

AQUASM

An  Essential Utilities Company

Delaware River Chemical Spill & Impacts to Plant Operations

November 3, 2023

How we knew there was a potential issue

Reported Event:

On Saturday, 3/25/2023 at 12:27 AM, a water quality event was reported in the Delaware Valley EWS:

Event Id

577

Risk Level

High

Event Date/Time

03/25/2023 12:00 AM

Status

Reported

Location

Bristol Township, Bucks County, PA

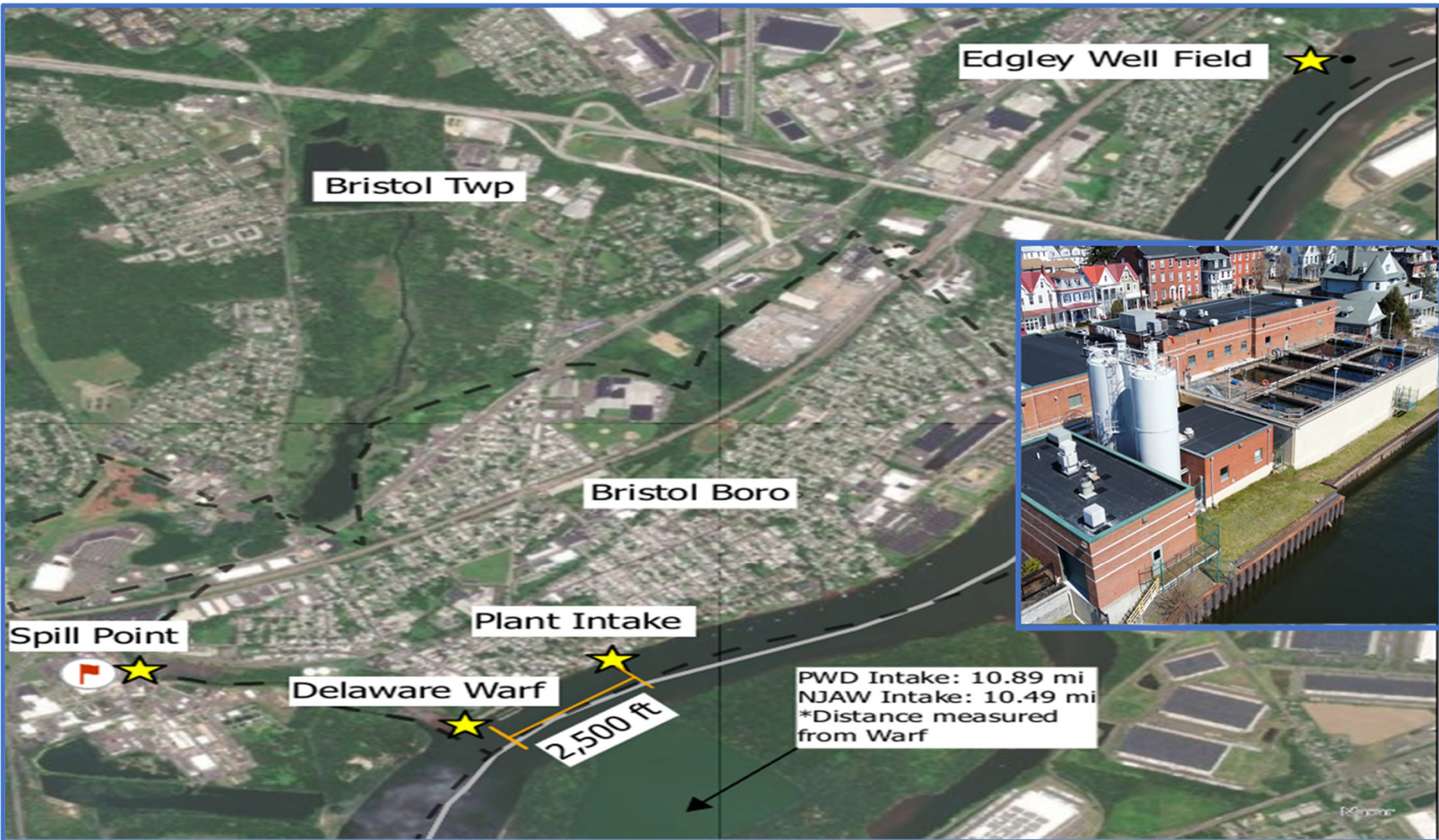
Receiving Waterway

Mill Creek

Description

Trinseo Autoglas (100 Veterans hwy, Bristol) had a pipe break releasing 65,000 pounds (8,100 gallons) of a water soluble emulsion into Otter Creek (Mill Creek on map?) and then into the Delaware River. The material is white and mixes with water. Facility said the material is non-hazardous. Attempting to obtain SDS at this time. DEP SERO and Bucks County Hazmat responding. Dow Chem safety officer providing asst to facility

Delaware Valley 
Early Warning System



Initial Response – Information Collection

- What is the spilled material?

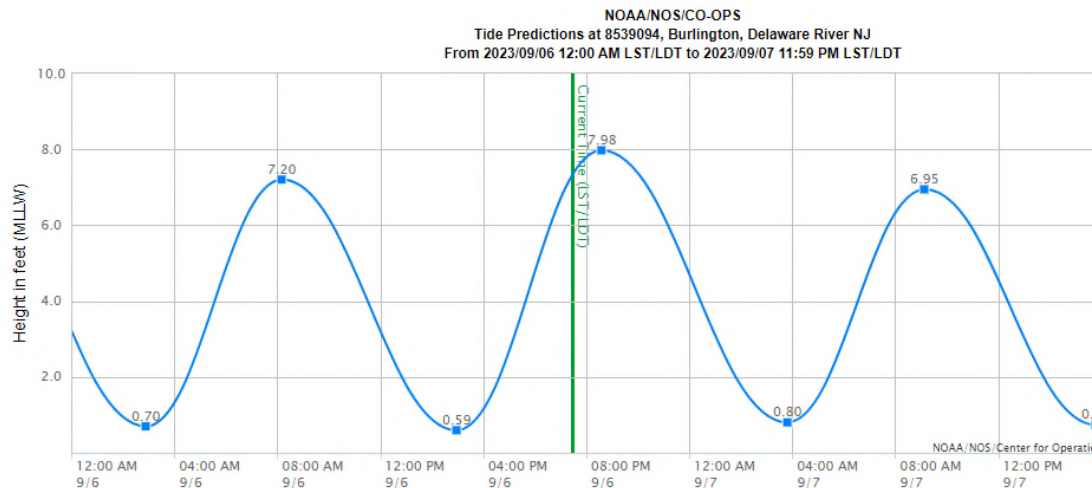
2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Individual Residual Monomer	Proprietary	0.1	Y
Water	7732-18-5	47-50	N
Acrylic Polymer	Proprietary	50-53	N

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

While this material is not classified as hazardous under Federal OSHA regulations, this MSDS contains valuable information critical to the safe handling and proper use of this product. This MSDS should be retained and available for employees and other users of this product.

- Tidal influence of Delaware



Rapid Operations Response

- Mobilize staff
- Inform WTP operations

Water Treatment Plant Shut Down Authority and SOP Protocol

If a plant operator suspects a water quality issue or any other situation that would cause a public health and safety threat, the plant operator has the **full authority** to shut the water plant down immediately and then notify plant supervision. While this is considered to be an abnormal or unusual circumstance, our first priority is to public health and safety and insuring the customers trust in our operations.

Following are a few examples (not exhaustive) where a plant shutdown may be required:

1. Raw water quality issue, i.e. petroleum release, upstream spill of contaminant, unusual T/O event, etc.
2. Plant effluent chlorine residual < 0.2 mg/l or >4.0 mg/l
3. Filter composite turbidity exceedance
4. Plant effluent pH < 6.0 or > 9.0 (Note: exceptions to this pH range at lime softening plants based on operating conditions may be allowed, provided approval by management.)
5. Plant effluent T/O issue that is unexplainable and unusual, i.e. – petroleum or synthetic odors.
6. Gross chemical overfeed situation
7. Complete loss of chemical treatment
8. Filter contamination
9. Major water line leak in plant, i.e. raw or send out lines

For reasons of concern other than those listed above, the operator's professional judgment is required to make the most appropriate decision based on conditions at that time.

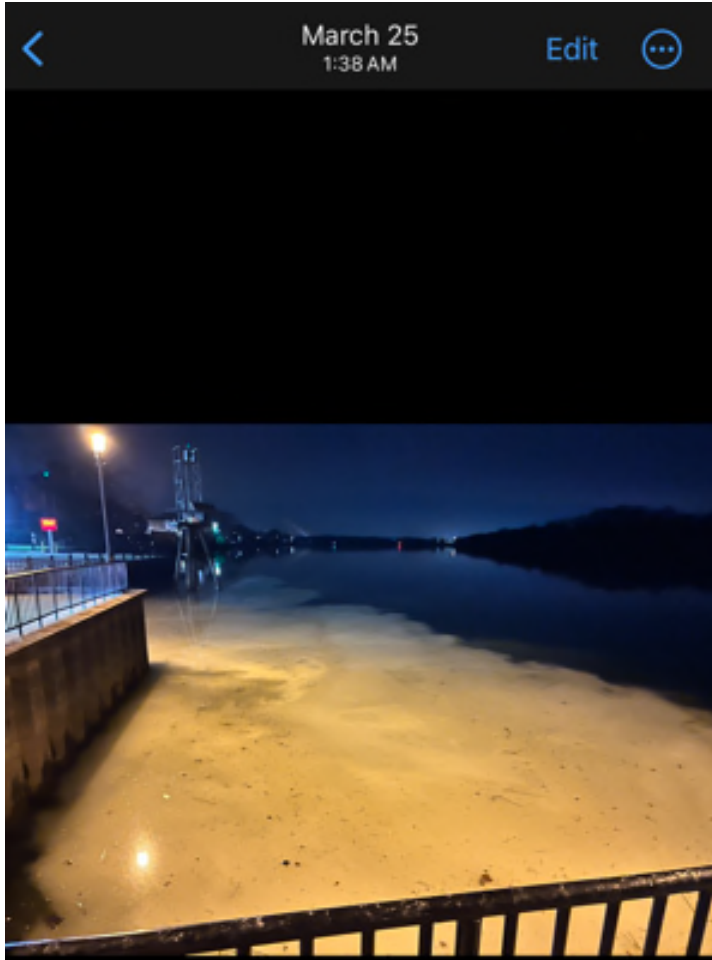
Note that all procedures for proper plant shutdown must be followed.

Contact plant supervision immediately if you have any questions on conditions of operations.

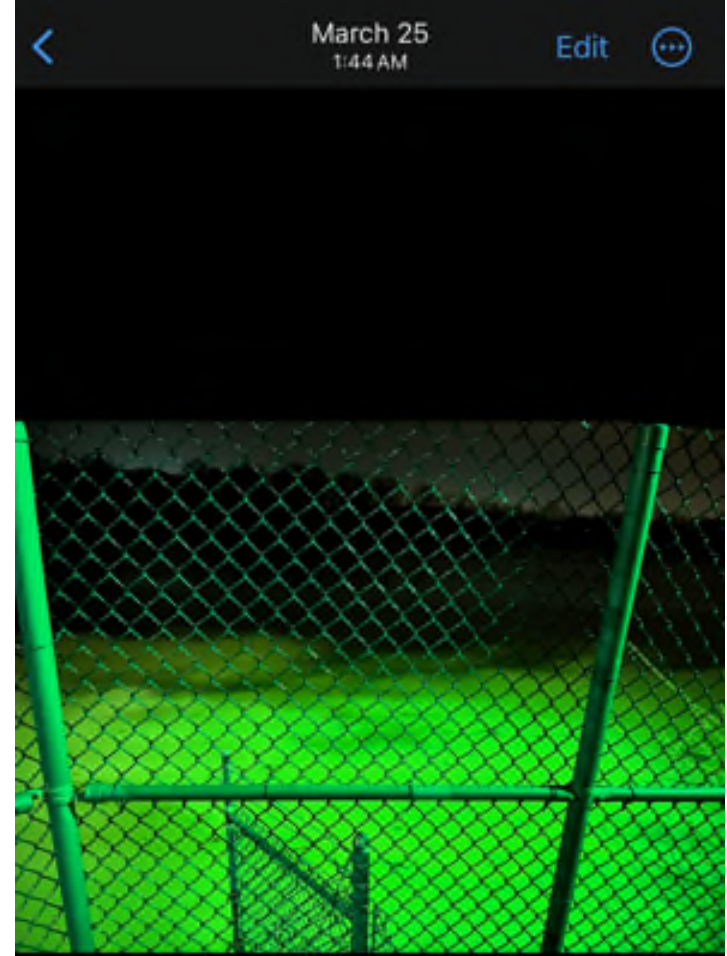
Todd Duerr
VP Production

Rapid Operations Response

Bristol Wharf



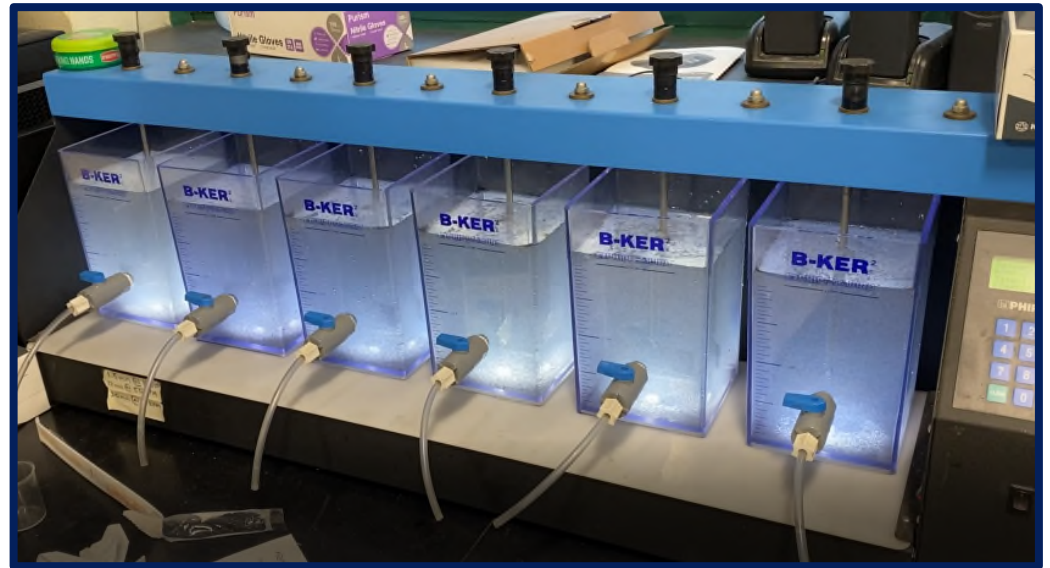
Bristol WTP Raw Intake



< 6 minutes

Contingency Planning

- Provide DEP Drinking Water 1-hour notification
- Evaluate water storage capacity
- Communicate with neighboring utilities
- Evaluate plant
- Treatability Testing

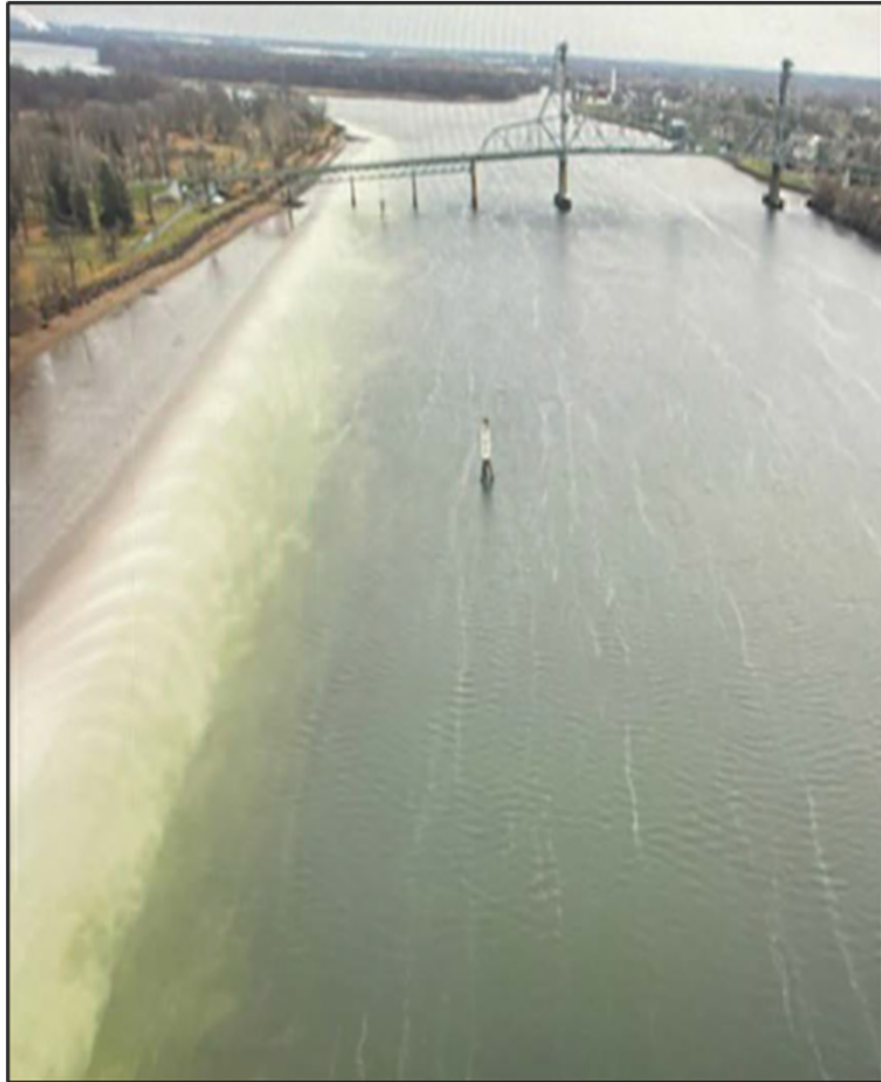






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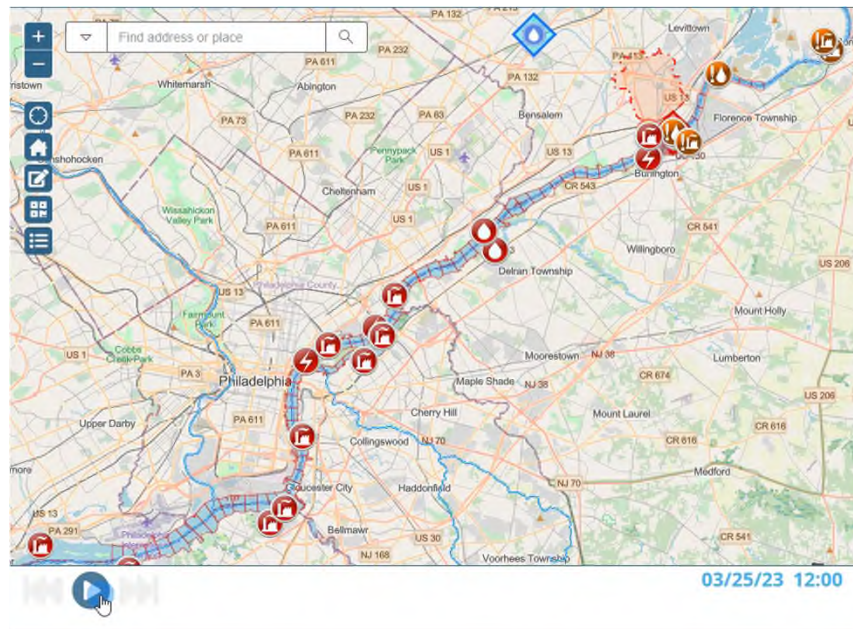
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March 25, 2023 drone footage near the Burlington Bristol Bridge, looking upstream to Bristol, PA.

Next Steps

- Product was obtained from spill site
 - Provided to Aqua Lab and neighboring utilities
- Coordinated testing with Aqua Lab
- EWS Tidal Model updated



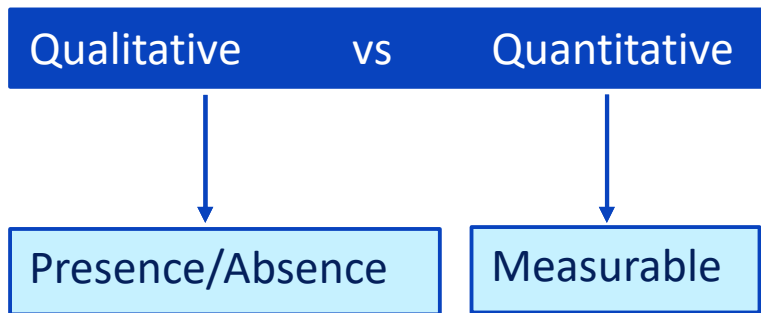
Laboratory Testing

- Aqua's accredited environmental laboratory:
 - Certified in five states including PA and NJ for analysis of drinking water and wastewater
 - Runs 90,000 tests annually for compliance and operational sampling.
 - Utilizes instrumentation such as GC/MS, LC/MS & ICP-MS
- The laboratory employs a team of 20 chemists, microbiologists and quality assurance specialists
 - Operates 7-days a week
- Consists of three sections:
 - Microbiology
 - Inorganic Chemistry
 - Organic Chemistry



East Palestine Derailment

- February 3rd, 2023 – Norfolk Southern Train derailed
- Multiple chemicals listed on manifest
- Qualitative scans initially
- Quantitative: Operational method developed for several acrylate compounds
 - Butyl Acrylate
 - Ethyl Methacrylate
 - 2-Ethylhexyl acrylate
 - Methyl acrylate



<https://abcnews.go.com/US/ntsb-holds-2-day-hearing-east-palestine-toxic/story?id=100144838>

Delaware River Spill – Compounds of Interest

- Trinseo provided SDS, “Product Recipe”, and chemist input to what made up the spilled latex material
- Technical teams of the water suppliers worked together to identify the constituents of interest and how to test and quantify them

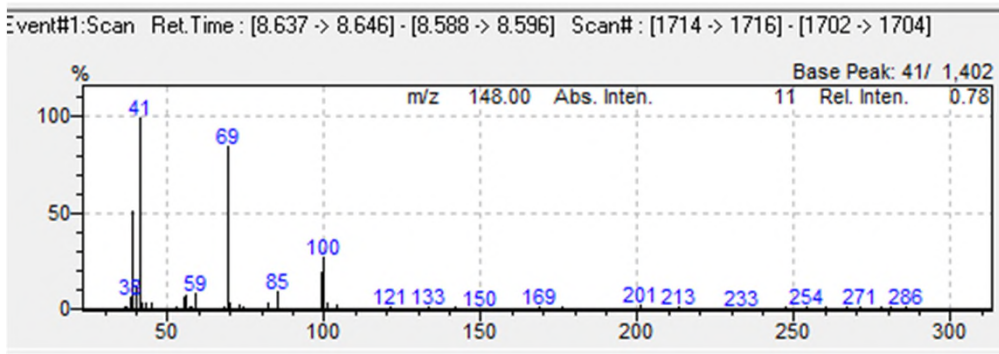
Unregulated VOCs of interest



Methyl Methacrylate
Butyl Acrylate
Ethyl Acrylate

Laboratory Analysis

- Aqua’s Bryn Mawr lab served as a first source for lab support for all parties
 - EPA Method 524.3
 - Operational acrylate method
 - Initially qualitative scans for MMA and EA
 - Used source material as reference/fingerprint
 - Obtained standard for MMA



MS spectrum of MMA from “raw material” sample

Analyte	Calibration Range
Methyl Acrylate	1.0ppb – 50ppb
Butyl Acrylate	
Ethyl Methacrylate	
2-Ethylhexyl Methacrylate	
Methyl Methacrylate	

The Lab was measuring MMA and BA down to 1 ppb; EA was only able to be “detected” since no standard existed for it at the time in Aqua’s Lab

Health Effects

What level is safe for human ingestion?

Regional Screening Level (RSL) Resident Tap Water Table (TR=1E-06, HQ=1) November 2022

T; D = OW; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer CHILD Hazard Index (HI) = 1				
Analyte	CAS No.	Ingestion SL TR=1E-06 (ug/L)	Dermal SL TR=1E-06 (ug/L)	Inhalation SL TR=1E-06 (ug/L)	Carcinogenic SL TR=1E-06 (ug/L)	Ingestion SL Child THQ=1 (ug/L)	Dermal SL Child THQ=1 (ug/L)	Inhalation SL Child THQ=1 (ug/L)	Noncarcinogenic SL Child THI=1 (ug/L)	MCL (ug/L)
Endrin	72-20-8					6.0E+00	3.7E+00		2.3E+00	2.0E+00
Epichlorohydrin	106-89-8	7.9E+00	7.9E+02	4.7E+00	2.9E+00	1.2E+02	1.3E+04	2.1E+00	2.0E+00	
Epoxybutane, 1,2-	106-88-7							4.2E+01	4.2E+01	
Ethanol, 2-(2-methoxyethoxy)-	111-77-3					8.0E+02	1.3E+06		8.0E+02	
Ethephon	16672-87-0					1.0E+02	4.2E+04		1.0E+02	
Ethion	563-12-2					1.0E+01	7.7E+00		4.3E+00	
Ethoxyethanol Acetate, 2-	111-15-9					2.0E+03	2.3E+05	1.3E+02	1.2E+02	
Ethoxyethanol, 2-	110-80-5					1.8E+03	6.3E+05	8.3E+01	8.0E+01	
Ethyl Acetate	141-78-6					1.4E+04	9.7E+05	1.5E+02	1.4E+02	
Ethyl Acrylate	140-88-5					1.0E+02	3.0E+03	1.7E+01	1.4E+01	
Ethyl Chloride (Chloroethane)	75-00-3							8.3E+03	8.3E+03	

Contaminant Name	#	CHRONIC VALUES (ppb)				INTERMEDIATE VALUES (ppb)		
		ATSDR CREG	ATSDR Chronic EMEGs		ATSDR Chronic RMEGs		ATSDR Intermediate EMEGs	
			Child	Adult	Child	Adult	Child	Adult
Methamidophos					0.35	1.3		
Methanol					14,000	52,000		
Methidathion					7.0	26		
Methomyl					180	650		
Methoxychlor					35	130	35	130
Methyl methacrylate					9,800	36,000		

This information was provided by EPA to help us assess at what level the VOCs of interest were of human health concern.



Butyl Acrylate: 560 ppb
Methyl Methacrylate: 9,800 ppb
Ethyl Acrylate: 100 ppb

Lab detection limit for MMA and BA was 1.0 ppb

Lab/Operations Synergy

Lab Liaison

- Provided 24-hour staffing of laboratory
- Coordinated sample receiving
- Results communication from lab staff to Operations Liaison

Operations Liaison

- Sample collection and delivery
- Results communication to plant staff to provide GO/NO-GO for plant startup

Coordination Strategy

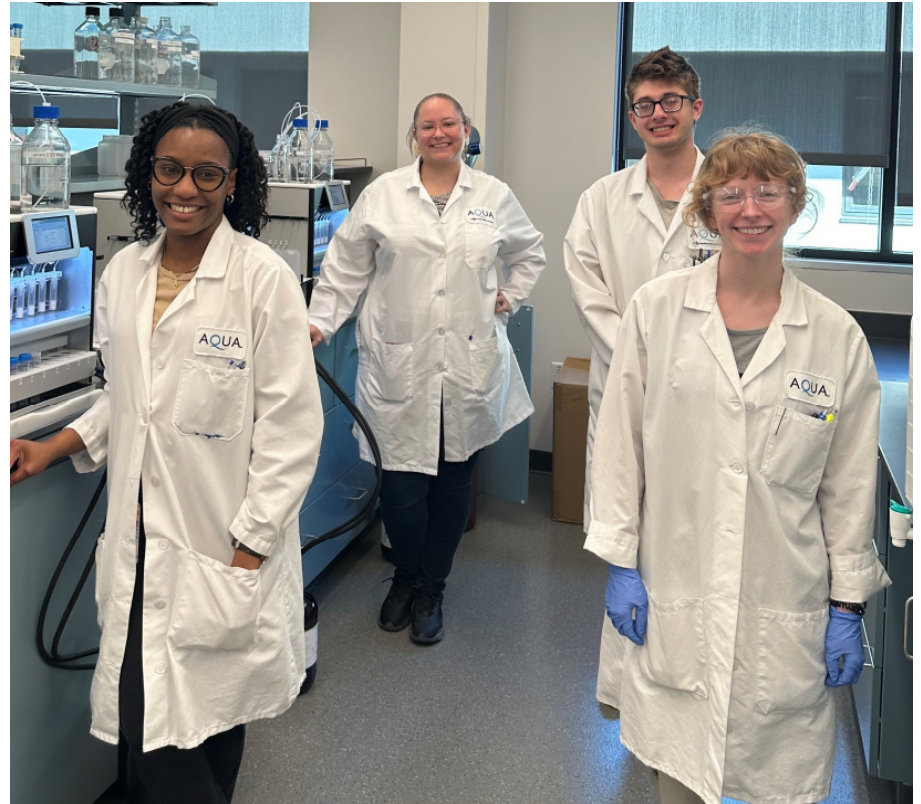
1. Tide goes out – no visible plume
2. Odor panel at plant
3. Sample collection/delivery to lab
4. Sample result communication
5. Odor panel at plant
6. Plant startup

Summary

- Total number of samples analyzed for entire event = 145

Between 3/25 and 4/2

Sample Count	
Aqua PA	70
Other	75





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