

East Palestine Train Derailment and Controlled Burn: Environmental Data Review Update (August 2023 - April 2024)



Introduction and Purpose

On February 3, 2023, a Norfolk Southern freight train derailed in East Palestine, Ohio. Twenty rail cars contained hazardous materials. These materials included vinyl chloride, ethylene glycol, ethylhexyl acrylate, butyl acrylate and isobutylene. Vinyl chloride in the derailed rail cars was considered unstable and potentially explosive. Rather than let an explosion happen, Norfolk Southern decided to do a controlled burn release of the vinyl chloride.

The derailed train caused a cascade of activities. Federal and state agencies began extensive environmental monitoring, including sampling and monitoring of air, drinking water, surface water, sediment, groundwater and soil. Other studies monitored and assessed potential chemical exposures for residents and responders.

U.S. EPA made its Technical Assistance Services for Communities (TASC) program available to support the village of East Palestine. In coordination with East Palestine officials, TASC prepared the East Palestine Train Derailment and Controlled Burn: Environmental Data Review Report. The report came out in October 2023. It describes the types of environmental data gathered to understand the contamination released during the train derailment and subsequent controlled burn accomplished as of August 1, 2023. It also summarizes assessment of chemical exposure (ACE) studies focused on public health. TASC compiled as much data as possible from publicly available resources for the report.



Sampling and monitoring continued beyond August 1, 2023 – the cut-off date for environmental data reviewed in TASC’s October 2023 report. This fact sheet summarizes monitoring and sampling results from August 1, 2023, through April 19, 2024.¹

Summary of Completed Environmental Sampling and Results Since August 1, 2023

The purpose of environmental monitoring in and around East Palestine is to determine the type, amount and location of contamination, as well as possible human health impacts related to the release of the spilled materials and fallout from the controlled burn. U.S. EPA took the lead, monitoring media of concern to the community (air, soil, surface water and sediment). Since the impacts of the derailment and controlled burn extended across state boundaries, representatives from the states of Ohio and Pennsylvania also provided support. Since contaminants could move downstream and affect neighboring communities, Allegheny County in Pennsylvania and two cities (Cincinnati, Ohio, and Louisville, Kentucky) also participated.

Table 1 lists the entities and the types of samples that TASC summarized in its October 2023 report. Since that time, U.S. EPA, Ohio EPA, Norfolk Southern and their contractors have collected data from more air, soil, surface water, sediment, drinking water (groundwater) and biological samples. Table 1 highlights the datasets updated since TASC’s October 2023 report and summarized in this fact sheet.²

¹ The report, the report summary and the report presentation are available on the village of East Palestine’s [Health and Safety webpage](#).

² U.S. EPA’s TASC program provided the East Palestine Train Derailment and Controlled Burn: Environmental Data Review Report and this fact sheet. Their contents do not necessarily reflect the policies, actions or positions of U.S. EPA.

Table 1: Environmental Sampling Conducted to Date, by Material and Lead Party

Material	Entity									
	U.S. EPA	Ohio DNR ¹	Ohio EMA ²	Ohio EPA	PDEP ³	County ⁴	Ohio Dept. of Health	ORSA N-CO ⁵	COC ⁶	City of Louisville
Air	√				√	√				
Drinking Water			√	√	√	√	√	√	√	√
Surface Water	√			√	√					
Sediment	√									
Groundwater				√	√					
Soil	√				√					
Biological ⁷		√		√	√					

Notes:

1. Ohio Department of Natural Resources
 2. Ohio Environmental Management Agency
 3. Pennsylvania Department of Environmental Protection
 4. Allegheny County (air) and Columbiana County (drinking water)
 5. Ohio River Valley Sanitation Commission
 6. City of Cincinnati
 7. Ohio EMA summarizes crop studies completed by the Ohio Department of Agriculture and Ohio State University.
- √ – Dataset amended since the October 2023 TASC report and incorporated into this fact sheet.

Updated Results, by Environmental Material

This section describes the environmental sampling conducted since TASC’s October 2023 environmental data review report, from August 1, 2023, through April 19, 2024. It includes a description of the sampling as well as results and conclusions. Web site links for each reference is provided at the end of this report.

Air Sampling Results

EPA and Norfolk Southern continued to collect air samples, monitoring for potential contaminants of concern, including volatile organic compounds (VOCs) such as vinyl chloride, n-butyl acrylate and 2-ethylhexyl acrylate. Air sampling involves the collection of air for laboratory analysis. Air sampling measures how much of a contaminant is present in the air over a set period. For this response, samples are collected over periods ranging from four hours to 24 hours. Samples are sent to a laboratory for analysis.

U.S. EPA’s East Palestine Air Sampling Data website (EPA, 2024a) provides sampling results. TASC reviewed and evaluated all data for samples taken after August 1, 2023. Data were available for air samples taken through November 5, 2023.

- The U.S. EPA database includes 58,559 air sample analysis results for samples collected from August 1 through November 5, 2023. In total, 6,204 of these results show chemical detections. The other 52,355 results are either non-detect (below the instrument’s ability to detect a chemical) or estimated due to levels being too low to determine accurately.
- Environmental staff completed sampling every day using several methods, including summa canisters, badges and sorbent tubes. Table 2 includes a summary of representative days from August through November. The table

shows that sampling detected relatively few chemicals and these chemicals were detected at very low concentrations. The table also shows that the number of detected chemicals increased from September 30 to October 1. This increase is due to the expanded suite of chemical analysis completed for each sample. The increase is not an indication of derailment-related chemical releases. No chemicals were detected in concentrations above levels considered safe by U.S. EPA.

Table 2: Air Sampling Results, August through November 2023^a

Date (2023)	Aug. 1	Aug. 15	Aug. 30	Sep. 1	Sep. 15	Sep. 30	Oct. 1	Oct. 15	Oct. 30	Nov. 3
Number of Locations Sampled	8	8	8	8	8	8	15	8	15	15
Number of Analytes Tested	123	108	144	117	117	104	616	616	616	618
Number of Chemicals Detected ^b	0	0	0	0	0	0	69	50	56	69
<i>Notes:</i>										
a. TASC obtained summaries from the full database downloaded on April 19, 2024. This summary captures only those samples taken from August 1 through November 5, 2024.										
b. Number of chemicals that were not estimated (J qualified) or non-detect (U qualified).										

In conclusion, the additional air sampling results indicate that air quality continues to be good. The data available on the U.S. EPA website as of April 19, 2024 are incomplete. Samples were collected beyond November 5, 2023. However, data review and validation are ongoing. Therefore, this dataset will likely be amended in the future.

Drinking Water and Groundwater Results

East Palestine village's municipal drinking water comes from groundwater. Throughout the derailment response, Ohio EPA tested drinking water from East Palestine's municipal water wells every week. Ohio EPA also sampled groundwater monitoring wells located between the municipal wells and the derailment site every week. These wells are referred to as sentinel, shallow and deep monitoring wells. They are installed to monitor for potential groundwater contamination that could be moving toward the municipal wells.

TASC reviewed East Palestine village drinking water sample results collected since the publication of TASC's October 2023 environmental data review report. To date, no chemicals associated with the derailment have been detected in East Palestine's municipal water supply. Chemicals detected are associated with other common sources such as agriculture and water treatment. East Palestine's drinking water webpage (hosted by Ohio EPA) provides a full description of the sample results and what they mean (epa.ohio.gov/divisions-and-offices/drinking-and-ground-waters/reports-and-data/ep-drinking-water-results). Other entities sample drinking water for communities downstream (cities of Louisville and Cincinnati) that rely on surface water. The surface water section of TASC's October 2023 environmental data review report discusses these drinking water assessments in more detail.

U.S. EPA's groundwater data website lists groundwater sampling results from the sentinel, shallow and deep monitoring wells. Table 3 lists the data available from U.S. EPA's website. Ohio EPA also posted results from these wells on its website (Ohio EPA, 2024). Results indicate there have not been any derailment-related chemicals detected in any of the monitoring wells.

Table 3. Summary of Recent Groundwater Sampling Results Provided on U.S. EPA’s Groundwater Data Website

Type of Well	Location	Date Sampled (2023)	Number of Analytes Tested	Number of Chemicals Detected
Sentinel	SMW-04S	December 13	38	0
	SMW-04S DUP	December 13	38	1
	SMW-08	December 13	35	1
	SMW-09	December 14	38	0
	SMW-18	December 19	37	0
Shallow	STW-29	December 8	37	0
	STW-31	December 8	37	0
	STW-32S	December 7	3	0
Deep	MW-03	December 5	38	0
	MW-05	December 6	37	0
	MW-07	December 6	37	0
	MW-10	December 14	3	0

Surface Water Results

Environmental staff members conduct surface water sampling to identify any impacts on Leslie Run and Sulphur Run drainages as well as more streams downstream. U.S. EPA, Ohio EPA and Norfolk Southern are completing these studies. U.S. EPA’s East Palestine Water Data website states that 3,700 surface water samples have been collected (as of April 2024).

TASC reviewed surface water data available as of April 2024 and compared it to the previously evaluated dataset compiled for TASC’s October 2023 environmental data review report. There were no additional sample results in this dataset that the report had not already summarized. The U.S. EPA database contains results from 16 samples taken from 13 locations gathered from the beginning of the emergency response (from February 4 through February 14, 2023).

Ohio EPA collects surface water samples from 20 locations beginning at the derailment site in East Palestine and progressing downstream to the Ohio River. The agency evaluates water quality, sediment quality, bacteria, stream habitat, and biology (fish and insects). It has been using biology to help evaluate streams since the 1970s. Ohio EPA has been evaluating the streams impacted by the derailment as part of its ongoing Little Beaver Creek watershed studies, which took place in 1985, 1999 and 2022. Ohio EPA posted an update to its surface water studies in 2023. Results indicate that stream water quality is close to pre-derailment conditions.

The Ohio River Valley Water Sanitation Commission (ORSANCO) and Louisville Water Company evaluate surface water from the Ohio River to determine if derailment contamination has moved downstream to their water intakes. There has been no additional information added since TASC’s October 2023 environmental data review report. The report said that they found no derailment-related chemicals detected in their samples.

The measured concentrations of chemicals detected in surface water consistently show that levels of chemicals from the derailment remained below levels considered hazardous to human health and the environment. However, U.S. EPA still urges area residents to avoid the creeks. Some areas most impacted by the derailment are marked with “keep out” signs to deter people from using the water while investigations and cleanup efforts are ongoing.

Sheen Results

U.S. EPA issued an order under the Clean Water Act requiring that Norfolk Southern conduct sheen investigations focused on oily sheens and sediments in Sulphur Run and Leslie Run. Norfolk Southern assessed the creek at 739 locations downstream of the derailment and 89 background locations (upstream locations not impacted by the derailment). Figure 1 highlights the downstream locations (orange areas) and background locations (green areas).

Preliminary results indicate that oil-related compounds are predominant where sheen is present, and sheen is present when sediments are disturbed in more than half of the waterways (see the discussion of sediment in the next section). In Leslie Run, 59% of locations had some sheen, compared to 66% of locations in Sulphur Run. In background locations, 92% of areas had no sheen. Using U.S. EPA’s East Palestine Derailment Qualitative Sheen Assessment Dashboard, people can select different stream segments to see the breakdown of the sheen results observed in each segment, as well as photos from different points along the segment.

U.S. EPA’s water database contained one “free product” sample result (location SW03-SR) that was analyzed for 127 VOCs and semi-volatile organic chemicals (SVOCs) (EPA, 2024c). Free product is material that is representative of the original, released material such as the spilled vinyl chloride. Only one chemical (vinyl chloride) was detected.

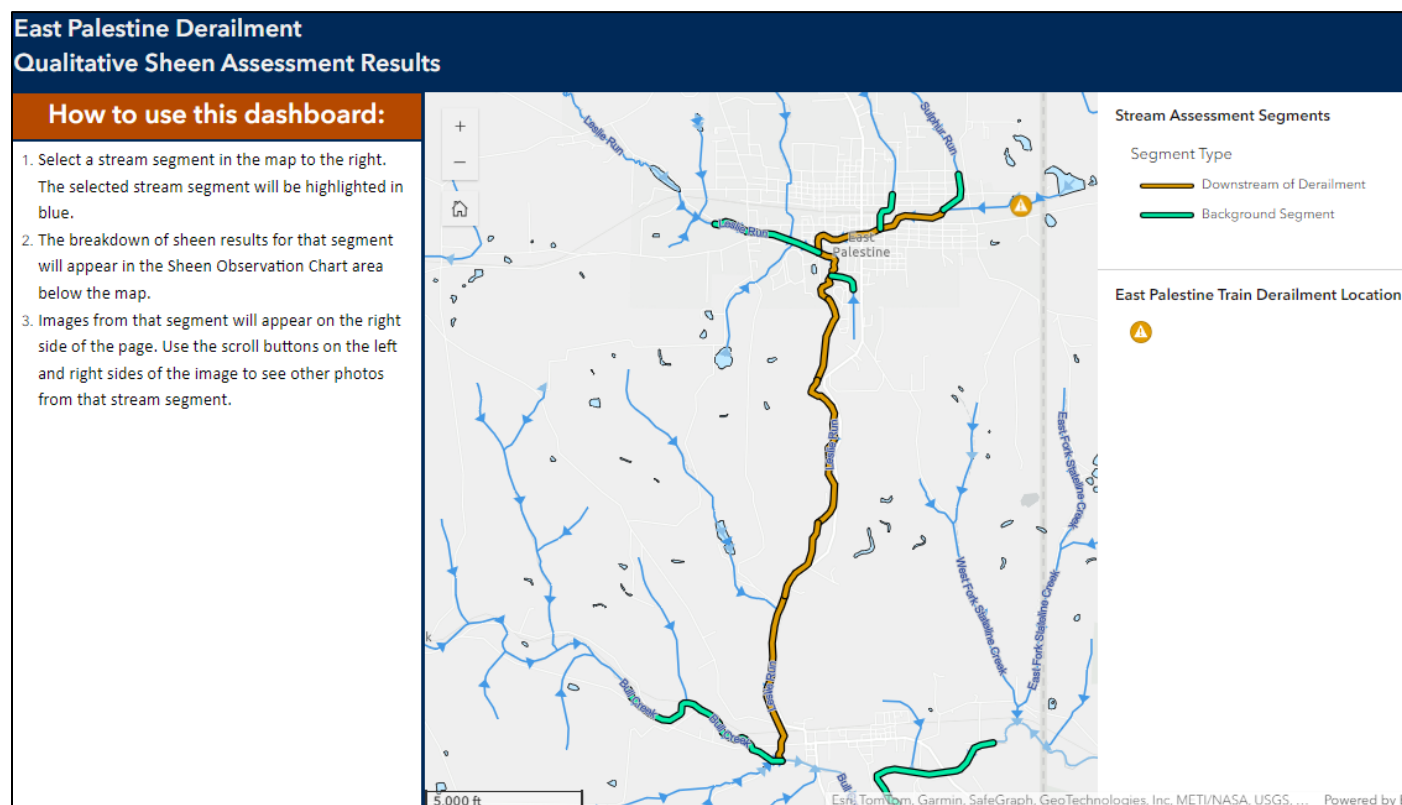


Figure 1. Screenshot of U.S. EPA’s East Palestine Derailment Qualitative Sheen Assessment Dashboard (www.epa.gov/east-palestine-oh-train-derailment/qualitative-sheen-assessment-results).

Sediment Results

Environmental staff members conduct sediment sampling to identify impacts on the Leslie and Sulphur Run drainages. Results are provided on U.S. EPA’s East Palestine Soil and Sediment Data website (U.S. EPA, 2024d). TASC reviewed the data available as of April 19, 2024, and compared it to the previously evaluated sediment dataset compiled for TASC’s October 2023 environmental data review report. Table 4 below lists more sample results collected from July through November 2023.

- About 233 sediment samples have been collected from strategic locations and analyzed for a select suite of SVOCs and VOCs. Both surface sediment samples (0 to 6 inches in depth) and subsurface samples (6 to 12 inches in depth) were collected.
- Table 4 lists the recent samples collected and their results. A review of the data found that the sampling detected chemicals at low concentrations.

Table 4. Summary of Recent Sediment Sampling Results

Date (2023)	Number of Locations Sampled	Total Number of Analytes	Total Number of Chemicals Detected
July 26	1	84	31
July 27	2	168	10
August 1	1	42	9
August 9	1	42	2
August 10	2	84	6
August 11	3	215	32
November 3	1	47	7
November 6	1	47	4
November 7	2	94	15
November 9	1	47	11
November 10	4	235	25
November 13	1	47	9
November 14	3	141	8
November 15	1	46	3
November 20	1	187	15
November 21	2	235	33
November 27	3	120	4
November 28	3	234	9

The sediment sample results indicate that the impacts to sediment are low and sediment quality is improving. In addition to these results, other studies show that the ecological conditions in the streams are improving (Ohio EPA, 2023 and 2024).

Soil Results

Investigations of soils impacted by the derailment focus on soils in the East Palestine City Park and agricultural croplands. This research helps map the spill area and soot depositional area as a whole and verifies the effectiveness of removal cleanup actions. At the time of this report (April 2024), U.S. EPA estimates that about 6,232 soil samples have been collected. Only a small set of these analytical results was available at the time of TASC’s October 2023 environmental data review report, including the City Park soils analysis. Soil analysis results are provided through technical reports and posted in table summaries provided on U.S. EPA’s website (U.S. EPA, 2024e). TASC was unable to access the original soils database from which these conclusions were drawn. However, summaries of soil conditions on U.S. EPA’s webpage support U.S. EPA’s findings (shared below).

- The Phase 1 soil sampling results from 146 locations (collected in spring 2023) showed that properties are suitable for normal use, including recreation and gardening. Most results fell within typical background ranges for rural and urban/suburban soil. A few data points with higher results were associated with commercial/industrial properties or located on the public right of way (next to a road/highway). In October 2023, U.S. EPA published a technical report providing analysis of the soil sampling data confirming that the “vent and burn” did not significantly contribute to background dioxin deposition in the area. The report concluded that residents can continue to use their properties normally, including for recreation and gardening.
- In mid-September 2023, the final site characterization process began. This process was designed as a “double-check” to make sure all derailment-related soil contamination has been identified and that cleanup has been successful. In all, more than 2,500 samples will have been collected through spring 2024 under this plan.

In conclusion, available soils information indicates that potentially impacted soils are returning to pre-derailment conditions. Sampling and verification are ongoing as part of completing removal action activities. U.S. EPA will likely post final soils data on its website once this information is compiled.

Biological Results

Various entities sample biological materials – aquatic life (fish) and plants (crops) – to determine if they have accumulated derailment-related contaminants. At the time of TASC’s October 2023 environmental data review report, the information from these studies was still being evaluated. Conclusions have since been developed and include:

- During summer 2023, Ohio EPA and the Ohio Department of Natural Resources conducted fish surveys and other biological assessments to evaluate if and how Sulphur Run and Leslie Run were recovering. Fish sampling results indicated that the waterways have mostly recovered to pre-derailment conditions (Ohio EPA, 2023).
- The agricultural plant tissue sampling results gathered by the Ohio Department of Agriculture (ODA) and Ohio State University (OSU) College of Food, Agricultural and Environmental Sciences were finalized and documented. Results show plant materials from agricultural sites in the East Palestine area are not contaminated with SVOCs associated with the train derailment (ODA OSU, 2023).


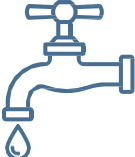
Updated Environmental Results Summary






- Air results continue to show minimal detection of VOCs associated with active removal action activities. In general, the air quality is good.
- Monitoring of public water supplies (drinking water and groundwater) continues to show that there are no derailment/controlled burn chemicals of concern impacting these sources. Results for private wells are shared

with well owners. They are not publicly available.

- Surface water, sheen and sediment sampling took place next to the derailment and along streams that may carry spilled materials toward drinking water supplies. More results have become available since TASC’s October 2023 environmental data review report. Results indicate that the streams are recovering to pre-derailment conditions, although occasional sheen may be present.
- Soils information continues to be made available to the public. Results indicate that soil cleanup activities can be verified and soils in residential and commercial areas are safe.
- Biological samples of fish show signs of recovery to pre-derailment conditions. Crops do not contain any detectable levels of derailment-related SVOCs.

Environmental Data Reviewed and TASC Level of Concern Based on Data Reviewed

Affected Part of the Environment	Data Reviewed	Level of Concern Based on Data Reviewed
Air 	Allegheny County, Air Quality. www.alleghenycounty.us/Services/Health-Department/Air-Quality.aspx .	Low
	U.S. EPA. <ul style="list-style-type: none"> • Air Sampling Data. www.epa.gov/east-palestine-oh-train-derailment/air-sampling-data. • Air Monitoring and Sampling Data. www.epa.gov/east-palestine-oh-train-derailment/air-monitoring-and-sampling-data. 	Low
Drinking Water 	Columbiana County Health District: East Palestine Drinking Water Sampling Results. www.columbiana-health.org/resources .	Low
	City of Cincinnati. Ohio River Test Results. www.cincinnati-oh.gov/water/news/ohio-river-test-results-show-no-contaminants .	Low
	Louisville Water. louisvillewater.com/news/louisville-pure-tap-water-you-can-trust-is-safe . Data Chart. louisvillewater.com/wp-content/uploads/2023/02/022123-Lab-Results-Chart.pdf .	Low
	Ohio EPA. East Palestine Drinking Water Test Results. epa.ohio.gov/monitor-pollution/pollution-issues/east-palestine . East Palestine Municipal Drinking Water Results. epa.ohio.gov/divisions-and-offices/drinking-and-ground-waters/reports-and-data/ep-drinking-water-results .	Low
	ORSANCO Data Download. www.orsanco.org/wp-content/uploads/2023/05/East-Palestine-Train-Derailment-Data-from-GCWW-PUBLIC-050323.pdf Derailment-Data-from-GCWW-PUBLIC-040623.pdf .	Low

Affected Part of the Environment	Data Reviewed	Level of Concern Based on Data Reviewed
	Pennsylvania Department of Environmental Protection (PDEP). East Palestine Train Derailment: PDEP Interactive Map Address (Public Water and Private Wells). experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69 .	Low
Surface Water 	Ohio EPA. East Palestine Surface Water Sampling. epa.ohio.gov/divisions-and-offices/surface-water/reports-data/ep-surface-water-results . Surface Water Sampling Map. geo.epa.ohio.gov/portal/apps/dashboards/9ce820a86edd48b7bd0f0e5365552d14 .	Low
Sheen 	U.S. EPA. Water Sampling Data. www.epa.gov/east-palestine-oh-train-derailment/water-sampling-data . ³	Low
Groundwater 	Ohio EPA. Summary of Detections in East Palestine’s Wells. epa.ohio.gov/static/Portals/47/citizen/response/East-Palestine-RawSummaryofDetections.pdf .	Low
Soil 	PDEP. East Palestine Train Derailment: PDEP Interactive Map Address – Soil. experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69 .	Low
Biological 	U.S. EPA. <ul style="list-style-type: none"> Soil and Sediment Sampling Data. www.epa.gov/east-palestine-oh-train-derailment/soil-and-sediment-sampling-data. City Park Soil Sampling Results. www.epa.gov/east-palestine-oh-train-derailment/city-park-soil-sampling-results .	Low
	Ohio Department of Natural Resources (Ohio DNR). Update on East Palestine Train Derailment Impact to Wildlife. ohiodnr.gov/discover-and-learn/safety-conservation/about-ODNR/news/Train-Derailment . Ohio DNR Map of Aquatic Species Collection Sites (Fish Kill Monitoring Stations). mcusercontent.com/9762d9943f454cab103416c32/files/08564e87-6b3e-f32b-1b4b-4f7c6892d4e4/NS_East_Palestine_Fish_Survey_Map_Updated.pdf .	Low
	PDEP. East Palestine Train Derailment: PADEP Interactive Map Address - Plants. experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69 .	Low

³ See information source for singular free product result found in the water database.

Resources

U.S. EPA, 2024a. East Palestine, Ohio Train Derailment, Air Sampling Data (downloaded April 19, 2024). www.epa.gov/east-palestine-oh-train-derailment/air-sampling-data.

U.S. EPA, 2024b. East Palestine, Ohio Train Derailment, Water Data. www.epa.gov/east-palestine-oh-train-derailment/water-sampling-data.

U.S. EPA, 2024c. East Palestine, Ohio Train Derailment, Qualitative Sheen Assessment Results. www.epa.gov/east-palestine-oh-train-derailment/qualitative-sheen-assessment-results.

U.S. EPA, 2024d. East Palestine, Ohio Train Derailment, Soil and Sediment Data. www.epa.gov/east-palestine-oh-train-derailment/soil-and-sediment-data.

U.S. EPA, 2024e. East Palestine, Ohio Train Derailment, Phase One Residential, Commercial, and Agricultural Soil Sampling Results. www.epa.gov/east-palestine-oh-train-derailment/phase-one-residential-commercial-and-agricultural-soil-sampling.

Louisville Water Company, 2023. louisvillewater.com/news/see-the-data-you-can-trust-the-quality-of-louisvilles-drinking-water and louisvillewater.com/wp-content/uploads/2023/02/LouWater-River-Samples-for-ButylAcrylate.pdf.

Ohio EPA, 2023. Division of Surface Water: Water Quality in Leslie Run and Sulphur Run (update to Ohio EPA surface water studies posted in October 2023). epa.ohio.gov/static/Portals/47/citizen/StreamUpdate.pdf.

Ohio EPA, 2024. East Palestine Train Derailment Information. epa.ohio.gov/monitor-pollution/pollution-issues/east-palestine.

ODA and OSU College of Food, Agricultural, and Environmental Sciences, 2023. Agricultural Plant Tissue Sampling Results. May 16, 2023. ema.ohio.gov/media-publications/east-palestine-derailment-info/testing-results#:~:text=Plant%20Tissue%20Testing%20Results,-The%20Ohio%20Department&text=Analysis%20of%20scientific%20data%20by,associated%20with%20the%20train%20derailment.

ORSANCO, 2024. Ohio River Valley Water Sanitation Commission, East Palestine Ohio Train Derailment Spill Response. www.orsanco.org/east-palestine-train-derailment-spill-response and www.cincinnati-oh.gov/water/news/ohio-river-test-results-show-no-contaminants.