at 12:21 AM. Toxicity levels established by the State of California are listed in tables 3.3 above

Figure 3.8: North Richmond p-Xylene Monitored by UV

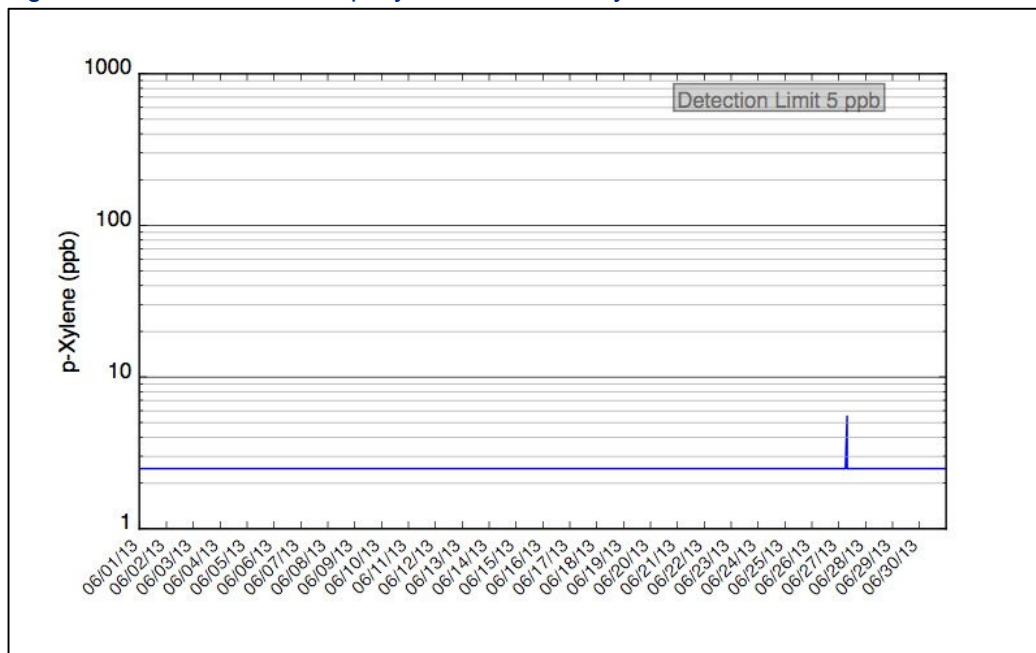


Figure 3.8 shows that the maximum concentration of 6 ppb was detected on June 27, 2013 at 7:49 AM. Toxicity levels established by the State of California are listed in tables 3.3 above.

Figure 3.9: North Richmond Sulfur Dioxide Monitored by UV

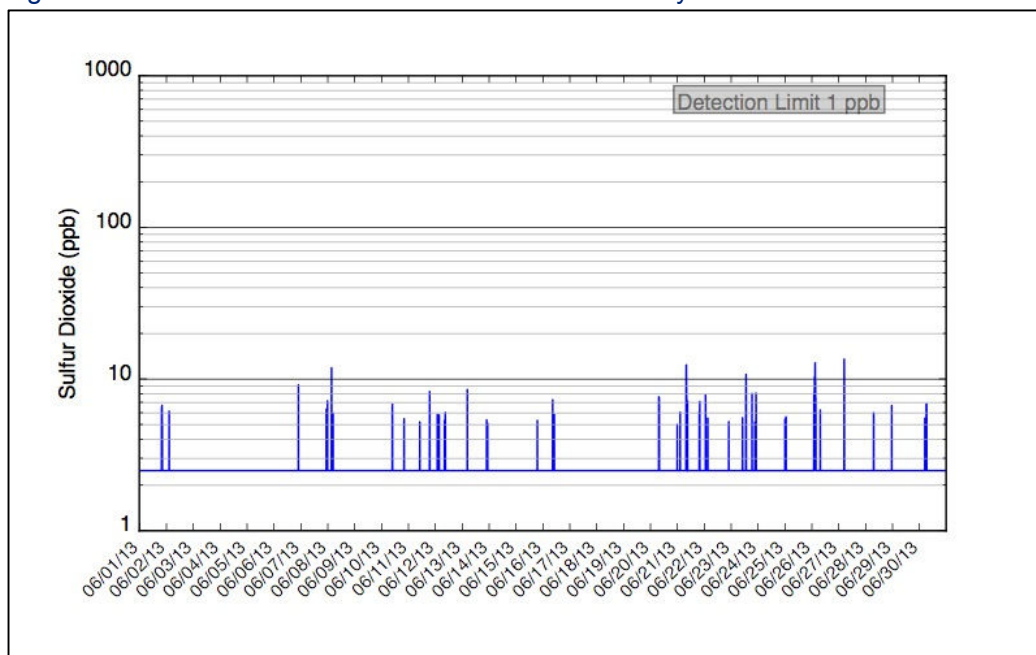


Figure 3.9 shows that the maximum concentration of 14 ppb was detected on June 27, 2013 at 5:14 AM. Toxicity levels established by the State of California are listed in tables 3.3 above.

3.2.3.1 North Richmond Wind Speed and Wind Direction

Figure 3.10: North Richmond Wind Speed

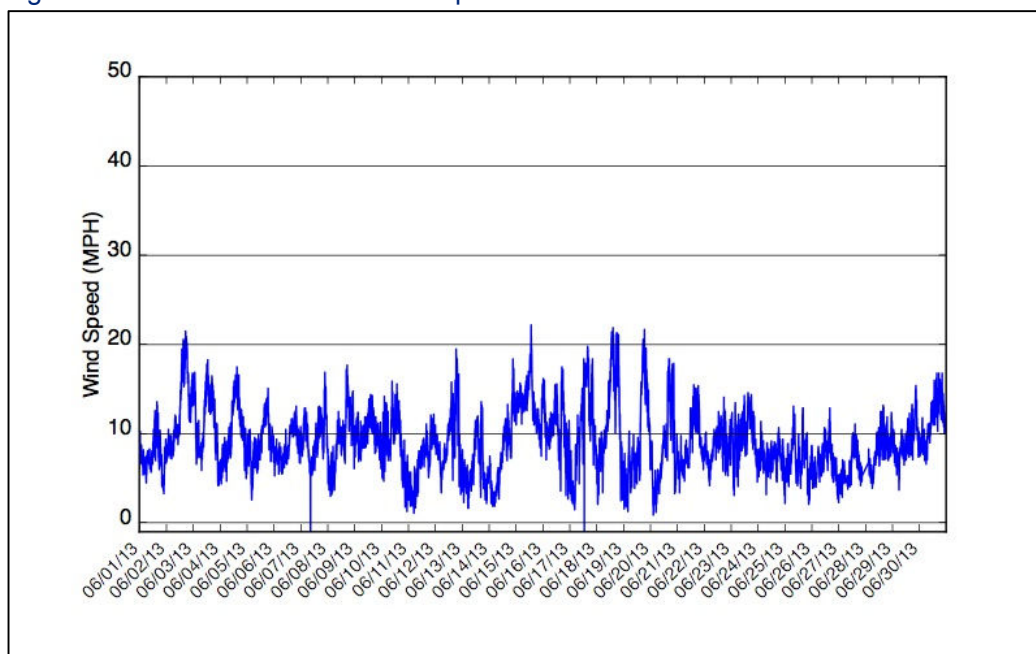
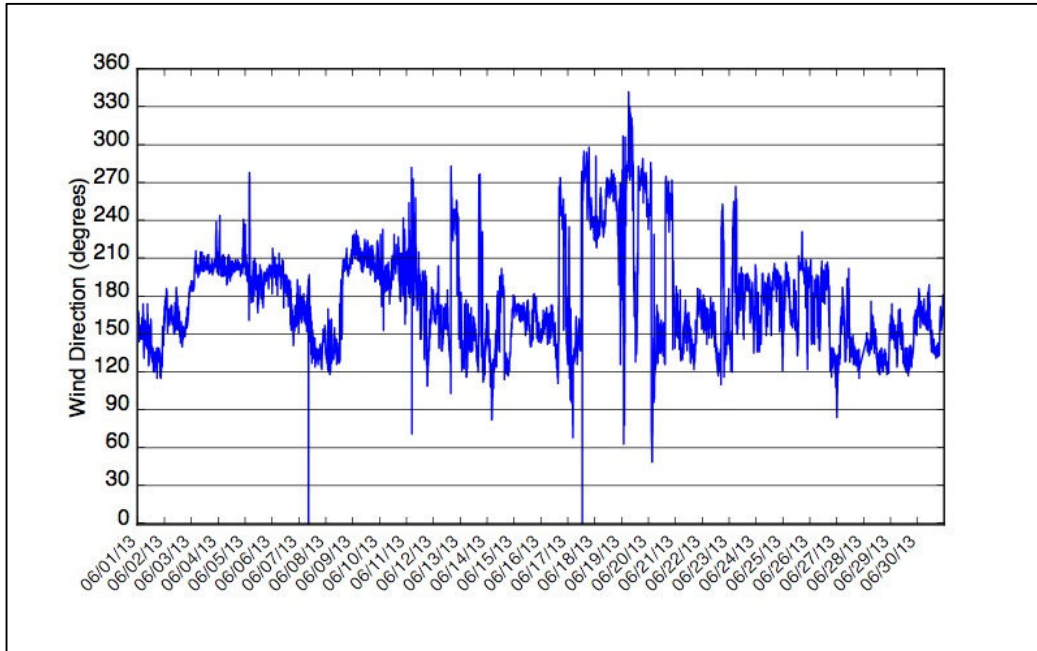


Figure 3.11: North Richmond Wind Direction



3.3 QA/QC Checks

Figure 3.12: Point Richmond Ozone by UV

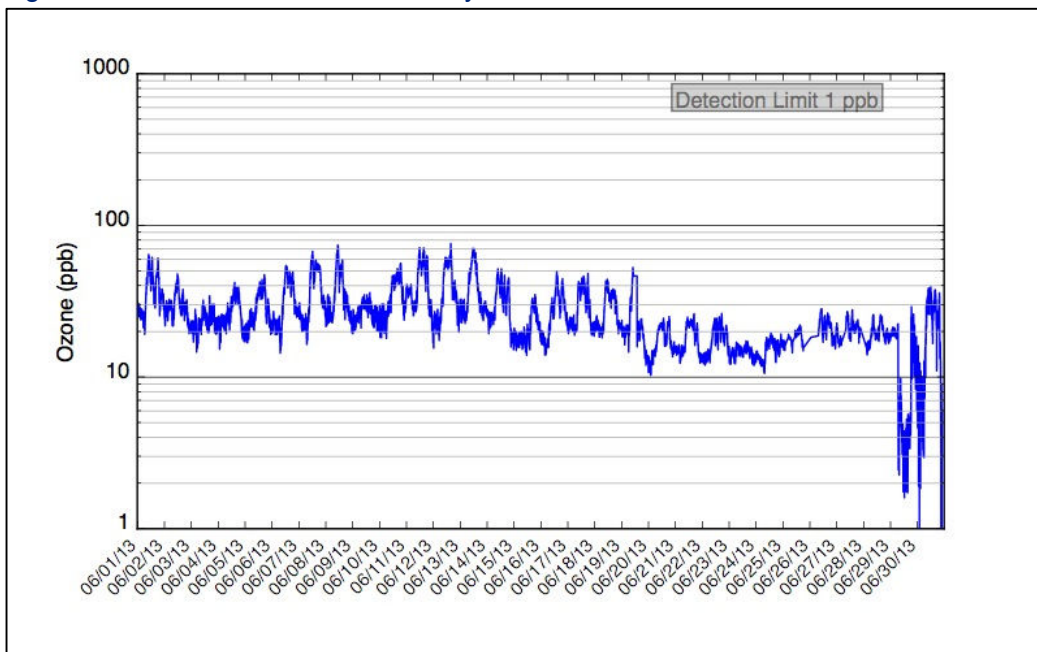


Figure 3.13: Atchison Village Ozone by UV

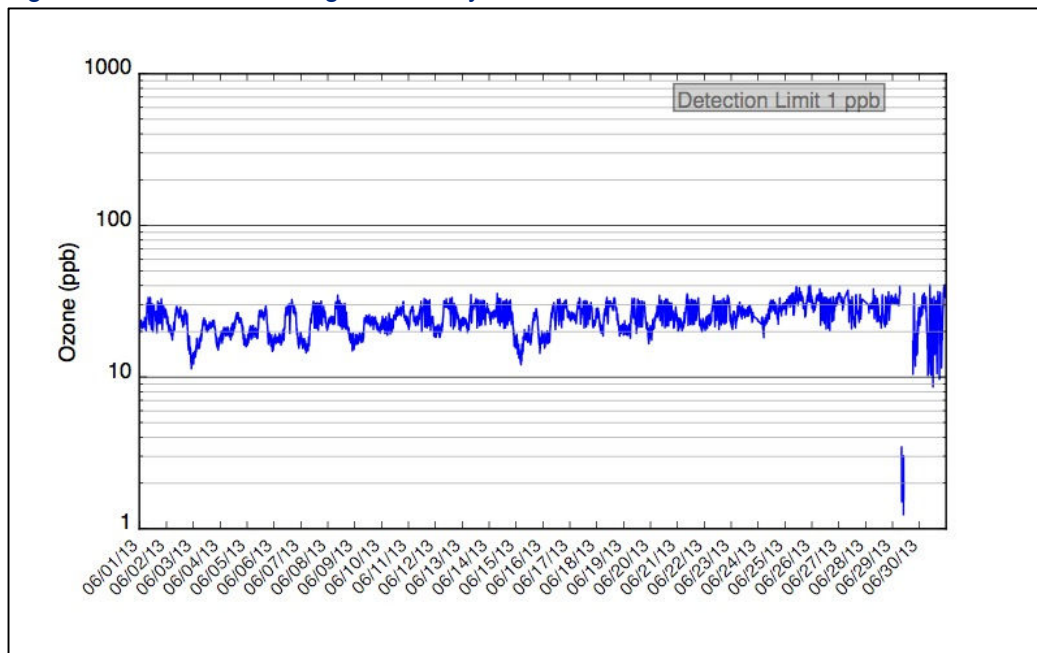
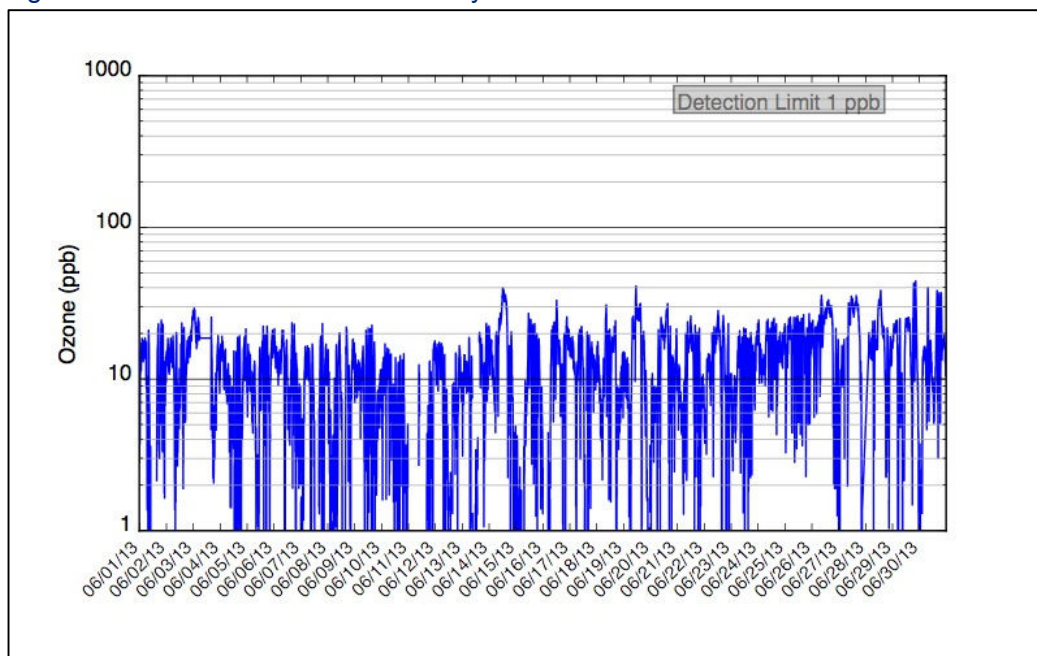


Figure 3.14: North Richmond Ozone by UV



4 Operational Performance Events

On June 03, 2013 there was a scheduled power outage for maintenance between 6:30 AM and 4:17 PM that affected the monitoring system on the refinery perimeter adjacent to North Richmond. An Argos field technician was dispatched to Chevron and restarted the workstation that operates the Open Path Ultra Violet (Open Path UV) and Tunable Diode Laser (TDL) systems. Both systems were back on line at 4:17 PM.

The meteorological station at the monitoring system on the refinery perimeter adjacent to Atchison Village and Point Richmond was not operational following a bird strike in the month of May 2013. Replacement was delayed pending information from the supplier of the equipment regarding an upgrade of the meteorological station.

5 Maintenance Activities

Routine maintenance and quality assurance/quality control (QA/QC) for the open path fence line monitoring systems occurred on June 19, 2013.

6 Summary of Findings

The following was noted from the monthly results of the monitoring activities:

- The monitoring results indicated that there were detections of sulfur dioxide, toluene and p-xylene to the south of the refinery perimeter that is adjacent to Point Richmond. These occurred when the winds were from the South and Southeast;
- At the refinery perimeter that is adjacent to Atchison Village, benzene and p-xylene maxima were recorded when the winds were from the South-to-southeast. The maximum toluene value was recorded when winds were from the South-to-southwest;
- The monitoring results indicated that there were detections of sulfur dioxide, toluene and p-xylene to the south of the refinery perimeter that is adjacent to North Richmond. These occurred when the winds were from the South and Southeast.

Appendix A: Maintenance and Calibration Activities

The following calibration activities were recorded at the site.

Point Richmond QA/QC

Instrument	Compound	Date	Time	Passed Yes/No
UV	Benzene, Toluene, Sulfur Dioxide, p-Xylene	06/19	10:52 AM	Yes
TDL	Hydrogen Sulfide	06/19	10:28 AM	Yes

Atchison Village QA/QC

Instrument	Compound	Date	Time	Passed Yes/No
UV	Benzene, Toluene, Sulfur Dioxide, p-Xylene	06/19	10:49 AM	Yes
TDL	Hydrogen Sulfide	06/19	10:37 AM	Yes

North Richmond QA/QC

Instrument	Compound	Date	Time	Passed Yes/No
UV	Benzene, Toluene, Sulfur Dioxide, p-Xylene	06/19	9:21 AM	Yes
TDL	Hydrogen Sulfide	06/19	1:08 PM	Yes

Appendix B: Website Message Board Logs

The following operational issues were noted on the Richmond Refinery Community Website:

- 06/19/2013 16:01 - QA/QC and monthly maintenance of the fence line monitoring systems have been completed.
- 06/19/2013 08:57 - Argos is on site to perform monthly maintenance. UV and TDL systems may be temporarily offline for the next few hours. The message board will be updated when QA/QC work is complete.
- 06/03/2013 16:17 - The scheduled power outage ended earlier than expected. The North Richmond UV instrument is back in operation.
- 06/01/2013 04:26 - There is a scheduled power outage starting Monday June 3rd at 6:30 am. The power outage should last 48 hours and will impact the North Richmond fence line UV air monitoring system which will be taken off-line during this period. The other fence line air monitoring systems and the meteorological systems will remain operational. The message board will be updated after the scheduled power outage ends and the fence line UV air monitor is brought back on line.

Appendix C: Equipment Location

The location of the sampling systems is shown in Figure C.1 below:

