Appendix 1

Acrylic/Methacrylic Acid Transfer

Preliminary Air Sampling and Analysis Plan (SAP)

THE SCIENCE OF READY℠

Acrylic/Methacrylic Acid Transfer Monitoring

Preliminary Air Sampling and Analysis Plan (SAP)

Version 1.1

Prepared on Behalf of:

Sherwin Williams

Prepared By:

CTEH, LLC

5120 Northshore Drive

Little Rock, AR 72118

501-801-8500

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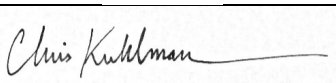
	Name/Organization	Signature	Date Signed
Prepared by:	Jessica Chopyk, PhD, Toxicologist		8/8/23
Reviewed by:	Christopher Kuhlman, PhD, CIH, DABT, Senior Toxicologist		8/8/23
Approved by:			
Approved by:			
Approved by:			

Air Monitoring and Sampling Strategy

CTEH® is focusing on the mixtures and chemicals chosen below because they are among the most important and readily monitored hazards of an acrylic/methacrylic acid transfer. The possible hazards of this transfer may vary by the source and type of acrylic/methacrylic acid as well as with the environmental conditions associated with the transfer of this product. Monitoring and sampling for some chemicals or indicators of the presence of acrylic/methacrylic acid 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; **3)** Site Assessment. Worker Activity Monitoring will generally take place in the presence of workers performing/supporting transfer operations. The readings will generally be taken at a height consistent with that of the sampler's breathing zone and in close proximity to workers without interfering or obstructing their work tasks. Community Monitoring may take place in those residential and commercial locations immediately surrounding the transfer work 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 a potential 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 operations, and site conditions. Radio-telemetering RAE Systems® AreaRAE/MultiRAE Pro units may be deployed near transfer operations to allow for continuous air monitoring in multiple areas during product displacement operations. AreaRAE/MultiRAE Pro readings may be received and monitored in a centralized location by CTEH® personnel to allow for recognition, communication, and response to changing conditions.

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	0.2 ppm 5 min.	Report reading to PM; Note odors; Assess for the presence of acrylic acid	To avoid over exposure to acrylic acid	MultiRAE PID AreaRAE PID	0.1 ppm	Range: 0.1 – 5,000 ppm	NA
Acrylic Acid	2 ppm 5 min.	Exit Area or don air purifying respirator; Report reading to PM. Note odor*	ACGIH® TLV-TWA	MultiRAE PID AreaRAE PID 10.6 eV lamp	1.2 ppm	Range: 1.2 – 60,000 ppm	12
				Gastec tube #81	0.2 ppm	Range: 2 - 50 ppm Volume: See insert	1
Methacrylic Acid	20 ppm 5 min.	Exit Area or don air purifying respirator; Report reading to PM. Note odor**	ACGIH® TLV-TWA	MultiRAE PID AreaRAE PID 10.6 eV lamp	0.15 - 0.35 ppm	Range: 0.15 - 17,500 ppm	2.5+/-1 (estimated)
				Gastec tube #81	0.2 ppm	Range: 1.8 - 45 ppm Volume: See insert	0.9

*Acrylic Acid has odor described as sharp and irritating with threshold at 0.06 to 1.0 ppm; **Methacrylic acid has an odor described as acrid and repulsive with threshold of 0.17 ppm

Flammability

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	1% 1 min.	Notify PM	Elevated LEL	MultiRAE Sensor AreaRAE Sensor	1 %	Measuring range: 1 – 100%	NA
%LEL	10%	Exit Area and Notify PM	10% LEL	MultiRAE Sensor AreaRAE Sensor	1 %	Measuring range: 1 – 100%	NA

*Acrylic acid has a lower explosive limit (LEL) of 2.4%

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; Note odors; Assess for the presence of carbon disulfide	Approximate background level	MultiRAE PID AreaRAE PID	0.1 ppm	Range: 0.1 – 5,000 ppm	NA
Acrylic Acid	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID AreaRAE PID 10.6 eV lamp	1.2 ppm	Range: 1.2 – 60,000 ppm	12
				Gastec tube #81	0.2 ppm	Range: 2 - 50 ppm Volume: See insert	1
Methacrylic Acid	Detection	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID AreaRAE PID 10.6 eV lamp	0.15 - 0.35 ppm	Range: 0.15 - 17,500 ppm	2.5+/-1 (estimated)
				Gastec tube #81	0.2 ppm	Range: 1.8 - 45 ppm Volume: See insert	0.9

*Acrylic Acid has odor described as sharp and irritating with threshold at 0.06 to 1.0 ppm; **Methacrylic acid has an odor described as acrid and repulsive with threshold of 0.17 ppm

Flammability

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	1% 1 min.	Notify PM	Elevated LEL	MultiRAE Sensor AreaRAE Sensor	1 %	Measuring range: 1 – 100%	NA
%LEL	10%	Exit Area and Notify PM	10% LEL	MultiRAE Sensor AreaRAE Sensor	1 %	Measuring range: 1 – 100%	NA

*Acrylic acid has a lower explosive limit (LEL) of 2.4%

Plan 3: Site Assessment

Objective: Characterize the nature and extent of a 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
Acrylic Acid	NA	Report reading to PM	NA	MultiRAE PID AreaRAE PID 10.6 eV lamp	1.2 ppm	Range: 1.2 – 60,000 ppm	12
				Gastec tube #81	0.2 ppm	Range: 2 - 50 ppm Volume: See insert	1
Methacrylic Acid	NA	Report reading to PM	NA	MultiRAE PID AreaRAE PID 10.6 eV lamp	0.15 - 0.35 ppm	Range: 0.15 - 17,500 ppm	2.5+/-1 (estimated)
				Gastec tube #81	0.2 ppm	Range: 1.8 - 45 ppm Volume: See insert	0.9

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 and integrated into SafetySuite/VIPER. The AreaRAEs will be telemetering instantaneous data at 15-second intervals to a computer console. MultiRAE 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, 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.

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: Addressed EPA comments

	Name/Organization	Signature	Date Signed
Prepared by:	Jessica Chopyk/CTEH		8/9/2023
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

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In the section titled:

	Name/Organization	Signature	Date Signed
Prepared by:			
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Appendix 2

Acrylic/Methacrylic Acid Transfer

Process Hazard Analysis

3. Worksheet

Process: Unloading RT-9 and RT-10 to tank wagons

Node: Tank wagon loading

What ifs	Causes	Consequences	Risk Matrix S	L	RR	Effective Existing Safeguards	Recommendations	Responsibility	Comments
1. What if the acid line begins to leak during the offload?	1. Poor gasket	1. Employee exposure - Stop Transfer, close valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6	1. Use of new gaskets and hoses 2. Pressure test of the system prior to starting 3. PPE (Chemical suite, gloves, PAPR, chemical suite)			1. Employee expsure risk could lead to a recordable injury 2. Small spill of material (less than 1 gallon)
		2. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring measurements and clean up with baking soda	1	2	2	4. PID monitoring in the area 5. Trained operator 6. Multiple employees in attendance 7. SOP / Procedure			
	2. Loose connection	1. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6	1. Use of new gaskets and hoses 2. Pressure test of the system prior to starting 3. PPE (Chemical suite, gloves, PAPR, chemical suite)	1. Move genertor away (min of 35 ft) from the area and ensure that all doors are closed to the admin building	Edward Valdez	1. Hose connection at the tank will be tied to a valved located on the tank. In the event of a loose connection, the valve can be shut and the line can be isloated.
		2. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up with baking soda	2	2	4	4. PID monitoring in the area 5. Trained operator 6. Multiple employees in attendance 7. SOP / Procedure 8. Manned operation for and bottom out valve 9. Pins and straps on all hose connections			
	3. Misdirected flow	1. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny	3	2	6	1. SOP/Procedure 2. Trained operator 3. PPE (Chemical suite,	1. Move genertor away (min of 35 ft) from the area and ensure that all doors are closed to the admin building	Edward Valdez	1. Misdirected flow from line beling left open after pressure test.

Process: Unloading RT-9 and RT-10 to tank wagons

Node: Tank wagon loading

What ifs	Causes	Consequences	Risk Matrix S	L	RR	Effective Existing Safeguards	Recommendations	Responsibility	Comments
		Medical Servces				gloves, PAPR, chemical suite)			2. Misdirected flow from tank wagon back into hose after loading.
		2. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up with baking soda	2	2	4	4. Double check of all set-up and transfers 5. Pressure test of the system prior to starting 6. Tankwagon loading checklist 7. PID monitoring in the area			
	4. Leak from pump	1. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up	2	2	4	1. Use of new gaskets and hoses 2. Pressure test of the system prior to starting	1. Move genertor away (min of 35 ft) from the area and ensure that all doors are closed to the admin building	Edward Valdez	
		2. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6	3. PPE (Chemical suite, gloves, PAPR, chemical suite) 4. PID monitoring in the area 5. Trained operator 6. Multiple employees in attendance 7. SOP / Procedure 8. New diaphgram on AOD pumps			
	5. Overfilling the tank wagon	1. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up				1. Continous monitoring of the transfer 2. Transfering in with periodic evaluation of the material transferred	1. Move genertor away (min of 35 ft) from the area and ensure that all doors are closed to the admin building	Edward Valdez	
		2. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6	3. Targeting a ~50% fill of each tankwagon 4. PID monitoring in the area 5. PPE (Chemical suite, gloves, PAPR, chemical suite) 6. Trained operator			

Process: Unloading RT-9 and RT-10 to tank wagons

Node: Tank wagon loading

What ifs	Causes	Consequences	Risk Matrix S	L	RR	Effective Existing Safeguards	Recommendations	Responsibility	Comments
2. What if pressure is not releived at the end of the transfer?	1. Operator error	1. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6	1. PPE (Chemical suite, gloves, PAPR, chemical suite) 2. Trained operators 3. SOP / Procedure 4. Bleed off to relieve pressure	2. Add into the procedure to include checking the manual pressure guage before disconnecting the hose	Scott Reckless	
	2. Thermal expansion	1. Pressure build leading to employee exposure Stop Transfer, Close valves, move to fresh air and safety shower, contact Emergency Medical Services	3	2	6	1. PPE (Chemical suite, gloves, PAPR, chemical suite) 2. Trained operators 3. SOP / Procedure 4. Bleed off to relive pressure	2. Add into the procedure to include checking the manual pressure guage before disconnecting the hose	Scott Reckless	
3. What if the hose is disconnected under pressure	1. Overpressure from the pump	1. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6	1. PPE (Chemical suite, gloves, PAPR, chemical suite) 2. Plant air is at 80 psi 3. Hose Straps and locking cams	1. Move genertor away (min of 35 ft) from the area and ensure that all doors are closed to the admin building	Edward Valdez	
		2. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoriing results and clean up	3	1	3				
	2. Air left on during material transfer	1. increase amount of vapor going back to storage tank, Stop transfer, close all valves	3	1	3	1. storage tank vent is bigger than air inlet to material transfer 2. Trained operator	3. only have one air hose in area	Joseph Dillion	
4. What if there is a leak on the tankwagon?	1. faulty gasket on tank wagon	1. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up	2	2	4	1. Trained operator 2. SOP / Procedure 3. PPE (Chemical suite, gloves, PAPR, chemical suite)	4. pressure test external valve prior to starting trnasfer. Add to SOP	Scott Reckless	
		2. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6				

Process: Unloading RT-9 and RT-10 to tank wagons

Node: Tank wagon loading

What ifs	Causes	Consequences	Risk Matrix S	L	RR	Effective Existing Safeguards	Recommendations	Responsibility	Comments
	2. loose packing external bottom out assembly	1. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up	2	2	4	1. Trained operator 2. Internal valve and external valve			
		2. Loss of containment - Stop transfer, close all valves, Contain spill, review area monitoring results and clean up	2	2	4				
		3. Employee exposure - Stop Transfer, Close Valves. Move to fresh air and safety shower, contact Emergeny Medical Servces	3	2	6				
5. What if grounding fails	1. Clamp knocked off	1. Static build up in tank wagon, Replace ground clamp	3	2	6	1. Test continuity	5. Add a second ground for the tank wagon, one at each end	Scott Reckless	
	2. Ground ineffective	1. Static build up in tank wagon Reposition ground clamp	3	2	6	1. Test Continuity			
6. What if the material begins to react	1. High Temp	1. Bulk polimerization and loss of containment, Stop Transfer, close all valves, contain spill, review area monitoring results and clean up	3	2	6	1. Continual temperature monitoring			
7. What if the fire system activates	1. Manual acitvation	1. Fire water at zone 2, 667 gpm max. Stop Transfer, close all vavles. Notify plant to start removing water from secondary onsite containment	4	2	8	1. 75 minutes of storage in local containment before we go to the second site containment	6. Clear out space for extra water	Richard Leverton	
							7. Added burms for extra capacity	Richard Leverton	
							8. Covered storm drains	Richard Leverton	

Appendix 3

Acrylic/Methacrylic Acid Transfer

PACKAGING PLANT FIRE WATER CONTAINMENT PLAN

PACKAGING PLANT FIRE WATER CONTAINMENT PLAN

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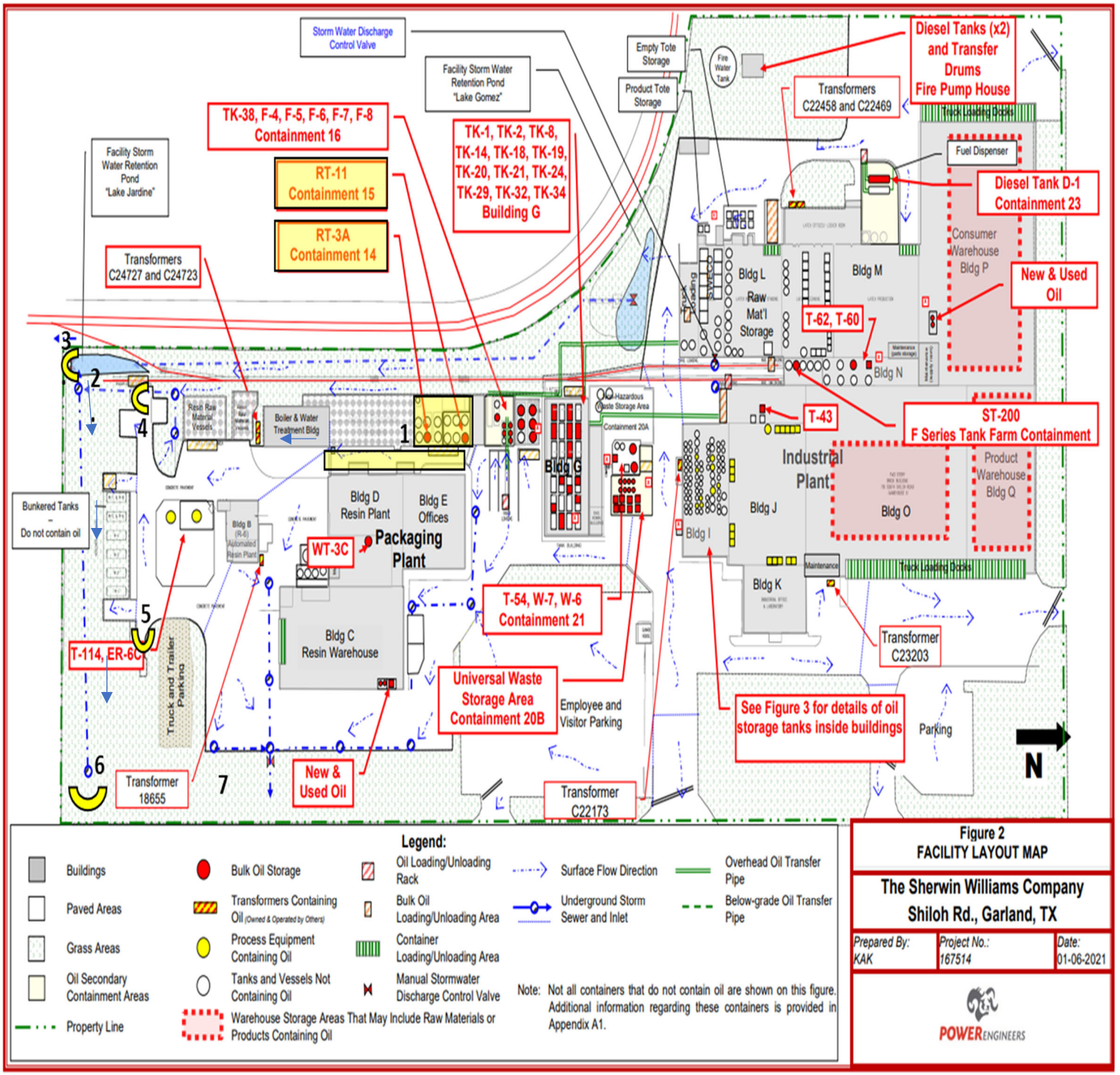

Fire Water Containment Areas

1. Containment 14- Total Volume ~28,914 gallons, Containment 15- Total Volume ~18,535 gallons, 0-19 Alley ~5,000 gallons
2. Lake Jardine Water Retention Pond- Total Volume ~45,000 gallons
3. Lake Jardine Berm- Total Volume ~10,000 gallons
4. Truck Loading Area Berm & Storm Drain Cover- Total Volume ~10,000 gallons
5. Bunker Berm- Total Volume ~10,000 gallons
6. Shiloh Rd. Berm- Total Volume ~20,000 gallons
7. Pre-staged Vacuum Truck on Shiloh Rd adjacent to Berm 6 to collect water as needed.
8. Pre-staged dirt that can be dumped in street to create a large berm which allow the road to be used as containment. Vacuum Truck manned and prepared to pump overflow as needed.

Appendix 4

Acrylic/Methacrylic Acid Transfer

Fire Response Plan

1. Specialized Response Solutions (SRS) Industrial Fire Fighting will be on-site during the transfer operations.
2. Appropriate chemical fire protective gear will be worn.
3. Fire response equipment will include, but not be limited to:
    a. 2-300 pound Purple K drychem extinguishing agent
    b. 700 gallon of fluorine free firefighting foam
4. In the event of incipient stage fire to a large fire, the fire team will utilize Purple K and/or firefighting foam with water spray application.