

East Palestine Train Derailment and Controlled Burn: Environmental Data Review



Introduction and Purpose

On February 3, 2023, a Norfolk Southern freight train derailed in East Palestine, Ohio. Twenty rail cars contained hazardous materials, including 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 made the decision to do a controlled burn release of the vinyl chloride.

The derailed train caused a cascade of activities. Emergency response workers, first on the scene, addressed immediate hazards, followed by officials and workers associated with a variety of federal and state agencies and representatives who began extensive environmental monitoring. These activities included 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 a report titled “East Palestine Train Derailment and Controlled Burn: Environmental Data Review.” It describes the types of environmental monitoring 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.¹ TASC compiled as much data as possible from publicly available resources for the report.

The Report’s Information Review Findings

The purpose of the environmental monitoring and ACE studies is to determine the type, amount, and exact location of contamination, and possible human health impacts related to the release of the spilled materials and fallout from the controlled burn. For example, results from the emergency response air sampling help identify immediate risks to human health. Results from train derailment area soil samples help delineate the footprint of contaminated soils for removal. Groundwater monitoring helps determine if chemicals are moving toward the municipal water supply well field. Surface water and sediment samples help determine if spill-related chemicals are moving downstream. In addition, the potential footprint of the controlled burn ash fallout was evaluated by collecting soils from around the community, including residential areas. Collection of environmental samples is ongoing.

- *Air* results show volatile organic chemicals (VOCs) detected above levels protective of human health on dates during the controlled burn and during intense cleanup activity at locations near the derailment. Ongoing monitoring of air using monitoring methods identified some air quality concerns that were often short term (hours in length) and occur in areas near the derailment.
- *Drinking water* monitoring of public water supplies shows that there are no derailment/controlled burn chemicals of concern impacting these sources. The results for private wells are shared with well owners and are not publicly available.
- *Surface water* sampling took place next to the derailment and along streams that may carry spilled materials toward drinking water supplies. Limited results are available. They show the presence of chemicals around the train derailment area that quickly became undetectable downstream.

¹ U.S. EPA’s TASC program provided the TASC report (East Palestine Train Derailment and Controlled Burn: Environmental Data Review) and this fact sheet. Their contents do not necessarily reflect the policies, actions or positions of U.S. EPA.






- *Sediment* sampling took place in a similar fashion to surface water, with samples collected next to the derailment and along streams that may carry spilled materials. Only a limited amount of chemical analysis data is publicly available. These data likely reflect conditions prior to cleanup actions. Available results show that most of the contamination was limited to the derailment area and had not moved downstream at the time of sampling.
- *Groundwater* information relates primarily to the drinking water well data described above. However, Ohio EPA is also collecting groundwater information to monitor the possible movement of derailment contamination toward the East Palestine municipal well field. No data suggest that groundwater has been contaminated by the derailment.
- *Soils* were tested immediately after and close to the derailment. More soils have been collected from East Palestine City Park and residential areas impacted by the deposition of soot. The soils collected immediately after the derailment in areas near the derailment had polycyclic aromatic hydrocarbons (PAHs) at levels higher than levels considered protective of human health. However, the sampling collection area has been the focus of cleanup efforts. Results from the areas within the soot deposition footprint found minimal chemicals at levels above typical concentrations observed in industrial areas. Targeted sampling of soils at East Palestine City Park on March 9, 2023, did not identify any contaminants at levels of concern. More residential soils data gathered as part of the soot deposition study and more soils data collected as part of ongoing soil remedy efforts are forthcoming.
- *Samples from crops and monitoring of aquatic life.* Results indicate that there are no contaminants at levels of concern in crop tissues. The Ohio Department of Natural Resources (Ohio DNR) initially conducted monitoring efforts to identify impacts on aquatic life. Results showed increased impacts on aquatic life (e.g., fish kills) early on after the derailment related to chemical release.
- *Assessment of chemical exposure, or ACE, studies* identify possible health impacts to both residents and first responders. Reported symptoms from chemical exposure potentially related to the derailment and controlled burn included headaches, irritation of the eye, anxiety, coughing, and at least one new or worsening symptom affecting mental health, which could include tiredness, difficulty sleeping, nervousness, agitation, feeling hopeless or unexplained fear.







What Additional Information is Needed?

TASC's information review found a large amount of data that addresses significant questions and concerns related to the derailment and controlled burn. TASC's review also identified a few possible data gaps:

- Need for sampling of *dioxins, furans and PAHs* in surface water, sediment and groundwater.
- Need for *per- and polyfluoroalkyl substances (PFAS)* sampling. PFAS are a part of aqueous film-forming foams used for flammable liquid fires (also called Class B fires). PFAS are of concern because they can move through soils and contaminate drinking water sources and can build up (bioaccumulate) in fish and wildlife. TASC recommends sampling drinking water, surface water, sediment, groundwater and soils near the derailment and controlled burn areas to confirm the presence or absence of these chemicals.
- Need to sample for *cyanide*, which can result after butyl acrylates break down.

Environmental Data Reviewed, and TASC Level of Concern based on Data Reviewed

| Affected Part of the Environment | Data Reviewed | Level of Concern Based on Reviewed Data |
|--|--|---|
|  <p>Air</p> | <p>Allegheny County, Air Quality. www.alleghenycounty.us/Health-Department/Programs/Air-Quality/Air-Quality.aspx</p> | Low |
| | <p>U.S. EPA.</p> <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 |
|  <p>Drinking Water</p> | <p>Columbiana County Health District: East Palestine Drinking Water Sampling Results. www.columbiana-health.org/resources/</p> | Low |
| | <p>City of Cincinnati. Ohio River Test Results. www.cincinnati-oh.gov/water/news/ohio-river-test-results-show-no-contaminants/</p> | Low |
| | <p>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</p> | Low |
| | <p>Ohio Environmental Protection Agency (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</p> | Low |
| | <p>Ohio River Valley Water Sanitation Commission (ORSANCO). ORSANCO Data Download. www.orsanco.org/wp-content/uploads/2023/04/East-Palestine-Train-Derailment-Data-from-GCWW-PUBLIC-040623.pdf</p> | Low |
| | <p>Pennsylvania Department of Environmental Protection (PDEP). East Palestine Train Derailment: PDEP Interactive Map Address (Public Water and Private Wells). experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69</p> | Low |
|  <p>Surface Water</p> | <p>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. https://geo.epa.ohio.gov/portal/apps/dashboards/9ce820a86edd48b7bd0f0e5365552d14</p> | Low |
| | <p>Pennsylvania Department of Environmental Protection (PDEP). East Palestine Train Derailment: PDEP Interactive Map Address. experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69</p> | Low |
| | <p>U.S. EPA. Water Sampling Data. www.epa.gov/east-palestine-oh-train-derailment/water-sampling-data</p> | TBD |

| Affected Part of the Environment | Data Reviewed | Level of Concern Based on Reviewed Data |
|--|---|---|
| Sediment  | U.S. EPA. Soil and Sediment Sampling Data. www.epa.gov/east-palestine-oh-train-derailment/soil-and-sediment-sampling-data | TBD ² |
| 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 - Groundwater. experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69 | Low |
|  | 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 | TBD |
| Biological  | 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 |

² Based upon limited sediment sampling results available at the time of this review, TASC levels of concern regarding sediment contamination are low. However, results from a more recent large-scale U.S. EPA sampling effort are not yet available.