FSP Worksheet #1: Title and Approval Page

FIELD SAMPLING PLAN (FSP)

Final

Preparation Date – February 2022
Document Title – United Refining Sampling Plan –
Naphtha Tank Roof Failure, Warren, PA

Prepared for:
Pennsylvania DEP

Prepared by:
Pennsylvania Department of Environmental Protection/Air Quality Program
230 Chestnut Street, Meadville, PA 16335

Review Signature: _____
Date

Approval Signature: Eric A. Gustafson_____
Eric Gustafson, Program Manager, DEP NWRO 2/25/2022

Approval Signature: _____
Date

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EXECUTIVE SUMMARY

This Sampling Plan will be implemented in Warren, PA as a part of the Department of Environmental Protection's (DEP, Department) investigation and follow-up to the failure of an external floating roof on a tank at United Refining Company (United Refining, URC) which was storing petroleum Naphtha at the time of the roof failure. This sampling plan is designed to provide guidance on the Department's response to complaints and is developed to supplement other monitoring being conducted by United Refining Company which includes United routine passive fenceline monitoring program for benzene and a community monitoring program developed at the request of the Department to ensure that the community is not being impacted by acute or chronic risks to the Warren, PA community associated with emissions resulting from the tank roof failure and response to the failure.

The Sampling Plan includes a multi-layered sampling approach which includes the use of community wide monitoring network, United Refining's existing passive fenceline sampling for benzene, the use of hand-held meters during complaint investigations and the deployment of SUMMA Canisters.

Community-Wide Monitoring Network: United Refining Company has agreed to deploy a community wide sampling network which will including 6 samplers which will sample for hydrogen sulfide, total volatile organic compounds, oxygen, carbon monoxide and lower explosive limit (a health and safety parameter typically associated with work safety). These samplers will provide continuous sampling at six locations throughout the community. Real time data from the monitors will be available to both the Department and United Refining Company through remote access to the devices. The monitors will also provide email notifications to the Department and United Refining should an action level be exceeded for any constituent. The Community Wide Monitoring Network will be deployed on February 25, 2022 and will be maintained throughout the length of the incident. This equipment will be inspected daily and maintained by United Refining Company.

Passive Fenceline Monitoring Network: United Refining will continue to maintain its passive fenceline monitoring network for benzene which is being implemented in accordance with U.S. EPA Methods 325 A and B. The passive sampling tubes are scheduled to be changed out on Tuesday, March 1, 2022 and approximately every two weeks thereafter. United Refining will immediately transmit all passive sampling results to the Department immediately upon receipt by United Refining Company.

DEP Complaint Response Monitoring: The Department will maintain and use MultiRAE and UltraRAE 3000 handheld meters to determine concentrations of VOC and hydrogen sulfide. An initial survey for VOC will be made using the MultiRAE device. If the MultiRAE device detects a VOC concentration of 1 ppm or above, then the Department will conduct a 15-minute survey to determine benzene concentration using the UltraRAE 3000 meter with a benzene specific sampling tube.

SUMMA Canister Sampling: The Department will intermittently conduct testing during the event with SUMMA Canisters. These 12-hours samples will provide additional information about long term exposure during this event to the PA Department of Health and CDC's Agency for Toxic Standards and Disease Registry. Staff from those two organizations have been providing guidance to the Department regarding exposure trigger and action levels included in the is document. The samples will be deployed and retrieved by DEP personnel and will be analyzed at DEP's lab in Harrisburg, PA using EPA Method TO-15. An initial round of

samples was taken overnight from February 24, 2022 into the early morning on February 25, 2022. A second duplicate round of sampling will occur overnight from February 25 to the morning of February 26, 2022. Additional SUMMA canister sampling will be conducted, as conditions change, throughout the event.

FSP Worksheet #2 & 3: Field Sampling Plan Identifying Information

(UFP-QAPP Manual Section 2.2.4 and 2.3.1)

This project-specific air monitoring field sampling plan (FSP) was prepared using elements of the *Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP)* (EPA 2005) and United States (U.S.) Environmental Protection Agency (EPA) *Guidance for Quality Assurance Project Plans, EPA QA/G-5* (EPA 2002).

Site Name: United Refining Company
Site Address: 5 Bradley St, Warren, PA 16365
Site latitude and longitude coordinates:
AQS ID (if applicable): N/A
Lead Organization/Air Monitoring Agency: DEP
Contract Laboratory Name: PA Dept. of Environmental Protection – Summa Canisters. United Refining's existing lab contractor – Passive sampling tubes
Contract Laboratory Address: Harrisburg, PA

List organizational partners (stakeholders) and identify the connection with lead organization (i.e. air monitoring agency):

Organization Partners/Stakeholders	Connection/ Role
DEP Northwest Regional Office Emergency Response Program	Sampling, Emergency Response
DEP Northwest Regional Office (NWRO) Air Quality Program	Sampling Planning, conduct sampling, submit samples for laboratory analysis
United Refining Company	Community Wide Monitoring Network installation and maintenance and alarm response; fenceline benzene monitoring network.

Distribution List

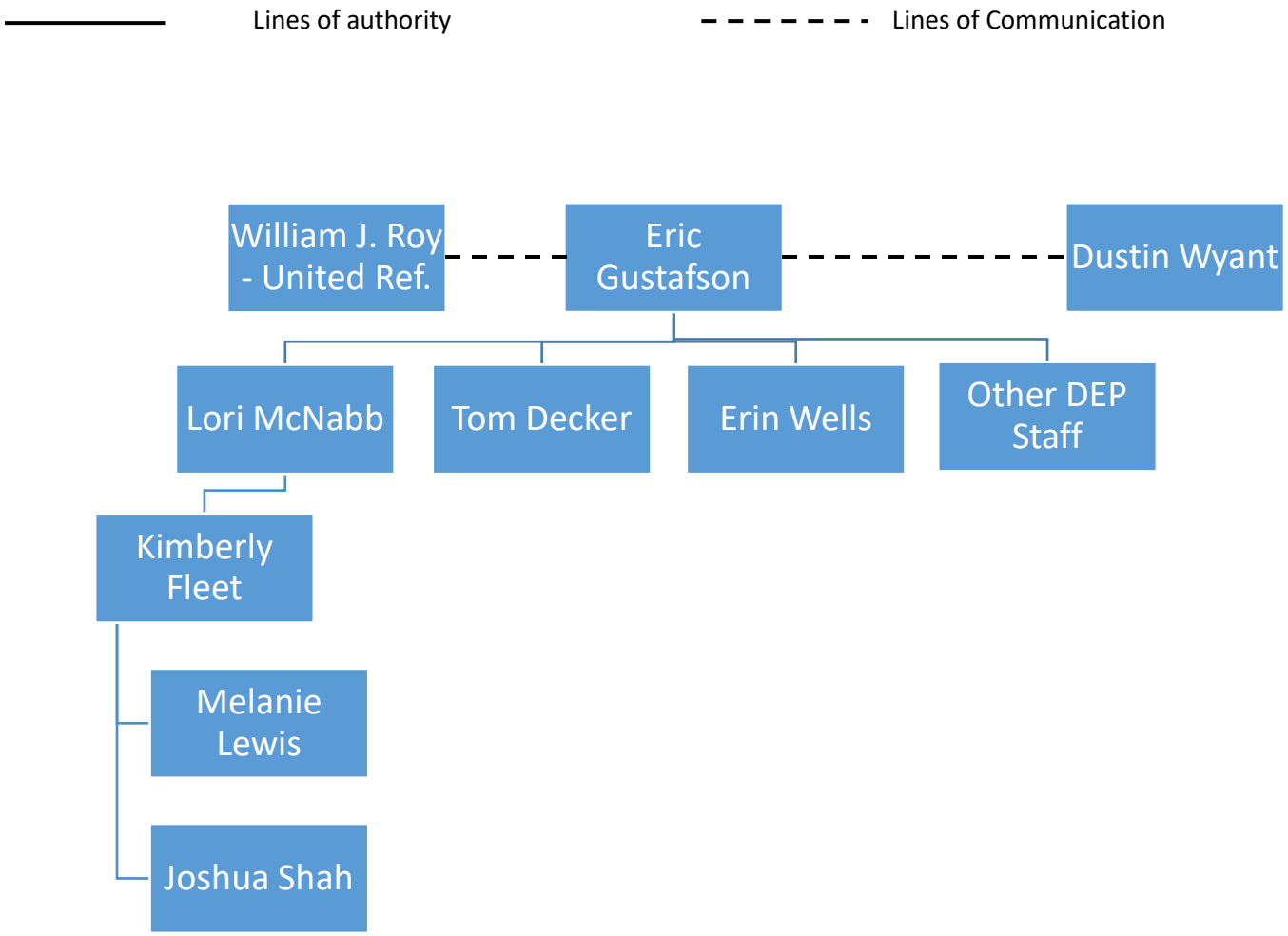
FSP Recipients	Title	Organization	E-mail Address
Dustin Wyant	Environmental Emergency Response Manager	DEP	dwyant@pa.gov
Eric Gustafson	Environmental Program Manager, NWRO Air Quality	DEP	egustafson@pa.gov
William J. (Joey) Roy		United Refining	jroy@urc.com

FSE Worksheet #4: Project Personnel

(UFP-QAPP Manual Sections 2.3.2)

Name	Project Title/Role
Eric Gustafson, NWRO	Project oversight, monitor siting and installation, sampling plan oversight
Lori McNabb, NWRO AQ	Sampling Plan implementation oversight
Kimberly Fleet, NWRO AQ	Sampling Plan implementation oversight and employee oversight
Melanie Lewis, Warren D.O., AQ	Complaint Response, sampling, sample shipment, data entry
Joshua Shah, Warren D.O., AQ	Complaint Response, sampling, sample shipment, data entry
DEP Emergency Response, incl. Dustin Wyant, ER Manager	Incident oversight, complaint response, emergency response
William J. (Joey Roy), United Refining	Establishment and implementation of Community-Wide Monitoring Program and passive fenceline benzene monitoring program. Communication of data results to DEP.

FSP Worksheet #5: Project Organizational Chart
(UFP-QAPP Manual Section 2.4.1)



FSP Worksheet #6 & 7: Communication Pathways

(UFP-QAPP Manual Section 2.4.2)

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
Field/sampling issue	DEP - NWRO	Melanie Lewis Joshua Shah Other DEP Staff	mellewis@pa.gov jshah@pa.gov	Notify Kim Fleet, Lori McNabb or Eric Gustafson
Site access issue	DEP - NWRO	Eric Gustafson	egustafson@pa.gov	Communicate with United Refining
FSP changes prior to field work	DEP	Eric Gustafson	egustafson@pa.gov	Communicate with field staff on any significant changes to the field sampling plan
FSP changes during project execution	DEP	Eric Gustafson	egustafson@pa.gov	
Field equipment corrective actions	United Refining	William (Joey) Roy	jroy@urc.com	Contact Supplier with any field equipment issues
QA field issue	DEP-NWRO	Eric Gustafson	egustafson@pa.gov	Notify United Refining of area wide monitoring concerns.

Identify key project personnel associated with each organization, contractor, and subcontractor participating in responsible roles; discuss their specific roles and responsibilities. Key personnel may include:

Title/Role	Organization	Responsibilities
Air Quality Specialist/Emergency Response Team Member	NWRO	Meter usage, sampling, complaint response
Air Quality District Supervisor	DEP	Complaint response oversight, sampling plan implementation
Air Quality Program Manager	DEP	Sampling Plan Development and overall implementation; coordination with United Refining.
Environmental Manager	United Refining	Community Wide and fenceline monitoring networks; communication with PA DEP. Response to complaints received directly by United Refining Company

FSP Worksheet #10: Conceptual Model

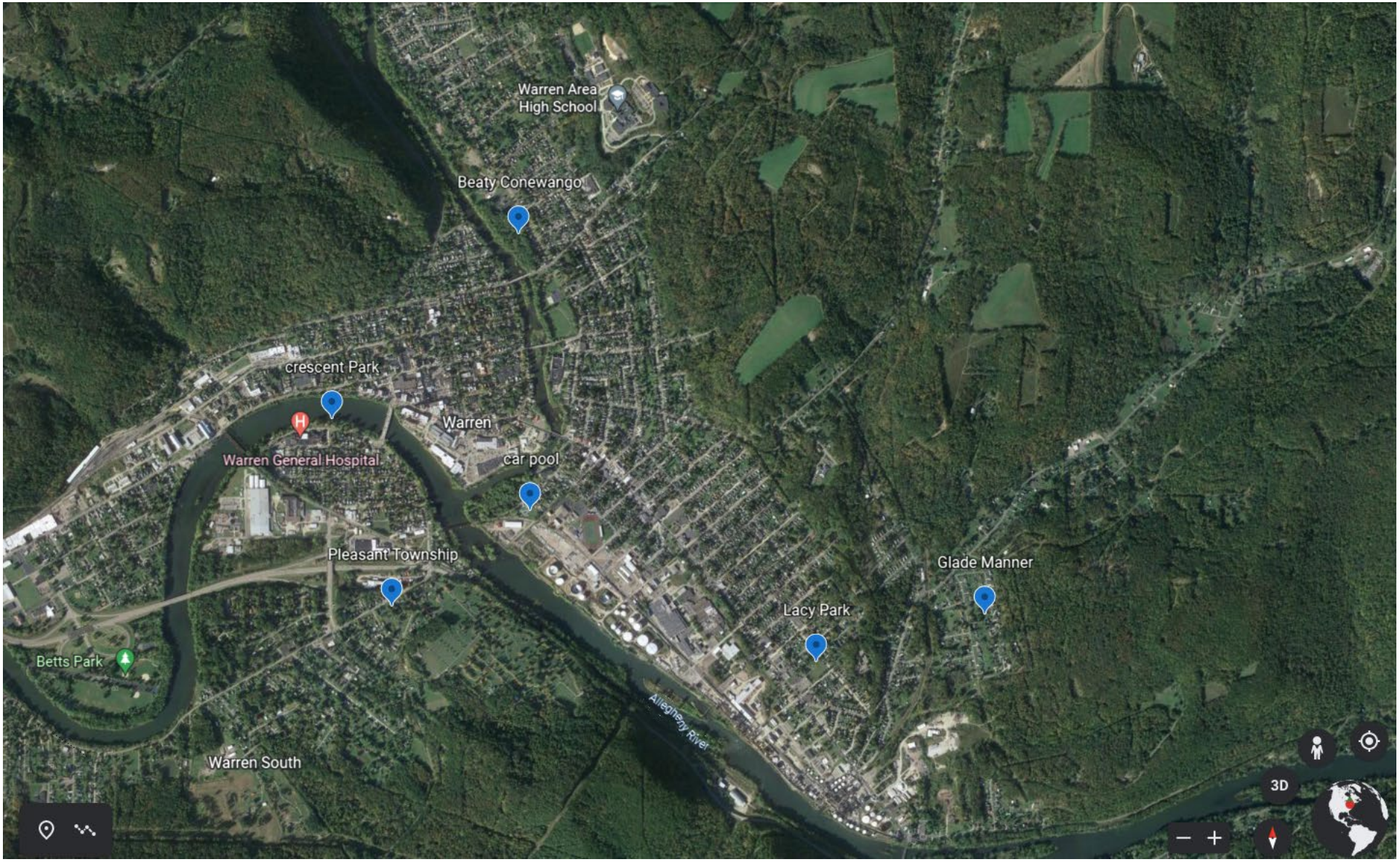
(UFP-QAPP Manual Section 2.5.2)

This project is being initiated to determine monitor for the presence of acute health impacts to the general population in the area of the United Refining facility during United Refining Company's corrective action to the floating roof failure on the naphtha tank. The Department has received numerous complaints in Warren, PA regarding odors, eye irritation, throat irritation and impacts to sleep. This project is being initiated to provide some answers to the complaints and community health concerns.

The sampling project is targeted to begin February 24, 2022 and continue for the duration of United Refining's response to the external floating roof failure event. This project includes several layers of monitoring including United Refining's existing passive sampling program for benzene, a community wide sampling program and the use of hand meters for complaint responses and trigger event follow-up. The community wide sampling monitors will be placed in the Warren, PA community near complaint clusters and sensitive populations. The area wide monitoring network will be comprised of 6 monitors and broadly dispersed throughout the Warren community. United Refining will continue to implement its passive fenceline monitoring network during the event. In addition, DEP will respond to complaints and conduct field sampling using handheld MultiRAE and UltraRAE meters to monitor for hydrogen sulfide, VOC, and benzene.

If sampling results exceed the established action levels DEP and United Refining will investigate to determine what specific activities in the area of United Refining, on or about the sampling period of an exceedance, could have caused the increased concentration level. If monitoring indicates pollutant levels which exceed acute impacts, appropriate notifications to local emergency management officials and the public will be made, as outlined in the screening level attachment to this document.

Figure 1 - Proposed Community Wide Sampling Locations.



The Community Wide Sampling Program will consist of six Radius BZ1 Area Monitors broadly placed throughout the community. These monitors will be used to determine hydrogen sulfide and VOC concentrations on a continual basis. The monitors will provide an email notification to both the Department and United Refining should an action level be detected. In addition, both DEP and United Refining will have live remote access to the monitors should a complaint be received. These monitors may be periodically moved throughout the community as conditions dictate and as approved by DEP. They will remain the community throughout the duration of the incident.

Passive Fenceline Benzene sampling will use EPA Method 325 A and B. This method was developed for fenceline monitoring at refineries and utilizes passive sampling tubes. Samples will be collected over a 14-day period using passive sampling tubes with CarboX packing material. The tubes will be conditioned and shipped in accordance with procedures previously established by United Refining Company. Tubes will be allowed to equilibrate with ambient temperature for approximately 30 minutes before removing them from their storage/shipping container for sample collection. Meteorological data used for the EPA Method 325A and B will be collected using United Refining's onsite meteorological tower to record wind speed, wind direction, ambient temperature, relative humidity and barometric pressure. The equipment will comply with the manufacturer's operating manual.

For all passive samples and SUMMA Canister samples, chain of custody sheets and/or Tube Tracking software will be used to document sample custody.

Worksheet #22: Field Quality Control
(UFP-QAPP Manual Section 2.6.2)

All QA/QC procedures for this project will meet the requirements.

Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action
Sampling Tubes	Deployment of tubes	14 days	Sampling caps secured, no leaking	Do not use, notify laboratory
SUMMA Canister	Deployment of Canister	12-hour sample	Canister secure, no leaking	If no suction, do not use, notify chain of command.
MultiRAE and UltraRAE	Deployment and use of meter	Instant	No Errors, proper calibration	Notify chain of command if error message is received.

FSP Worksheet #26: Sample Handling System and Data

(UFP-QAPP Manual Appendix A)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT		
Activity	**Personnel/Organization Responsible**	**Comment**
Scheduling and Shipment of Passive Sampling Tubes	United Refining's Vendor	Sampling, receipt and analysis in accordance with existing procedures.
Community Wide Sampling Network	United Refining	6 community wide samplers; available to both United Refining and DEP
Coordination of DEP SUMMA Canister Shipment	PA DEP Staff	
Sample Chain of Custody	All	

Appendix A – Trigger and Action Levels

Tier approach and Screening Value/Trigger Value Information for United Refining, Warren PA 2/23/22

Tier	Trigger Level	Time	Action	Trigger Rationale
	Hydrogen sulfide (H_2S)*			
1	0.1 ppm	10- minute average	- Notify community that odors may be experienced, but are not likely to cause health effects -Investigate source and perform mitigation activities if appropriate and feasible	Near the ATSDR Acute MRL of 0.07 ppm (concentration at which no health effects are expected)
2	1 ppm	10- minute average	-Local EMA Notification. Continue source investigation and perform mitigation activities (if appropriate & feasible) -If not source not mitigated; Shelter in place, especially schools, elderly care facilities, and health centers to reduce exposure (protecting sensitive populations – e.g., those with compromised respiratory systems or people with asthma)	Similar to the 10-min AEGL1 (0.75 ppm); Half of OSHA's lower end of reported concentrations (2-5 ppm) for lower-level effects (i.e., headache, tearing eyes, trouble breathing for asthmatics)
3	10 ppm	10- minute average	-Notify general community that exposure reduction is necessary -Consider possible evacuation (>10 ppm) -Continue source investigation and perform mitigation activities (if appropriate & feasible)	Equivalent to the NIOSH REL 10-min ceiling for workers (10 ppm) - Half of OSHA's reported level for debilitating impacts at 20 ppm (e.g., dizziness, fatigue, memory loss) -Serves as a safety warning for the 8-hr AEGL 2 (17 ppm); Gives time for communication and action to take place (within 8 hours).

	Total VOCs			
	1 ppm	10- minute average	- Investigate VOC detection with benzene-specific monitor (ppb levels); verify unit accuracy with bump test and zero air challenge	To determine whether total VOCS are mixture or primarily benzene
	Benzene			
	10 ppb	1 hour average [DEP will use a 15 minute average STEL using the UltraRAE 3000 as a surrogate for a 1 hour average]	- Investigate source and perform mitigation activities if appropriate and feasible	ATSDR Acute EMEG (9 ppb) for up to 2 weeks exposure
	9 ppm (9,000 ppb)	8 hour average	- Local EMA notification. -Notify general community that exposure reduction is necessary.	ATSDR Interim Acute Exposure Guideline Level-1 for 8-hour exposure. benzene Interim AEGL Document (epa.gov)

Notes: *=acute EMEG based on 2 ppm concentration for 30-minute exposure where asthmatics had respiratory and neurological effects

ATSDR recommends collection of environmental air samples (samples analyzed in the laboratory) to confirm field instrument readings. For example, 1 air sample per 10 field stations. This could be adjusted, as needed, if the air samples confirm the field instruments are protective. DEP will be using SUMMA Canisters to take instantaneous reading during the initial sampling period to verify results if elevated VOC levels trigger use of the UltraRAE 3000 to determine benzene levels.

The levels in this attachment have been developed to guide users of this plan and the public on the action/triggers levels which will be used during this monitoring event.