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Sherwin Williams - Facility Fire

Garland, Texas

Preliminary Air Sampling and Analysis Plan (SAP)

Version 1.2

Prepared on Behalf of:

Miller Environmental

Prepared By:

CTEH, LLC

5120 Northshore Drive

Little Rock, AR 72118

501-801-8500

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	Name/Organization	Signature	Date Signed
Prepared by:	Jessica Chopyk, Ph.D., CTEH		8/7/23
Reviewed by:	Michael Goorey FOSC		8/8/23 ML
Approved by:	Andrew Henault		8/15/23
Approved by:	Kurtis Rhudy SNW		8/16/23
Approved by:	Eric Delgado - FOSC		Digitally signed by Delgado, Eric Date: 2023.08.16 11:42:49 -05'00'

Air Monitoring and Sampling Strategy

CTEH®, LLC is focusing on the mixtures, chemicals, and indicators of flammability chosen below because they are among the most important and readily monitored hazards of spilled or burning paint and paint products. The possible hazards of paint and paint products vary by the source and type of the paint and paint products as well as with the environmental conditions associated with the spill. Monitoring and sampling for some chemicals or indicators of the presence of paint and paint products may be conducted less frequently or even discontinued as product-specific information becomes available or as initial monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly defined monitoring plans: **1)** Worker Monitoring; **2)** Community Monitoring; and **3)** Site Assessment. Worker Monitoring will generally take place in the presence of workers performing/supporting remediation operations. The readings will generally be taken at a height consistent with that of the samplers breathing zone and in proximity to workers without interfering or obstructing their remediation tasks. Community Monitoring may take place in those residential and commercial locations immediately surrounding the incident site, not necessarily currently occupied by members of the community. Unlike Worker Monitoring and Community Monitoring, Site Assessment does not necessarily represent ambient air monitoring near breathing zone level. Site Assessment may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. fence line monitoring, worst case determination, container head space, ground level, etc.).

Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release, and site conditions. If real-time community air monitoring results indicate that VOCs are detected, then environmental conditions will be assessed to determine whether the detections are due to ambient sources of VOCs or whether they could be due to site operations. If air monitoring personnel determine that the detection of VOCs may be associated with site operations, the personnel will stay in the area and continue monitoring to further characterize the area for at least 5 minutes to determine if detections of VOCs are sustained. These will be established as fixed-location handheld real-time locations to provide concentration averages that may be observed and analyzed over time in distinct geographic locations in the community.

Radio-telemetering RAE Systems® AreaRAE/AreaRAE Plus units may be deployed in all monitoring plans to allow for continuous air monitoring in multiple areas. AreaRAE/AreaRAE Plus readings may be received and monitored in a centralized location by CTEH® personnel to allow for recognition, communication, and response to changing conditions.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers (personal sampling) to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH Site-Specific Action Levels

CTEH site-specific action levels may be employed in all air monitoring plans to provide information for corrective action to limit potential exposures. These values do not replace occupational or community exposure standards or guidelines but are intended to represent a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practice may be assessed and then altered if necessary. Site-Specific Action Levels are not utilized for Site Assessment monitoring.

Plan 1: Worker Monitoring

Objective: Report air levels before they reach those requiring respiratory protection

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	30 ppm 5 min.	Assess for the presence of benzene/toluene/hexane; Report reading to PM	To avoid over exposure to benzene/toluene/hexane	MultiRAE PID AreaRAE PID	0.1 ppm	Range: 0.1– 5,000 ppm	NA
Benzene	0.5 ppm 5 min.	Confirm reading with secondary instrument; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	UltraRAE PID	0.01 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.05 – 65 ppm Volume: Variable	Var.
				Drager XPID 8000/8500	0.02 ppm	Range: 0.02 – 25 ppm	NA
	2.5 ppm 5 min.	Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-STEL	UltraRAE PID	0.01 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.05 – 65 ppm Volume: Variable	Var.
				Drager XPID 8000/8500	0.02 ppm	Range: 0.02 – 25 ppm	NA
Toluene	20 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Gastec tube #122L	0.5 ppm	Range: 0.5 – 100 ppm Volume: Var.	Var.
				Drager XPID 8000/8500	0.33 ppm	Range: 0.33 – 100 ppm	NA
Hexane	50 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Gastec tube #102L	1 ppm	Range: 1 – 1,200 ppm Volume: Variable	Var.
				Drager XPID 8000/8500	0.33 ppm	Range: 0.33 – 100 ppm	NA
Hydrogen sulfide	1 ppm 5 min.	Sample only as requested; Exit Area or don air purifying	ACGIH TLV-TWA	MultiRAE Sensor	1 ppm	Range: 1 – 100 ppm	NA
				MultiRAE Pro Sensor	0.1 ppm	Range: 0.1 – 100 ppm	NA

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
		respirator; Report reading to PM					
				Gastec tube #4LL	0.1 ppm	Range: 0.1 – 120 ppm Volume: Variable	Var.
Styrene	10 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Gastec Tube #124L	0.5 ppm	Range: 2 – 100 ppm Volume: Variable	Var.
Hydrogen Cyanide	2 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	1-hour AEGL-1 (2.0 ppm)	Gastec tube #12L	0.1 ppm	Range: 0.5 – 150 ppm Volume: Variable	Var.
Methyl Methacrylate	50 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Gastec Tube #149	1 ppm	Range: 10 – 500 ppm Volume: Variable	Var.
Butyl Acrylate	2 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Drager X-pid 8500	1.5 ppm (estimated)	Range: 7.6 – 760	NA
				MultiRAE PID	0.1 ppm	Range: 1 – 5,000 ppm	1.6
Ethyl Acrylate	5 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Gastec Tube #141L	2.1 ppm	Range: 8.4 – 336 ppm Volume: 200 ml	0.42
				MultiRAE PID 10.6 eV lamp	2.4 ppm	Range: 0 – 12,000 ppm	2.4
1-Butanol	20 ppm 5 min.	Sample only as requested; Exit Area or don air purifying respirator; Report reading to PM	ACGIH TLV-TWA	Gastec Tube #114	1 ppm	Range: 10-150 ppm Volume: Variable	Var.

Combustion Products							
Analyte	**Action Level**	**Action to be Taken**	**Basis**	**Instrument**	**Detection Limit**	**Notes**	**Correction Factor**
Particulate Matter ($PM_{2.5}$ or PM_{10})*	351 µg/m³ 5 min.	Report reading to PM	Wildfire Smoke Guidelines for 1 hr. avg. upper-bound breakpoint for unhealthy AQI	SidePak AM510	0.001 mg/m³	$PM_{2.5}$ impactor – 50% cut-off at 2.5 micron; PM_{10} impactor – 50% cut-off at 10 micron	NA
PM2.5 or PM10	200 µg/m³ 8 hrs.	Report reading to PM	See above - 8 hr. guideline	SidePak AM510	0.001 mg/m³	See above	NA
Carbon monoxide	25 ppm 5 min.	Report reading to PM	ACGIH TLV-TWA	MultiRAE Sensor	1 ppm	Range: 1 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 0.5 – 30 ppm Volume: 100 mL	1
Sulfur dioxide	0.2 ppm 5 min.	Report reading to PM	ACGIH TLV-STEL	MultiRAE Sensor	0.1 ppm	Range: 0.1– 20 ppm	NA
				Gastec tube #5Lb	0.01 ppm	Range: 0.01 – 10 ppm Volume: Var.	Var.
Nitrogen dioxide	0.2 ppm 5 min.	Report reading to PM	ACGIH TLV-TWA	MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0.1 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.1 – 125 ppm Volume: Var.	Var.
Formaldehyde	0.1 ppm 5 min.	Report reading to PM	ACGIH TLV-TWA	Gastec tube #91L	0.05 ppm	Range: 0.05 – 40 ppm Volume: Var.	Var.

***Monitoring for combustion products may be discontinued when the fire is extinguished**

Flammability								
Analyte	**Action Level**	**Corrected Value**	**Action to be Taken**	**Basis**	**Instrument**	**Detection Limit**	**Notes**	**Correction Factor**
%LEL	1 % 1 min	2.5 %	Notify PM	Elevated %LEL sustained 1 min	MultiRAE Sensor AreaRAE Sensor	1 %	Range: 1 – 100 %	2.5*
%LEL	4 %	10 %	Exit area and Notify PM		MultiRAE Sensor	1 %	Range: 1 – 100 %	2.5*

				AreaRAE Sensor			

*Rough estimate based on common volatiles in paint and paint products

Plan 2: Community Monitoring

Objective: Report air levels before they reach those causing nuisance or health issues

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	0.5 ppm 5 min.	Report reading to PM; Assess for the presence of benzene/toluene/hexane and other analytes	Approximate background level - Reading sustained for 5 minutes	MultiRAE PID AreaRAE PID	0.1 ppm	Range: 0.1 – 5,000 ppm	NA
Benzene	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	UltraRAE PID	0.01 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.05 – 65 ppm Volume: Variable	Var.
				Drager XPID 8000/8500	0.02 ppm	Range: 0.02 – 25 ppm	NA
Toluene	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #122L	0.5 ppm	Range: 0.5 – 100 ppm Volume: Variable	Var.
				Drager XPID 8000/8500	0.33 ppm	Range: 0.33 – 100 ppm	NA
Hexane	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #102L	1 ppm	Range: 1 – 1,200 ppm Volume: Variable	Var.
				Drager XPID 8000/8500	0.33 ppm	Range: 0.33 – 100 ppm	NA
Hydrogen sulfide	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE Sensor	1 ppm	Range: 1 – 100 ppm	NA
				MultiRAE Pro Sensor	0.1 ppm	Range: 0.1 – 100 ppm	NA
				Gastec tube #4LL	0.1 ppm	Range: 0.1 to 120 Volume: Variable	Var.

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Styrene	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec Tube #124L	0.5 ppm	Range: 2 – 100 ppm Volume: Variable	Var.
Hydrogen Cyanide	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #12L	0.1 ppm	Range: 0.5 – 150 ppm Volume: Variable	Var.
Methyl Methacrylate	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec Tube #149	1 ppm	Range: 10 – 500 ppm Volume: Variable	Var.
Butyl Acrylate	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Drager X-pid 8500	1.5 ppm (estimated)	Range: 7.6 – 760	NA
				MultiRAE PID	0.1 ppm	Range: 1 – 5,000 ppm	1.6
Ethyl Acrylate	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec Tube #141L	2.1 ppm	Range: 8.4 – 336 ppm Volume: 200 ml	0.42
				MultiRAE PID 10.6 eV lamp	2.4 ppm	Range: 0 – 12,000 ppm	2.4
1-Butanol	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec Tube #114	1 ppm	Range: 10-150 ppm Volume: Variable	Var.

Combustion Products							
Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})*	138 µg/m³ 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr. avg. upper-bound breakpoint for unhealthy for sensitive groups AQI	SidePak AM510	0.001 mg/m³	$PM_{2.5}$ impactor – 50% cut-off at 2.5 micron; PM_{10} impactor – 50% cut-off at 10 microns	NA
$PM_{2.5}$ or PM_{10}	79 µg/m³ 8 hr.	Report reading to PM	See above - 8 hr. guideline	SidePak AM510	0.001 mg/m³	See above	NA
Carbon monoxide	25 ppm 5 min.	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE Sensor	1 ppm	Range: 1 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 0.5 – 30 ppm Volume: 100 mL	1
Sulfur dioxide	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE Sensor	0.1 ppm	Range: 0.1 – 20 ppm	NA
				Gastec tube #5Lb	0.05 ppm	Range: 0.05 – 10 ppm Volume: Var.	Var.
Nitrogen dioxide	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0.1 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.1 – 125 ppm Volume: Var.	Var.
Formaldehyde	Detection	Sample only as requested; Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube #91L	0.05 ppm	Range: 0.05 – 40 ppm Volume: Var.	Var.

*$PM_{2.5}$ is especially prone to interference from high humidity, in cases of high humidity, PM_{10} impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Flammability								
Analyte	Action Level	Corrected Value	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	1 % 1 min	2.5 %	Notify PM	Elevated %LEL sustained 1 min	MultiRAE Sensor AreaRAE Sensor	1 %	Range: 1 – 100 %	2.5*
%LEL	4 %	10 %	Exit area and Notify PM		MultiRAE Sensor AreaRAE Sensor	1 %	Range: 1 – 100 %	2.5*

*Rough estimate based on common volatiles in paint and paint products

Plan 3: Site Assessment

Objective: Characterize nature and extent of release

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs	NA	Report reading to PM	NA	MultiRAE PID AreaRAE PID	0.1 ppm	Range: 0.1 – 5,000 ppm	NA
Benzene	NA	Report reading to PM	NA	UltraRAE PID	0.01 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.05 – 65 ppm; Volume: Variable	Var.
				Drager XPID 8000/8500	0.02 ppm	Range: 0.02 – 25 ppm	NA
Toluene	NA	Report reading to PM	NA	Gastec tube #122L	0.5 ppm	Range: 0.5 – 100 ppm; Volume: Variable	Var.
				Drager XPID 8000/8500	0.33 ppm	Range: 0.33 – 100 ppm	NA
Hexane	NA	Report reading to PM	NA	Gastec tube #102L	1 ppm	Range: 1 – 1,200 ppm; Volume: Variable	Var.
				Drager XPID 8000/8500	0.33 ppm	Range: 0.33 – 100 ppm	NA
Hydrogen sulfide	NA	Report reading to PM	NA	MultiRAE Sensor	1 ppm	Range: 1 – 100 ppm	NA
				MultiRAE Pro Sensor	0.1 ppm	Range: 0.1 – 100 ppm	NA
				MultiRAE PID	0.1 ppm	Range: 0.1 – 5,000 ppm	3.3
				Gastec tube #4LL	0.1 ppm	Range: 0.1 to 120 ppm; Volume: Variable	Var.
Styrene	NA	Report reading to PM	NA	Gastec Tube #124L	0.5 ppm	Range: 2 – 100 ppm Volume: Variable	Var.
Hydrogen Cyanide	NA	Report reading to PM	NA	Gastec tube #12L	0.1 ppm	Range: 0.5 – 150 ppm Volume: Variable	Var.
Methyl Methacrylate	NA	Report reading to PM	NA	Gastec Tube #149	1 ppm	Range: 10 – 500 ppm Volume: Variable	Var.
Butyl Acrylate	NA	Report reading to PM	NA	Drager X-pid 8500	1.5 ppm (estimated)	Range: 7.6 – 760	NA
				MultiRAE PID	0.1 ppm	Range: 1 – 5,000 ppm	1.6
Ethyl Acrylate	NA	Report reading to PM	NA	Gastec Tube #141L	2.1 ppm	Range: 8.4 – 336 ppm Volume: 200 ml	0.42

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				MultiRAE PID 10.6 eV lamp	2.4 ppm	Range: 0 – 12,000 ppm	2.4
1-Butanol	NA	Report reading to PM	NA	Gastec Tube #114	1 ppm	Range: 10-150 ppm Volume: Variable	Var.

Analytical Methods

Analyte	Media/Can	Method	Notes
VOCs	MiniCans (1L)	EPA TO-15 with TICs	
Benzene	Charcoal tube	NIOSH 1501	
BTEX (+Hexane)	3M 3520 Badge or Assay 566	Modified NIOSH 1500/1501	
PAHs (18 PNAH Profile - Galson)	37PTFE 2.0/Treated Amberlite XAD-2	Method 5506	

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Guardian Network	A Guardian network may be established with AreaRAEs equipped with electrochemical sensors at locations around the work zone perimeter. The AreaRAEs will be telemetering instantaneous data at 15-second intervals to a computer console. MultiRAE Pros may also be used in the network. The data will be visible in real-time at the computer console and will be monitored 24 hours per day by CTEH personnel.
Real-Time Handheld Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAE Plus; ppbRAE, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations. CTEH will use these handheld instruments primarily to monitor the ambient air quality at breathing zone level. Additionally, measurements may be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions. CTEH may also use these techniques to verify detections observed by the AreaRAE network.
Fixed Real-Time Monitoring locations	Multiple community locations may be identified and monitored at the same location approximately once per hour using handheld instruments. This allows the use of statistical analysis more effectively than with a random approach.
Analytical sampling	Analytical sampling may be used to validate the fixed and handheld real-time monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media and sent to an off-site laboratory for further chemical analysis.
Particulate Monitoring Network	A network of data-logging particulate monitors may be set up and positioned around the community.

Quality Assurance/Quality Control Procedures

Method	Procedure
Real-Time	Real-time instruments may be calibrated in excess of the manufacturer's recommendations. At a minimum whenever indicated by site conditions or instrument readings. Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field. Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	Chain of custody documents may be completed for each sample. Level IV data validation may be performed on the first sample group analyzed. Level II data validation may be performed on 20% of all samples. Level IV data validation may be performed on 10% of all samples.
Reporting	Daily data summaries may be provided for informational purposes using data that have not undergone complete QA/QC. Comprehensive reports of real-time and/or analytical data may be generated following QA/QC and may be delivered 60 days following receipt of validated results, if applicable.

Glossary

Term	Definition
Sustained	Instrument reading above the action level continuously for the listed time period.
Excursion Limit	Whenever a reading exceeds an ACGIH TLV by 5 times (if the chemical does not have a STEL- or Ceiling-based action level), exit the area and notify the PM
Breathing zone	The area within an approximate 10-inch radius of an individual's nose and mouth.
Ambient Air	That portion of the atmosphere (indoor or outdoor) to which workers and the general public have access.

Change from version 1.0 to 1.1

In the section titled: Added analytes per EPA

	Name/Organization	Signature	Date Signed
Prepared by:	CTEH		8/7/23
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Change from version 1.1 to 1.2

In the section titled: Adress EPA comments and added Butanol per SW chemical list.

	Name/Organization	Signature	Date Signed
Prepared by:	CTEH		8/8/23
Review by:			
Approved by:			
Approved by:			
Approved by:			

Approved by: