EPA Report Submitted Pursuant to Section 2(b) of Executive Order 14108

Executive Order 14108 on Ensuring the People of East Palestine Are Protected Now and in the Future[1]

October 20, 2023

[1] See 88 FR 66265 (9/26/23).

Executive Summary

On February 3, 2023, a Norfolk Southern Railway Co. train derailed in East Palestine, Ohio, releasing hazardous substances, causing a massive fire, and leading to the temporary evacuation of thousands of residents. U.S. Environmental Protection Agency (EPA) responders were on site within hours, and on February 21 the agency issued a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unilateral administrative order to hold the railroad accountable for cleaning up the mess they created. Since then, EPA has been directing and overseeing the extensive cleanup activities conducted by Norfolk Southern.

EPA's number one priority has been — and continues to be — the health and safety of the community. Since the disaster, EPA has collected more than 100 million air monitoring data points and more than 35,000 samples (air, water and soil) in and around the community. Air monitoring and air sampling are two different methods of looking at air quality. Air monitoring uses electronic devices to provide real-time readings of contaminants in the air. Air sampling involves collecting air over a period of time in a container that is then sent to a laboratory for analysis to identify and quantify specific compounds. This data collection continues, and ongoing science-based reviews show that residents of East Palestine are not in danger from contaminated drinking water, soil, or air from the derailment.

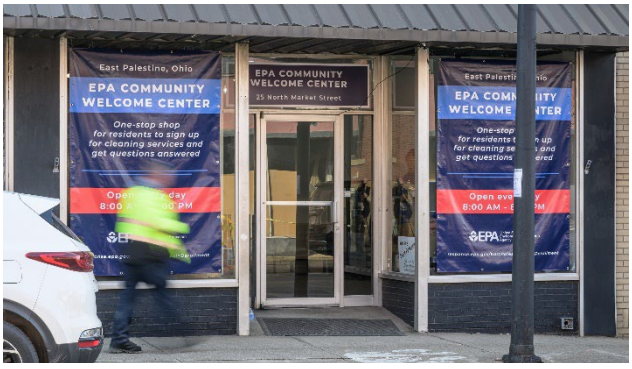

Figure 1. EPA opened a community welcome center in February to help residents get their questions answered.

Response "By the Numbers"

Remediation and Disposal

- *More than 165,000 tons of solid waste transported off site for disposal*
- *More than 35 million gallons of hazardous wastewater transported off site for disposal*
- *More than 2 million gallons of wastewater treated on site for "contained in" determination and subsequent disposal*

Personnel

- *Average number of regulatory agency personnel (including contractors) — 179*
- *Average number of Norfolk Southern personnel (including contractors) on site — 387*
- *Total number of assisting/cooperating Agencies — 15*

Health and Safety

- *More than 500,000 person hours worked on the response without a reportable OSHA or FRA incident*
- *More than 100 individual job hazard analysis/job safety analyses performed for all work performed on the site*
- *More than 750 views of the site health-and-safety orientation video*

Air Monitoring and Sampling

- *More than 100 million air monitoring data points collected for worker and community protection*
- *More than 18,000 total air samples collected for worker and community protection*

Surface Water Sampling

- *More than 3,400 surface water samples collected*

Monitoring Well Sampling

- *More than 600 monitoring well samples collected*

Drinking Water Sampling

- *290 individual private wells sampled*
- *1,011 total private well samples collected (up to 7 multiple rounds)*
- *34 rounds of sampling conducted on the public water supply wells*

Structure Cleaning

- *119 interviews scheduled (104 completed)*
- *80 cleanings scheduled (60 completed)*

Community Assistance/Outreach

- *EPA Welcome Center — more than 2,300 in-person visits and phone calls*
- *60 public meetings/events to provide information to the community*
- *22 editions of the community newsletter delivered throughout the area*
- *Norfolk Southern Family Assistance Center — more than 23,000 claims (more than 11,000 households)*

Since February, there has been tremendous progress towards removing contamination resulting from the derailment from the community — excavating and disposing of more than 165,000 tons of contaminated soil and shipping more than 35 million gallons of wastewater off-site. The contaminated soil and gravel beneath the train tracks at the derailment location have been excavated and transported off-site for disposal. Excavation of contaminated soil from affected areas near the tracks is nearly complete, and site-wide confirmation sampling is underway to double-check that all contamination resulting from the derailment has been removed.

EPA has been monitoring Norfolk Southern's work to provide temporary relocation assistance to residents while major cleanup work continues. As the voluntary relocation program winds down, EPA is overseeing an indoor cleaning program which the agency ordered Norfolk Southern to provide to eligible residents. This program will be completed after excavation in the impacted areas is complete.

Two streams, Leslie and Sulphur Runs, were also affected by the derailment. Surface water data have been collected regularly since the derailment. Almost no contaminants of concern have been detected at levels of concern in water in surface streams since early May. Ohio EPA data indicate that surface water in the creeks is generally back to pre-incident conditions. Some cleanup of sediments and surface water has occurred, and additional cleanup will be conducted as necessary. Accordingly, on October 18, 2023, EPA Region 5 issued a Clean Water Act § 311(c) Order to Norfolk Southern requiring the company to remove contaminated sediments in culverted areas of Sulphur Run and further delineate, characterize, and, as necessary, remove oil and hazardous substances from the sediments in Leslie and Sulphur Runs.

Communication with the surrounding communities and with state and local leaders has been a priority throughout the response effort, as has collaboration and engagement with other federal agencies, local and state government, local stakeholders (including community groups, businesses and others), researchers, and health agencies and providers. EPA personnel have led and participated in numerous meetings in the community to discuss the cleanup work. EPA Administrator Michael Regan has visited East Palestine four times since the derailment occurred, and Regional Administrator Debra Shore has visited nine times and more than 500 EPA staff have been involved in the response. EPA remains committed to the people of East Palestine, to the successful completion of the cleanup, and to the revitalization of their community.

Figure 2. Administrator Michael Regan being briefed by EPA on-scene coordinators during a visit to the derailment site on February 28.

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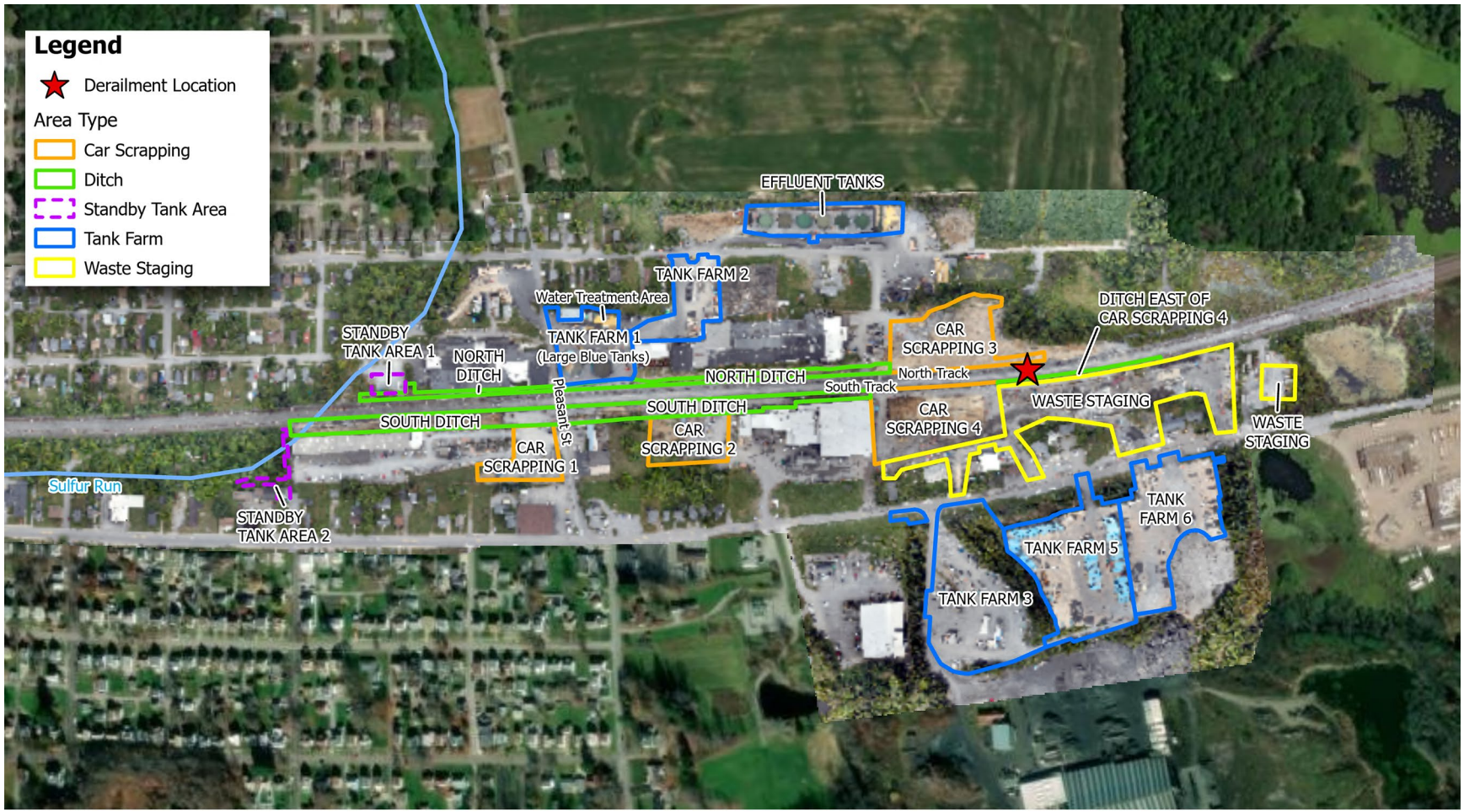
Introduction

On September 20, 2023, President Joseph Biden issued Executive Order 14108 (*Executive Order on Ensuring the People of East Palestine Are Protected Now and in the Future*). The order directs EPA to submit a report within 30 days on the cleanup efforts and on Norfolk Southern's compliance with EPA's February 21, 2023, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unilateral administrative order (UAO) to address the imminent and substantial endangerment its derailment caused. Executive Order 14108 also directs EPA to explain the status of air, soil, surface water, groundwater, and drinking water sampling and monitoring, and to submit an updated report to the President every 60 days thereafter until all cleanup, assessment, and monitoring work required by EPA's UAO has been completed.

This report is submitted in response to these directives. It begins with a narrative of the initial incident and response efforts, the issuance of EPA's CERCLA UAO, and the formation and management of cleanup efforts under a unified command response organization. Subsequent sections will describe the status of cleanup efforts and the status of air, soil, surface water, groundwater, and drinking water. The report concludes with an outline of remaining timeline and next steps.

Initial Incident and Response Efforts

On the evening of February 3, 2023, a Norfolk Southern train carrying hazardous materials derailed in the Village of East Palestine, located in Columbiana County in the State of Ohio. At least 11 rail cars



East Palestine, Ohio, Train Derailment Response

Site Overview Map

contained hazardous materials, including vinyl chloride, ethylene glycol monobutyl ether, ethyl-hexyl acrylate, butyl acrylates, benzene residue, and isobutylene. Some cars caught fire, and some spilled their loads onto the ground. These substances traveled into local waterways, including Sulphur Run and Leslie Run, and flowed miles downstream. East Palestine's fire department and several other fire departments responded. On the evening of February 5, 2023, Norfolk Southern's spill response contractors observed a dramatic temperature increase in a derailed tanker rail car containing vinyl chloride. Norfolk Southern expressed serious concern that the temperature change could lead to a catastrophic tanker rail car failure, which could cause a boiling liquid expanding vapor explosion (BLEVE) with the potential of deadly shrapnel traveling up to one mile. The East Palestine Fire Chief (as Incident Commander), along with state response officials in coordination with Norfolk Southern, made the decision that the safest course of action was to conduct a controlled burn of the chemicals.

Within hours of the Norfolk Southern train derailment, EPA deployed a team to East Palestine to provide support to state and local emergency and environmental response efforts. EPA came on scene as a supporting agency to conduct air monitoring and reported to the Incident Commander for the response (the East Palestine Fire Chief). On February 21, 2023, EPA issued a UAO for Removal Actions pursuant to CERCLA, as amended, 42 U.S.C. § 9606(a). Pursuant to the UAO, EPA is directing and supervising Norfolk Southern's cleanup to protect the health, safety, and future of the East Palestine community and other affected communities. Norfolk Southern and its contractors are performing the cleanup under the UAO. Since February 21, 2023, working closely with federal, state, and local partners, EPA has led and continues to lead cleanup efforts, air quality monitoring, soil sampling, and water sampling; to ensure the protection of human health and the environment; to keep residents of East Palestine and nearby areas of Ohio and Pennsylvania updated on these and other ongoing efforts; and – importantly – to hold Norfolk Southern fully accountable under CERCLA for the cleanup operation.

More than 165,000 tons of contaminated soil and more than 35 million gallons of contaminated liquid have been shipped offsite for disposal. EPA has built and manages an extensive air monitoring and sampling network that uses several different technologies and approaches to provide separate and redundant sources of data on air quality at the derailment site and throughout the area. In addition to monitoring, EPA's network continues to conduct analytical air sampling at many locations in the affected areas. Together, these efforts are designed to ensure that contamination from the site does not enter nearby communities. To date, EPA and NSR have collected more than 18,000 air samples and more than 3,000 soil samples. The EPA's state and local partners[2], along with Norfolk Southern, have collected more than 425 monitoring-well samples, 3,400 surface water samples, and more than 1,000 private well samples; and they have conducted 34 rounds of drinking water sampling from the public well supply. Available data show that no contaminants of concern have been detected at levels of concern in the air in the affected communities at sustained levels since the evacuation order was lifted on February 8, 2023. Almost no contaminants related to the derailment have been detected at levels of concern in water in surface streams since early May 2023. Raw water and treated municipal drinking water show no detection of contaminants associated with the derailment. To date, sampling indicates that residential groundwater wells have not been affected by chemicals associated with the derailment. Initial sediment investigations have been conducted in Sulphur Run and Leslie Run which indicate that

[2] Ohio EPA, Columbiana County Health Department, and the Pennsylvania Department of Environmental Protection

some contamination from the derailment remains which causes a sheen on the surface water when sediments are disturbed. See page 16 for more details about the status of air, soil, surface water, groundwater and drinking water.

EPA Issues CERCLA Unilateral Administrative Order

On February 21, 2023, EPA issued a CERCLA UAO to Norfolk Southern[3]. The company was ordered to take actions necessary to protect human health and the environment related to the spill of hazardous substances. The CERCLA UAO further detailed the tasks required of the company, which included fully participating in the on-site response organization with all appropriate agencies, developing and implementing work plans to fully characterize and clean up the spilled hazardous substances, and cleaning up dust in building interiors which was generated by response efforts. Details of the order will be discussed on page 6 of this report.

Unified Command and Cleanup Activities under Unified Command

EPA joined a unified command under the Incident Command System by coordinating with Norfolk Southern, Ohio EPA, Columbiana County Emergency Management Agency, the Village of East Palestine, the Ohio Department of Natural Resources, Federal Emergency Management Agency, representatives of the Commonwealth of Pennsylvania, and other agencies, to coordinate cleanup efforts and delineate the extent of contamination. The unified membership has changed over time, but has included EPA Regions 3 and 5, FEMA, Ohio EPA, the Village of East Palestine, Columbiana County Emergency Management Agency, Pennsylvania Department of Environmental Protection, and Norfolk Southern. Many other agencies and stakeholders, including CDC and ATSDR, have been officially recognized as assisting and cooperating agencies as part of the command structure at the site. With the issuance of the CERCLA UAO, EPA assumed the lead Incident Commander role in unified command.

The unified command established a full Incident Command System process and continues to follow the planning cycle for meetings to produce incident action plans which direct the work on the cleanup. Regular meetings are held to ensure that work activities proceed efficiently and safely.

As work has progressed at the site, all actions being performed by Norfolk Southern have been directed and overseen by EPA with the input and assistance of the unified command. Actions currently being performed by the company under EPA direction include:

- Excavation, temporary staging, management, transportation, and disposal of contaminated soils.
- Temporary storage, transportation, and disposal of contaminated liquids.
- Treatment of hazardous wastewater via an on-site treatment system along with off-site disposal of that treated non-hazardous wastewater.
- Evaluating data from the Phase 1 — Residential/Agricultural/Commercial Soil Sampling Plan.
- Delineating groundwater contamination through continued groundwater sampling; monitoring drinking water through sampling of private and public water supplies.

[3] https://www.epa.gov/system/files/documents/2023-02/02%2021%2023%20Norfolk%20Southern%20Removal%20UAO%20-%20Signature%201-508checked.pdf

- Delineating surface water contamination and system recovery through continued sampling of the tributary system to the Ohio River.
- Sediment sampling and review of associated analytical data to determine if more sediment cleanup is required. Review of this information led to a UAO under Section 311(c) of the Clean Water Act on October 18, 2023, to further address the streams.
- Community and worker air monitoring, sampling, and analysis.
- Coordination regarding community concerns including conducting public outreach events.

Community Engagement

EPA has put a strong emphasis on outreach to the community and effective risk communication. In February, EPA opened a storefront "community welcome center" in East Palestine to ensure residents were able to meet face-to-face with Agency staff to ask questions and learn about the response. Originally open 12 hours a day, 7 days a week, the welcome center has had more than 1,000 visitors and received more than 1,200 phone calls.

Throughout the response, the agency's outreach strategy has been informed by input from a stakeholder group that the agency helped organize. This group of key community leaders has provided feedback on how the unified command could communicate effectively with residents. Following that group's advice, EPA developed a community newsletter that is mailed to all residents and distributed in area businesses. Thus far, twenty-two editions of the newsletter have been published. In addition, EPA staff have participated in more than 60 outreach events – from large public meetings to church-basement presentations to booths at street fairs – to share updates and answer questions.

EPA's website has grown to include dozens of documents, photos and videos that provide easy-to-understand information. The website's dashboards and maps allow interested community members to find monitoring and sampling data and to review the technical workplans and legal documents.

Unilateral Administrative Order and Norfolk Southern requirements under the Order

On February 21, 2023, EPA issued a CERCLA unilateral administrative order[4] to Norfolk Southern, ordering it to conduct all necessary actions associated with the cleanup of the February 3, 2023, derailment in East Palestine, Ohio. The effective date of the order is February 27, 2023. Specifically, the UAO requires Norfolk Southern to develop a removal work plan[5] to identify and clean up contaminated soil and water resources; to mitigate impacts to the community; to pay EPA's costs incurred under the UAO; and to provide financial assurance to demonstrate that Norfolk Southern has adequate financial resources available to complete the required cleanup work. EPA continues to closely monitor and evaluate Norfolk Southern's compliance with the order and all approved work plans. Based on EPA's oversight, the Agency believes that Norfolk Southern is in compliance with the UAO.[6] This assessment of compliance may change as there are some obligations which have not yet been triggered and certain obligations which are continuing.

Norfolk Southern requirements under the unilateral administrative order			
Paragraph	*Requirement*	*Due Date*	*Date of Performance*
30	Notification of intent to comply with the order	2/27/23	2/24/23
31	Submission of contact information and qualifications of the personnel, contractors, and laboratories to be used for the cleanup work and submission of the contractor's quality management plan.	3/2/23	2/28/23
32	Designation of a project coordinator.	3/2/23	2/27/23
38	Submission a draft removal work plan for EPA review and approval.	3/6/23	3/6/23
38.e.	Compliance with EPA approved plans, reports, specifications, schedules, etc.	Various dates based on dates of EPA's approvals	Ongoing
40	Submission of a sampling and analysis plan for EPA review and approval.	3/6/23	3/6/23
41	Submission of a health and safety plan to EPA for review and comment.	3/6/23	3/6/23

[4] The UAO was amended by EPA on March 27, 2023. This amendment made several minor changes to the UAO.
[5] The removal work plan consists of 13 separate appendices addressing various kinds of work including, but not limited to, soil excavation, under the main line; residential, commercial, and agricultural soil sampling; waste sampling; potable water sampling; groundwater characterization; and surface water and sediment characterization.
[6] This assessment is current as of October 19, 2023.

44	Submission of weekly progress reports.	Weekly	Ongoing
51.a.	Submission of a draft notice to successors-in-title regarding the removal action and the UAO.	3/14/23	3/13/23
	Recording of the notice to successors-in-title within 10 days of EPA's approval of the draft notice.	5/23/23[7]	5/23/23
	Submission of a certified copy of the recorded notice to successors-in-title.	6/2/23	5/24/23
60	Submission of a written certification that there has been no destruction of records relating to potential liability regarding the site and full compliance with any requests for information regarding the site.	3/6/23[8]	3/2/23
75	Submission of general commercial liability insurance.	3/6/239	Subject to ongoing negotiations.
78	Submission of a draft financial assurance mechanism for EPA review and approval.	4/20/23[10]	4/20/23
	Submission of finalized financial assurance mechanism.	5/17/2023[11]	5/17/23

[7] EPA approved Norfolk Southern's draft notice to successors-in-title on May 11, 2023. The due date, which was May 22, 2023, was extended to allow for delivery of the notice to the records office.
[8] The due date fell on Saturday, March 4, 2023. Per the terms of the UAO, the due date was extended to the next business day.
[9] The due date fell on Saturday, March 4, 2023. Per the terms of the UAO, the due date was extended to the next business day.
[10] EPA provided the cost estimate to Norfolk Southern on March 31, 2023.
[11] EPA approved the draft financial assurance mechanism on April 27, 2023.

Status of Cleanup Efforts

Cleanup efforts began almost immediately after the end of initial response. Under EPA's CERCLA UAO, Norfolk Southern was required to submit a *Removal Work Plan*, which it did on March 6. The *Removal Work Plan* included 13 separate work plans, addressing a wide variety of different aspects of the cleanup, including a plan for health and safety of cleanup site workers, a site security plan, and plans for sampling of air, surface water, groundwater, and soil. The work plan for the cleanup of the derailment site itself is detailed in the *Main Line Soil Removal Work Plan (Appendix D)*. As the cleanup has progressed, additional work plans have been added to the overall *Removal Work Plan*. EPA (with input and assistance from the unified command) has approved all but one work plan (*Community Impact Mitigation Plan*), and all approved work plans have been implemented or are currently being implemented.

Derailment Site and Location of Contamination

The derailment site consists of the derailment area within and adjacent to East Palestine and surrounding areas, including Darlington Township, Pennsylvania, which is located southeast of the derailment. The Ohio-Pennsylvania border is located less than a mile from the derailment location. Within East Palestine, the areas surrounding the railroad are mixed-use commercial, industrial, and residential. Areas outside East Palestine are primarily residential and agricultural use.

Norfolk Southern's freight railroad transects the site. Two unnamed ditches — referred to as North Ditch and South Ditch — lie on either side of the tracks. The ditches discharge into Sulphur Run, which flows southwest into Leslie Run and other downstream waterbodies before emptying into the Ohio River. The waterways became contaminated after the derailment. Residential properties are also located along the waterways.

The nearest public well supply is located approximately one mile from the derailment location. Wetlands and State Line Lake are located immediately adjacent to the northeast of the Site.

After the rail car fires were extinguished, and the Evacuation Order was lifted by the Village of East Palestine on February 8, a "Home Safely Plan," which included voluntary residential air screening, was offered by Norfolk Southern with EPA oversight.

As the cleanup began, there was evident gross contamination throughout the derailment area, including materials spilled from the railcars. Containment measures within affected waterways continued, and wrecking equipment was mobilized by Norfolk Southern to begin clearing rail cars and debris from the immediate railway area. The railway was fixed with temporary rail line, and the line became active again on February 9, following removal of rail cars and debris in the immediate rail area. There was still significant contamination in the ballast and soils beneath the rail line, which Norfolk Southern agreed to excavate under the CERCLA UAO.

Due to significant contamination of Sulphur Run with spilled hazardous substances or oil from the derailment, water was diverted from an upstream wetland area to an area further downstream along Sulphur Run to bypass the areas of gross contamination within Sulphur Run and to prevent additional contamination from moving downstream ("Sulphur Run Bypass").

Initial cleanup actions at the site conducted by Norfolk Southern, with oversight by the Ohio EPA, include:

- Dredging and scraping of grossly contaminated sediment within an unnamed ditch south of the derailment site.
- Removal of grossly contaminated soils at the derailment site.
- Removal of free product at the derailment site.
- Containment and recovery of contaminated liquids and soils.
- Delineation of extent of contamination (multimedia).

EPA issued a General Notice of Potential Liability to Norfolk Southern on February 10, 2023. Ohio EPA issued a Notice of Violation letter on February 10, 2023. On March 30, 2023, the United States filed a complaint in federal court seeking, among other things, penalties, reimbursement of its cleanup costs, declaratory judgement, and injunctive relief against Norfolk Southern. The United States later amended its complaint to also include a request for declaratory judgement allowing the recovery of natural resource damages for the federal trustees.

Status of Progress on Work Plans

Health and Safety Plan (Appendix A)

The initial overall site *Health and Safety Plan* was approved on March 29, 2023. Since then, the plan has gone through several updates and revisions (including more than 100 specific job hazard analyses/job safety analyses), making the plan user friendly for the field personnel. Throughout the response, EPA and Norfolk Southern have engaged multiple outside resources, including the Occupational Safety and Health Administration (OSHA) and subject matter experts, to ensure the health and safety of all responders. To date, there have been more than 500,000 person-hours worked on the project with no major reportable OSHA or Federal Railroad Administration incidents.

Figure 3. EPA field staff receiving their morning safety briefing at the Agency's forward operating base.

Site Security Plan (Appendix B)

The *Site Security Plan* was approved on May 12, 2023. The plan includes site badging for all response personnel. In addition, security personnel were hired for all access points to the work zones and all office spaces being used by responders. This has ensured that only properly trained personnel are able to access potentially hazardous work areas, and that only personnel involved with the project access the office spaces for the response. Site security is subject to constant review and analysis by EPA, and changes to the security plan are made as appropriate.

Air Sampling and Analysis Plan (Appendix C)

The *Air Sampling and Analysis Plan* was approved on April 25, 2023. This plan includes stationary air monitoring stations, random air monitoring stations, and air sample stations throughout the work zone and the community. The plan calls for the use of fixed and handheld instruments for air monitoring and vacuum canisters, sorbent tubes, and badges for sampling. Other technologies included in the plan are mobile laboratories (such as EPA's Trace Atmospheric Gas Analyzer and Norfolk Southern's mobile labs) and field portable analytical instruments such as HAPSITE gas chromatograph/mass spectrometer and the MINICAMS continuous air monitoring system operated by the U.S. Army Chemical Biological Application and Risk Reduction team. These technologies have operated 24 hours a day, seven days a week, since very early in the response.

Figure 4. EPA contractors checking on air monitoring stations. EPA has built and manages an extensive air monitoring and sampling network that uses several different technologies and approaches to provide separate and redundant sources of data on air quality at the derailment site and throughout the area.

In addition to day-to-day sampling/monitoring efforts, the *Air Sampling and Analysis Plan* also outlines steps to take in the event an odor complaint is received from the community. To date, no contaminant that can be attributed to the train derailment has been detected in the community above screening levels. The *Air Sampling and Analysis Plan* is continuously evaluated for updates based on site work and will remain in use until the response is completed. To date, more than 100 million air monitoring data points and 18,000 air samples have been collected under this plan.

Under the *Home Safely Plan* — launched as the evacuation order was lifted — more than 700 indoor air screenings were conducted with a MultiRAE photoionization device (general volatile organic compounds) and a colorimetric gas detector tube (vinyl chloride) to determine if indoor air was safe for residents to return home.

The air monitoring/sampling network is continually evolving and will continue in some fashion throughout all response work. No further indoor air monitoring or sampling is anticipated due to the robust nature of the community-wide air monitoring program.

Main Line Soil Removal Work Plan (Appendix D)

The *Main Line Soil Removal Work Plan* was approved on March 2, 2023, and has been updated several times since then. This plan focuses on the approach for excavation and soil sampling in the track areas

and areas directly affected with impacts related to the derailment. This plan includes all the excavation work for the most heavily impacted areas (Main Lines 1 and 2, Center Line, North Ditch, South Ditch, Car Scrapping Area 3 [and burn pits], and Car Scrapping Area 4). Once areas are excavated, soil samples are collected and analytical results are compared to the plan's clearance criteria prior to being backfilled. EPA's PHILIS laboratory has supported this task by analyzing more than 1,300 split soil samples.

Under this plan, excavation work for more than 6,000 linear feet of both rail lines, Center Line, North Ditch and South Ditch has been conducted. Excavation work for approximately 0.75 acres of Car Scrapping Area 3 and 2.5 acres of Car Scrapping Area 4 has also been conducted. Main Lines 1 and 2, Center Line, North Ditch, Car Scrapping Area 3, and Car Scrapping Area 4 are 100% complete (excavated, confirmation sampled, and backfilled). Work on South Ditch is approximately 90% complete. Both rail lines were fully operational on June 26, 2023. All remaining work under this plan is scheduled to be completed by October 27, 2023.

Figure 5. Contaminated soil being excavated from underneath Pleasant Drive. As work has progressed at the site, all actions being performed by Norfolk Southern have been directed and overseen by EPA with the input and assistance of the unified command.

Characterization Work Plan for Derailment Area Soil (Appendix E)

The *Characterization Work Plan for Derailment Area Soils* was approved on September 7, 2023. This plan will guide efforts to verify that cleanup goals have been achieved, delineate the extent of any remaining contamination in soil, identify potential long-term sources of groundwater contamination, identify potential preferred pathways, and identify potential vapor intrusion issues.

This plan covers all properties that were affected by the derailment and response — from the most heavily affected areas (such as the derailment area and burn pits), to areas that were used for staging supplies. Results from the sampling effort will be used to determine if any additional actions need to be taken. Work under this plan began on September 11, 2023. To date, approximately 700 of the estimated 2500 required samples have been collected with EPA oversight. Work under this plan is expected to be mostly complete by March 2024, with a few exceptions that will extend into August 2024.

Phase I — Preliminary Residential/Commercial/Agricultural Soil Sampling Plan (Appendix F)

The *Phase I — Preliminary Residential/Commercial/Agricultural Soil Sampling Plan* was approved on March 7, 2023. The purpose of this plan was to sample a large area (up to 3.5 miles from the derailment, plus background locations) to determine if contaminants of concern had spread throughout the community because of the derailment and subsequent controlled burn.

EPA and its partners oversaw all sampling efforts under this plan and collected split samples to verify Norfolk Southern's work. A total of 357 properties were investigated, and 146 property locations were sampled (including background samples). Two samples were collected at each location — one at the

surface and another from 1 to 6 inches below ground. A mix of residential/commercial/industrial and special use properties (such as parks and schoolyards) were investigated.

This sampling effort was completed on April 14, 2023. Semi-volatile organic chemical and dioxin results from the assessment fell within typical background ranges for rural and urban/suburban soil with a few exceptions (commercial/industrial property or next to roadside). These properties are being evaluated for further assessment. A report summarizing the findings of the sampling effort was provided to the public on October 2, 2023[12].

Surface Water Sampling and Analysis Plan (Appendix G)

The *Surface Water Sampling and Analysis Plan* was approved on June 29, 2023. Initial sampling work has been completed under these plans and the data is currently under review to determine if any additional response work is required. Analytical results for all surface water samples were compared to Ecological Screening Levels and Human Health Screening Levels established in this Plan. No analytes in surface water samples collected under this plan (July to September 2023) exceeded any of the established screening levels.

Sheen is present in some areas of the waterbodies, particularly when sediment is disturbed. Polyaromatic hydrocarbons were detected in the sheen samples. Review of the data and planning for next steps is currently underway.

Figure 6. Initial sediment investigations have been conducted in Sulphur Run and Leslie Run which indicated that some contamination from the derailment remains which causes a sheen on the surface water when sediments are disturbed.

Sediment Characterization Work Plan (Appendix H)

The *Sediment Characterization Work Plan (Sulphur Run)* was approved on July 12, 2023, and the *Sediment Characterization Work Plan (Leslie Run and Downstream Creeks)* was approved on August 5, 2023. The purpose of these plans is to delineate the extent of contamination in waterbodies connected to the derailment area. Initial sampling work has been completed under these plans. Based on initial review of the data a CWA Order was issued on October 18, 2023, for further sediment assessment and limited sediment cleanup.

Groundwater Characterization Work Plan (Appendix I)

The *Groundwater Characterization Work Plan* was approved on June 29, 2023. The purpose of this plan is to assess the nature and extent of groundwater and shallow soil impacts in the vicinity of the derailment area; to guide the creation of a permanent monitoring well network for long-term assessment of groundwater quality; to provide groundwater and soil quality data for assessing potential vapor intrusion pathways to nearby building occupants; and to provide a general evaluation of hydrogeology to inform the team's understanding of potential movement of contamination from the derailment area and to determine if any contamination from the derailment area moved into

[12] https://www.epa.gov/east-palestine-oh-train-derailment/phase-one-residential-commercial-and-agricultural-soil-sampling#phase1

groundwater. The plan is not directly intended to provide information about drinking water wells or municipal drinking water. Ohio EPA has provided oversight of the installation, development, and sampling of these groundwater monitoring wells by Norfolk Southern to ensure work was conducted in accordance with the approved plan. Approximately 10 permanent and 19 temporary monitoring wells were installed within and surrounding the train derailment area. The permanent monitoring wells were sampled on a regular basis. At least four of the wells were sampled on a weekly basis since March 2023. As new wells were installed, they were also sampled. The monitoring wells are sampled to monitor groundwater in the local aquifers and to determine if contamination is present or migrating in groundwater. Review of monitoring well groundwater data collected in March 2023 through August 2023 indicated there were a few sporadic exceedances of at least seven PAHs above the established human health screening levels (HHSLs). Volatile organic compounds (VOC), including vinyl chloride and benzene, other semi-volatile organic compounds (SVOC), other acrylates, other PFAS, and glycols, were not detected in these same samples. Regular sampling of permanent monitoring wells is still being conducted. Data is continuously being evaluated as it is received. The installation and sampling of additional monitoring wells to better understand the aquifers and to refine the well location network is in process.

Potable Water Sampling Work Plan (Appendix J)

The *Potable Water Sampling Work Plan* was approved on April 28, 2023. The plan was developed to monitor drinking water quality in the vicinity of the site. Throughout the response, the Columbiana County General Health District has provided all oversight activities related to Norfolk Southern's efforts to sample privately owned potable wells in Columbiana County (918 samples) and Pennsylvania Department of Environmental Protection has provided similar oversight in Pennsylvania (49 samples). EPA has provided additional labor resources as needed and requested. Ohio EPA has provided resources required to sample the municipal drinking water supply (samples collected from all 5 supply wells pre-treatment and 1 treated effluent sample) throughout the response.

To date, there have been no detections of derailment-related chemicals in any of the potable well samples collected. The state and local agencies will continue to provide oversight of Norfolk Southern efforts to sample all potable wells. To date under this plan, more than 960 private potable well samples (including multiple rounds) have been collected, and 34 rounds of sampling of the public municipal wells have been conducted.

Sentinel Well — Monitoring Well Installation and Groundwater Sampling Work Plan (Appendix K)

The *Sentinel Well Work Plan* was approved on June 29, 2023. The primary purpose of the sentinel well program is to monitor for the potential migration of contaminants in groundwater to ensure that drinking water wells are not affected. Approximately 14 sentinel wells were installed within approximately 0.5 to 1.5 miles of the derailment area. The sentinel wells are sampled regularly to monitor groundwater in the local aquifers and to determine if contamination, if present, is migrating in groundwater. Review of sentinel well groundwater data collected in February 2023 through August 2023 indicated there were no results showing contaminants of potential concern above the established human health screening levels in samples. Contaminant of potential concern VOCs, including vinyl chloride and benzene, SVOCs, acrylates, or glycols were not detected above the laboratory reporting limit. Weekly sampling of sentinel wells is still being conducted. Data is continuously being evaluated as

it is received. Planning is in process to install and sample additional sentinel wells to better understand the aquifers and to refine the well location network.

Waste Sampling and Management Plan (Appendix L)

The *Waste Sampling and Management Plan* details how waste generated by response activities will be stored on site, sampled, profiled, and transported off site for proper disposal. This plan has been updated throughout the project to include procedures on in-situ sampling/profiling and direct load procedures. Under this plan, more than 165,000 tons of contaminated soil, 35 million gallons of contaminated wastewater, and 201 drums of miscellaneous material have been properly managed and transported off site for disposal. Most soil/debris disposal occurred via truck transportation (8,127 loads). All wastewater transportation occurred either via truck or truck to rail line (7,131 loads). Work under this plan will continue until all site wastes have been properly transported off site for disposal.

Figure 7. Trucks being loaded with contaminated soil for disposal. More than 165,000 tons of contaminated soil and more than 35 million gallons of contaminated liquid have been shipped offsite for disposal.

Community Impact Mitigation Plan (Appendix M)

The *Community Impact Mitigation Plan* includes, among other things, a description of the measures to mitigate the potential impacts to the community from the response work (for example, air emissions, dust, odor, traffic, noise, temporary relocation, and negative economic effects), with a particular focus on impacts to residential areas, schools, playgrounds, healthcare facilities, or recreational public areas frequented by community members — these are referred to as "community areas" in the unilateral administrative order. While EPA has not yet formally approved this plan, Norfolk Southern has already implemented many of these mitigation measures.

Other work plans

The original *Removal Work Plan,* submitted on March 6, 2023, included the 13 work plans discussed above. During the course of the response there have been numerous other work plans, memos, and procedures that were reviewed and approved by EPA. Two of these other work plans are notable and will be discussed here.

- *Structure Cleaning Program: Cleaning Protocol* — The structure cleaning work plan was approved on August 9, 2023. EPA personnel took the lead in setting up pre-cleaning interviews with interested community members and arranging for cleaning dates. Norfolk Southern arranged for all cleaning services to be conducted with EPA oversight. This program launched on August 23, 2023, and 119 interviews have been scheduled (104 completed) with 80 cleanings requested (60 completed) to date.
- *Wastewater Treatment and Contained-In Determination Operational Summary* — Norfolk Southern constructed an on-site treatment plant to remove any residual vinyl chloride from wastewater generated on site. EPA and Ohio EPA reviewed all plans associated with the

treatment system before it was approved and allowed to operate with EPA oversight. After batches of wastewater are treated, Ohio EPA reviews sampling data and then issues a "contained-in determination" which removes any hazardous waste codes that were associated with the wastewater prior to on-site treatment. This enables other wastewater treatment plants to receive the treated water and treat it again prior to discharge. To date, more than 2 million gallons of wastewater have been treated on-site and been granted a determination for disposal as non-hazardous waste.

Estimated Timeline for Completion of Work

Completion of excavation work is projected for October 27, 2023, although additional material will be generated through surface scraping of work areas (waste staging piles, tank farms, etc.) as they are decommissioned, sampled, and restored. Restoration of the waste excavation areas is expected to be completed by the end of January 2024.

Transportation and disposal of accumulated hazardous wastewater is expected to be complete by October 30, 2023, at which time all site wastewater will be managed by the on-site treatment system and transported off-site for disposal as non-hazardous wastewater (although contingencies are in place in the event the treatment system becomes overwhelmed due to weather events). Operation of the wastewater treatment system will continue until the derailment area has been fully characterized and the regulatory agencies are satisfied that there is no longer any potential for surface water running onto the site to become contaminated.

The *Structure Cleaning Program* is expected to be completed by November 30, 2023.

Initial sampling phases in groundwater (potable wells, monitoring wells, and sentinel wells) are expected to be completed by end of December 2023. Additional sampling after review of the data will be conducted if considered necessary.

Results from the surface water and sediment of the nearby surface waters (Sulphur Run and Leslie Run) are still being evaluated for potential additional cleanup actions. In addition, on October 18, 2023, EPA Region 5 issued a Clean Water Act § 311(c) Order to Norfolk Southern requiring the company to remove contaminated sediments in culverted areas of Sulphur Run and to further delineate, characterize, and, as necessary, remove oil and hazardous substances from the sediments in Leslie and Sulphur Runs.

Estimated Timeline for Completion of Full Site Assessment

The work described in section on *Characterization Work Plan for Derailment Area Soil* is commonly referred to as the "full site assessment" of the response. This plan will guide efforts to verify that cleanup goals have been achieved, to delineate the extent of any remaining contamination in soil, to identify potential long-term sources of groundwater contamination, to identify potential preferred pathways, and to identify potential vapor intrusion issues. It is anticipated that all soil sampling activities related to this characterization will be complete by July 15, 2024, and vapor intrusion studies will be complete by August 21, 2024.

Status of Air, Soil, Surface Water, Groundwater, and Drinking Water

Air

The 24/7 air monitoring and sampling network managed by EPA and Norfolk Southern remains in place at the derailment site. The unified command continuously evaluates the air monitoring and sampling program to ensure that it is appropriate for the current work at the site. To date, none of the more than 100 million monitoring readings or more than 18,000 analytical results have been reported in the community above any site-established action levels since the lifting of the evacuation.

Soil

Main Line Soil Removal (Appendix D) — Currently, work under the Main Line Soil Removal plan is approximately 95% complete with remaining excavation in the South Ditch. Work under this plan is anticipated to be completed by October 27, 2023. Contaminated soil from beneath the tracks was excavated and the excavated areas were restored with clean material and new track was installed. Other areas excavated under this plan were also sampled to ensure they met clearance criteria; however, they will also be re-assessed under Appendix E prior to restoration.

The *Characterization Work Plan for Derailment Area Soil (Appendix E)* is the final step in determining if all contamination that resulted from the derailment has been remediated and will identify areas requiring further study. This effort was initiated on September 11, 2023, and is expected to last until mid-2024.

Soil investigation under *Phase I — Preliminary Residential/Commercial/Agricultural Soil Sampling Plan (Appendix F)* was completed on April 14, 2023. Results from the assessment indicated that semi-volatile organic chemicals and dioxins were within typical background concentrations for rural and urban/suburban soil. A report summarizing these findings was provided to the public on October 2, 2023[13]. No further community-wide sampling is expected to be conducted at this time.

Surface Water and Sediments

Work plans covering surface water and specific surface water bodies (Sulphur Run, Leslie Run, and downstream creeks) were prepared and implemented by Norfolk Southern following the derailment. These plans outline the objectives and procedures for data collection to characterize stream media consisting of sediment, pore water, stream surface sheen, and stream surface water.

The review of surface water sample data collected from February through August identified detections of contaminants including acrylates, glycols, benzene, vinyl chloride, and PAHs, sometimes at concentrations exceeding screening levels. PAHs and petroleum hydrocarbons have been the most common compounds identified in surface water. Frequent sampling on a 3-day rotation has indicated that the number of detected analytes and their respective concentrations have declined from February

[13] https://www.epa.gov/east-palestine-oh-train-derailment/phase-one-residential-commercial-and-agricultural-soil-sampling#phase1

2023 to present. According to available data, no exceedances of the ecological screening levels or human health screening levels have occurred in July or August 2023.

A sheen or film was observed at several localized areas of the streams. Sheen sample results from August 2023 documented the presence of detectable levels of PAHs.

Sediment samples collected in February and March 2023 detected contaminants, including acrylates, glycols, and PAHs, and exceedances of screening levels. After interim remedial activities, sediment samples were collected in July and August 2023 to characterize current stream sediment conditions. Data review from the July and August sampling indicated detections of PAHs, including exceedances of ecological screening levels. During that same sampling effort, volatile organic compounds (toluene and acetone) were identified in several samples at levels that exceeded the ecological screening levels. Only benzo(a)pyrene, a PAH, was in exceedance of the human health screen levels in July and August. Background sediment samples collected in August 2023 indicated detections and ecological screening levels exceedances for PAHs and detections of volatile organic compounds, toluene, and acetone. There were no exceedances of the human health screening levels in the sediment background samples.

Review of preliminary pore water sample results collected in August 2023 (sampling of water from the streambed between the pores of gravel and sediment in areas where there is not enough sediment for a sample) indicated some detections and exceedances of ecological screening levels for some contaminants. In two samples, concentrations were greater than the applicable screening levels. In two pore water samples, the concentration of a polycyclic aromatic hydrocarbon, benzo(a)pyrene, was greater than the screen level. In one pore water sample the concentration of a volatile organic compound, toluene, was greater than the screening level. Neither contaminant exceeded the applicable screening level in surface water samples collected in August 2023. A laboratory estimated detection of vinyl chloride was identified at one pore water sample location; the sample result is being investigated and the sample location is being evaluated.

All data gathered from the surface water and sediment sampling efforts is being reviewed and additional actions are being considered by the unified command. As mentioned above, on October 18, 2023, EPA Region 5 issued a Clean Water Act § 311(c) Order to Norfolk Southern requiring the company to remove contaminated sediments in culverted areas of Sulphur Run and to further delineate, characterize, and, as necessary, remove oil and hazardous substances from the sediments in Leslie and Sulphur Runs.

Groundwater

As of September 26, 2023, 8 of 10 planned deep groundwater characterization wells have been installed. Shallow groundwater characterization wells are also being installed and 20 of 29 locations are currently installed.

A conceptual site model will be generated from the data to provide a description of relevant site features and the surface and subsurface conditions to understand the extent of identified contaminants of concern and the risk they pose to receptors. Conceptual site models are currently under development that cover regional geology, site hydrology, and contaminant distribution and transport.

Contaminant distribution in shallow soils has been focused on the bottom of the unsaturated zone (not surficial soils). No non-aqueous phase liquids have been observed in this sampling effort. One sample interval was observed to have elevated volatile organic compounds readings when the sample was screened with a handheld photoionization detector. These analytical results have been compared to protection of groundwater screening levels with no volatile organic compound exceedances. Sixty-five percent of the samples did have exceedances for semi-volatile compounds, all of which were polyaromatic hydrocarbons and not specifically derailment related. Methylnaphthalene and naphthalene are the most frequently detected of these compounds.

Potable Water

The *Potable Water Sampling Plan* was developed to monitor drinking water quality in the vicinity of the of the site. There have been no detections of contaminants related to the derailment in any of the potable water samples collected.

Local and state agencies provide oversight of Norfolk Southern's work for this effort. Potable well sampling is ongoing and is expected to be complete by December 2023. After review of the data from this sampling event, sampling will continue if deemed necessary by the state and local regulatory agencies. Sentinel wells were installed between the derailment site and public wells under a separate plan to also monitor the uppermost aquifer downgradient of the site.

Remaining Timeline and Conclusion

Over the past eight months, EPA has directed and overseen Norfolk Southern cleanup activities, in coordination with the unified command. Extensive progress has been achieved. More than 165,000 tons of contaminated soil and 35 million gallons of contaminated and/or treated water have been transported out of East Palestine for disposal. Comprehensive studies of the air, soil, water, and sediments have been conducted and will continue. Hundreds of thousands of worker-hours have been devoted to this project with no major reportable injuries or incidents. High importance has been placed on community outreach, and EPA has made extensive efforts to keep the community informed about the progress of the cleanup, utilizing a number of different approaches, including production of a newsletter for residents, public meetings, media interviews, and public engagement meetings for community groups.

EPA is in the process of overseeing and directing Norfolk Southern's removal of derailment-impacted soils from the final areas and disposing of that waste off site. The key end points for the project will be finalization of the work summarized previously in this report. Each key work requirement has been projected with a timeline for completion. The following summaries provide a narrative of the end point projections for each key work item being overseen by EPA:

- The health and safety program will continue through project end. EPA anticipates Norfolk Southern will have a presence on site through much of 2024 finalizing restoration and study activities. Any long-term monitoring efforts will be covered by specific health and safety protocols from Norfolk Southern once the unified command is dissolved.
- A comprehensive air monitoring and sampling plan has been in place since the early hours of the incident. This robust system will remain in place through the end of the soil excavation and disposal activities, slated to be completed in October 2023. As the project shifts toward assessment activities, the air monitoring and sampling footprint is anticipated to be reduced to normal air monitoring for environmental assessment activities and worker protection.
- The excavation and disposal of known soil contamination resulting from the derailment is anticipated to be completed in October 2023.
- Restoration of the areas of soil excavation and support areas is anticipated to be complete by the end of January 2024.
- Cleaning of structure interiors which may have been impacted by dust generated by the excavation and disposal activities is ongoing and is anticipated to be complete by the end of November 2023.
- A vapor intrusion study of several commercial buildings near the derailment site is underway and samples will be collected each quarter to complete the study. This effort is anticipated to have final sampling in August 2024.
- A full site-wide sampling assessment to verify all soil contamination has been removed has been initiated. This effort will require the collection of several thousand samples to be analyzed at an off-site laboratory. Due to the size of this effort, it is anticipated that sampling and review of the resulting data will continue through July 2024.
- The effort to finalize the baseline sediment and surface water sampling efforts is anticipated to be complete in October 2023. Results will be reviewed to determine what further cleanup is required to improve stream quality. As mentioned above, to further this effort, on October 18,

2023, EPA Region 5 issued a Clean Water Act § 311(c) Order to Norfolk Southern requiring the company to remove contaminated sediments in culverted areas of Sulphur Run and to further delineate, characterize, and, as necessary, remove oil and hazardous substances from the sediments in Leslie and Sulphur Runs. Sulphur Run and Leslie Run are historically impacted waterways that have shown progress in habitat recovery, especially Leslie Run.

- Sampling of potable water, groundwater, and sentinel wells has been ongoing, and the sampling is scheduled to be completed in December 2023. The results are being analyzed and should be completed in January 2024. The review of that work will determine if this sampling effort is complete or needs to continue.
- Disposal of site-related wastes has been occurring since shortly after the derailment. Soils from live-loading, waste piles and roll off boxes should all be transported and disposed of off-site by end of October 2023.
- Treatment of wastewater generated or captured on-site has been ongoing and is projected to last through January 2024. This date may be extended if derailment-related contaminants are identified in the ongoing full site assessment.
- A *Community Impact Mitigation Plan* is being finalized that incorporates response mitigation measures already conducted by Norfolk Southern and any further proposed actions. There is currently no projected end point for this activity.

Since the early days of the emergency response, EPA has stated that its timeline for completion of the cleanup would be dictated by conditions on the ground, and that EPA's operations in East Palestine would continue as long as necessary to ensure that the cleanup was successful and that the residents of East Palestine and nearby areas in Ohio and Pennsylvania could have confidence in the quality of the air, soil, and water in their community. As of October 20, 2023, excavation of the immediate derailment site — the tracks, the ditches, car scrapping areas, and adjacent support areas — is 95% complete. The full-site assessment is in progress to verify that all contaminated soils have been identified and removed, and other investigations are currently underway to determine what additional cleanup activities are necessary or advisable.

As directed under Executive Order 14108, EPA will continue to report to the President every 60 days until all cleanup, assessment, and monitoring work required by EPA's unilateral administrative order has been completed.