NATIONAL ENERGY TECHNOLOGY LABORATORY

2024 ANNUAL SITE ENVIRONMENTAL REPORT

U.S. DEPARTMENT of ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY

January 23, 2025

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2024 ANNUAL SITE ENVIRONMENTAL REPORT

U.S. DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

ALBANY, OREGON

PITTSBURGH, PENNSYLVANIA

MORGANTOWN, WEST VIRGINIA

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EXECUTIVE SUMMARY

The U.S. Department of Energy's (DOE's) National Energy Technology Laboratory (NETL) develops the Annual Site Environment Report (ASER) to provide a comprehensive status of its environmental compliance in three states. NETL is a U.S. Department of Energy (DOE) national laboratory dedicated to advancing the nation's energy future by creating innovative solutions that strengthen the affordability, reliability and security of energy systems and natural resources. With laboratories and computational capabilities at research facilities in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania, NETL addresses energy challenges through implementing DOE programs across the nation and advancing energy technologies related to hydrocarbons and geothermal energy. By fostering collaboration and conducting world-class research, NETL strives to strengthen national energy security through energy technology development.

Throughout 2024, NETL continued to implement its Environment, Safety, and Health (ES&H) & Emergency Management (EM) programs at the Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania locations. As part of these programs, NETL maintained its Integrated Safety Management System (ISM), and Environmental Management System to ensure that regulatory requirements and controls are integrated into all aspects of work conducted at the sites.

NETL's environmental operating experience and performance measure programs exist as part of its ES&H Management System. Integral to these programs are the Safety Analysis and Review System (SARS) programs for R&D activities, support operations activities, construction activities, and facility use. NETL also tracks its performance through individual programs, such as industrial wastewater, groundwater, air quality, waste management, and others. This report seeks to address questions the public may have about NETL's efforts to protect the environment at its locations. Comments and concerns are always welcome and should be addressed, in writing to Scott Tyner, U.S. Department of Energy—NETL, M/S 922-117A, 626 Cochran Mill Road, Pittsburgh, PA 15236; or by email to scott.tyner@netl.doe.gov.

1.0 INTRODUCTION

1.1 SITE LOCATIONS

Part of the U.S. Department of Energy's (DOE) national laboratory system, the National Energy Technology Laboratory (NETL) has laboratory sites in Albany, Oregon; Pittsburgh, Pennsylvania; and Morgantown, West Virginia.

1.2 GENERAL ENVIRONMENTAL SETTING

1.2.1 ALBANY, OREGON

NETL-Albany is in Linn County in western Oregon. The facility is in the Willamette Valley, which is a structural and erosional lowland between the uplifted marine rocks of the Coast Range and the volcanic rocks of the Cascade Range. The site covers approximately 42 acres. The site is relatively flat, located on a higher section of town and away from floodplains. The Calapooia River is located one-half mile west of the site. Land use immediately surrounding the site is combination of residential, commercial and public school district.

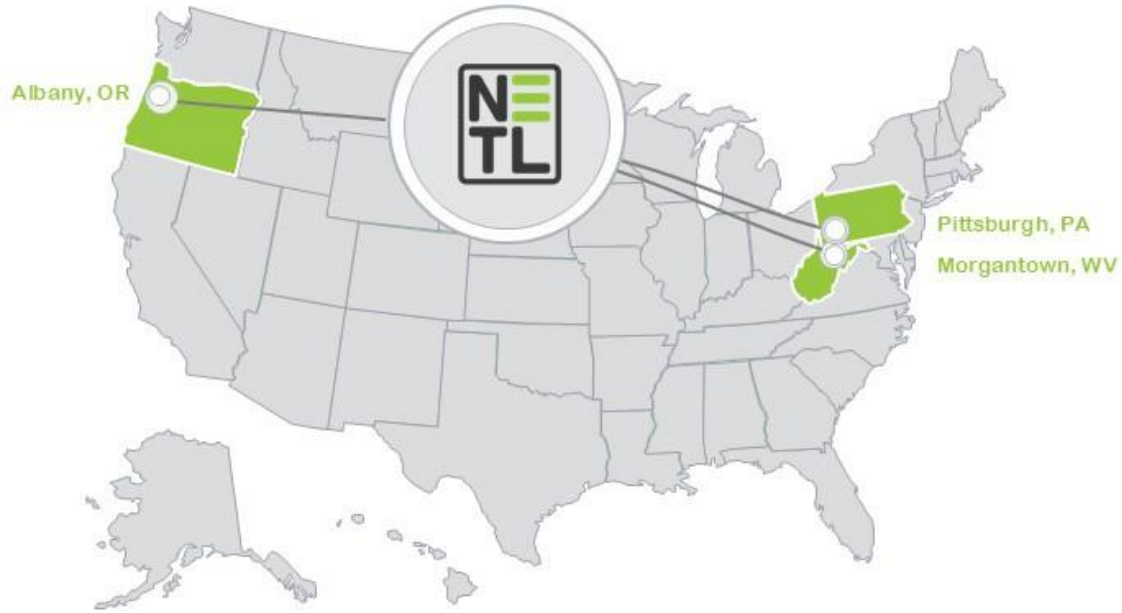
1.2.2 PITTSBURGH, PENNSYLVANIA

NETL-Pittsburgh is in Allegheny County, Pennsylvania, at the Bruceton Research Center. The site is on 237 acres located approximately 13 miles south of Pittsburgh, in South Park Township. The facilities sit within rolling hills and steeply incised stream valleys that are tributaries of the Monongahela River. The site is a partially wooded tract, divided into two subsites (the administrative plateau and the R&D plateau) with scattered industrial and office buildings. The immediate vicinity was completely rural when the site was first developed; however, the nearby population and housing densities have increased dramatically in recent years.

1.2.3 MORGANTOWN, WEST VIRGINIA

NETL-Morgantown is in Monongalia County, West Virginia, on the northern end of the city of Morgantown. The site sits within the rolling hills of the Appalachian Plateau, about 1,000 feet east of the Monongahela River and about 10 miles west of Chestnut Ridge, the westernmost ridge of the Allegheny Mountains. The site covers approximately 135 acres, 33 of which are developed for industrial use. Two small streams border the site on the east and northeast sides. The Monongahela River is on the northwest side of the site. All surface water drains into these two streams and river. Land use immediately surrounding the site is a combination of residential, commercial, and public school districts.

1.3 LABORATORY MISSION



NETL is a DOE national laboratory dedicated to advancing the nation's energy future by creating solutions that strengthen the security, affordability and reliability of energy systems and natural resources. NETL operates as DOE's only government-owned, government-operated lab, managing a workforce of approximately 1,800 federal and site-support contractor staff across three sites in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania as of December 2024. The Lab's team includes technical research and development scientists and engineers, project management and financial assistance experts, interns and postdoctoral appointees — all working to advance energy technology innovation and research.

NETL specializes in applied energy technologies that advance DOE's Hydrocarbons and Geothermal Energy Office priorities and broader national energy goals. The Lab conducts research across critical areas, including computational science and engineering, energy conversion, geological and environmental systems, materials engineering and systems analysis. Research priorities include high-performance computing, artificial intelligence, and machine learning, domestic rare earth element and critical mineral supply chain development, advanced materials, microwave chemistry and subsurface science — all aiming to enhance energy security, industrial competitiveness and economic growth.

Partnerships are essential to NETL's success. The Lab partners with industry, academia and government agencies to accelerate technology development, helping to transition NETL's research into real-world applications.

In addition to research and development, NETL plays a pivotal role in DOE program deployment, ensuring seamless integration of scientific advancements with project execution. The Laboratory supports a broad range of initiatives for seven DOE Offices, from planning and application evaluation to project management and funding execution. NETL integrates research, project management, procurement and legal

expertise to effectively execute DOE program deployment. In fiscal year 2024, NETL managed over 2,300 active projects across all 50 states, representing nearly $10 billion in investments for DOE's energy programs.

Through its forward-thinking research, NETL strives to ensure a robust economy and strengthen national security by developing advanced energy technologies that support DOE's mission while fostering collaborations that lead to a resilient and abundant energy future for the nation.

1.4 PRIMARY OPERATIONS AND ACTIVITIES AT THE SITES

NETL's staff exceeded 1,800 personnel including federal employees and site-support contractor employees as of December 2024. The workforce includes scientists, engineers, economists, procurement specialists, legal professionals, research support staff, technical project managers and research associates at multiple academic levels. Personnel are organized into six functional areas to accomplish NETL's mission and provide flexible, dynamic expertise and capabilities to its public and private sector customers throughout the nation. The functional areas are **Office of the Director**; **Science & Technology Strategic Plans & Programs**; **Technology Development Center**; **Finance & Acquisition Center**; **Research & Innovation Center**; and **Laboratory Operations Center**.

OFFICE OF THE DIRECTOR

The Office of the Director has control and authority, including delegated authority, over the NETL complex. This includes responsibility and authority for delivery and execution of advancing the nation's energy future by creating innovative solutions that strengthen the affordability, reliability and security of energy systems and natural resources. To sustain NETL as a world-class research and development (R&D) enterprise, the Office of the Director provides organizational direction supporting effectiveness and efficiency in research efforts and business practices.

SCIENCE & TECHNOLOGY STRATEGIC PLANS & PROGRAMS

Science & Technology Strategic Plans & Programs develops strategic direction for programs and activities within NETL and identifies needed future competencies so that NETL can best utilize existing capabilities (reposition and redeploy as needed) and invest in new capabilities to sustain and grow NETL.

TECHNOLOGY DEVELOPMENT CENTER

The Technology Development Center implements national research, development and demonstration programs in the Hydrocarbons and Geothermal Energy Office for DOE with industry, institutes of higher education, nonprofit organizations, small businesses and other federal agencies and national laboratories to develop and mature technologies that will accomplish programmatic goals and objectives.

FINANCE & ACQUISITION CENTER

The Finance & Acquisition Center plans, directs and coordinates procurement and financial assistance (financial award and grant) functions, ensuring effective oversight and stewardship of the Laboratory's financial resources.

RESEARCH & INNOVATION CENTER

The Research & Innovation Center (RIC) develops, nurtures and exercises the core technical competencies that enable NETL to be an international resource for energy innovation, from discovery to development and deployment. RIC's technical core competencies, which combine world-class expertise with mission-relevant laboratory facilities, including **Computational Science & Engineering**, **Energy Conversion Engineering**, **Geological & Environmental Systems**, **Materials Engineering & Manufacturing**, **Research Partnerships & Tech Transfer**, **Research Planning & Delivery** and **Strategic Systems Analysis & Engineering**.

LABORATORY OPERATIONS CENTER

The Laboratory Operations Center (LOC) at NETL manages a comprehensive program of support operations and services. These services are delivered in alignment with the NETL mission and adhere to applicable laws, federal policies, and best practices. The LOC's core functions include the development, implementation, integration, monitoring, and continuous improvement of products and services essential for supporting NETL's business and laboratory operations, including R&D laboratory operations and engineering, facilities and construction, environmental safety and health, emergency management, security, information technology, cybersecurity, career management and education programs, and business performance, audits, and assessments.

1.5 RELEVANT DEMOGRAPHIC INFORMATION

With locations in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania, NETL includes 128 buildings and 112 operational labs covering over 240 acres. As of December 31, 2024, NETL had 1,820 employees at its three research locations – 698 were federal employees (Pittsburgh 248, Morgantown 221, Albany 62, and remote 167), and 1,107 were site-support contractors (Pittsburgh, 368; Morgantown, 283; Albany, 97; and remote, 359).

1.6 ACCOMPLISHMENTS

NETL achieved the following environmental-related accomplishments in 2024.

- NETL monitored a total of 85 employees for potential external radiation exposure in 2024. These employees were monitored for: effective dose from external sources; equivalent dose to the lens of the eye; and equivalent dose to the skin. Of the 85 employees monitored, none of the employee exposure was over the DOE limit of 5 rem per year.
- The process to obtain a West Virginia Department of Environmental Protection (WVDEP) Division of Water and Waste Management General Permit for Minor Construction Stormwater permit for the Computational Science and Engineering facility in Morgantown was completed.
- The WVDEP completed a periodic inspection of the Morgantown site March 22, 2024. The inspection covered the hazardous waste activities ranging from manifest and contingency plan review, inspection of waste handling facilities and satellite accumulation areas. No Notices of Violation (NOV) were identified in 2024.
- Meteorological tower replacement at Morgantown and Pittsburgh was completed. Replacement of the towers was essential due to outdated and faulty equipment. This activity has resulted in more accurate weather data that can be used in the event of an accidental release or in an emergency.

2.0 COMPLIANCE SUMMARY

NETL is committed to ensuring compliance with all environmental requirements that affect its locations, including requirements found in DOE directives; Executive Orders (EOs); federal, state, and local codes and regulations; acquisition letters; negotiated agreements; and consensus standards.

Requirements that subject matter experts (SMEs) determine to be applicable to environmental, safety, and health (ES&H) compliance are incorporated into NETL directives. These directives further describe how NETL implements various statutes and regulations at the Laboratory. ES&H directives include orders and procedures. Additionally, NETL's ES&H & emergency management personnel are available to provide specific guidance through subject-related manuals and the ES&H handbook.

The standards and requirements are verified by several methods, including:

- Implementation of a rigorous safety analysis and review system (SARS) designed to assess the details of each project before authorizing significant activities to proceed. SMEs and safety representatives use checklists developed for SARS to verify that standards and requirements are being met during the review of a project.
- Conducting annual walk-through inspections of site facilities to ensure that all NETL facilities are visually verified to be following applicable standards and requirements.
- This Annual Site Environmental Report (ASER) documents the comprehensive evaluation of NETL's compliance with all major environmental standards and regulatory mandates. Its preparation involves the meticulous compilation of the previous year's environmental performance data, a process significantly enriched by the active participation and diverse expertise of numerous subject matter experts.

2.1 MAJOR ENVIRONMENTAL STATUTES AND REGULATIONS

NETL conducts numerous inspections and audits throughout the calendar year to verify compliance with environmental statutes and existing permits. The inspections and audits are documented in inspection reports and audit reports, ensuring that any instances of environmental noncompliance or nonconformance have been identified. Examples of major environmental statutes include, but are not limited to: Comprehensive Environmental Response, Compensation, and Liability Act; Superfund Amendments and Reauthorization Act; Resource Conservation and Recovery Act; Federal Facilities Compliance Act; National Environmental Policy Act; Toxic Substances Control Act; Federal Insecticide, Fungicide, and Rodenticide Act; Clean Air Act; Clean Water Act; and the Atomic Energy Act of 1954.

Statutes with requirements relevant to all three locations are described below. However, if more specific compliance descriptions are appropriate, these descriptions are included in the site-specific discussions.

2.1.1 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)

CERCLA Section 120 (40 C.F.R. 300-310; 43 C.F.R. 11) requires federal facilities to comply with the provisions of the act. Section 120 imposes regulations related to site studies, notices for the sale and other transfers of federal real property. This section applies CERCLA guidelines, rules, regulations and criteria applicable to federally owned or operated facilities, including requirements for: (1) preliminary assessments for facilities where hazardous substances are located; (2) possible inclusion of such facilities on the National Priority List (NPL); and (3) remedial actions at these sites. However, federal facilities are not required to comply with CERCLA provisions regarding financial responsibility and removal/remediation contracts with state governments. While federal facilities not on the NPL may be subject to state laws concerning removal and remediation actions, these state laws and regulations may not impose provisions more stringent than those applicable to non-federal facilities. NETL did not have any CERCLA-related violations in 2024 at any of its sites.

2.1.2 SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) AND COMMUNITY RIGHT-TO-KNOW

SARA Title III requires facilities to report hazardous chemicals that were present at a facility that exceeded certain established quantities during the preceding year. This includes gaseous, liquid and solid chemicals designated as extremely hazardous substances in amounts greater than or equal to 500 pounds, and liquids in amounts greater than or equal to 55 gallons or amounts greater than or equal to the threshold planning quantities. SARA Title III also requires reporting of all other hazardous chemicals present at the facility during the preceding calendar year in amounts equal to or greater than 10,000 pounds.

NETL focused on reducing the accumulation of hazardous chemicals on- site. The intent is to avoid unnecessary accumulation of potentially hazardous chemicals in the laboratories, while maintaining sufficient chemical stores to complete mission-related research. To meet these goals, NETL uses an active inventory database of all hazardous and extremely hazardous chemicals on-site, along with the safety data sheets using Chemical Safety's Environmental Management System (EMS) chemical inventory software. NETL also continues to look for opportunities to reduce its chemical footprint, as appropriate, with the understanding that site research requires the purchase of new and sometimes uncommon chemicals. Efforts have included:

- Removing and disposing of chemicals that are no longer needed or have expired.
- Offering unused and unopened chemicals received for disposal to other researchers for potential use.

- Substituting less hazardous or nonhazardous chemicals for requested hazardous chemicals when possible.
- Sending batteries and fluorescent bulbs to recyclers and recycling used computers and other electronics via NETL's automatic data processing scrap contract.

In 2024, NETL reported the chemicals stored at each site that triggered SARA related reporting requirements. This information is included under the site-specific sections.

2.1.3 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA is the public law that creates the framework for proper management of hazardous waste. The law describes the waste management program mandated by Congress authorizing the U.S. Environmental Protection Agency (EPA) to develop the RCRA program. The law details the requirements for managing hazardous waste "cradle-to-grave," including generation, transportation, treatment, storage and disposal. Sites that produce, manage, transport or dispose of hazardous waste are designated as generators, transporters, or treatment, storage, and/or disposal (TSD) facilities.

NETL's on-site hazardous waste handling is governed by NETL Procedure 436.1-09, RCRA Hazardous Waste Management Program. This procedure addresses (a) general RCRA hazardous waste management; (b) identification, characterization, and classification of hazardous waste; (c) management of satellite accumulation areas (SAAs); (d) operation of designated central accumulation areas; (e) container management; (f) elementary neutralization of corrosive wastes; (g) waste collection/transportation; (h) recordkeeping; and (i) personnel training.

All 2024 hazardous waste management activities were performed in a safe and environmentally sound manner and in compliance with Title 40 Part 262, Standards Applicable to Generators of Hazardous Waste, and all applicable federal, state, and local laws and regulations, as well as DOE/NETL policies. NETL complied with all the recordkeeping and reporting requirements specified in 40 C.F.R. 262 Subpart D — Recordkeeping and Reporting Applicable to Small and Large Quantity Generators.

NETL's hazardous waste program manager oversees implementation of the program, including conducting periodic program reviews to alert the appropriate individuals or managers of any deficiencies. The hazardous waste program manager also ensures the development, accuracy, and submission of the required reports, including the Biennial Hazardous Waste Report for Pittsburgh and Morgantown; the Annual Hazardous Waste report for Albany, and any other reporting required by DOE.

Federal environmental personnel receive training to sign RCRA manifests and other relevant documentation, such as land disposal restriction forms, waste profiles and bills of lading. Original copies of the RCRA manifests, and biennial reports are maintained by the hazardous waste program manager.

In accordance with 40 C.F.R. 262.11, waste management staff make the determination about whether waste is hazardous to ensure compliance. When unidentified waste is provided for disposal, NETL sends samples to a contracted certified laboratory to test hazardous characteristics (i.e., toxicity, ignitability, reactivity, and corrosivity) and to ensure proper handling. NETL did not have any RCRA violations at any of its sites in 2024.

2.1.4 FEDERAL FACILITIES COMPLIANCE ACT (FFCA)

FFCA of 1992, Pub. Law No. 102-386, became law Oct. 6, 1992. This law amended the waiver of sovereign immunity with respect to RCRA compliance. As a result, FFCA ensures that federal facilities are treated the same as private parties with respect to RCRA compliance. Prior to FFCA, the EPA did not have the statutory authority to issue administrative compliance orders pursuant to RCRA Section 3008(a). Currently, Federal Facility Compliance Agreements are negotiated with federal facilities to bring them into compliance. In addition, under Section 103 of FFCA, Congress clarified that federal agencies are considered persons for purposes of RCRA. NETL did not have any violations regarding FFCA compliance in 2024.

2.1.5 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

NEPA (42 U.S.C. 4321 et seq., 1969) establishes federal policy for protecting the quality of the environment. The Act establishes three levels of review for federal actions: Environmental Impact Statements (EISs), Environmental Assessments (EAs) and Categorical Exclusions (CXs). Under the highest level of review, an EIS is prepared to evaluate the environmental consequences of any major federal action that might have significant impact on the quality of the human environment. The EIS must include a comparative analysis of realistically available alternatives that would accomplish the same goals that the federal action is expected to address. Based on the EIS, a Record of Decision (ROD) is prepared to document which alternative will be pursued.

If the scope of the federal action does not clarify that an EIS is necessary, or if the potential for environmental impacts from the proposed action is uncertain, the second-tier level of review, an EA, is prepared. Based on the analysis in the EA, a determination is made that either the potential environmental impacts warrant preparation of an EIS, or the impacts are not significant, and a Finding of No Significant Impact (FONSI) can be issued.

If the federal action is not likely to have a significant effect on the environment, either individually or cumulatively, then the third level of review, a CX, is warranted. These types of federal actions can be excluded from an in-depth NEPA review. DOE has determined that certain classes of actions do not individually or cumulatively have a significant effect on the human environment, and therefore, can be covered by a CX. A list of the CXs and the eligibility criteria for their application are identified in DOE's NEPA implementing procedures (10 C.F.R. 1021).

NETL conducts NEPA reviews for both on-site and off-site actions proposed for funding by the federal government. These include actions planned in cooperation with other governmental organizations, educational institutions, and private industry.

Table 2.1.5.1: CX and No-Cost Time Extension Activities for Calendar Year 2024

NO COST TIME EXTENSIONS GRANTED: 25

INTERNAL CXs TO NETL

NETL-Morgantown	12	
NETL-Pittsburgh	14	
NETL-Albany	8	
Multiple NETL Sites	2	
Total Internal CXs	36	*[Supporting EQs reviewed: 36]*

NETL PARTNERED PROJECTS (EXTERNAL TO MGN-PGH-ALB)

Continental U.S.	724	
Non-continental U.S.	46	
Total External CXs	770	*[1,708 Supporting EQs reviewed: 97 of these covered work in international or non-continental U.S. locations]*

GRAND TOTAL CXs APPROVED FOR 2024: 806

GRAND TOTAL EQs REVIEWED FOR 2024: 1,744

2.1.6 TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA of 1976 authorizes the EPA to require reporting, recordkeeping, testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, importation, use and disposal of certain chemicals, including polychlorinated biphenyls, asbestos, radon and lead-based paint. No NETL sites manufacture chemicals, therefore, none of the sites are subject to sections of TSCA related to manufacturing. No spills or releases of substances regulated by TSCA were reported in 2024. In most cases, TSCA compliance at NETL relates to asbestos and lead-based paint management. Given the Laboratory's unique history related to construction and maintenance activities and infrastructure at each NETL facility, the activities related to TSCA compliance are addressed in the site-specific sections.

2.1.7 FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA)

FIFRA requires federal regulation of pesticide distribution, sale and use. Under FIFRA, all pesticides distributed or sold in the United States must be registered by EPA. However, before a pesticide can be registered, it needs to be demonstrated that using the pesticide according to specifications "will not generally cause unreasonable adverse effects on the environment." NETL does not typically use pesticides at its facilities, but each site has a pest control subcontractor who handles specific landscaping concerns per the appropriate regulatory requirements, as needs arise.

2.1.8 CLEAN AIR ACT (CAA)/AIR QUALITY AND PROTECTION ACTIVITIES

The CAA regulates air emissions from both stationary and mobile sources. The Act establishes national ambient air quality standards to protect public health and public welfare, and regulates emissions of hazardous air pollutants. Each NETL site tracks its emissions via a quarterly air emissions inventory. Specific air quality compliance requirements are addressed in the site-specific sections. No air quality violations were identified at any of the sites in 2024.

As part of the laboratory's environmental management system, NETL has identified objectives focused on continuous environmental improvements such as the reduction of energy usage per square foot (Btu/ft^2) by 0.7% in FY 2024.

In addition, NETL tracks hydrofluorocarbon (HFC) usage at each site and efforts to prepare an HFC phasedown are underway. Details on these efforts are provided in the site-specific sections.

2.1.9 CLEAN WATER ACT (CWA)

CWA regulates the discharge of pollutants into the waters of the United States. The regulations establish wastewater standards for industry, as well as national water quality criteria recommendations for pollutants in surface waters.

Under the CWA, it is unlawful to discharge any pollutant from a point source into navigable waters unless a National Pollutant Discharge Elimination System (NPDES) permit is obtained. Currently only NETL-Morgantown holds an NPDES permit. NETL-Pittsburgh does not hold an NPDES permit but is required to comply with the Bruceton Research Center (BRC) permit held by the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (CDC/NIOSH), a co-located agency at the BRC. Finally, NETL-Albany does not have an NPDES permit, but is required to comply with the terms of the City of Albany's NPDES permit as delineated in the Industrial Wastewater Discharge Permit. Compliance with the CWA, as well as other water quality requirements, is detailed under the site-specific discussions.

2.2 DOE INTERNAL ENVIRONMENTAL AND RADIATION PROTECTION ORDERS

2.2.1 DOE ORDER 436.1, DEPARTMENTAL SUSTAINABILITY

NETL was in full compliance with DOE Order 436.1, Departmental Sustainability, in 2024. This order addressed the requirements and responsibilities for managing sustainability and achieving the goals established in applicable laws, regulations and executive orders.

2.2.2 DOE ORDER 231.1, ENVIRONMENT, SAFETY, AND HEALTH REPORTING

In accordance with DOE Order 231.1, Environment, Safety, and Health Reporting, NETL ensures the collection and reporting of ES&H information. NETL tracks requirements for reports scheduled by DOE or by regulation that are essential for evaluating NETL operations. Reports are compiled and submitted for NETL-Albany, NETL-Morgantown, and NETL-Pittsburgh as necessary.

2.2.3 DOE ORDER 458.1, RADIATION PROTECTION OF THE PUBLIC AND ENVIRONMENT

NETL has implemented its radiation protection program in accordance with DOE Order 458.1, Radiation Protection of the Public and Environment. While NETL's research involving radiation is minimal in comparison with other DOE national laboratories or sites, the program was established to account for potential radiation exposure from research instrumentation and geologic samples. An inventory of NETL's radiation sources is maintained and monitored by the radiation safety officer. The inventory contains information regarding each isotope, quantity, custodian, location, status and sealed-source activity. All radioactive sources are sealed and are used in instrumentation/equipment or as check sources.

There are four main parts to NETL's program: (1) radiation generating devices; (2) sealed radioactive sources; (3) naturally occurring radioactive materials (NORM) and technologically enhanced naturally occurring radioactive materials (TENORM); and (4) legacy radioactive materials. Radiation protection activities are discussed, as necessary, in the site-specific sections.

2.2.4 DOE ORDER 435.1, RADIOACTIVE WASTE MANAGEMENT

DOE Order 435.1, Radioactive Waste Management, ensures that DOE radioactive waste is managed in a manner that protects workers and public health and safety, and the environment. It requires that radioactive waste management activities be systematically planned, documented, executed and evaluated. Radioactive waste is managed to: (1) protect the public from exposure to radiation from radioactive materials; (2) protect the environment; (3) protect workers; and (4) comply with applicable federal, state and local laws and regulations. NETL ensures that such activities comply with DOE Order 435.1, and any other applicable EOs and DOE directives.

2.3 ATOMIC ENERGY ACT OF 1954

The Atomic Energy Act of 1954 (AEA) and its amendments require federal control of radiation source materials for the protection of its workers and the public. In addition, DOE orders, EPA regulations, and Nuclear Regulatory Commission regulations are developed based on the AEA. To fulfill its obligations, DOE has implemented radiation protection programs at its facilities that process, produce, handle, use and dispose of radiation source materials or other radioactive materials. NETL's radiation protection program is limited based on research priorities and is minimal in comparison with other DOE national laboratories or sites under the control of the NNSA national laboratories.

Radiation protection at NETL is managed based on the "as low as reasonably achievable" (ALARA) principle. Radiation protection monitoring at NETL includes whole-body thermoluminescent dosimeters and finger rings. Employees enrolled in the dosimetry program are those who work in the mail facility (mail and packages are scanned via X-ray upon receipt), and those identified in appropriate R&D SARS packages. Radiation field surveys are completed for all site radiation-generating devices on a semi-annual basis. NETL also maintains an inventory of radioactive sources and their respective custodians at each site.

2.3.1 ENVIRONMENTAL RADIOLOGICAL PROTECTION PROGRAM AND DOSE ASSESSMENT

In 2024, the cumulative annual dose for all NETL personnel performing operations that require dosimetry at NETL-Albany, NETL-Morgantown, and NETL-Pittsburgh was less than 1,000 millirem (roentgen equivalent man, <10 millisievert). The average annual dose was less than 7 millirem (<0.07 millisievert) per person subject to the dosimetry program. Due to limited exposure to radioactive materials, NETL does not currently monitor for any specific radionuclides.

2.3.2 RADIOLOGICAL DISCHARGES

NETL did not discharge any radiological materials to the environment via air or water in 2024. Radiological air monitoring is addressed in Section 5.0.

2.3.3 CLEARANCE OF PROPERTY CONTAINING RESIDUAL RADIOACTIVE MATERIALS

A radiation scoping survey was conducted in parts of B-23 at the NETL Albany Site in February 2024. The investigation included alpha and beta surveys, surface contamination smears, and sampling of brick and sand from the floor to determine if thorium radiological contamination is present. The results indicate the radiation contamination criteria levels are below the established criteria levels for Th-232 (3 pCi/g for volume metric contamination or 1,000 dpm/cm^2 for surface contamination).

While the brick readings were below the surface contamination levels prescribed, the levels require them to be considered naturally occurring radioactive material (NORM). As such, Oregon Administrative Rule 345 Division 50 required the NORM to be collected and disposed of as Low-Level Radioactive Waste (LLRW).

2.3.4 UNPLANNED RADIOLOGICAL RELEASES

There was one potential unplanned radiological release in 2024 at NETL within a research area. In October 2024, a researcher was transferring shale cuttings from a 200-gram container to 25-gram sample cups. The researcher was working on the benchtop with the sample cups, which were designed to fit over the XRF gun for analysis. While pouring shale cuttings from the larger container to the sample cup, a plume of dust was created, which resulted in a potential inhalation hazard. The researcher was provided the opportunity to participate in a radio bioassay sampling but declined. An internal dose estimate was developed per internal dosimetry practices and accepted international models and standards. The committed effective dose due to inhalation of radioactive particulates was estimated to be 0.101 rem, which is well below the annual occupational effective dose limit of 5 rems.

2.3.5 ENVIRONMENTAL RADIOLOGICAL MONITORING

NETL conducts quarterly area monitoring for Radiation Generating Devices (RGD) via area dosimeters. Area monitoring locations and results are in Table 2.3.5.1. The majority of the RGDs registered as non-detects (ND) based on area dosimetry; one RGD installation was found to have an area dose of 108 mrem for the year. However, this is well below the annual threshold of 5 rems for the year.

Table 2.3.5.1 Radiological Area Monitoring Data for 2024		
Environmental Area Dosimeter Location	**Site Location**	**mrem**
Medical CT Scanner B-17 Area 2	MGN	ND
Medical CT Scanner B-17 Conference Room	MGN	ND
Medical CT Scanner B-17 ground floor	MGN	ND
Industrial CT Scanner B-17 Control Room	MGN	ND
Medical CT Scanner B-17 Hallway	MGN	ND
Shipping/Receiving X-Ray Machine B-19	MGN	ND
Shipping/Receiving Area	MGN	ND
X-Ray Diffractometer B-25 R-108	MGN	ND
XRF B-25 R-110	MGN	ND
Shipping/Receiving X-Ray Machine B-902	PGH	ND
XRD B-84 L-217	PGH	ND
XRD B-94 L- 401/402	PGH	ND
XRF B84 - 217 — This unit is portable X-Ray Fluorescence (XRF) unit, which operates with an open beam. An area dosimeter, positioned in close proximity to this open beam, registered scattered radiation from the unit. The dose of 108 mrem was attributed to the use of a portable X-Ray Fluorescence (XRF) unit.	PGH	108
Rigaku Ultima-III x-ray Diffractomer, B-31 R-104A	ALB	ND
Jeol JSM IT700 HR Scanning Electron Microscope B-31 R-103A	ALB	ND
JEOL X-Ray Microanalyzer, Scanning Electron Microscope B-31 R-103B	ALB	ND
Vanta XRF Portable CSeries B-31 R-105	ALB	ND
ND = Not Detectable means that a dosimeter was processed but that the dose is below the minimum reportable dose. The minimum reportable dose is the minimum dose that can be identified by the dosimeter and varies with the type of dosimeter and the radiation being monitored.		

2.3.6 FUTURE RADIOLOGICAL MONITORING

NETL plans to conduct quarterly radiological monitoring on all RGDs using area dosimeters.

2.3.7 RESIDUAL RADIOACTIVITY (RESRAD)-BIOTA

No radiation protection program activities at NETL require the use of RESRAD-BIOTA code. No radionuclide air emissions (under National Emissions Standards for Hazardous Air Pollutants – NESHAPs) have been identified. Therefore, no reporting is required.

2.4 COMPLIANCE AND/OR CLEANUP AGREEMENTS

NETL has agreements with Wyoming Department of Environmental Quality and the Oregon Department of Environmental Quality. NETL's cleanup agreements with the state of Wyoming's Department of Environmental Quality (WYDEQ) are the result of experimental R&D research that began in the 1960s at the Laramie Energy Technology Center (LETC), which was a sister site to what is now NETL Morgantown. When LETC closed, all remediation efforts associated with the site were transferred to NETL Morgantown. The agreements include efforts to remediate groundwater at Rock Springs Oil Shale Retort Site (RSOSRTS) in Sweetwater County, Wyoming. From 1965 to 1979, DOE's Laramie Energy Research Center conducted in-situ oil shale retorting experiments at a facility located seven miles west of the town of Rock Springs, Wyoming. After research activities ended, DOE performed a site-wide surface reclamation in 1982. In 1997, DOE completed a site-wide groundwater characterization effort and identified benzene as a contaminant of concern for groundwater. Based on the results of the characterization effort, WYDEQ required groundwater remediation of benzene with a restoration goal of <5 ug/l benzene at six of the 13 retort sites (4, 5, 6, 7, 9 and 12).

Beginning in 1998, DOE implemented a variety of groundwater remediation technologies at these six sites including pump and treat, bioremediation, and air sparging. Five sites at the Wyoming site underwent active groundwater remediation involving periods (or cycles) of air sparging, contaminant rebound, and monitoring (0.5 ug/l benzene). In 2024, monitoring results indicated that Sites 6 and 7 are near the remediation goal. These sites are in a two-year stability monitoring period that will extend through April 2026 and September 2026, respectively. Once the restoration goal is reached, or WYDEQ approves groundwater remediation at each retort site, DOE will perform surface revegetation and decommissioning prior to closing each site.

Similarly, NETL-Albany is part of the Oregon Department of Environmental Quality's (ODEQ's) Voluntary Cleanup Program. The NETL facility in Albany, Oregon, formerly the Department of the Interior and Department of Energy Albany Research Center, has been performing groundwater monitoring activities and providing periodic reports to ODEQ since potential contaminants of concern were communicated to ODEQ in 2006. Initial characterization of the site hydrology and lithology was performed from 2001 to 2006 with soil borings, groundwater sampling, soil sampling, and soil vapor sampling for a comprehensive view of potential contaminants in the various environmental media that make up the site subsurface. Nearby drinking water wells were also sampled. Based on

the characterization activities (2001-2006), a Publicly Operated Treatment Works drinking water connection was provided to all qualified homeowners in support of public health and safety. Further information on current groundwater investigation activities can be found in Section 7.1 of this document.

2.5 ENVIRONMENTAL VIOLATIONS CITED BY REGULATORS/NOTICES ISSUED

Each NETL research location is identified in the U.S. EPA's Enforcement & Compliance History Online (ECHO) database. NETL's facilities include:

- U.S. DOE Albany Research Center, 1450 Queen Avenue SW, Albany, OR 97321
  - FRS ID: 110004776225
- National Energy Technology Laboratory,3610 Collins Ferry Road, Morgantown, WV 26505 (Also listed as the National Energy Technology Center)
  - FRS ID: 110070749865
- U.S. Department Of Energy, National Energy Technology Laboratory, 626 Cochran Mill Road, Pittsburgh, PA 15236
  - FRS ID: 110001061421

NETL did not receive any notices of violation for these facilities in calendar year 2024.

2.6 NOTICES OF DEFICIENCY, NOTICES OF INTENT TO SUE, AND OTHER ENFORCEMENT ACTIONS

NETL had no notices of deficiency, no notices of intent to sue, and no other enforcement actions identified during calendar year 2024.

2.7 REPORTABLE ENVIRONMENTAL OCCURRENCES THAT REQUIRE NOTIFICATION TO AN OUTSIDE REGULATORY AGENCY

The department's occurrence reporting and processing system (ORPS) provides timely notification to the DOE complex of events that could adversely affect public or DOE worker health and safety, the environment, national security, DOE's safeguards and security interests, and functioning of DOE facilities or the department's reputation. NETL had nine ORPS reportable items, none of which were characterized as environmental occurrences in 2024.

2.8 MAJOR ISSUES, INSTANCES OF NON-COMPLIANCE, AND CORRECTIVE ACTIONS

In October of 2024, NETL transitioned from using external registrar certification for ISO 14001 to self-certifying its Environmental Management System (EMS) conformance to ISO 14001. The program is being restructured to better align with DOE processes, systems and resources, and will provide a more efficient and cost-effective means to comply with DOE directives, mission, and goals. The most recent audit was conducted October 31, 2024.

2.9 STATUS OF ONGOING THIRD-PARTY INSPECTIONS, SELF-ASSESSMENTS AND ENVIRONMENTAL AUDITS

NETL uses a variety of self-assessment procedures to improve ES&H performance including internal audits, project assessments and inspections, independent assessments, and reporting through NETL's corrective action tracking system (CATS). Self-assessments enable NETL to identify strengths, opportunities for improvement, and nonconformances, which are tracked in CATS.

The framework for NETL's EMS is the International Organization for Standardization's (ISO) 14001:2015, Environmental Management Systems: Requirements with Guidance for Use. NETL's EMS covers all site activities and implements programs to meet environmental and sustainability goals and to support the fulfillment of environmental compliance obligations. In October of 2024, NETL transitioned from an external registrar certification to self-certifying its Environmental Management System (EMS) conformance to ISO 14001. The program is being restructured to better align with DOE processes, systems and resources, which will provide a more efficient and cost- effective means to comply with DOE directives, mission and goals. The most recent audit was conducted October 31, 2024.

2.10 SUMMARY OF PERMITS

Table 2.10.1: 2024 Summary of Permits

Permit	Category	Site	Issuing Agency	Status
Industrial Wastewater Discharge Permit Permit No. 8731-02	Wastewater	ALB	City of Albany	Active
Site-Use Permit for Low-Level Radioactive Waste Disposal (Regional Disposal Facility) Permit No. G2140	Low-Level Radioactive Waste Disposal	ALB	Washington Department of Public Health	Active.
B-28 (Phase I & Phase II) Asbestos Abatement ATEZ, Inc. License No. FS-2023-00535 & FS-2024-00535 CCB License No. 64090	Asbestos Removal	ALB	Oregon Department of Environmental Quality (ODEQ)	Phase I – Completed Phase II – Active
B-34 Renovations Net Compliance Environmental Services, LLC License No. FS-2024-00749 CCB License No. 160931	Asbestos Removal	ALB	Oregon Department of Environmental Quality (ODEQ)	Completed
B-23 (Room 100) and B-35 (Room 105) Fume Hood Radiological Work Permit ALB-2024-001	Radiological Work	ALB	NETL	Completed
Minor Source Operating Permit (Allegheny County) Permit No. 0296	Air	PGH	Allegheny County Health Department (ACHD)	Active
Industrial Wastewater Permit No. PHA 052622	Wastewater	PGH	Pleasant Hills Authority	Active
B-74 Storage Tank Registration Tank IDs: 589842 and 589843	Storage Tanks	PGH	Pennsylvania Department of Environmental Protection (PADEP) Bureau of Environmental Cleanup and Brownfields	Active
Allegheny County Dispensing Tank Registration	Fuel Storage Tanks	PGH	Allegheny County Department of Emergency Services	Active
Industrial Wastewater Discharge Permit (NPDES) Permit No. MUB 012	Wastewater	MGN	West Virginia Department of Environmental Protection (WVDEP) Morgantown Utility Board	Active
Stormwater WV/NPDES Permit No. WV0111457	Stormwater	MGN	WVDEP	Active
Construction Stormwater WV/NPDES (CSE Project) Permit No. WV112716	Stormwater	MGN	WVDEP	Active
T-40 Demolition Neumeyer Environmental Services, Inc. License # AC002854 WV Contractor License No. WV057369	Asbestos Removal	MGN	West Virginia Department of Health and Human Resources (WVDHHR)	Completed

2.11 EXECUTIVE ORDER 14057

EO 14057, Catalyzing Clean Energy Industries and Jobs through Federal Sustainability, was implemented, Dec. 8, 2021.While this executive order was in place in 2024, it has since been revoked and replaced by EO 14148, Unleashing American Energy.

2.12 PFAS AND ADDITIONAL EMERGING CONTAMINANTS

Emerging contaminants refers to chemicals that can enter the water supply and have a detrimental effect on aquatic species and nonaquatic species (bioaccumulating up the food web). EPA has identified several emerging contaminants that present unique issues and challenges to the environmental community, including per- and polyfluoroalkyl substances (PFAS).

In 2024, NETL continued to work to ensure compliance with the new DOE and EPA policies regarding PFAS. The following are examples of these activities.

- NETL continued to update its inventory of PFAS-containing AFFF systems and ensured that systems were labeled with basic information to mitigate exposures and environmental impact.
- NETL is actively planning the replacement of its PFAS-containing Aqueous Film-Forming Foam (AFFF) systems. This initiative includes removal of two systems in Pittsburgh, as well as evaluating the need to remove or modify one system in Albany and another system in Morgantown.
- Reports were submitted to DOE and to the State of West Virginia that included the most updated inventory.
- The systems would only be discharged in a fire emergency (per DOE's PFAS policy memo).
- Drinking water supplies at each site are sourced from public drinking water systems. NETL does not test or monitor PFAS content in public drinking water. (Groundwater and surface water sources do not provide drinking water. Government guidance dictates that the supplier is the one responsible for any testing.)

2.13 EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT REPORTING STATUS TABLE

Table 2.13.1: Emergency Planning and Community Right-to-Know Act Reporting Status for 2024

EPCRA Section	Description of Reporting	Status
EPCRA Sec. 302-303	Requires a facility to notify state and local emergency response agencies if any extremely hazardous substances are present in quantities exceeding threshold quantities.	There were no extremely hazardous substances stored in excess of the threshold planning quantities at NETL sites.
EPCRA Sec. 304	Requires a facility to notify state and local emergency response and planning agencies if there is an accidental spill or release in excess of the reportable quantity of a hazardous substance.	There were no releases of hazardous substances which required reporting under Section 304.
EPCRA Sec. 311-312	Section 311 requires one-time submittal of Safety Data Sheets to state and local emergency response agencies for chemicals stored on site in quantities greater than the threshold planning quantities. Section 312 requires an annual report of EPCRA Section 311 information.	EPCRA Section 311 reporting was not required. Section 312 Tier II hazardous substance reports were submitted for the MGN and PGH facilities. Albany was required submit a State-specific report which meets the Section 312 reporting requirements but has lower reporting thresholds.
EPCRA Sec. 313	Section 313 requires that a toxic chemical release inventory report be filed with the EPA in the event of an environmental release of any chemical that is manufactured, processed, or otherwise used in quantities exceeding the regulatory thresholds.	EPCRA Section 313 Toxic Release Inventory (TRI) reporting was not required.

3.0 COMPLIANCE STATUS BY SITE

3.1 ALBANY, OREGON

3.1.1 SITE DESCRIPTION

NETL-Albany focuses on technologies in scientific and engineering areas including materials performance, multi-environmental materials characterization, alloy development/manufacture, and geospatial data analysis. The work is accomplished through both in-house R&D and contracted research. There were 159 employees at NETL-Albany, including 632 federal employees and 97 contractor employees as of December 31, 2024.

Photo 3.1.1a: NETL-Albany and Surrounding Area.

GEOGRAPHY, SURFACE WATER & HYDROLOGY

Geographically, the facility is in the Willamette Valley, which is a structural and erosional lowland between the uplifted marine rocks of the Coast Range and the volcanic rocks of the Cascade Range. NETL-Albany covers approximately 42 acres with approximately 248,000 square feet of building working area. The site is relatively flat and located on a higher section of town away from any flood plains. The Calapooia River is located west of the laboratory, flowing in a broad arcuate pattern from

southeast of the laboratory west to north, emptying into the Willamette River.

NETL-Albany has two relatively shallow aquifers, including a perched aquifer and a deeper gravel aquifer separated by a clay lens. The facility has 35 groundwater monitoring wells and 8 soil gas vapor wells, which are sampled and reported on twice a year. The figures below show the groundwater contours on the perched and gravel aquifers.

LAND USE

NETL-Albany is in Linn County, Oregon, in the western part of the state (Photo 3.1.1a). Albany, the county seat of Linn County, is located approximately 45 miles north of Eugene, 70 miles south of Portland and 25 miles south of Salem. Land use immediately surrounding the site is a combination of residential housing developments, small businesses and public-school properties.

Albany's population, per the 2023 U.S. Census estimates (updated for 2024) is 56,773 people and 21,835 households. The population density was 3,582 persons per square mile. As of December 31, 2024, there were 23,105 housing units at an average density of 1,198.8 per square mile. Albany's racial makeup of the city was 79.5% White, 0.8% African American, 1.4% Native American, 1.8% Asian, 0.3% Pacific Islander, and 10.2% from two or more races. Hispanic or Latino of any race were 14.1% of the population.

The median income for a household in 2024 was $73,809. The per capita income for the city was $34,402. About 13.3% of the population lives below the poverty line. The major employers in Albany are Samaritan Health Services, Linn Benton

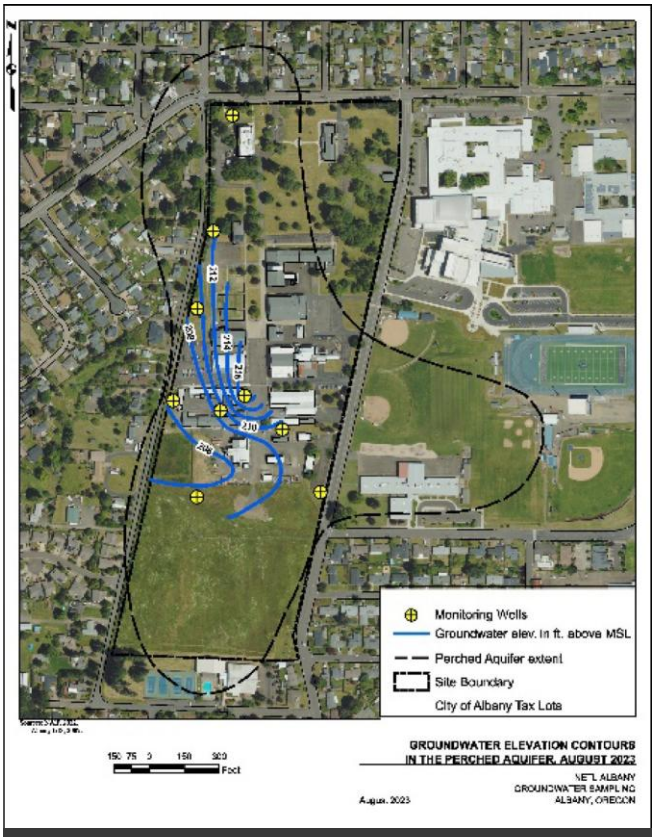


Photo 3.1.1b: Perched aquifer.

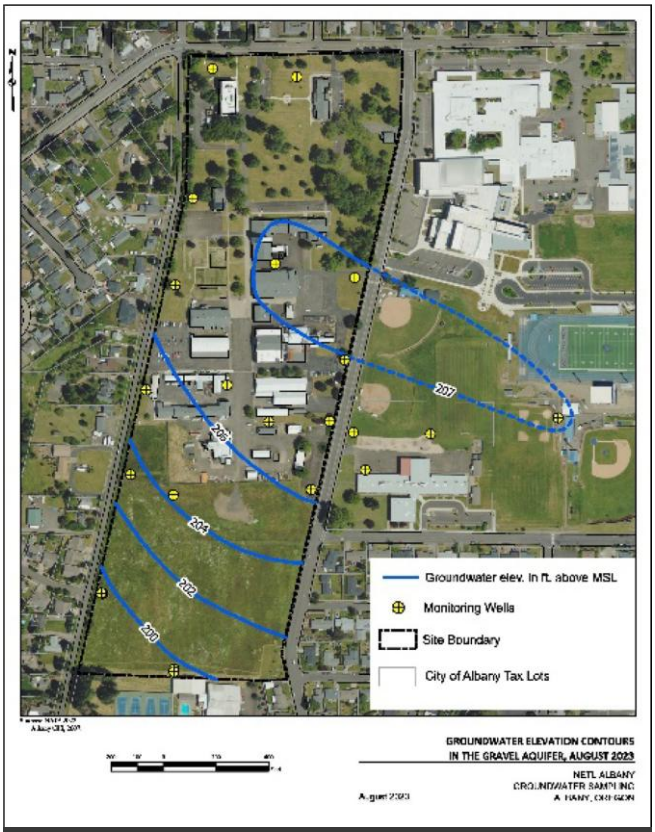


Photo 3.1.1c: Gravel aquifer.

Photo 3.1.2.1: B-28 Electrical Vault Upgrades

Photo 3.1.2.2: B-25 Equipment Enclosure Fence Replacement

Photo 3.1.2.3: B-1 Main Entrance Stairs Replacement

Photo 3.1.2.4: B-34 Advanced Alloy Service Center

Photo 3.1.2.5: Project Design – Site Solar Array

Community College, Greater Albany Public Schools ATI, Greater Target Distribution Center and Linn county.

3.1.2 MAJOR SITE ACTIVITIES

1. **Building 28 (B-28) Electrical Vault Upgrades**
   Construction continued throughout 2024 to upgrade the electrical infrastructure of B-28 for reliability and capacity. This project will ensure code compliance and more effectively support current and future research capabilities.

2. **Building 25 (B-25) Equipment Enclosure Fence Replacement**
   Recent work included replacement of the B-25 equipment enclosure fence. The existing wooden fence was dilapidated and rotting. The new chain link fence with slats will provide more integrity to the equipment enclosure area.

3. **Building 1 (B-1) Main Entrance Stairs Replacement**
   NETL began replacement of the B-1 main entrance stairs. The existing stairs were dilapidated and cracking. The project also included the repainting of the handrails and the replacement of the sidewalks in front of the building.

4. **Building 34 (B-34) Advanced Alloy Service Center**
   Mobilization, abatement and demolition commenced in 2024 on the renovation of B-34 for a new Advanced Alloy Service Center laboratory facility.

5. **Project Design – Site Solar Array**
   Design efforts, along with a NEPA Environmental Assessment and consultation with the Oregon State Historic Preservation office, occurred in 2024 for the construction of a 1 MW Solar Array. This project has since been canceled.

6. **Buildings 20 and 23 (B-20 and B-23) Renovation Projects**
   Assessment, remediation and design efforts occurred for the renovation of B-20 and B-23 to

Photo 3.1.2.6a: B-20 and B-23 Renovation Projects

Photo 3.1.2.6b: B-20 and B-23 Renovation Projects

allow for the placement and operation of new research equipment. The remediation efforts included the removal of Naturally Occurring Radioactive Materials (NORM) contaminated bricks in B-23.

Photo 3.1.2.7: GEMS Computational Center Design

7. **Geological Environmental Material Science (GEMS) Computational Center Design** Assessment and design efforts to renovate Building 33 (B-33) to include advanced computational capabilities commenced in 2024.

3.1.3 ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT

3.1.3.1 CERCLA

NETL-Albany had no off-site remediation activities in 2024. NETL-Albany is not listed on the National Priorities List (NPL) sites, which have liability under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA).

3.1.3.2 SARA TITLE III EMERGENCY PLANNING AND COMMUNITY RIGHT-TO KNOW ACTS

To meet the Emergency Planning and Community Right-to-Know Act (EPCRA) requirements, the Albany site must submit the Oregon Community Right-to-Know Hazardous Substance Report (Tier II Emergency and Hazardous Chemical Inventory) by March 1 of each year. Section 312 of SARA Title III requires facilities to file an annual Tier II report listing the hazardous chemicals present at levels equal to or exceeding specific thresholds at any time during the previous calendar year.

3.1.3.3 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

NETL-Albany is categorized as a Small Quantity hazardous waste generator, i.e., generating less than 1,000 kg per month of hazardous waste or less than 1 kg per month of acutely hazardous waste. NETL-ALB is permitted to accumulate hazardous waste in its central accumulation area for 180-days.

NETL's hazardous waste management support personnel are not authorized to transport hazardous waste. In 2024, NETL-Albany used Waste Xpress as its transporter. NETL-Albany completed four (4) shipments of hazardous waste. The amount of hazardous materials and waste removed from the site in 2024 was slightly higher than in previous years likely to due to increased construction activity. Albany generated 3,787 pounds of hazardous waste and 991 pounds of universal waste in 2024. See Figure 3.1.3.2a: NETL-Albany Annual Hazardous Waste Generation

3.1.3.4 FEDERAL FACILITIES COMPLIANCE ACT (FFCA)

There were no issues identified in 2024 regarding the FFCA at NETL-Albany.

3.1.3.5 TSCA

NETL-Albany does not manufacture chemicals, and therefore, is not subject to sections of the Toxic Substance Control Act (TSCA) related to manufacturing. In

addition, no spills or releases of substances regulated by the TSCA of 1976 (with amendments, et. seq.), including pesticides, polychlorinated biphenyls (PCBs), formaldehyde, methylene chloride, asbestos, etc., were reported in 2024 at the site.

TSCA waste generated at NETL-Albany in 2024 included asbestos containing materials and lead-based paint waste. These materials were disposed of in accordance with federal, state and local requirements.

3.1.3.5.1 ASBESTOS

No unplanned releases of air pollutants covered by CERCLA, or TRI regulations occurred in 2024. All known friable asbestos-containing material (ACM) has either been removed or encapsulated. Non-friable asbestos present at the site is inventoried and maintained. No samples taken in 2024 contained fiber concentrations exceeding EPA or state of Oregon clearance levels (0.01 fibers/cc). Asbestos engineering drawings based on inventory continue to be maintained and updated.

Evaluations, tests and sample collection continue to be conducted by an accredited Oregon-licensed asbestos building inspector (ABI), certified for Class III Asbestos Activities per 40 C.F.R. § 763.92(a)(2) or a Certified Industrial Hygienist (CIH). Analysis of bulk or presumed ACM is performed by persons/ laboratories with proficiency demonstrated by current successful participation in a nationally
recognized testing program, such as the National Voluntary Laboratory Accreditation Program (NVLAP), the National Institute for Standards and Technology (NIST), the Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA) or an equivalent nationally recognized round robin testing program per OSHA 29 C.F.R. § 1910.1001(j)(8)(ii)(B) and OSHA 29 C.F.R. § 1926.1101(k)5)(ii)(B).

When asbestos is removed as part of any remodeling or reworking in a room, building or facility, it is handled by a licensed asbestos abatement/removal contractor (AA/ RC) and adheres to OSHA 29 C.F.R. §1910.1001 (Asbestos-General Industry), OSHA 29 C.F.R. § 1926.1101 (Asbestos-Construction), OSHA Instruction CPL 2-2.40, 40 C.F.R. § 61 (subpart M,

Table 3.1.3.5.1.1 Asbestos Permit Required Projects 2024

Project	Asbestos Removed	Removed by	Disposal
B-28 HVAC & Architectural (Phase I & Phase II)	1,600 ft^2	ATEZ, Inc. (License #: FS-2023-00535 & FS-2024-00535; CCB License No. 64090)	Coffin Butte Landfill Short Mountain Landfill
B-34 Renovations	225 ft 75 linear feet	Net Compliance Environmental Services, LLC. (License #: FS-2024-00749; CCB License No. 160931)	Hillsboro Landfill

NESHAPs), and applicable state regulations (Oregon Administrative Rules, Division 2 [General Industry] & Division 3 [Construction]).

Two projects required a 10-day asbestos notification permit to Oregon DEQ in 2024.

There was one (1) asbestos work activity that was exempt from notification per OAR 340-248-0250.

In January 2024, during construction activities for the B-28 HVAC & Architectural (Phase

I), in Room 115 (Entryway Demo) an inadvertent disturbance of less than 2.5 square feet of trace (< 1%) asbestos containing debris was cleaned up and encapsulated by a

Photo 3.1.3.5.1.a

Photo 3.1.3.5.1.b

licensed ABI (license #: IRO-24-2163B and IRO-24-6830B). Photo 3.1.3.5.1.a illustrates the before/pre-cleanup condition and Photo 3.1.3.5.1.b illustrates the after/post-cleanup condition.

In addition, 12 asbestos sampling events were conducted in 2024 related to operation/ maintenance projects (five events) and construction projects (seven events). Samples were collected by a licensed ABI (license #: IRO-24-2163B).

3.1.3.5.2 LEAD-BASED PAINT

NETL-Albany tests for lead-based paint before demolition, renovation and maintenance projects or elimination of materials through excess property or recycling.

Seven lead-based paint sampling events were conducted in 2024 related to operation/ maintenance projects (four events) and/or construction projects (three events). Paint renovation work for the positive samples was conducted in accordance with OSHA 29 C.F.R. 1910.1025, Lead (General Industry), and OSHA 29 C.F.R. 1926.62, Lead (Construction).

3.1.3.6 FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA)

No restricted-use pesticides, herbicides or defoliants were used at NETL-Albany in 2024. Only general-use herbicides were used for routine vegetation control along fence lines, guard rails, and flower beds. Rodent control was provided via traps with commercial-use baits.

3.1.4 CLEAN AIR ACT/ AIR QUALITY AND PROTECTION ACTIVITIES

3.1.4.1 CLEAN AIR ACT

The Oregon Department of Environmental Quality's (ODEQ) Air Quality program implements Oregon's air permit program established under the state's Environmental Quality Act. Oregon's permit program includes review of applications, determination of permit applicability, and issuance of permits for both minor and major sources. Per ODEQ, laboratory operations (facilities associated with R&D activities) fall under OAR 340, Division 216, Air Contaminant Discharge Permits. These requirements provide guidance and clarification regarding any necessary permitting for construction and operation of stationary sources of air pollutants from laboratory facilities. ODEQ generally evaluates air quality on a county-by-county basis. Monitoring is performed regularly in various counties, and the data is made available from the ODEQ website's air quality index and from the EPA AirNOW webpage.

The site has no project-related emissions that require monitoring, reporting or permitting under the Clean Air Act based on current operations. In 2024, there were no New Source (Pre-Construction) Reviews. The site does not contribute significantly to any air emissions under the National Ambient Air Quality Standards.

3.1.4.2 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Table 3.1.4.2.1 Albany 2024 Air Emissions Inventory

Pollutant	Estimated Emissions (lbs/yr)
Volatile Organic Compounds	16.79
Nitrogen Oxide	916.25
Carbon Monoxide	416.01
Sulfur Dioxide	12.88
Total Suspended Particulates	155.26
Particulate Matter-10 (PM_{10})	61.57
Total Organic Carbon	17.15

No Albany facilities or projects are regulated under the National Emission Standards for Hazardous Air Pollutants, since no current facilities/projects have the potential to emit more than 10 tons per year of a single designated toxic air pollutant, or more than 25 tons per year in aggregate of all (189) toxic air pollutants. Table 3.1.4.2.1 displays the estimated 2024 air emissions for both facility operations and R&D projects.

Table 3.1.4.3.1 2024 ALB HFC Phaseout Inventory Summary							
(All values in pounds)							
Refrigerant	Amount in Equipment Dec. 31, 2023	Amount in Equipment Dec. 31, 2024	Amount in Storage Dec. 31, 2023	Amount in Storage Dec. 31, 2024	Amount purchased in 2024	Amount removed from equipment in 2024	Leaks in 2024
R134A-HFC	25.50	25.50	0	0	0	0	0

3.1.4.3 HYDROFLUOROCARBON (HFC) PHASEDOWN

Table 3.1.4.3.1 Albany HFC Phaseout Inventory Summary shows there is only one HFC used at the Albany site that would be subject to the HFC Phasedown requirements. There were no issues in 2024 regarding compliance HFC phasedown at Albany. NETL continues to evaluate cost effective ways to meet these requirements and to remove targeted refrigerants when the opportunities arise.

3.1.5 WATER QUALITY AND PROTECTION ACTIVITIES

3.1.5.1 CLEAN WATER ACT (CWA)

The EPA and the Oregon DEQ have implemented water pollution control programs, including wastewater standards for industry and water quality standards for all surface water contaminants. These requirements are managed via permits issued to the City of Albany, which then acts as the CWA permitting authority for NETL.

3.1.5.1.1 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) / STORMWATER

NETL-Albany holds an industrial wastewater discharge permit with the City of Albany, which was renewed in December 2023 on a five-year renewal cycle. Albany was required to submit a Slug Discharge Control Plan to the city with the permit renewal. This plan was updated in October 2023 to reflect an increase in chemical storage due

3.1.5.1.1.1a: Elementary neutralization system.


3.1.5.1.1.1b Elementary neutralization system.

to the installation of new equipment. Biannual monitoring is required in accordance with the permit. Table 3.1.5.1.1.1 provides the results of the 2024 monitoring. All results were within permit limits.

Elementary neutralization units have been installed at two laboratory buildings (B-26 and B-31) (see Photos 3.1.5.1.1.1a and 3.1.5.1.1.1b) to prevent potential pH excursions from laboratories even though procedures prohibit disposition of chemicals via laboratory drains. City of Albany Environmental Services personnel inspected the facility in August 2024 and issued a letter confirming compliance.

Table 3.1.5.1.1.1: 2024 Industrial Wastewater Discharge Permit Monitoring Analysis — Albany

Constituent	Permit Limits	Sample Date	
		Feb. 16, 2024	Aug. 06, 2024
Arsenic	1.0 mg/L	ND	0.0013 mg/L
Cadmium	0.44 mg/L	ND	ND
Chromium	2.8 mg/L	0.0012 mg/L	0.0046 mg/L
Copper	3.4 mg/L	0.0040 mg/L	0.025 mg/L
Cyanide (Total)	1.2 mg/L	ND	ND
Lead	0.7 mg/L	ND	0.0063 mg/L
Mercury	0.08 mg/L	ND	0.00045 mg/L
Molybdenum	0.84 mg/L	0.0013 mg/L	0.0014 mg/L
Nickel	1.6 mg/L	0.0020 mg/L	0.0017 mg/L
Oil & Grease (Total)	300 mg/L	ND	42 mg/L
Selenium	0.72 mg/L	ND	ND
Silver	1.1 mg/L	ND	ND
Zinc	1.5 mg/L	0.026 mg/L	0.015 mg/L

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

NETL-Albany does not hold a stormwater permit but is subject to the City of Albany stormwater program. The City of Albany continues to work with Oregon DEQ concerning its NPDES MS4 Phase II requirements, including a Stormwater Management Plan. NETL-Albany will be required to comply with the final permit when issued. Per Oregon DEQ's website, the Phase II MS4 General Permit renewal is underway with Albany but not yet issued.

3.1.5.2 SAFE DRINKING WATER ACT

There were no compliance issues with the Safe Drinking Water Act in 2024. Potable water is supplied by the City of Albany Public Works, which publishes Safe Drinking Water Act compliance reports detailing water quality testing. Drinking water fixtures on-site are filtered, with filters and plumbing maintenance performed during period scheduled preventative maintenance.

3.1.6 PFAS AND ADDITIONAL EMERGING CONTAMINANTS

NETL tracks its inventory of PFAS-containing chemicals as part of its PFAS Management effort (See Section 2). There are four chemicals in the Fire Suppressant Inventory at the Albany site (three are considered to be PFAS-containing).

Table 3.1.6.1 Albany Fire Suppression Inventory

Fire Suppressant	Chemical Names	Notes
B-1, 1st Floor Data Center 3M™ Novec ™1230	1,1,1,2,2,4,5,5,5,-Nonafluoro-4-(trifluoromethyl)-3-pentanone CAS# 756-13-8	System was installed prior to the new guidance. Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4
B-1, 2nd Floor Data Center FM-200 Clean Agent Fire Suppression System	1,1,1,2,3,3,3-Heptafluoropropane CAS# 431-89-0	Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4
B-35, small extinguishers Halotron Fire Extinguisher	2, 2-Dichloro-1, 1, 1-trifluoroethane CAS# 306-83-2	Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4

The City of Albany Public Water System was tested for PFAS in 2013-2014 and the results were non-detect. For additional details on PFAS use and management at NETL, refer to Section 2.

3.1.7 OTHER ENVIRONMENTAL STATUTES

3.1.7.1 ENDANGERED SPECIES ACT

There were no issues at NETL-Albany regarding the Endangered Species Act in 2024.

3.1.7.2 EO 13751 SAFEGUARDING THE NATION FROM THE IMPACTS OF INVASIVE SPECIES

There were no issues at NETL-Albany regarding impacts of invasive species in 2024.

3.1.7.3 NATIONAL HISTORIC PRESERVATION ACT

As part of its renovation efforts, NETL-Albany works with Oregon State Historic Preservation Office (SHPO) regarding potential historical properties on site.

3.1.7.4 MIGRATORY BIRD TREATY ACT

There were no issues at NETL-Albany regarding the Migratory Bird Treaty Act in 2024.

3.1.8 DOE ORDER 436.1, DEPARTMENTAL SUSTAINABILITY

See Section 2.2.1.

3.1.9 EXECUTIVE ORDERS AND DOE ORDERS

NETL-Albany was in full compliance with all applicable environmental EOs in 2024. Throughout the year, numerous inspections and audits were performed and documented to ensure there were no instances of noncompliance.

3.1.9.1 EO 11988, FLOODPLAIN MANAGEMENT

There are no designated floodplains at NETL-Albany.

3.1.9.2 EO 11990, PROTECTION OF WETLANDS

There are no designated wetlands at NETL-Albany. A wetland determination performed in support of renovation activities found that the subject area does not contain any wetlands subject to regulation.

3.1.10 OTHER MAJOR ENVIRONMENTAL ISSUES AND ACCOMPLISHMENTS

The Department's Occurrence Reporting Program System (ORPS) provides timely notification to the DOE complex of events that could adversely affect: the public or DOE worker health and safety, the environment, national security, DOE's safeguards and security interests, functioning of DOE facilities or the department's reputation. NETL-Albany did not have any ORPS reportable incidents in 2024.

3.1.10.1 NATURAL RESOURCES CONSERVATION PROGRAMS AND PROJECTS

Natural resources conservation programs and projects help reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat and reduce damage caused by floods and other natural disasters. In 2024, no issues in this area were uncovered at NETL-Albany.

3.1.10.2 SUSTAINABLE RESILIENT REMEDIATION (SRR)

There are no hazardous waste sites suitable for SRR at NETL-Albany in 2024.

3.1.11 CONTINUOUS RELEASE REPORTING

There was no continuous release reporting required at NETL-Albany in 2024.

3.1.12 UNPLANNED RELEASES

There were no unplanned releases at NETL-Albany during 2024

3.1.13 SUMMARY OF ENVIRONMENTAL PERMITS

Table 3.1.13.1: 2024 Summary of Permits

Permit	Category	Issuing Agency	Status
Industrial Wastewater Discharge Permit. Permit No. 8731-02	Wastewater	City of Albany	Active
Site-Use Permit for Low-Level Radioactive Waste Disposal (Regional Disposal Facility) Permit No. G2140	Low-Level Radioactive Waste	Washington Department of Public Health	Active
B-28 (Phase I & Phase II) Asbestos Abatement ATEZ, Inc. License No. FS-2023-00535 & FS-2024-00535 CCB License No. 64090	Asbestos Removal	Oregon Department of Environmental Quality (ODEQ)	Phase I-Completed Phase II – Active
B-34 Renovations Net Compliance Environmental Services, LLC License No. FS-2024-00749 CCB License No. 160931	Asbestos Removal	Oregon Department of Environmental Quality (ODEQ)	Completed
B-23, Room 100 and B-35, Room 105 Fume Hood Radiological Work Permit ALB-2024-001	Radiological Work	NETL	Completed

3.1.14 FIRE PROTECTION MANAGEMENT AND PLANNING

Fire alarm control panels (FACPs) and fire suppression systems are installed in all occupied buildings as required by DOE Orders. All FACPs are equipped with digital alarm communication transmitters (DACTs) that enable the panels to send fire alarm and trouble signals for monitoring and response. Each building with a FACP is equipped with visual and audible notification devices to alert personnel of a fire. Building fire suppression systems will activate automatically and attempt to extinguish the fire as well as send a water flow alarm to initiate a fire response. (Details on PFAS-related fire suppression systems at Albany are contained in 3.1.6, PFAS AND ADDITIONAL EMERGING CONTAMINANTS.)

Annual fire drills are conducted for all occupied buildings to allow employees to practice evacuation and accountability protocols. NETL Albany does not have an on-site fire department but maintains a Memorandum of Understanding (signed in December 2022) with the Albany Fire Department for planning, preparedness, and response to emergency situations at NETL. The site maintains an emergency phone line reporting system, which connects the individual reporting a fire to the security office. NETL's response to any fire in a facility, project area, vehicle, wildfire or other, is to call the local fire department. Voluntary fire extinguisher use is allowed but not required. During any hot work or fire protection outages, a trained "fire watch" person(s) is designated to continuously monitor the area of concern and report any fires.

3.1.15 RECREATIONAL HUNTING AND FISHING

NETL-Albany does not offer the opportunity for the public to entertain recreational hunting and fishing to control wildlife populations in a controlled setting.

3.2 PITTSBURGH, PENNSYLVANIA

3.2.1 SITE DESCRIPTION

NETL-Pittsburgh focuses on process systems engineering, decision science, functional materials, environmental sciences and energy systems optimization. The work is accomplished through both in-house research and development and through funding awarded externally for specific research. As of Dec. 31, 2024, there were 663 employees at NETL-Pittsburgh: 248 federal and 415 site-support contractors.

NETL-Pittsburgh (Photo 3.2.1.1) lies within Allegheny County, Pennsylvania, at the Bruceton Research Center. The site, comprising approximately 63 acres, is 13 miles south of Pittsburgh in South Park Township, and about 60 miles north of Morgantown, West Virginia. NETL-Pittsburgh shares the Bruceton Research Center with the Centers for Disease Control and Prevention-National Institute for Occupational Safety and Health (CDC-NIOSH) and the U.S. Department of Labor, Mine Safety and Health Administration. The facility sits within the rolling hills and steeply incised stream valleys that are tributaries of the Monongahela River. It is a partially wooded tract, with two subsites having both industrial and office buildings.

GEOGRAPHIC, SURFACE WATER & HYDROLOGY

Immediately west of the site is a low-ridge top with a road and houses. Another road with houses borders the site's north side. The east side of the site is bordered by Lick Run, the Pleasant Hills Authority Sewage Treatment Plant, and Cochran Mill Road. Housing development is increasing around all boundaries of the site, especially to the southwest, where new homes overlook the site. Commercial zones are found more than three quarters of a mile away, although some small businesses are located nearby. Approximately 40% of the immediately surrounding land is forested, about 25% consists of pasture or fallow fields, and the remaining area is residential.

Photo 3.2.1.1: NETL-Pittsburgh Aerial.

LAND USE

According to 2024 U.S. Census estimates, Pittsburgh's population consisted of 307,668 people and 140,615 households within the city limits. The population density was 5,521.4 per square mile. There were 167,947 housing units at an average density of 2,820.39 per square mile. The city's racial makeup was 63.67% White, 22.46% African American, 5.84% Asian, 4.23% Hispanic or Latino of any race, 0.17% Native American and 3.63% from two or more races.

The median income for a household in the city was $66,219. The per capita income for the city was $45,108. About 19.9% of the population lives below the poverty line. The major employers in Pittsburgh are University of Pittsburgh and affiliated medical center, Highmark Health, and PNC Bank.

3.2.2 MAJOR SITE ACTIVITIES

1. **B-83 Center for Artificial Intelligence and Machine Learning (CAML) Data Center**
   This project is to renovate the north end of the first floor of B-83 and to build an addition to house a new machine learning data center, visualization laboratory and office and mechanical and electrical spaces. Progress in 2024 included the installation of the new transformer, installation of finishes and furniture, and exterior paving.

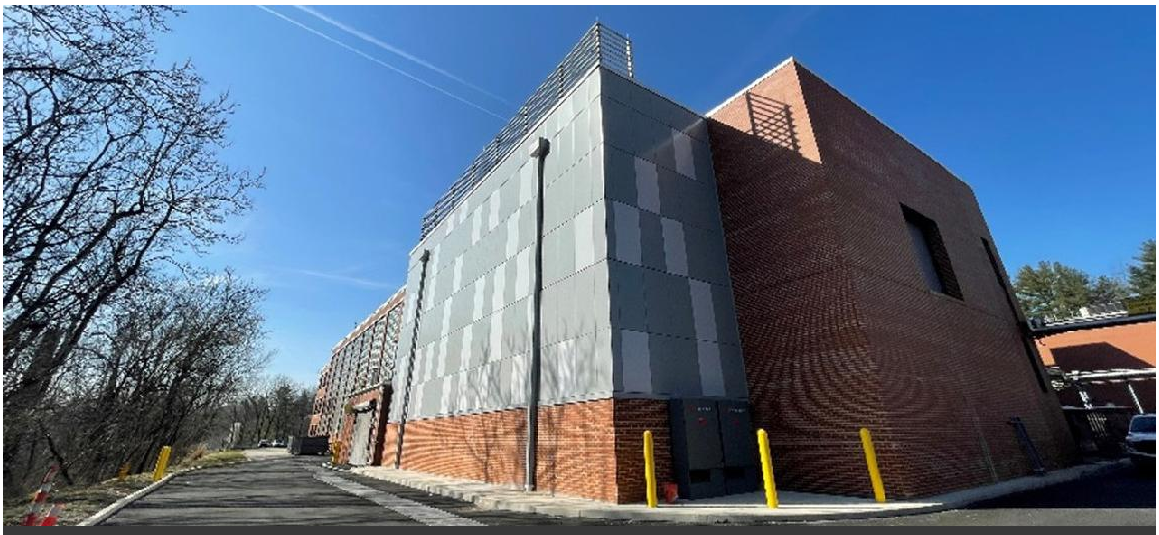


Photo 3.2.2.1a: B-83 CAML building addition.

Photo 3.2.2.1.1b: B-83 CAML two-megawatt generator.

Photo 3.2.2.1.1c: B-83 CAML visualization laboratory.

2. B-922 Conference Center Renovation

This project involves the renovation of B-922 conference rooms (101, 102, 103, 104, 106 and M-2); the north entrances, corridors, and restroom; and the M-2A kitchenette.

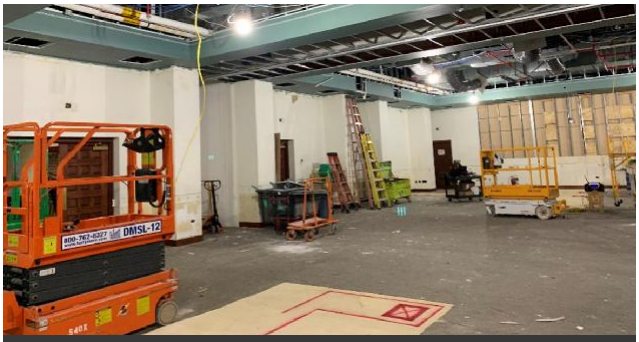


Photo 3.2.2.2a: B-922 conference center — room 106 before renovation.

Photo 3.2.2.2b: B-922 conference center — room 106 after renovation.

Photo 3.2.2.2c: B-922 conference center — hallway after renovation.

3. **920 Plateau Load Interrupter Switch Project**
   This project, completed in August 2024, included replacing the 920-plateau load interrupter switch.

Photo 3.2.2.3a: 920 plateau existing switchgear.

Photo 3.2.2.3b: New switchgear and enclosure.

Photo 3.2.2.3c: Inside switchgear enclosure.

4. **Electric Vehicle (EV) Charging Stations**
   This project is to install multiple EV charging stations throughout the Pittsburgh and Morgantown sites. Four new stations were installed at the Pittsburgh site and one new station at the Morgantown site.

Photo 3.2.2.4: B-83 EV charging station

5. **B-84 High Bay – User Center for Gas Separations**
   The scope of this project is to renovate the existing Building 84 High Bay into two large-scale environmental simulation chambers, capable of providing up to 3,000 scfm of conditioned air continuously. The chambers will be capable of simulating and sustaining atmospheric conditions between -10 to 40 degrees Celsius and the full range of humidity. These modules will provide a flexible prototyping space to support testing priorities of the current Administration's goals and objectives for NETL. Rough-in of all mechanical, electrical, and plumbing is largely complete with the remaining focus on the final tie-ins, testing, and commissioning of the skid-serving equipment. The construction portion of the Center for Gas Separations is projected to be completed in March 2026

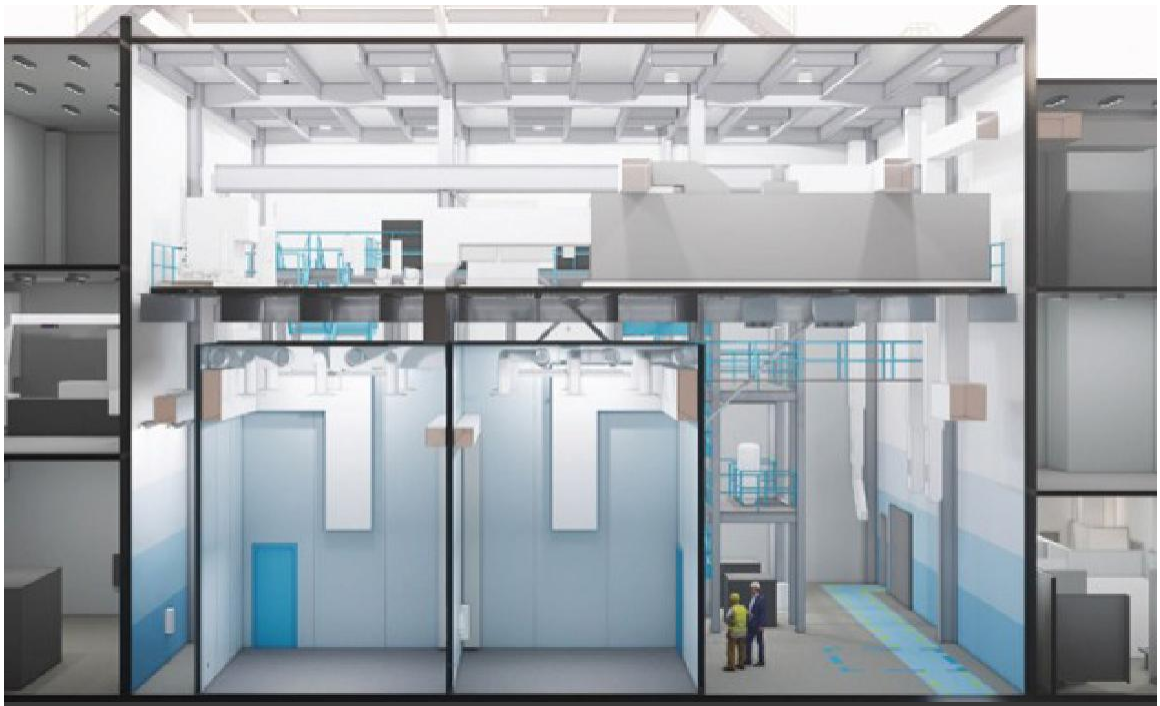


Photo 3.2.2.5: B-84 Center for Gas Separations — east section model view.

6. **B-901 Roof Replacement Project**
   This project provided a new single-ply roofing membrane over the existing roof. Rigid insulation was added to the existing metal roof to fill flutes of the existing surface, which provided a flat surface to fully adhere a new single-ply roofing membrane. A fall protection and lighting protection system was also installed. The project was completed in January 2024.

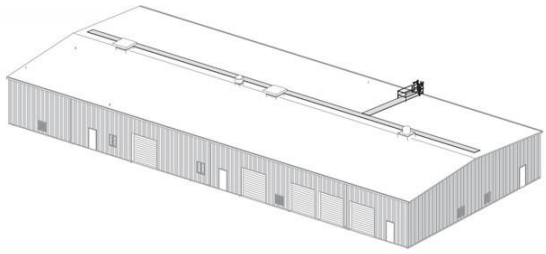


Photo 3.2.2.6a: B-901 roof drawing.

Photo 3.2.2.6b: B-901 — new roof with fall protection and lighting protection system.

7. **B-167 Roof Replacement Project**
   This project provided a new single-ply roofing membrane over the existing roof. Rigid insulation was added to the existing metal roof to fill flutes of the existing surface, which provided a flat surface to fully adhere a new single-ply roofing membrane. A fall protection and lighting protection system was also installed. The project was completed in January 2024.

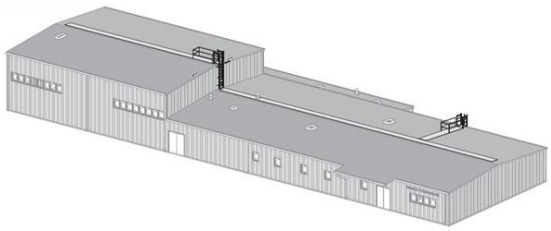


Photo 3.2.2.7a: B-167 roof drawing

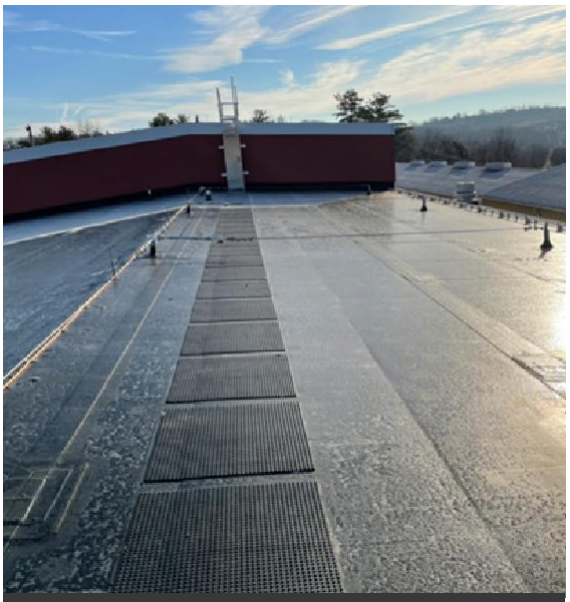


Photo 3.2.2.7b: B-167 new roof with fall protection and lighting protection system.

8. **B-922 Electrical Resilience Upgrades**
   This project is to replace the aging main switchgear and distribution panel that feeds B-920, B-921 and B-922. The design will cover switchgear, distribution panels, motor control center (MCC), and switch replacements.

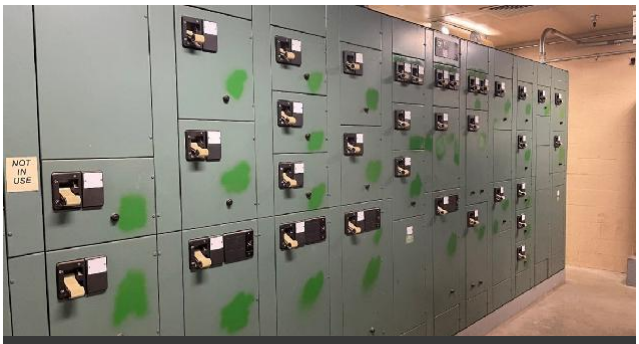


Photo 3.2.2.8a: Outdated and mostly unused MCC equipment in B-922.

Photo 3.2.2.8a: Outdated switchgear in B-922.

9. **B-90 Electrical Resilience Upgrades.**
   This project replaced the end-of-life Gardner Denver air compressor and air dryers. This compressor supplies house air to the entire R & D plateau.

Photo 3.2.2.9a: Newly installed Quincy air compressor.

Photo 3.2.2.9b: Newly installed Quincy air dryers.

10. **B-84 User Center for Gas Conversion Laboratory Renovation**
    NETL's gas conversion center will fill a critical need by providing a fleet of flexible testing capabilities to de-risk new concepts that support departmental priorities. The center design will house modular test rigs that connect to gas distribution and analytical manifolds. The infrastructure will also accommodate external testing rigs so external partners can validate bespoke reactor designs at the small-to-medium scale. This approach will maximize testing flexibility for a variety of pathways, including electrochemical, thermal, and/or photochemical conversion approaches. The expanded capabilities will complement existing NETL infrastructure by providing a higher-throughput and lower-cost pathway to down-select more exploratory systems before testing at larger scale.

Photo 3.2.2.10: B-84, Room 212 existing laboratory space to be renovated.

11. **B-93 Critical Materials Laboratory Renovation**

This project is to renovate the existing B-93 first floor high bay to construct a state-of-the-art critical minerals extraction laboratory to identify and characterize resources and to support extraction technology research. This project will also develop a new water processing facility to advance technology to extract lithium and other critical minerals from produced water and other aqueous sources. Below are photos referencing the existing condition of the B-93 High Bay and a very high-level conceptual design laboratory layout.

Photo 3.2.2.11a: B-93, room 102 high-bay — existing space to be renovated.

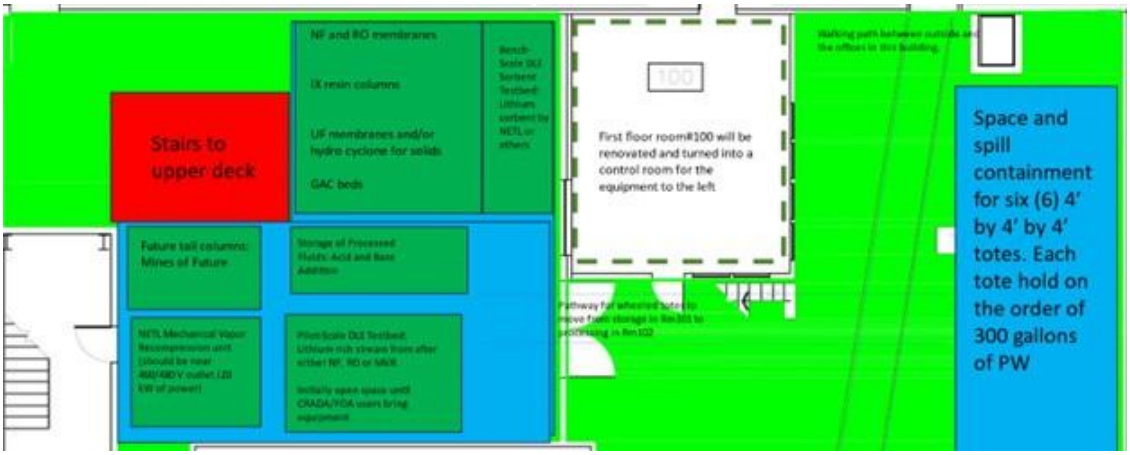


Photo 3.2.2.11b: B-93 high bay high-level critical materials conceptual laboratory layout.

12. **B-64 & B-92 Aqueous Film Forming Foam (AFFF) Fire Suppression System Replacement**
    This project is to remove the existing AFFF containing deluge fire suppression systems in B-64 and B-92 and replace those systems with new water-based fire suppression systems. This renovation includes the installation of a new fire alarm system and associated components, and a new containment system for B-92, room 04.

Photo 3.2.2.12: B-64 & B-92 Aqueous Film Forming Foam (AFFF) Fire Suppression System Replacement.

3.2.3 ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT

3.2.3.1 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)

NETL-Pittsburgh had no off-site remediation activities in 2024. The Pittsburgh site is not listed on the National Priorities List, which includes sites that have liability under CERCLA/ Superfund Amendments and Reauthorization Act (SARA). The U.S. Environmental Protection Agency (EPA) administers the CERCLA program in cooperation with the Commonwealth of Pennsylvania for NETL-Pittsburgh.

3.2.3.2 SARA TITLE III EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

To meet SARA Title III, Emergency Planning and Community Right-to-Know Act (EPCRA) requirements and Pennsylvania's Hazardous Material Emergency Planning & Response Act (Act 165 of 1990), NETL-Pittsburgh submits Tier II Emergency and Hazardous Chemical Inventory information by March 1 of each year. Section 312 of SARA Title III requires NETL to file an annual Tier II report listing the hazardous chemicals that are present at the facility at levels equal to or exceeding specific thresholds at any time during the previous calendar year. Copies of the Tier II report are provided to Pennsylvania Department of Labor and Industry, Allegheny County Department of Emergency Services, South Park Local Emergency Planning Commission, South Park Township Police, Library Volunteer Fire Department, and the Broughton Volunteer Fire Department.

NETL-Pittsburgh is not required to submit a TRI Form R because the site does not use, produce or process any of the listed toxic materials in quantities that exceed the threshold amounts. Additionally, no toxic releases occurred that would have triggered emergency notification as required by EPCRA or CERCLA in 2024.

3.2.3.3 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

The Pittsburgh site is categorized as a large-quantity hazardous waste generator, i.e., generating 1,000 kg per month or more of hazardous, or more than 1 kg per month of acutely hazardous waste. While NETL-Pittsburgh typically generates lesser amounts of hazardous waste most months, occasionally laboratory activities generate larger quantities that exceed the small-quantity generator threshold. As a result, NETL's permit limits hazardous waste storage to up to 90 days. Most waste is packaged and shipped in laboratory packs (lab packs) containing combinations of several different compatible chemicals within a single container (photos 3.2.3.1).

Photo 3.2.3.1a: Lab packs.

Photo 3.2.3.1b: Lab packs.

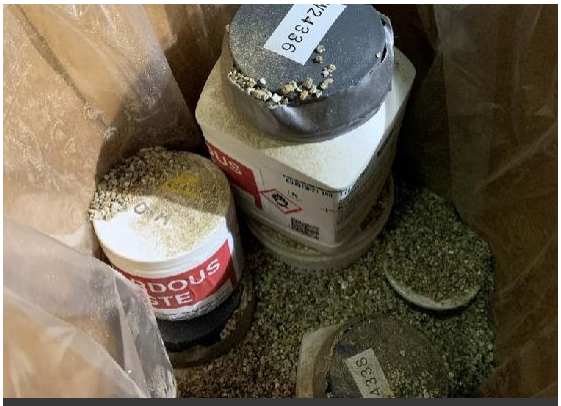


Photo 3.2.3.1c: Inside of lab pack.

Because NETL's hazardous waste management support personnel are not authorized to transport hazardous waste, NETL-Pittsburgh used Tradebe Environmental Services LLC (Tradebe) to transport. NETL-Pittsburgh completed seven waste shipments in 2024. Due to Tradebe's large operational size, most of Pittsburgh's final waste disposition is completed at Tradebe's own facilities. NETL monitors Tradebe facilities, along with other Treatment, Storage, and Disposal (TSD) facilities that Tradebe uses for final treatment and disposal. The amount of hazardous materials and waste removed from the site in 2024 was slightly higher than in previous years, likely due to the disposal of unneeded chemicals. NETL-Pittsburgh generated 15,386 pounds of hazardous waste and 935 pounds of universal waste.

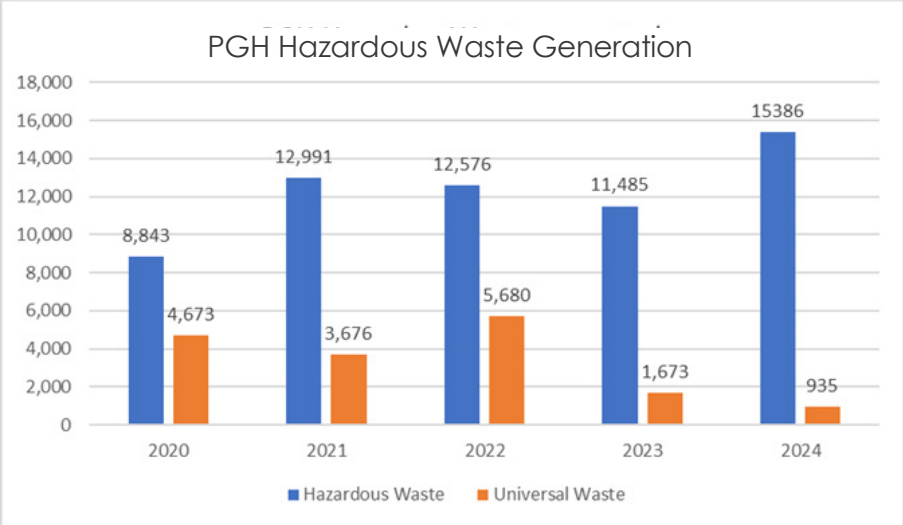


Figure 3.2.3.1a: NETL-Pittsburgh Annual Hazardous Waste Generation

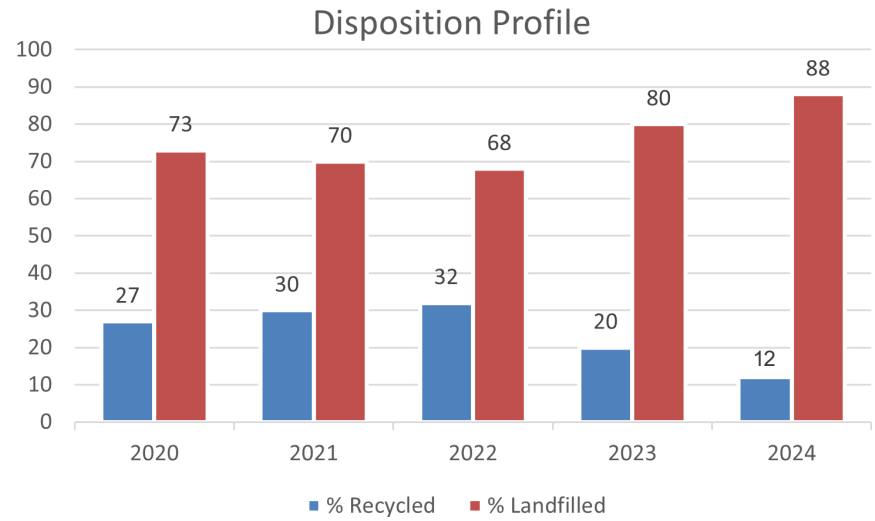


Figure 3.2.3.1b: Pittsburgh RCRA Hazardous Waste Disposition Profile

There were no compliance issues with RCRA at the Pittsburgh site in 2024. There were no Notices of Violation, corrective actions, or best management practices associated with the inspection or operations of hazardous waste handling. There were no RCRA compliance inspections completed by the Pennsylvania Department of Environmental Protection (DEP) at the Pittsburgh site during 2024. There were no EPA Region 3 inspections during 2024.

3.2.3.4 FEDERAL FACILITY COMPLIANCE ACT (FFCA)

NETL-Pittsburgh had no FFCA-related issues in 2024.

3.2.3.5 TOXIC SUBSTANCE CONTROL ACT (TSCA)

NETL-Pittsburgh does not manufacture chemicals and therefore is not subject to manufacturing-related sections of TSCA. No spills or releases of TSCA-regulated (with amendments, et. seq.) substances, including pesticides, polychlorinated biphenyls, formaldehyde, methylene chloride, asbestos, etc., were reported in 2024 at the Pittsburgh site. The two sources of TSCA waste generated in 2024 were asbestos and lead-based paint. These waste materials were disposed of in accordance with federal, state and local requirements. Further information regarding asbestos and lead-based paint-related removal is provided below.

3.2.3.5.1 ASBESTOS

No unplanned releases of air pollutants covered by CERCLA or TRI regulations occurred during 2024. All known friable asbestos-containing material (ACM) has either been removed or encapsulated. Nonfriable asbestos present at the NETL-Pittsburgh site is inventoried and maintained. In 2024, no samples taken indicated the materials contained fiber concentrations exceeding EPA or Pennsylvania clearance levels of (0.01 fibers/cc). Asbestos engineering drawings based on NETL-Pittsburgh inventory continue to be maintained and updated.

Evaluations, tests and sample collection are conducted by an accredited Pennsylvania-licensed Asbestos Building Inspector (ABI), who received certification for Class III Asbestos Activities per 40 C.F.R. 763.92(a)(2), or by a certified industrial hygienist. Analysis of bulk ACM or presumed ACM shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the NVLAP (National Voluntary Laboratory Accreditation Program) or NIST (National Institute of Standards and Technology), or the round robin for bulk samples administered by the AIHA (American Industrial Hygiene Association) or an equivalent nationally recognized round robin testing program per OSHA 29 C.F.R. § 1910.1001(j)(8)(ii)(B) and OSHA 29 C.F.R. § 1926.1101(k)5)(ii)(B).

When asbestos is removed as part of any remodeling or reworking in a room, building or facility, it is handled by a licensed Asbestos Abatement Removal Consultant (AA/RC) and adheres to OSHA 29 C.F.R. § 1910.1001 (Asbestos-General Industry), OSHA 29 C.F.R. § 1926.1101 (Asbestos-Construction), OSHA Instruction CPL 2-2.40, 40 C.F.R. § 61 (Subpart M, NESHAPs), and applicable state regulations (Allegheny County Health Department [ACHD] Article XXI, the Asbestos Occupational Accreditation and Certification Act of 1990 [P.L. 805, No. 194], the Worker and Community Right-to-Know Act of Pennsylvania [P.L. 734, No. 159, P.S. 7317], 25 PA Code § 124, 25 PA Code § 299.152, 25 PA Code § 299.232, and 25 PA Code § 299.302).

No construction projects in 2024 required a 10-day asbestos notification permit. However, 15 asbestos sampling events were conducted in 2024 related to operation/maintenance (13 events) and construction projects (two events). Samples were collected by an ABI (license #: 059485, 066961, and 056089).

Two incident investigations were conducted in 2024.

B-93, Room 101:

Insulation was disturbed during a thermostat replacement effort (NETL-PGH-IR-2406-118). In June 2024, an off-site subcontractor (Blue Sky) reported that, upon removal of an existing wall- mounted thermostat, a significant amount of granular material (presumed Vermiculite) poured out of the inner east side wall. All samples were found to be non-detect for asbestos.

B-84 Room 119S:

In May 2024, demolition of laboratory materials resulted in concerns regarding potential asbestos. After sampling the mastic and the bench top all samples were found to be non-detect for asbestos.

Detailed sampling results are maintained at the sites and can be provided when necessary.

3.2.3.5.2 LEAD-BASED PAINT

NETL tests for lead paint before demolition, renovation and maintenance projects or elimination of materials through excess property or recycling. Ten lead-based paint sampling events were conducted in 2024 related to operation/ maintenance (seven events) and construction projects (three events). Paint renovation work for the positive samples was conducted in accordance with OSHA 29 C.F.R. § 1910.1025, Lead (General Industry), and OSHA 29 C.F.R. § 1926.62, Lead (Construction).

3.2.3.6 FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA)

No restricted-use pesticides, herbicides, or defoliants, as regulated by FIFRA were kept on-site. Only general-use pesticides were kept and used for routine insect control. A professional pest control company, Leaf Pest Control, is subcontracted to spray inside certain offices, as needed, cafeteria drains, certain lunch areas, certain basement areas, and the day care facility. Herbicides are used for controlling weeds for the fence lines, mulch beds and guard rails. No defoliants are used.

3.2.4 CLEAN AIR ACT/AIR QUALITY AND PROTECTION MEASURES

3.2.4.1 CLEAN AIR ACT

Pennsylvania's Department of Environmental Protection (PADEP) Bureau of Air Quality is responsible for implementing the requirements of the federal Clean Air Act, as well as Pennsylvania's Air Pollution Control Act. The ACHD is authorized to administer Title V operating permits under the Clean Air Act Amendments.

The Pittsburgh site's Title V, Operating Permit was issued on July 7, 2021, and designates NETL-Pittsburgh as a synthetic minor source. The permit is effective for five years and will be renewed in 2026. NETL-Pittsburgh submits biannual reports to ACHD in accordance with the Title V Operating Permit, General Condition III.15.d. listing the various types of comfort-heat boilers, space heaters, and emergency generators that require fuel usage. The submissions also matches product statements from the fuel suppliers.

Additionally, NETL- Pittsburgh is required to submit an annual emissions inventory to the ACHD by March 15 of each year, for the preceding calendar year. NETL uses an air emission inventory model, AES* Online, which is required by both the ACHD's Bureau of Environmental Quality and PADEP's Bureau of Air Quality to calculate the annual emissions. The model is based on on-site fuel usage and provides a worst-case scenario for potential emissions. The model uses the type, quantity and total burn time of each fuel to calculate the estimated emission levels. Modeling results are summarized in Table 3.2.4.1.1. NETL-Pittsburgh did not receive any notices of violation, nor were there any unplanned air emission occurrences in 2024.

Table 3.2.4.1.1: 2024 Air Emissions Inventory — Pittsburgh	
Pollutant	Calculated Emissions (lbs./yr.)
Ammonia	131.7
Benzene	0.07
Butane	7.5
Carbon Dioxide	4,155,072
Carbon Monoxide	2,984.1
Hexane	0.6
Naphthalene	0.02
Formaldehyde	2.7
Nitrogen Oxide	78.2
Lead	0.02
Pentane	9.2
Ethane	11.0
Methane	81.7.8
Particulate Matter, $PM_{2.5}$	1,100
Particulate Matter, PM_{10}	1,370
Sulfur Dioxide	21.3
Toluene	0.12
Arsenic	0.007
Barium	0.2
Cadmium	0.04
Chromium	0.05
Cooper	0.03
Manganese	0.01
Mercury	0.01
Molybdenum	0.04
Nickel	0.1
Vanadium	0.1
Zinc	1.0
VOC	195.4

3.2.4.2 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

The NETL-Pittsburgh site is compliant with all applicable National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, as established under Title 40 of the Code of Federal Regulations, Part 61 and Part 63. The site conducts regular monitoring, reporting, and emission control activities in accordance with federal and state environmental requirements to ensure the continued protection of human health and the environment.

3.2.4.3 HYDROFLUOROCARBON (HFC) PHASEDOWN

NETL-Pittsburgh actively participates in the HFC Phasedown program to reduce the use of Class I ozone depleting substances (ODSs) as part of the American Innovation and Manufacturing Act. The goal is to recover and reclaim hydrochlorofluorocarbon refrigerants from existing HVAC equipment (for subsequent reuse and recycle) and to facilitate the transition to next-generation refrigerants. In recent years, the inventory of ODS-containing equipment has been steadily decreasing at NETL-Pittsburgh. Older ODS-containing equipment is being replaced and the use of Class I ODSs is being phased out from HVAC equipment and replaced with environmentally friendly substitutes.

Below is a table that shows the phaseout list at NETL-Pittsburgh. There were no issues in 2024 regarding compliance with HFC phasedown at Pittsburgh. The refrigerant lost due to leaking at NETL-Pittsburgh facility came from a leaking liquid line service valve. The valve was replaced, and the equipment was made operational.

Table 3.2.4.3.1 HFC Phase Out Summary

(All values in Pounds)

Refrigerant	Amount in Equipment Dec. 31, 2023	Amount in Equipment Dec. 31, 2024	Amount in Storage Dec. 31, 2023	Amount in Storage Dec. 31, 2024	Amount Purchased in 2024	Amount Removed from Equipment in 2024	Leaks in 2024
R134A-HFC	1664.89	1664.89	432.6	349.84	0	0.19	82.57

3.2.4.1 METEOROLOGICAL TOWER DATA

Two new meteorological towers were installed on the Pittsburgh site in September 2024. The new towers were placed as part of an upgrade project and will provide data for the temperature, humidity, wind (direction and speed), precipitation and solar radiation on a solar-powered platform. This upgrade will allow better access to site security, the EOC, and the environmental professionals. Meteorological tower #2 is shown in Photo 3.2.4.1.1.

3.2.4.1.1: Pittsburgh meteorological tower.

3.2.5 WATER QUALITY AND PROTECTION ACTIVITIES

3.2.5.1 CLEAN WATER ACT

NETL-Pittsburgh topography consists of rolling hills separated by the natural flow of water at the Bruceton Research Center site. As a result, surface water at NETL-Pittsburgh is

divided into two distinct areas: the northern area and the southern area. The northern area is located north of Experimental Drive and houses the laboratory and process facilities for DOE's portion of the site. The southern area is south of Wallace Road and houses administrative, project management and contractor maintenance operations. The northern area is referred to as the "R&D plateau," and the southern area is referred to as the "main plateau."

NETL-Pittsburgh's water quality program ensures that activities do not contaminate industrial wastewater, sanitary wastewater or storm water discharges. Environmental staff review all on-site research projects, support activities and construction activities for potential impacts to air, surface water, groundwater and soil as part of the Safety Analysis and Review System processes. Applicable federal, state and local regulations affecting these activities are considered to ensure compliance before approval is given for work to proceed.

On the R&D Plateau sampling is performed by NETL-Pittsburgh environmental staff. The Pleasant Hills Authority (PHA) also conducts independent sampling and analysis of wastewater effluent, wastewater treatment facility discharge, and subinterceptor discharge (sanitary water). This information is used to determine whether any effluent discharges exceed local limits. No industrial wastewater permit limits were exceeded in 2024.

NETL-Pittsburgh's main plateau (southern area) does not require an industrial wastewater treatment system since this portion of the site does not house laboratory operations; only administrative, project management and contractor maintenance operations occur on the main plateau.

3.2.5.1. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)/ STORMWATER

DESCRIPTION OF PITTSBURGH WASTEWATER TREATMENT FACILITY

Treatment in the wastewater treatment facility (WWTF) begins with flow equalization, followed by pH adjustment using either caustic soda or ferric chloride. Subsequently, metals and particulates are removed by agglomeration in the flocculation tank, followed by solids separation in the plate separator (Photo 3.2.5.1.1a). Prior to discharge to the Pleasant Hills sanitary sewer, the treated water is sent through an activated clay/ activated carbon filtration system for additional removal of organics and metals. Once through the filtration system, if the effluent does not meet the necessary pH (6 to 9), it is recirculated through the system. If the pH is outside the allowable range, a diverter valve in the effluent monitoring tank opens automatically, allowing the off-specification effluent to be recirculated within the system for additional treatment. Final effluent pH

Photo 3.2.5.1.1a: Pittsburgh plate separator.

adjustment occurs in a chamber inside the effluent monitoring tank prior to discharge. Once the WWTF effluent meets specification, it is routed to the PHA sewage treatment plant for final treatment.

Table 3.2.5.1.1: B-74 2024 Monthly Monitoring Results (mg/L) — Pittsburgh

Constituent	Permit Limit	Sampling Date											
		1/17/24	2/14/24	3/13/24	4/9/24	5/8/24	6/13/24	7/10/24	8/7/24	9/11/24	10/16/24	11/13/24	12/11/24
Cadmium	0.54	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0005
Cyanide	3.21	0.014	0.011	0.10	ND	ND	ND	ND	ND	0.011	ND	ND	ND
Mercury	0.0062	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00023
pH (s.u.)	6.0-9.0	7.47*	6.71*	8.20*	7.26*	6.91*	7.23*	6.77*	6.20*	6.92*	7.24*	7.25*	6.57*

ND = not detected; s.u. = standard units; * = Field Measurement; NA= Not Analyzed; NS- not sampled

SANITARY WASTEWATER

Separate from the treated laboratory/process wastewater discharge, sanitary sewage from the R&D plateau (northern area) is combined with sanitary sewage from CDC/NIOSH. The NETL/NIOSH subinterceptor sanitary sewer line then discharges into the South Park (Pennsylvania) main sanitary line at a point close to the PHA wastewater treatment facility. CDC/NIOSH also has another sanitary sewer line that discharges directly into the South Park main sanitary line.

The NETL-Pittsburgh sanitary sewage from the main plateau is routed to and treated at the Clairton municipal sewage treatment plant. No permit parameters have been identified for discharges of sanitary sewage to the Clairton plant.

STORMWATER

NETL-Pittsburgh also discharges stormwater in conjunction with CDC/NIOSH since CDC/NIOSH holds the National Pollutant Discharge Elimination System (NPDES) stormwater permit for the Bruceton Research Center. The NPDES permit lists four outfalls associated with NETL's portion of the site: the north outfall (001), the south outfall (002), the north outfall extension (101), and the south outfall extension (102). The NPDES permit regulates contaminants to the stormwater effluent. Potential stormwater discharges include: the salt-storage facility area, air-conditioning condensate (Photo 3.2.5.1.1b), runoff from various impervious surfaces into the site storm sewer system and treated acid-mine drainage from a research coal mine operated by CDC/NIOSH. The NPDES permit requires CDC/NIOSH to monitor and report discharge results for north outfall (001) and south outfall (002) on a quarterly basis. The permit requires measurement of pH, flow, total suspended solids, manganese, iron and aluminum, but does not mandate discharge limits.

Photo 3.2.5.1.1b: North Outfall

On the R&D plateau, stormwater (surface water) runoff from the 69-acre area exits the site through the northern storm drainage system, which drains directly into nearby Lick Run. Lick Run is a small natural stream that flows along the eastern boundary of the 238-acre Bruceton Research Center. The stormwater discharge occurs at the NPDES-permitted north outfall (001). The north outfall extension (101) also discharges directly into the north outfall.

Stormwater collected from the main plateau exits the site through a dedicated southern drainage system, which also enters Lick Run. This discharge occurs at NPDES-permitted south outfall (002). Stormwater discharged from the site's southern (main plateau) side is also regulated through the NPDES permit. The south outfall receives stormwater from both NETL-Pittsburgh and NIOSH.

No notices of violation were issued with respect to the Bruceton Research Center's NPDES permit in 2024. Because CDC/NIOSH holds the NPDES permit, they are responsible for sampling and issuing the monthly discharge monitoring report.

3.2.5.2 SAFE DRINKING WATER ACT

There were no issues in 2024 regarding compliance with the Safe Drinking Water Act. NETL-Pittsburgh's potable water is supplied by the local water utility, which publishes Safe Drinking Water Act compliance reports detailing water quality testing. Drinking water fixtures on-site are filtered, with filters and plumbing maintenance performed during periodic scheduled preventative maintenance.

3.2.6 PFAS AND ADDITIONAL EMERGING CONTAMINANTS

NETL tracks its inventory of PFAS-containing chemicals as part of its PFAS management effort. Four PFAS-containing fire suppression systems are in place at the Pittsburgh site.

Table 3.2.6.1 Pittsburgh Fire Suppressant Inventory

Fire Suppressant	Chemical Name	Status
B-64 (Chemical Storage) Deluge Foam AFFF System	Trade Secret, Universal Gold®C6 1%/3% Alcohol Resistant (AR)-AFFF Concentrate	Classified as PFAS-containing. Replacement scheduled for FY 2025.
B-92 (Waste Handling) Deluge Foam AFFF System	Trade Secret, Universal Gold®C6 1%/3 (AR-AFFF)	Classified as PFAS-containing. Replacement scheduled for FY 2025.
B-94 (Data Center) Pre-action Clean Agent Sapphire System	1,1,1,2,2,4,5,5,5,-Nonafluoro-4-(trifluoromethyl)-3-pentanone CAS 756-13-8	Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4
B-922 (Computer Room) Halon 1301 Gaseous System (Aban-doned)	Bromotrifluoromethane CAS 75-63-8	Not registered per EPA definition but is registered using the OECD definition of a –CnF2n–. Halon cylinders have been removed; pipes/components remain.

See Section 2.12 for information regarding PFAS at NETL.

3.2.7 OTHER ENVIRONMENTAL STATUTES

3.2.7.1 ENDANGERED SPECIES ACT

There were no issues at NETL-Pittsburgh regarding the Endangered Species Act in 2024.

3.2.7.2 E.O. 13751 SAFEGUARDING THE NATION FROM THE IMPACTS OF INVASIVE SPECIES

There were no issues at NETL-Pittsburgh regarding impacts of invasive species during 2024.

3.2.7.3 NATIONAL HISTORIC PRESERVATION ACT

There were no issues at NETL-Pittsburgh regarding the National Historic Preservation Act in 2024.

3.2.7.4 MIGRATORY BIRD TREATY ACT

There were no issues at NETL-Pittsburgh regarding the Migratory Bird Treaty Act in 2024.

3.2.8 DOE ORDER 436.1, DEPARTMENTAL SUSTAINABILITY

See Section 2.2.1.

3.2.9 EXECUTIVE ORDERS

NETL-Pittsburgh was in full compliance with all applicable environmental executive orders (EO) in 2024. Throughout the year, numerous inspections and audits were performed and documented to ensure there were no instances of noncompliance.

3.2.9.1 EO 19818, FLOODPLAIN MANAGEMENT

There were no issues at NETL-Pittsburgh regarding floodplain management in 2024.

3.2.9.2 EO 11990, PROTECTION OF WETLANDS

There were no issues at NETL-Pittsburgh regarding protection of wetlands in 2024.

3.2.10 OTHER MAJOR ENVIRONMENTAL ISSUES AND ACCOMPLISHMENTS

DOE's Occurrence Reporting and Processing System (ORPS) provides timely notification to the DOE complex of events that could adversely affect: the public or DOE worker health and safety, the environment, national security, DOE's safeguards and security interests, functioning of DOE facilities or the department's reputation. NETL-Pittsburgh filed four ORPS reports in 2024, however none of the ORPS reports triggered environmental reporting.

3.2.10.1 NATURAL RESOURCES CONSERVATION PROGRAMS AND PROJECTS

Natural resources conservation programs and projects help reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damage caused by floods and other natural disasters. There were no issues in this area in 2024 at NETL-Pittsburgh.

3.2.10.2 SUSTAINABILITY RESILIENT REMEDIATION

There were no hazardous waste sites suitable for sustainability resilient remediation at NETL-Pittsburgh in 2024.

3.2.11 CONTINUOUS RELEASE REPORTING

No continuous release reporting was required at NETL-Pittsburgh in 2024.

3.2.12 UNPLANNED RELEASES

There were no unplanned environmental releases that required reporting at NETL-Pittsburgh in 2024.

3.2.13 SUMMARY OF ENVIRONMENTAL PERMITS

Table 3.2.13.1: 2024 Summary of Permits — Pittsburgh			
Permit No. and Title	Issue Date/ Renewal	Regulatory Agency	Description
0296-OP21 Minor Source Operating Permit	07/07/2021 01/06/2026	Allegheny County Health Department, Air Quality Program	Establishes NETL-PGH as a minor source for particulate matter (PM), PM of 10 microns or less in diameter (PM10), sulfur dioxide (SO_2), volatile organic compounds (VOCs), nitrogen oxides (NO_x), carbon monoxide (CO) and hazardous air pollutants, as defined in section 2101.20 of Article XXI Air Pollution Control of the Allegheny County Health Department, Rules and Regulations.
IP 0296-I001 Installation Permit	03/31/23 09/30.2024	Allegheny County Health Department, Air Quality Program	Establishes the installation permit requirements for the Center for Artificial Intelligence/Machine Learning (CAML) project generator and fuel storage tank.
GF 47497.009 Industrial Sewer Use Permit	12/16/2020, 12/16/2025	PHA	Establishes permission for the discharge of certain industrial wastewaters for the purposes of treatment by PHA. Includes permit requirements, general provisions, fees, reporting and local limits for certain discharge parameters. Permit was modified 5/26/2022 to increase the amount of N,N-Dimethylacetamide waste stream that can be discharged to PHA.
ID: 02-81183 SEQ#: 008A Aboveground Storage Tank Registration Permit/ Certificate	1990s, 10/04/2024 Renewal 10/04/2025	PADEP Bureau of Environmental Cleanup and Brownfields	Permit for aboveground storage tank containing ferric chloride at Pittsburgh's WWTF (B-74).
ID: 02-81183 SEQ#: 009A Aboveground Storage Tank Registration Permit/ Certificate	1990s, 10/04/2024 Renewal 10/04/2025	PADEP Bureau of Environmental Cleanup and Brownfields	Permit for aboveground storage tank containing caustic soda at Pittsburgh's WWTF (B-74).
S-1018 Certificate of Fire and Explosion Safety	05/18/2004	Allegheny County Fire Marshal	Approval for the storage and handling of flammable and/or combustible liquids in aboveground storage tank; certificate covers ethanol tank and pump.
S-1102 Certificate of Fire and Explosion Safety	10/06/2006	Allegheny County Fire Marshal	Approval for the storage and handling of flammable and/or combustible liquids in aboveground storage tank; certificate covers one diesel tank and one gasoline tank.

3.2.14 FIRE PROTECTION MANAGEMENT AND PLANNING

At NETL-Pittsburgh, fire alarm control panels (FACPs) and fire suppression systems are installed in all occupied buildings as required by DOE orders. All FACPs are equipped with digital alarm communication transmitters that enable the panels to send fire alarm and

trouble signals to the security offices for monitoring and response. Each building with a FACP is equipped with visual and audible notification devices to alert personnel of a fire. Building fire suppression systems will activate automatically and attempt to extinguish the fire as well as send a water flow alarm to the security office to initiate a fire response.

Annual fire drills are conducted to allow all employees to practice evacuation and accountability protocols. NETL Pittsburgh does not have an on-site fire department, but the site does have an Emergency Response Organization (ERO) for on-site emergencies. A memorandum of understanding (signed July 2023) with CDC/NIOSH was issued for the purpose of planning, preparedness, and response for emergency situations at the shared Bruceton Research Center. The site maintains an emergency phone line reporting system (by dialing ext. 11), which connects the individual reporting a fire to the security office. NETL's response to any fire facility, project area, vehicle, wildfire or other would be to call the local fire department. Voluntary fire extinguisher usage is allowed but not required. During any hot work or fire protection outages, a trained "fire watch" person(s) is designated to continuously monitor the area of concern and report any fires.

3.2.15 RECREATIONAL HUNTING AND FISHING

NETL-Pittsburgh does not offer the opportunity for the public to entertain recreational hunting and fishing to control wildlife populations in a controlled setting.

3.3 MORGANTOWN, WEST VIRGINIA

3.3.1 SITE DESCRIPTION

NETL-Morgantown (Photos 3.3.1.1a and 3.3.1.1b) lies within Monongalia County, West Virginia, on the northern end of the city of Morgantown. The location is about 70 miles south of Pittsburgh, Pennsylvania, and about 200 miles west of Washington, D.C. Geographically, NETL-Morgantown sits within the rolling hills of the Appalachian Plateau, about 1,000 feet east of the Monongahela River and about 10 miles west of Chestnut Ridge, the westernmost ridge of the Allegheny Mountains. The site covers approximately 135 acres, 33 of which are developed as industrial use. All surface drainage goes into two small streams that border the site on the east and northeast sides. Land use immediately surrounding NETL-Morgantown is a combination of residential, commercial, and public-school systems.

Photo 3.3.1.1a: NETL B-39.

NETL-Morgantown focuses on technologies in scientific and engineering areas. Areas include energy conversion devices, simulation-based engineering, in-situ materials characterization, supercomputer infrastructure, and diagnostics, sensors and controls.

Photo 3.3.1.1b: NETL- Morgantown Aerial.

The work is accomplished both internally through in-house R&D and externally through funding awarded for specific research. As of Dec. 31, 2024, 493 employees were employed at NETL-Morgantown; 221 federal employees and 272 site-support contractor employees.

Morgantown's population, per the 2022 U.S. Census estimates, was 30,429 in 12,119 households within the city limits. The city's racial makeup was 85.7 % White, 4.2% African American, 3.9 % Asian, 4.0% Hispanic or Latino of any race, and 4.4 % from two or more races.

The median household income for the Morgantown metro area was $42,245. About 33.6% of the population lives below the poverty line. Major employers within the Morgantown area according to the Morgantown Area Partnership were West Virginia University (WVU), WVU Medicine, Monongalia County Board of Education, Monongalia General Hospital, NETL, CDC-NIOSH, and TeleTech.

3.3.2 MAJOR SITE ACTIVITIES

1. **Trailer 40 Demolition**
   Trailer 40 was demolished and removed. Originally housing administrative office space, the trailer was well past its useful life and carrying an excess in deferred maintenance costs. To eliminate continued maintenance costs and reduce NETL's overall footprint, the trailer was demolished and the area restored to a grassy level landscape.

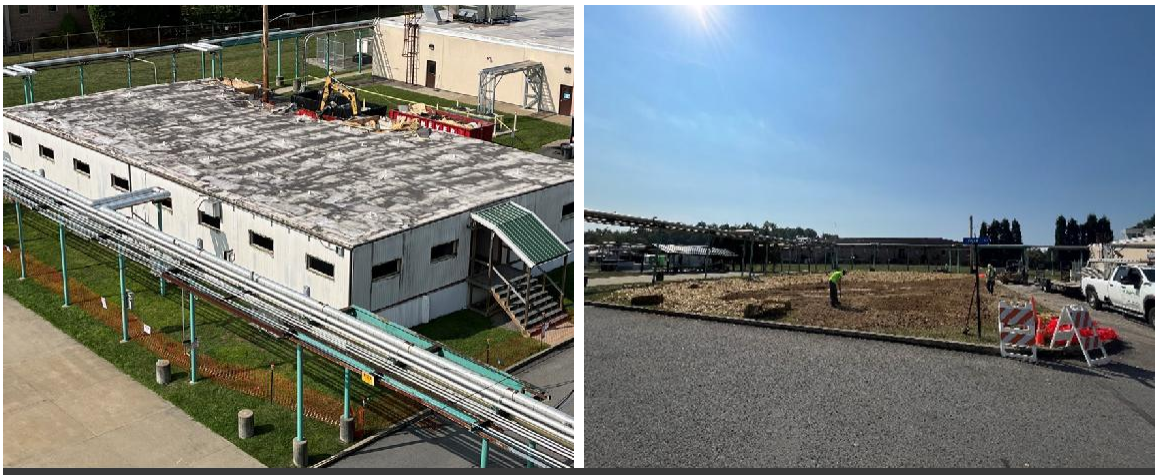


Photo 3.3.2.1: Trailer 40 before (left) and after demolition (right).

2. **Building 3 (B-3) Restoration**
   NETL completed emergency repair and restoration work to portions of B-3 from damage caused by a water line break. An extended period of extremely cold weather caused the building's potable water supply line to freeze and break, flooding a large portion of the building and damaging flooring, walls, furniture and equipment. The project completed remediation work to clean and repair areas of the building affected or damaged by water intrusion and installed a new service connection for the building's water supply.

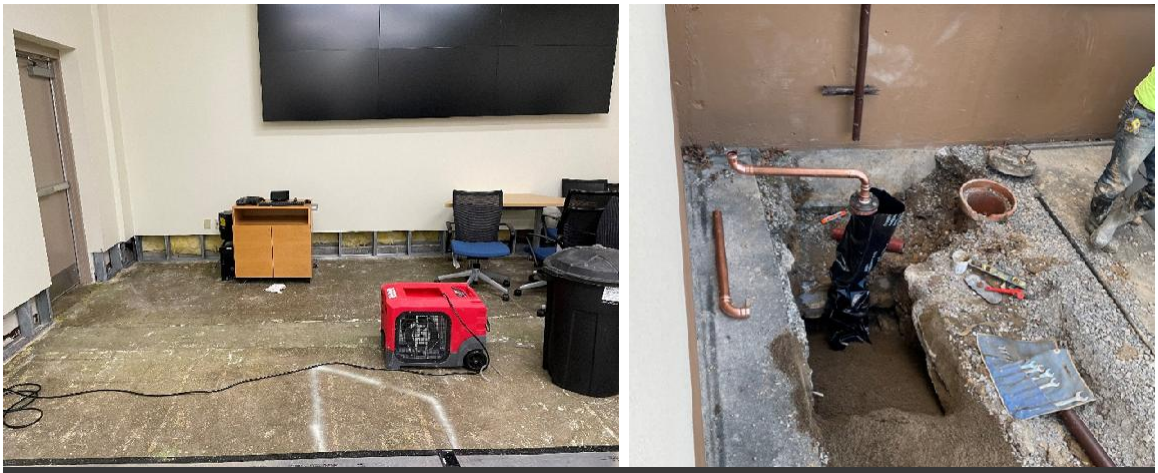


Photo 3.3.2.2: Drying and removal of damaged carpet and drywall inside B-3 (left) and installation of new water line building connection (right).

3. **Computation Sciences and Engineering (CSE) — Design**
   The design was completed for a new state-of-the-art facility to house NETL's Joule supercomputer, a computational laboratory, and other computational and R&D collaboration support areas. The new facility will add capability to NETL by providing expansion for growth of research and administrative work loads/new equipment such as the planned Wafer-Scale Engine (WSE) computing technology (e.g., Cerebras CS-2), consolidate NETL's data centers into a single facility, and allow decommissioning of current, less-efficient data center space.

Photo 3.3.2.3: Rendering of the CSE facility, exterior façade.

4. **Buildings 3, 17, and 19 HVAC Renovation — Design**
   NETL completed the design to upgrade and replace existing HVAC equipment for Buildings 3, 17, and 19 by replacing select air handling units, condensing units and exhaust fans. The existing equipment is in poor condition and requires frequent repair with increasingly difficult-to-obtain parts. Equipment will be upgraded and replaced through a later construction effort.

5. **Transformer Substation-4 and -9 Upgrades -- Design**
   The design was completed to upgrade and replace transformers 4 and 9. The existing electrical switchgear and transformers are decades old and must be replaced to ensure reliability of NETL-Morgantown's critical electrical infrastructure to serve both current needs and provide increased capabilities to meet future power demands. Both units will be upgraded and replaced through a later construction effort.


Photo 3.3.2.5: Transformers 4 (left) and 9 (right)

6. **B-16 Roof**
   Construction began to replace the roof of B-16. The project will install a new built-up roof system that will include improved insulation and new flashing around the roof perimeter edge. A new French drain system along the north and west sides of the building will be installed to improve drainage around the building.


Photo 3.3.2.6: Underside of B-16 (left) before replacement, showing numerous existing roof penetrations and leak points. New built-up roof system surface (right) with new flashing around the parapet perimeter.

3.3.3 ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT

3.3.3.1 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)

NETL-Morgantown had no National Priorities List (NPL) sites in 2024 and has never been proposed as an NPL site. Furthermore, NETL has never been on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list or the West Virginia Hazardous Waste Site list (state equivalent of CERCLIS). There were no reportable releases in 2024.

3.3.3.2 SARA TITLE III/EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

To meet SARA Title III Emergency Planning and Community Right-to-Know requirements, NETL-Morgantown submits Tier II Emergency and Hazardous Chemical Inventory information by March 1 of each year. Section 312 of SARA Title III requires facilities to file an Annual Tier II report listing the hazardous chemicals present at the facility at levels equal to or exceeding these thresholds at any time during the previous calendar year. Copies of the Tier II report are provided to the West Virginia State Emergency Response Commission, the Monongalia Emergency Centralized Communications Agency (MECCA911) and the Morgantown Fire Department. MECCA911 receives the data in its role as the local emergency planning committee and for the Morgantown Fire Department.

NETL-Morgantown is not required to submit a TRI Form R because the site does not use, produce or process any of the listed toxic materials in quantities that exceed the threshold amounts. Additionally, in 2024, no toxic releases occurred that would have triggered emergency notification as required by the Emergency Planning and Community Right-to-Know Act or CERCLA.

3.3.3.3 RESOURCE CONSERVATION AND RECOVERY ACT

NETL-Morgantown is designated as a large quantity hazardous waste generator i.e., generating 1,000 kg or more per month of hazardous waste or 1 kg or more per month of acutely hazardous waste. While NETL-Morgantown typically generates lesser amounts of hazardous waste most months, occasionally laboratory activities generate larger quantities that exceed the small-quantity generator threshold. As a result, NETL's permit limits hazardous waste storage in the Central Accumulation Area to up to 90 days. Most waste is packaged and shipped in laboratory packs (lab packs) containing combinations of several different compatible chemical within a single container.

NETL's hazardous waste management support personnel are not authorized to transport hazardous waste. In 2024, NETL-Morgantown used Tradebe Environmental Services LLC (Tradebe) as its transporter. NETL-Morgantown completed five (5) shipments of hazardous waste. Tradebe transported the waste to its storage and treatment facilities where small packages of similar wastes were combined and then repackaged for more cost-effective shipment to a final disposal facility.

The number of hazardous materials and waste removed from the site in 2024 slightly increased from previous years, likely due to cleaning out of older chemicals. NETL-Morgantown generated 2,707 pounds of hazardous waste in 2024, as well as 1,937 pounds of universal waste. See Figure 3.3.3.3.1 : 2024 Hazardous Waste Generation — Morgantown.

The WVDEP Office of Environmental Enforcement conducted its most recent inspection in 2024 and did not identify any deficiencies or findings.

Photo 3.3.3.3.1: Morgantown fluorescent light bulbs.

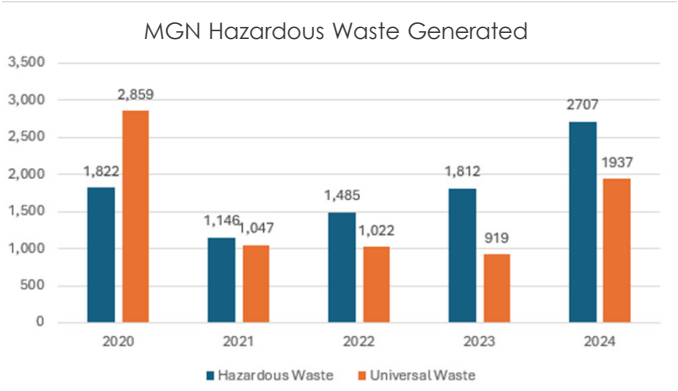


Figure 3.3.3.3.1a: 2024 Hazardous waste generation at NETL-Morgantown.

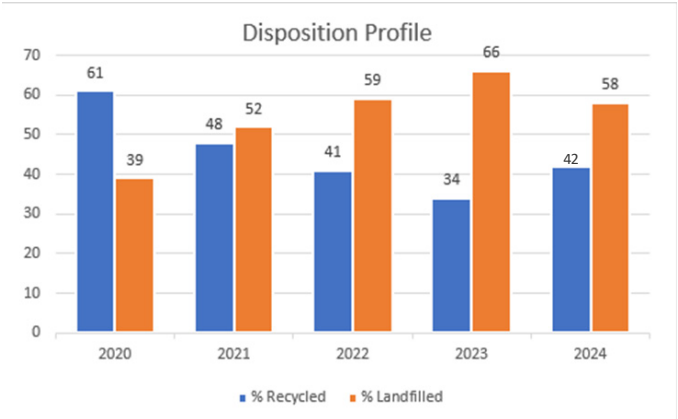


Figure 3.3.3.3.1b: 2024 Morgantown RCRA hazardous waste disposition profile.

3.3.3.4 FEDERAL FACILITIES COMPLIANCE ACT (FFCA)

There were no issues related to the FFCA in 2024.

3.3.3.5 TOXIC SUBSTANCES CONTROL ACT (TSCA)

NETL-Morgantown does not manufacture chemicals and is not subject to sections of the manufacturing-related TSCA. No spills or releases of substances regulated by the TSCA of 1976 (with amendments, et. seq.) including pesticides, polychlorinated biphenyls (PCBs), formaldehyde, methylene chloride, asbestos, etc., were reported in 2024. TSCA waste generated during 2024 included asbestos and lead-based paint.

3.3.3.5.1 ASBESTOS

No unplanned releases of air pollutants covered by CERCLA or TRI regulations occurred during 2024. Asbestiform fiber concentration air monitoring is conducted annually in Buildings 1, 2, 3, and 4 because asbestos-containing materials (ACMs) were used in the construction of these facilities. All known friable ACM has either been removed or encapsulated. Non-friable asbestos present at the NETL-Morgantown site is inventoried and maintained. No samples taken in 2024 indicated that the materials contained fiber concentrations exceeding U.S. Environmental Protection Agency (EPA) or state of West Virginia clearance levels (0.01 fibers/cc). Asbestos engineering drawings based on the NETL-Morgantown inventory continue to be maintained and updated.

Evaluations, tests and sample collection shall be conducted by an accredited WV licensed asbestos building inspector (ABI) who received certification for Class III Asbestos Activities per 40 C.F.R. § 763.92(a)(2) or by a certified industrial hygienist. Analysis of bulk ACM or presumed ACM shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program or National Institute of Standards and Technology, or the round robin for bulk samples administered by the American Industrial Hygiene Association or an equivalent nationally recognized round robin testing program per OSHA 29 C.F.R. § 1910.1001(j)(8)(ii)(B) and OSHA 29 C.F.R. § 1926.1101(k)5)(ii)(B).

When asbestos is removed as part of any remodeling or reworking in a room, building or facility, it is handled by an accredited asbestos and renovation contractor and adheres to OSHA 29 C.F.R. § 1910.1001 (Asbestos- General Industry), OSHA 29 C.F.R. § 1926.1101 (Asbestos-Construction), OSHA Instruction CPL 2-2.40, 40 C.F.R. § 61 (Subpart M, NESHAPs), and applicable state regulations (WV Code § 16-32, WV 33 CSR 1, WV 64 CSR 51, and WV CSR 63).

One project required a 10-day asbestos notification permit in 2024:

Table 3.3.3.5.1.1: ASBETOS REMOVED in 2024

Project	Asbestos Removed	Removed by	Disposal
T-40 Demolition	5,000 ft^2	Neumeyer Environmental Services, Inc. (License #: AC002854; Contractor License No. WV057369)	Imperial Landfill (DEP Permit #: 100620)

There were no asbestos work activities that were exempt from notification per WV Code § 16-32-11 section (c) and 64 CSR 63 section 10.3.

Sixteen asbestos sampling events were conducted in 2024 related to operation/maintenance and construction projects; 11 were related to preventive operation/maintenance and five were related to construction projects. Samples were collected by a licensed ABI (License #: AI010082 & AI010672).

3.3.3.5.2 LEAD-BASED PAINT

NETL tests for lead paint before demolition, renovation and maintenance projects or through the elimination of materials by excess property or recycling.

Nine lead-based paint sampling events were conducted in 2024 related to operation/maintenance events. The paint renovation work for the positive samples was conducted in accordance with OSHA 29 C.F.R. § 1910.1025, Lead (General Industry) and OSHA 29 C.F.R. § 1926.62, Lead (Construction).

3.3.3.6 FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA)

No restricted-use pesticides, herbicides or defoliants, as regulated by FIFRA, were kept on-site. Only general-use pesticides were kept and used for routine insect control.

Professional pest control companies are subcontracted under the site-support contract to spray around the base of office trailers and outside of certain buildings (for example, B-1). Herbicides are used in limited instances for weed control. No defoliants are used.

3.3.4 CLEAN AIR ACT/AIR QUALITY AND PROTECTIVE ACTIVITIES

3.3.4.1 CLEAN AIR ACT

The West Virginia Division of Air Quality's (WVDAQ) permitting section implements West Virginia's air permit program established under the state's Air Pollution Control Act. West Virginia's permit program includes review of applications, determination of permit applicability, and issuance of permits for both minor and major sources. Per WVDAQ, NETL-Morgantown operations (laboratory facilities associated with R&D activities) fall under 45CSR13, The Permitting of Laboratories. These requirements provide guidance and clarification regarding any necessary permitting for construction and operation of stationary sources of air pollutants from laboratory facilities. WVDAQ generally evaluates air quality on a county-by-county basis, although the regional data may be aggregated into Air Quality Control Region #6, for north central West Virginia. Monitoring is performed daily in Monongalia County at several sites, and the data is made available from the WVDEP website's air-quality index and from the EPA AirNOW webpage. Although the Morgantown site is not a significant contributor to ambient air quality issues, air emissions are estimated in quarterly and annual air emission inventories to analyze the cumulative effect of all projects and facilities. This analysis has shown that no regulatory or other environmental impact occurred during 2024.

Table 3.3.4.1.1 displays the estimated 2024 air emissions inventory.

Table 3.3.4.1.1: 2024 Air Emissions Inventory — Morgantown	
Pollutant	Estimated Emissions (lbs. /yr.)
Aldehydes	1.38E-03
Benzene	3.83E-05
CO_2	3.05E+03
CO	5.99E+00
Chlorine	1.50E-07
Ethylbenzene	2.91E-03
Formaldehyde	2.09E-02
Nitrogen Oxide	4.48E+00
Particulate Matter (PM), Condensable	1.53E-01
Particulate Matter, Filterable	1.17E-01
Particulate Matter, Total	5.21E-01
Particulate Matter, PM_{10}, Filterable	1.83E-02
Particulate Matter, Total	2.57E-01
Sulfur Dioxide	3.88E-02
Sulfur Oxides	2.58E-02
Toluene	2.18E-04
Total Organic Carbon	2.38E-01
Volatile Organic Compounds	6.48E-012
Xylene, Mixed Isomers	7.00E-05

3.3.4.2 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

There were no issues in 2024 regarding compliance with the National Emission Standards for Hazardous Air Pollutants at Morgantown.

3.3.4.3 HYDROFLUOROCARBON (HFC) PHASEDOWN

NETL-Morgantown actively participates in a program to reduce the use of class I ODSs as part of the American Innovation and Manufacturing Act. The goal is to recover and reclaim chlorofluorocarbon refrigerants from existing HVAC equipment (for subsequent reuse and recycle) and to facilitate the transition to next-generation refrigerants. In recent years, the inventory of ODS-containing equipment has been steadily decreasing at NETL-Morgantown. Older ODS-containing equipment is being replaced and the use of class I ODSs is being phased out from the HVAC equipment and replaced with environmentally friendly substitutes.

Plans to address the Phaseout requirements are in place. There were no issues in 2024 regarding compliance in Morgantown. Table 3.3.4.3.1 indicates the three hydrofluorocarbons that are being phased out.

Table 3.3.4.3.1: 2024 Morgantown HFC Phaseout Inventory Summary							
(All values in pounds)							
Refrigerant	Amount in Equipment Dec. 31, 2023	Amount in Equipment Dec. 31, 2024	Amount in Storage Dec. 31, 2023	Amount in Storage Dec. 31, 2024	Amount Purchased in 2024	Amount Removed from Equipment in 2024	Leaks in 2024
R134A-HFC	985.28	982.20	193.75	193.75	0	2.8	.28
R23	2	2	0	0	0	0	0
R125-HFS	39.44	39.44	0	0	0	0	0

3.3.4.4 METEOROLOGICAL TOWER DATA

Two new meteorological towers were installed on the Morgantown site in August 2024. The new towers replaced the old towers that were generating faulty information. The new towers will provide data for the temperature, humidity, wind (direction and speed), precipitation and solar radiation on a solar-powered platform. This upgrade will give better access to site security, the emergency operations center and environmental professionals.

Photo 3.3.4.4.1a: B-39 meteorological tower.

3.3.5 WATER QUALITY AND PROTECTION ACTIVITIES

NETL engages in water quality and protection activities to: (1) maintain full compliance with all applicable federal, state and local requirements; (2) prevent spills of potential pollutants into the environment; and (3) ensure the safety and protection of our employees, the public, and the environment. These activities include management of surface water, industrial process water and groundwater/soil. There were no water quality issues at NETL-Morgantown during 2024.

3.3.5.1 CLEAN WATER ACT

The EPA and the West Virgina DEP have implemented water pollution control programs, including wastewater standard for industry and water quality standard for all surface water contaminants. These requirements are managed via permits issued by the Morgantown Utility board (MUB), which then acts as the CWA permitting authority for NETL-Morgantown.

3.3.5.1.1 NATIONAL POLLUTANT DISCHARGE ELIMIMINATION SYSTEM PERMIT/ STORMWATER

Morgantown's Surface Water Quality Program address permitting and monitoring for stormwater sewers and for construction-related disturbances that have the potential of increasing sediment loads in streams. It also includes information on spill prevention, hazardous waste control and emergency actions.

The Clean Water Act, and corresponding state water quality regulations, require facilities generating point-source discharges, or facilities or areas discharging storm water associated with industrial activities, to obtain an NPDES permit. The WVDEP has primacy over its NPDES permitting program. NETL Morgantown (Registration No. WVG610042) is authorized to operate under WV/NPDES General Water Pollution Control Permit No. WV0111457 and subject to the provisions of Section W-1 of the general permit.

Under the existing permit, the site is required to test their effluent quarterly to verify permit compliance; the test results are submitted to the WVDEP. Additionally, the permit requires a Stormwater Pollution Prevention Plan (SWPPP) to be developed and maintained to prevent or minimize potential storm water contamination.

Morgantown has four major outfall locations (outfalls 002, 003, 005, and 010). Three of the outfalls are required to be monitored under the current permit (002, 005, and 010); one outfall does not require monitoring (003).

- Outfall 002 drains stormwater from a 616,000 square foot area that contains most of the site's office buildings, research facilities, and storage areas.
- Outfall 003 receives drainage from a 42,000 square foot area that is approximately 65% impervious with the remainder consisting of the vegetated hillside next to B-17.
- Outfall 005 drains a 229,000 square foot area that includes B-19 (warehouse and machine shop), the parking lot behind B-33, and various research facilities.
- Outfall 010 drains a 3.8 million square foot area that includes four facilities, B-39 (offices), B-40 (childcare facility) and B-43 (guard shack and roof at main entrance) parking areas, offices, and a large section of undeveloped land.

Table 3.3.5.1.1.1a: 2024 NPDES Permit Stormwater Monitoring Results lists the parameters contained in the quarterly discharge monitoring report (DMR). The list requires monitoring results to be reported quarterly. The monitoring results are presented in Table 3.3.5.1.1a. If a spill were to occur, emergency response procedures would be activated

immediately, and the appropriate outfalls would be monitored, as necessary, for the contaminants of concern. The permit does not have reporting limits; it utilizes benchmark monitoring concentrations and only requires NETL to report the monitoring results. If the benchmark concentrations are exceeded; additional monitoring will be required and the SWPPP will be reviewed and updated. NETL satisfied the permit requirements. No permit issues were identified in 2024. (Note: WVDEP issued the latest Multi-Sector Stormwater General Permit for the Morgantown site on February 25, 2021, expiring on September 12, 2024.) The permit renewal occurred in September of 2025; the process for renewal was dictated by the WVDEP.

Table 3.3.5.1.1.1a: 2024 NPDES Stormwater Analysis Results — Morgantown

Constituents	Outfall 002				Outfall 005				Outfall 010			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Total Nitrite plus Nitrate (Grab)	ND	.35 mg/L	<0.25 mg/L	<0.25 mg/L	0.98 mg/L	0.54 mg/L	<0.25 mg/L	<0.25 mg/L	<0.52 mg/L	0.51 mg/L	0.63 mg/L	0.64 mg/L
Total Ammonia Nitrogen (Grab)	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L	< 10.0 mg/L
Fecal Coliform (Grab)	4.1 Cfu/ 100ml	>2419.6 Cfu/ 100ml	>2419.6 Cfu/ 100ml	>2419 Cfu/ 100ml	1.0 Cfu/ 100ml	1986.3 Cfu/ 100ml	>2419.6 Cfu/ 100ml	1203.3 Cfu/ 100ml	3.1 Cfu/ 100ml	>24419.6 Cfu/ 100ml	>2419.6 Cfu/ 100ml	8.6 Cfu/ 100ml
Total Suspended Solids (Grab)	<100 mg/L	<100 mg/L	<100 mg/L	<100 mg/L	<100 mg/L	125 mg/L	<100 mg/L	<100 mg/L	<100 mg/L	<100 mg/L	212mg/L	<100 mg/L
Biological Oxygen Demand	>7.0 mg/L	3.9 mg/L	3.2 mg/L	<3.0 mg/L	3.8 mg/L	<3.0 mg/L	<3.0 mg/L	<3.0 mg/L	<3.0 mg/L	<38.8 mg/L	5.5 mg/L	<3.0mg/L
pH	7.75	8.35	8.93	7.12	8.24	8.44	8.7	6.95	8.21	8.30	8.58	7.39
COD	1587 mg/L	<20 mg/L	< 20.0 mg/L	25.2 mg/L	<20 mg/L	< 20.0 mg/L	< 20.0 mg/L	<20.0 mg/L	<20.0 mg/L	< 20.0 mg/L	<20.0 mg/L	<20.0 mg/L
Oil and Grease	<20 mg/L	< 20.0 mg/L	< 20.0 mg/L	<20.0 mg/L	<20.0 mg/L	<20.0 mg/L	< 20.0 mg/L	< 20.0 mg/L	<20.0 mg/L	<20.0 mg/L	<20.0 mg/L	<20.00 mg/L

ND = not detected; NS = not sampled; NR = not reported

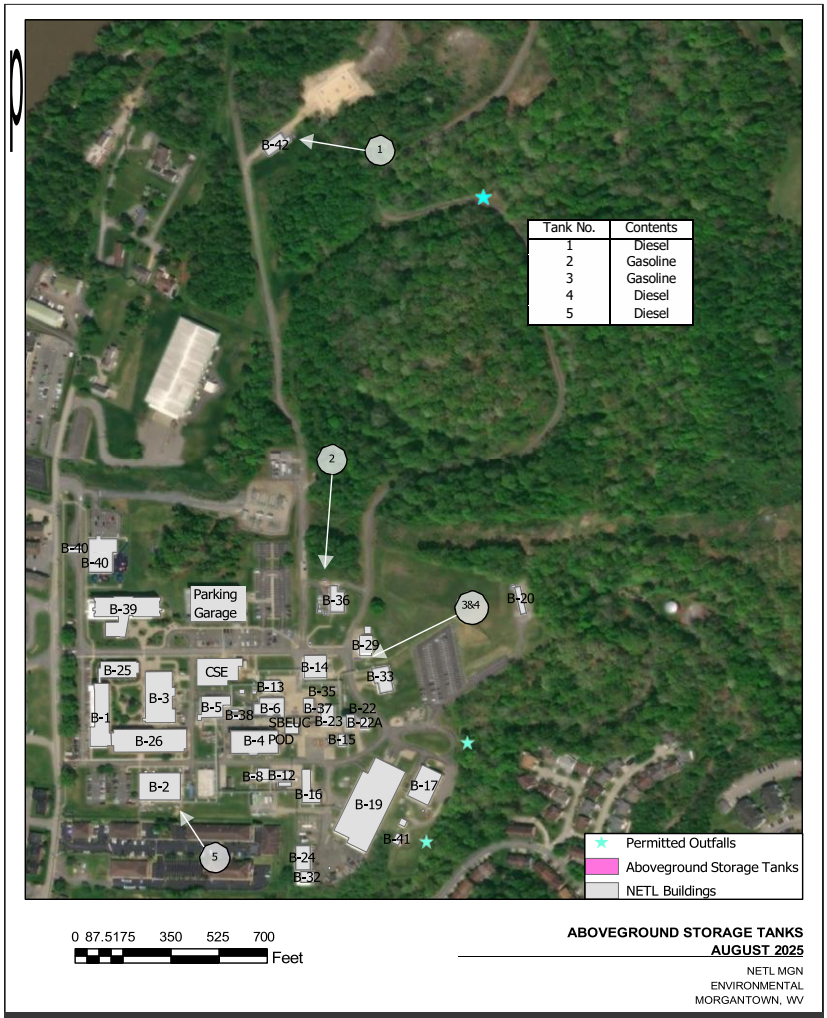


Photo 3.3.5.1.1.1a MGN above ground storage tanks locations.

The requirement to maintain a SWPPP enables NETL-Morgantown to manage potential sources of surface water contamination resulting from spills of petroleum products and oils from aboveground storage tanks (ASTs), oil-filled transformers and switches and
55-gallon drums stored at several locations (B-58, B19, and B-36). The site has five ASTs containing petroleum products (diesel fuel and gasoline) and one containing ethanol. Two ASTs are located inside the area drained by outfall 002. One storage tank is in the drainage area of outfall 005, and the remaining two are in the drainage area of outfall 010. The site has 28 oil-filled transformers, all of which have been tested for PCBs. No buried, or partially buried, storage tanks exist at the Morgantown site.

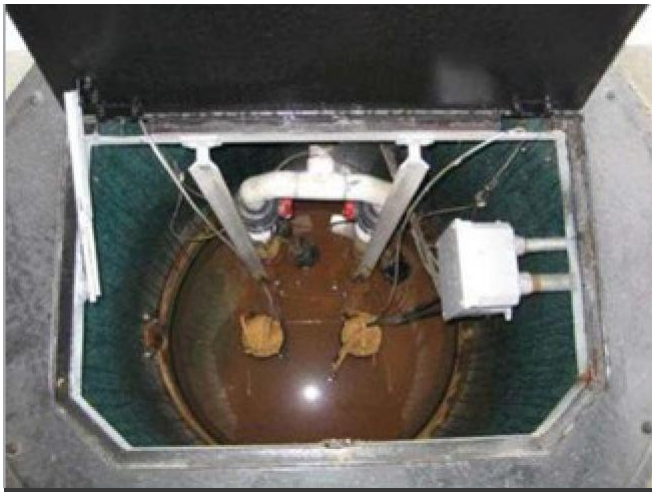


Photo 3.3.5.1.1.1b: Morgantown parking lot oil-water separator.

An oil-water separator, Photo 3.3.5.1.1a, is installed inside the runoff collection system of the parking garage, but no other treatment systems are installed for stormwater at NETL-Morgantown. Based on previous test results, the primary concern with surface water has been sediment loading, since runoff can affect Burroughs Run along the southeastern margin of the site, West Run along the northeastern margin of the site, and a small stream that traverses the northern portion of the site and empties into West Run. Burroughs Run drains into an area of significant urban and suburban development, which contributes to typical urban/ suburban pollution (e.g., oil, salt, pesticides, and herbicides). West Run is highly acidic from mine drainage located on the upper reaches of the drainage basin, and suburban development is increasing within the basin. Protecting surface water and groundwater requires preventing leaks from storage tanks. Accordingly, NETL-Morgantown is compliant with WVDEP's AST regulations. In addition, as required by the NPDES stormwater permit, this program maintains written spill prevention, control,
and countermeasures plan for each site and a written operation and maintenance plan for each individual storage tank system. Each system capable of contributing to fires, explosions, emissions, or spills of hazardous materials must have a written operating plan addressing emergency prevention and actions to be taken should an emergency occur.

The ASTs are visually inspected weekly, and their interstitial cavities are checked quarterly. Visible leaks are corrected immediately. Though no visible leaks have been observed, the interstitial space of the B-36 gasoline AST tested above the lower explosive limit in 2024. The area around the AST is currently diked and is inspected daily. The diked area around the AST is drained of rainwater only once it has been inspected to ensure there is no evidence (sheen, smell, discoloration, etc.) of petroleum products in the rainwater. Oil-filled transformers are visually inspected daily. If leaked materials are observed, the materials are collected or absorbed with spill kits and disposed of per applicable regulations.

CONSTRUCTION STORMWATER PERMIT

The WVDEP, as part of its authority under the NPDES program, requires operators of construction sites that disturb one acre or greater to obtain authorization to discharge stormwater under WV NPDES construction stormwater general permit. The Morgantown site is currently construction the Computational Science and Engineering (CSE) facility, which is disturbing 2.09 acres, and a permit was required.

NETL personnel worked with the construction contractor to obtain a permit (WVR112716), which was issued October. 3, 2024, (expiration date is April 5, 2029). Project erosion control practices include:

- Perimeter filter fabric fence and temporary inlet protection filter fabric fence must be placed, constructed and maintained. The ends of the silts fence must be constructed upslope to prevent water ponded by the fence from flowing around the ends.
- Silt fence must be installed along contours, to the extent practical.
- Filter socks or erosion control measure eels are inspected weekly and after each runoff event. The permit requires accumulated sediment to be removed when it reaches one-half the height of the filter sock or erosion eel.
- Damaged silt barriers must be repaired or replaced and accumulated sediment removed when it reaches one-third the above ground height of the silt barrier.

The permit allows erosion control measures to be discontinued when the upstream disturbed area has been stabilized.

INDUSTRIAL WASTEWATER PROGRAM

Industrial wastewater System Management Program: Industrial wastewater is conveyed from floor drains, equipment condensate lines, and laboratory sinks to the clarifier (Photo 3.3.5.1.1b) and associated processes/equipment for sediment removal and pH adjustment. The site's industrial waste discharge permit (MUB 012), issued by the local utility, Morgantown Utility Board (MUB), and allows for the operation and maintenance of a 16-foot diameter Lakeside Equipment Company Spirotlo clarifier, a batch pH treatment system with a 2,632-gallon equalization tank and two 2,500-gallon neutralization tanks, a 12 x 16-foot sludge drying bed, and one 12-inch tap to the MUB sanitary sewer collection system. The permit allows a wastewater discharge rate limit of 90,000 gallons per day. Monthly sampling is performed at a laboratory chosen from an EPA-certified list, and DMRs detailing this sampling and analysis are provided to the MUB. DMR results for 2024 are provided in Table 3.3.5.1.1.1b: 2024 Wastewater Effluent Analysis (lbs./d); Pretreatment Permit, Outlet No. 01, One Sample/Month – Morgantown. The sampling point is displayed in Photo 3.3.5.1.1.1c.

Photo 3.3.5.1.1.1c: Morgantown clarifier.

Photo 3.3.5.1.1.1d: Morgantown wastewater permit sampling point.

Table 3.3.5.1.1.1b: 2024 Wastewater Effluent Analysis (lbs./d) Pretreatment Permit, Outlet No. 01, One Sample/Qtr. — Morgantown					
Parameter	**Limit**	**1st Qtr.**	**2nd Qtr.**	**3rd Qtr.**	**4th Qtr.**
Flow (MGD) Monthly Avg. Daily MGD)	 0.09 0.15	 0.02273 0.1267	 0.0087 0.067	 0.0084 0.057	 0.014 0.04
BOD5 Monthly Avg. Daily Max.	 Monitor Monitor	 2.30 2.43	 2.30 1.12	 <0.14 <0.95	 0.40 1.13
Total Suspended Solids Monthly Avg. Daily Max.	 Monitor Monitor	 1.73 9.62	 0.09 0.73	 0.22 1.52	 0.23 0.67
Arsenic Monthly Avg. Daily Max.	 0.005 0.008	 0.00019 0.0011	 0.00015 0.0011	 < 0.00014 < 0.0010	 < 0.00023 < 0.0007
Cadmium Monthly Avg. Daily Max.	 Monitor Monitor	 <0.00019 <0.0011	 <0.00036 <0.0028	 <0.00004 <0.0002	 <0.00006 <0.0002
Chromium Monthly Avg. Daily Max.	 0.007 0.011	 0.00038 0.0021	 0.00015 0.0011	 <0.00014 <0.0010	 <0.00023 <0.0007
Copper Monthly Avg. Daily Max.	 0.04 0.06	 0.0018 0.010	 0.0005 0.004	 <0.00014 <0.0010	 0.0012 0.003
Cyanide Monthly Avg. Daily Max.	 0.02 0.03	 <0.0019 <0.011	 <0.0007 <0.006	 0.0008 0.006	 <0.0012 <0.003
Lead Monthly Avg. Daily Max.	 0.025 0.038	 < 0.00019 < 0.0011	 <0.000036 < 0.0003	 <0.000035 <0.0002	 <0.000058 <0.0002
Mercury Monthly Avg. Daily Max.	 0.0006 0.0009	 <0.000038 <0.00021	 <0.000015 < 0.00011	 <0.000014 <0.00010	 <0.000023 <0.00007
Nickel Monthly Avg. Daily Max.	 Monitor Monitor	 0.00019 0.0011	 0.00007 0.0006	 <0.00007 <0.0005	 <0.00012 < 0.0003
Silver Monthly Avg. Daily Max.	 .011 .017	 <0.00019 <0.0011	 <0.00007 <0.0006	 <0.00004 <0.0002	 <0.00006 <0.0002
Zinc Monthly Avg. Daily Max.	 0.10 0.15	 0.0038 0.021	 0.0022 0.017	 0.0012 0.008	 <0.0012 <0.003
Iron Monthly Avg. Daily Max.	 Monitor Monitor	 0.055 0.31	 0.007 0.05	 0.005 0.03	 0.013 0.04
Manganese Monthly Avg. Daily Max.	 Monitor Monitor	 0.009 0.05	 0.002 0.01	 0.002 0.01	 0.008 0.02
Phenolics Monthly Avg. Daily Max.	 Monitor Monitor	 0.0021 0.012	 0.0007 0.006	 <0.0007 <0.005	 0.0016 0.005
TOX Monthly Avg. Daily Max.	 Monitor Monitor	 0.0114 0.063	 0.005 0.039	 0.0055 0.037	 0.0082 0.023
Organics Alachlor-1254 All others	 Report Report	 ND ND	 ND ND	 ND ND	 ND ND
pH (s.u.) Minimum Maximum	 6.0 9.0	 7.49 8.24	 6.45 8.35	 6.75 8.3	 6.32 8.69
Total Dissolved Solids Monthly Avg. Daily Max.	 Monitor Monitor	 111.9 623.8	 23.2 178.9	 19.6 133.2	 47.9 136.9

MGD = millions of gallons per day; NS = not sampled; ND = not detected;
BOD5 = biological oxygen demand for 5-day period; s.u. = standard units

SANITARY WASTEWATER

The Morgantown site sanitary wastewater is managed distinctly from laboratory and process wastewater discharges. It is directed to and treated by the Morgantown Utility Board (MUB). At present, specific permit parameters for sanitary sewage discharges have not been established.

3.3.5.2 SAFE DRINKING WATER ACT

There were no issues in 2024 regarding compliance with the Safe Drinking Water Act. NETL-Morgantown potable water is supplied by the local water utility, which publishes Safe Drinking Water Act compliance reports detailing water quality testing. Drinking water fixtures on-site are filtered, with filters and plumbing maintenance performed during scheduled preventative maintenance.

3.3.6 PFAS AND ADDITIONAL EMERGING CONTAMINANTS

See section 2.12 for information regarding PFAS (per- and polyfluoroalkyl substances) at NETL.

Table 3.3.6.1 Morgantown Fire Suppressant Inventory

Fire Suppressant System	Chemical	Status
B-4 (Control room) C4F10/Perflourobutane Fire Extinguishing Cylinders (one system)	Perfluorobutane CAS # 355-25-9	Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4
B-6 (Upper-level control room) Two PCA410 Clean Agent Fire Extinguishing Cylinders (one system) 22.5 lbs. each	Perfluorobutane CAS # 355-25-9	Planned to be replaced by a non-PFAS system.
B-17 (First and second floor) CAT Scanner and Control Room: Fike ECARO-25 Clean Agent System (HFC-125/FE-25)	Pentafluoroethane CAS # 354-33-6	Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4
B-Joule building, outside of B-4, single-wide trailer	1,1,1,2,2,4,5,5,5,-Nonafluoro-4-(trifluoromethyl)-3-pentanone CAS # 756-13-8	Registered at https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCTv4

3.3.7 OTHER ENVIRONMENTAL STATUTES

3.3.7.1 ENDANGERED SPECIES ACT

There were no issues regarding the Endangered Species Act.

3.3.7.2 EO 13751 SAFEGUARDING THE NATION FROM THE IMPACTS OF INVASIVE SPECIES

There were no issues at the Morgantown site regarding impacts of invasive species.

3.3.7.3 NATIONAL HISTORIC PRESERVATION ACT

There were no issues at the Morgantown site regarding the National Historic Preservation Act.

3.3.7.4 MIGRATORY BIRD TREATY ACT

There were no issues at the Morgantown site regarding the Migratory Bird Treaty Act.

3.3.8 DOE ORDER 436.1, DEPARTMENTAL SUSTAINABILITY

See section 2.2.1.

3.3.9 EXECUTIVE ORDERS EOs

NETL Morgantown site was in full compliance with all applicable environmental EOs in 2024. Throughout the year, numerous inspections and audits were performed and documented to ensure there were no instances of noncompliance.

3.3.9.1 EO 11988, FLOODPLAIN MANAGEMENT

There were no issues with floodplain management.

3.3.9.2 EO 11990, PROTECTION OF WETLANDS

There were no issues with protection of wetlands.

3.3.10 OTHER MAJOR ENVIRONMENTAL ISSUES AND ACCOMPLISHMENTS

The Department's Occurrence Reporting and Processing System (ORPS) provides timely notification to the DOE complex of events that could adversely affect the public or DOE worker health and safety, the environment, national security, DOE's safeguards and security interests, functioning of DOE facilities or the department's reputation. The Morgantown site filed five reports with the department's ORPS in 2024, none of which triggered environmental reporting

3.3.10.1 NATURAL RESOURCES CONSERVATION PROGRAMS AND PROJECTS

Natural resources conservation programs and projects help reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damage caused by floods and other natural disasters. In 2024 no projects of this type were undertaken.

3.3.10.2 SUSTAINABLE RESILIENT REMEDIATION (SRR)

There were no hazardous waste sites suitable for SRR at the Morgantown site in 2024.

3.3.11 CONTINUOUS RELEASE REPORTING

No continuous release reporting was required in 2024.

3.3.12 UNPLANNED RELEASES

There were no unplanned releases in 2024.

3.3.13 SUMMARY OF ENVIRONMENTAL PERMITS

A summary of environmental permits is provided in Table 3.3.13, 2024 Summary of Permits - Morgantown.

Table 3.3.13.1: 2024 Summary of Permits — Morgantown				
Permit No. and Name	**Site**	**Issue Date, Exp. Date**	**Regulatory Agency**	**Description**
MUB 012 Industrial Waste Discharge Permit	Morgantown	09/12/2019, Modified 02/25/2021 09/11/2025	MUB	Permit allows for the operation of wastewater pretreatment facilities and discharge into MUB's sanitary sewer system. It establishes discharge limits and monitoring requirements quarterly sampling, compliance with the Morgantown Industrial Waste Ordinance, reporting requirements, including accidental discharge reporting and testing procedures.
WV0111457 WV/ NPDES General Water Pollution Control Permit	Morgantown	Modified Permit Issued: 02/25/2021 Expires: 09/12/2024 Extension granted until 09/11/2025	WVDEP, Division of Water and Waste Management	MGN site (NPDES Stormwater Permit Registration Number: WVG610042) is authorized to operate under WV/ NPDES General Water Pollution Control Permit No. WV0111457 and subject to the provisions of section W-1 of the general permit. Quarterly stormwater samples are collected and submitted as per SWPP and groundwater protection management plan required by the permit.
WVR112716 Construction Stormwater Permit for the CSE Center	Morgantown	Issued: 10/03/2024 Expires: 05/05/2029	WVDEP, Division of Water and Waste Management	CSE Center General Permit Registration No. WVR112716 CSE Facility Construction Monongalia County, Acres (2.09) Stormwater Pollution Prevention Plan and Groundwater Pollution Prevention Plan developed for this activity

3.3.14 FIRE PROTECTION MANAGEMENT AND PLANNING

At NETL Morgantown, fire alarm control panels (FACPs) and fire suppression systems are installed in all occupied buildings as required by DOE orders. Each building with a FACP is equipped with visual and audible notification devices to alert personnel of a fire. Building fire suppression systems will activate automatically and attempt to extinguish the fire as well as send a water flow alarm to the security office to initiate a fire response.

Annual fire drills are conducted to allow all employees to practice evacuation and accountability protocols. NETL-Morgantown does not have an on-site fire department, but the site does have an emergency response organization for on-site emergencies. A memorandum of understanding has been signed with the Morgantown Fire Department

for the purpose of planning, preparedness and response for emergency situations at NETL. The site maintains an emergency phone line reporting system, which connects the individual reporting a fire to the security office. NETL's response to any fire — facility, project area, vehicle, wildfire, or other — would be to call the local fire department. Voluntary fire extinguisher usage is allowed but not required. During any hot work or fire protection outages, a trained "fire watch" person(s) is designated to continuously monitor the area of concern and report any fires.

3.3.15 RECREATIONAL HUNTING AND FISHING

NETL-Morgantown does not offer the opportunity for the public to entertain recreational hunting and fishing to control wildlife populations in a controlled setting.

4.0 ES&H MANAGEMENT SYSTEM

4.1 INTEGRATED SAFETY MANAGEMENT/ ENVIRONMENTAL MANAGEMENT SYSTEM

Integrated Safety Management (ISM) is an enterprise-wide organizational system for ensuring environmental compliance, stewardship and worker safety and health. ISM identifies, mitigates and communicates NETL's environmental, safety and health issues and integrates environmental, safety and health and sustainability considerations into the planning and execution of all work processes.

ISM is NETL's overarching management system used to process and incorporate safety management system (SMS) and environmental management system (EMS) requirements.

The framework for NETL's EMS is the International Organization for Standardization's (ISO) 14001:2015, Environmental Management Systems: Requirements with Guidance for Use. NETL's EMS covers all site activities and implements programs to meet environmental goals while fulfilling compliance obligations. In April 2024, an audit of two nonconformances related to Management Review was conducted with the primary objective to assess the implementation and effectiveness of processes and procedures related to Clause 9.3 of both ISO 45001 and ISO 14001 standards. The audit verified that corrective actions to address the nonconformances had been completed. In August 2024, an audit of four nonconformances related to Operational Controls with the primary objective to assess the implementation and effectiveness of processes and procedures related to Clause 8.1 of both ISO 45001 and ISO 14001 standards. The audit determined that the nonconformances had been addressed and verified that corrective actions to address the nonconformances had been completed.

In October 2024, NETL transitioned from an external registrar certification to self-certifying conformance to ISO 14001. The program was restructured to better align with DOE processes, systems and resources, which will provide a more efficient and cost- effective means to comply with DOE directives, mission and goals. The most recent audit was conducted October 31, 2024. During that audit, two opportunities for improvement (OFIs) were identified. The first OFI dealt with changing the management review structure since not all topics need to be addressed at once. The second OFI was to update and simplify NETL Order 440.1, Environmental, Safety, and Health Program, including updating the scope of the environmental management system. These OFIs are being evaluated as NETL transitions to self-certifying conformance to the ISO 14001 standard and will be addressed as appropriate within the ISM/EMS structure.

4.2 EMS SCOPE

The scope of NETL's EMS includes all on-site research and development activities, site maintenance and operations, site security and emergency response, construction management and verification activities and supporting administrative functions related to these activities and operations.

4.3 MANAGEMENT REVIEW

NETL's ES&H Management Review Board (MRB) includes top management from across the organization. The MRB meets at a minimum of twice per fiscal year to fulfill the management review requirements of the ISO standard, ensuring continuing suitability, adequacy and effectiveness. NETL strives to continually improve integrated leadership engagement and effective open communication across the entire organization.

4.4 ENVIRONMENTAL, SAFETY, & HEALTH (ES&H) POLICY

NETL's environmental policy is integrated into the ES&H policy as follows:

- NETL will achieve ES&H quality by proactively, systematically and fully integrating environment, safety and health considerations into the planning and execution of all work so that the mission is successfully accomplished for the safety and health of the public without detriment to NETL or the environment.
- NETL is committed to reducing ES&H impacts by:
    - Complying with all applicable ES&H laws, regulations and standards through rigorous regulatory compliance programs.
    - Implementing pollution prevention programs to eliminate or reduce waste and implementing emissions and accident/incident reduction programs to eliminate or reduce accidents and incidents.
    - Conserving energy and materials through resource management and recycling/reuse.
    - Using safety analysis and review systems to identify, control, and reduce safety and health risks and environmental impacts through engineering and administrative controls.
- NETL will work continually to improve environmental, safety and health systems with the goal of improving ES&H performance.
- NETL will communicate information to employees and seek their involvement in reducing environmental, safety and health impacts. NETL will also communicate its policies to stakeholders and the public.

4.5 EMS APPROACH

The EMS approach is founded on the Plan-Do-Check-Act model:

- **PLAN** — Establish environmental objectives and processes in accordance with the environmental policy.
- **DO** — Implement the processes as planned.
- **CHECK** — Monitor and measure processes against the environmental policy and report results.
- **ACT** — Take actions to continually improve.

4.6 EMS OBJECTIVES

4.6.1 WASTE MINIMIZATION, POLLUTION PREVENTION, AND RECYCLING

For FY 2024, NETL's EMS included addressing nonhazardous waste recycling and construction waste recycling. For example, the FY 2024 objective for Nonhazardous Waste Recycling was to increase diversion of nonhazardous solid waste from disposal by 50% by the end of FY 2025 and 75% percent by FY 2030. NETL recycled 77% of the nonhazardous waste stream (252,715 lbs. out of 329,428 lbs). In addition, the objective for Recycling Construction Waste was to recycle the maximum extent feasible of construction and demolition waste and divert it from landfill disposal by the end of FY 2024. NETL diverted 382 metric tons of its construction and demolition waste.

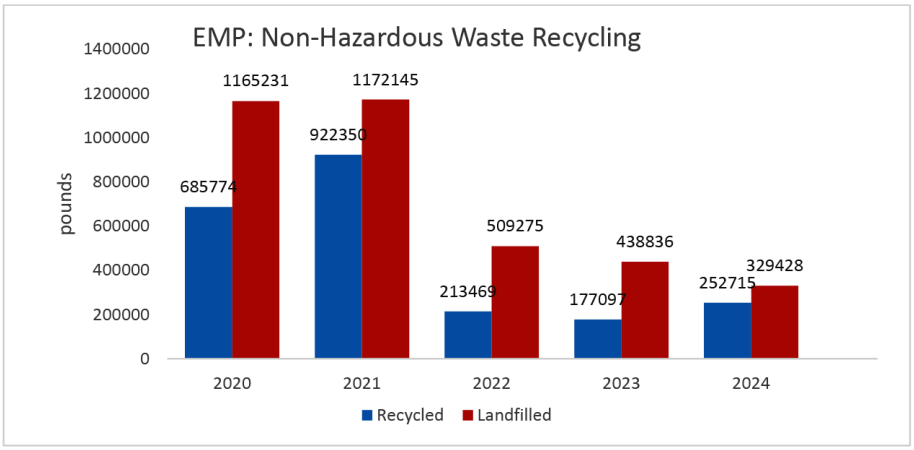


Figure 4.6.1.1a

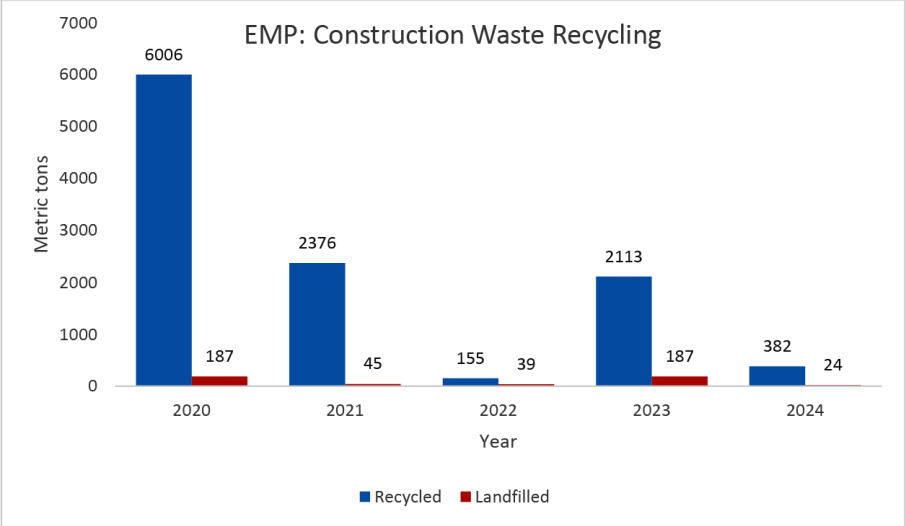


Figure 4.6.1.1b

4.6.2 HAZARDOUS MATERIALS PROCUREMENT, CONSUMPTION, AND STORAGE

For FY 2024, the objective for addressing hazardous materials procurement, consumption and storage focused on improvements to NETL's chemical inventory. The primary objective was to reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used and disposed of based on EO 13834. NETL had a 23.27% reduction in the number of containers (3072) compared to the baseline that was adjusted in FY 2023. The number of containers is within the no-net gain of (+/- 10%) target for FY 2024. As of the fourth quarter of 2024, the chemical inventory had 10,128 containers. The chemical inventory verifications were completed as planned for all research activities.

4.6.3 HIGH-PERFORMANCE SUSTAINABLE BUILDINGS (HPSB) IMPLEMENTATION

In FY 2024, 36.4% (four of 11) of NETL's applicable buildings over 25,000 gross square foot (GSF) met the Guiding Principles for Sustainable Federal Buildings, which make them HPSB-compliant. Including the bonus credit for one building below 25,000 GSF, 41.7% (five of 12) of NETL's applicable buildings met the HPSB Guiding Principles, which continues to exceed the DOE goal of 15% of buildings meeting the HPSB threshold. Additionally, 35.5% of NETL's applicable GSF meets the HPSB threshold, which exceeds the DOE goal of 18%.

NETL will continue to ensure the five current HPSB-compliant NETL buildings meet ongoing Energy Independence and Security Act of 2007 requirements by periodically reassessing against the Guiding Principles. NETL will apply requirements of EISA 2007, the Guiding Principles, and applicable Executive Orders into new building designs and planned building modifications, where applicable.

4.6.4 ELECTRONIC STEWARDSHIP

In FY 2024, the objective for Operation and Maintenance of Electronic Products focused on continuing to enable power management, duplex printing and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. In FY 2024, when exempt monitors and computers were accounted for, 90% of printers and workstations had power management settings in place.

4.6.5 ENERGY AND FUEL USE

The FY 2024 objective for energy intensity reduction was a 30% reduction in energy intensity for subject facilities by FY 2024 relative to the FY 2015 baseline. NETL's FY 2024 energy intensity was 133,021.6 BTU/GSF, only a 13.4% reduction from the FY 2015 baseline and a 4% decrease from FY 2023. This decrease was mainly due to milder temperatures at NETL's Morgantown and Pittsburgh campuses.

The Morgantown and Pittsburgh campuses consumed 81% of NETL's total energy in FY 2024. Year-to-year degree day comparisons show that in FY 2024, Morgantown and Pittsburgh had 51% more cooling degree days and 9% fewer heating degree days than in FY 2023. The Albany campus consumed 19% of NETL's total energy in FY 2024 and had 15% fewer cooling degree days and 10% fewer heating degree days in FY 2024 than in FY 2023. NETL will continue to reduce energy intensity through continued energy conservation measures (ECMs) in new and existing buildings and systems.

One other factor impacting FY 2024 electricity and natural gas use was that NETL continues to run building heating, ventilation and air conditioning (HVAC) systems based on Centers for Disease Control and Prevention (CDC)/American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) recommendations, Guidance for Building Operations During the Covid-19 Pandemic. HVAC systems in NETL buildings were adjusted to improve ventilation by opening outdoor air dampers beyond minimum settings to reduce or eliminate HVAC recirculation. Demand-controlled ventilation controls were turned off, filter efficiencies were increased as much as possible in each HVAC system, and HVAC systems ran longer hours (two hours before and after the building is occupied).

Data Centers

NETL has a data center business case with Federal Information Technology Acquisition Reform Act approval that outlines NETL's full data center strategy. A summary of this strategy is below.

- The NETL-Albany data center was relocated to the first floor of B-1 in FY 2022. The new data center is fully metered and has an estimated power use effectiveness (PUE) o 1.3. Data center infrastructure management (DCIM) software (Nlyte) provided by DO HQ was incorporated in the Albany data center.

- The Morgantown data center (B-50) was remodeled, and racks were consolidated into a smaller, contained space. This will significantly save power and cooling costs. It will be metered and managed by Nlyte with an estimated PUE of 1.14.

- In Pittsburgh, the construction of the Center for Artificial Intelligence/Machine Learning (CAML) project in Building B-83 continued. This facility is engineered

to integrate high-performance computing (HPC), specialized research IT equipment, and commodity enterprise IT equipment into a single, cohesive environment. This strategic consolidation aims to eliminate the need for multiple data centers onsite. The CAML will feature comprehensive metering and management via Data Center Infrastructure Management (DCIM) software.

All three sites are currently going through a physical to virtual migration of applications and services. Physical servers will be virtualized and placed on shared hardware to save on power and cooling, thus reducing PUE.

Fleet

The objective for petroleum fuel use was a reduction of 20% by FY 2015, and thereafter relative to FY 2005 baseline. NETL's consumption of petroleum fuel in FY 2024 was 87.66% less than NETL's petroleum consumption in FY 2005, which meets the goal. FY 2024 total milage was 1566,643 miles, which was 27,035 less miles than travelled in FY 2023.

NETL-Morgantown and NETL-Pittsburgh operate and maintain E85 refueling infrastructure to support the alternate fuel vehicles (AFVs) in the NETL fleet. Due to supplier issues related to the supply of E85 fuel in the first half of FY 2024, regular fuel was used in E85 AFVs periodically in FY 2024. E85 fuel delivery was resumed at the NETL-Pittsburgh site but NETL-Morgantown used an off-site fueling station for E85.

Photo 4.6.5.1: EV Charging Station at PGH.

Inter-site shuttle service between the NETL-Morgantown and NETL Pittsburgh sites was terminated in FY 2024, due to a decline in ridership.

8.0.1 WATER USAGE

NETL's objective was to reduce its water consumption intensity by 2% annually relative to the FY 2007 baseline of 27.3 million gallons (which equates to 23.3 gallons/gross square foot [gal/gsf]) through life-cycle cost-effective measures. NETL's FY 2024 potable water intensity was 8.8 gal/gsf. This equates to a 62% decrease from the 2007 baseline.

9.0 EMS COMPLIANCE

NETL's 2024 Environmental Management System (EMS) compliance report was submitted via the Department of Energy's EMS site information database. NETL received a GREEN score based on the following responses to the EMS metrics questions:

Table 4.7.1 EMS Metrics

METRIC QUESTION	RESPONSE
Environmental Performance	Using an established procedure, previously identified activities, products and services (and their associated environmental aspects) and all newly identified activities, products and services (and their associated environmental aspects) were evaluated for significance within the past fiscal year. The results of the analysis were documented, and any necessary changes were made or scheduled.
Environmental Objectives	Documented measurable environmental objectives are in place at relevant functions and levels. By the end of the fiscal year, at least 50-79% of those had either already been accomplished or were on schedule to be met.
Operational Controls	Within the past fiscal year, operational controls associated with identified significant environmental aspects were established, implemented, controlled and maintained in accordance with operating criteria.
Compliance with Regulatory Requirements/ Corrective Actions	Within the past fiscal year, an environmental compliance audit program was in place, audits were completed according to schedule or were rescheduled as needed, audit findings were documented and corrective and preventative actions were defined/documented. Corrective and preventative actions were not always on schedule for completion by an established date.
EMS/EO Goals Integration	80-100% of applicable EO 14057 Site Sustainability Plan goals are addressed in the EMS.

9.1 CORRECTIVE AND PREVENTIVE ACTION PROGRAM

Nonconformance with any appropriate regulations or standards identified during any self-assessment audits (or external assessments/audits) mentioned above is documented using NETL's current corrective and preventive action tracking system (CATS).

NETL Manual 450.1-01.04, Corrective and Preventive Action Management Program, outlines the processes for corrective and preventive actions for items identified in the assessments, inspections, audits, etc. performed at NETL. This information is captured; recorded; prioritized; assigned; analyzed for root cause determination; formally tracked in areas affecting environmental, safety, and health; and closed while incorporating as appropriate, into the lessons learned, near misses, and training systems.

After completing an assessment, the lead assessor uses the CATS to generate an assessment record. When a finding is entered into the system, a unique identifying number is assigned and cataloged in the database with the associated assessment record. A notification of the finding is sent electronically to the responsible person and their line manager. All corrective and preventive actions taken regarding the finding are then documented in CATS. To ensure findings have been fully addressed, a follow-up is done through the internal auditing process. Each month, closed findings undergo verification audits to determine if the corrective and preventive actions taken address the closed findings appropriately. Open findings are generated into a monthly report and sent to line management to further address and complete accordingly.

NETL completed a total of 344 internal inspections/audits at all three sites in 2024. As a result, NETL resolved 120 ES&H-related corrective/preventive actions.

5.0 ENVIRONMENTAL RADIOLOGICAL PROGRAM INFORMATION

5.1 DOE ORDER 458.1, RADIATION PROTECTION OF THE PUBLIC AND THE ENVIRONMENT

In accordance with 10 C.F.R. § 835.202, Occupational Dose Limits for General Employees, NETL monitored a total of 85 employees for potential external radiation exposure in 2024. These employees were monitored for: effective dose from external sources; equivalent dose to the lens of the eye; and equivalent dose to the skin. Of the 85 employees monitored, 15 employees showed an exposure rate. However, for these 15 employees, their exposure rates ranged from 11 mrem to 104 mrem for the year. 10 C.F.R. § 835.202, Occupational Dose Limits for General Employees sets the exposure thresholds for the total effected dose at 5 rems per year; the shallow dose equivalent at 50 rems per year; and the total deep dose equivalent at 50 rems per year. Based on these thresholds, the exposures for all employees monitored for external radiation at NETL were well below the above-mentioned regulatory levels. Table 5.1.1, Historical Exposure Rates, shows the historical exposure rates for the last three years. The 2024 exposure data was consistent with data from 2022 and 2023.

Table 5.1.1 Historical Exposure Rates

Year	2024	2023	2022
# of Employees Monitored for External Radiation	85	85	92
# of Employees with Exposure Rates	15	27	30
Average Committed Dose Equivalent to the Skin (mrem)	7	12	17

Individuals at NETL may be exposed to radiation through the following activities:

- Conducting research that involves the use of radiation generating devices (RGD).
- Conducting research that involves the use of sealed sources.
- Conducting research that involves various types of radioactive materials, naturally occurring radioactive materials (NORM), and technologically enhanced NORM (TENORM), including but not limited to zirconia crucibles, monazites, produced waters, core samples, and byproducts from the oil and gas industries.
- Supporting facility operations, such as the use of X-rays in mail rooms.
- Supporting construction-related activities, such as completing a scoping survey.

To ensure compliance with 10 C.F.R. § 835 and to protect the environment and employees that may receive occupational radiation exposure, hazards and mitigations are documented in the respective Safety Analysis and Review System (SARS) packages, pursuant to NETL Order 420.1A, Safety Analysis and Review system. Radiation hazards may be the result of using radiation generating devices, sealed sources, NORM/TENORM or other radioactive materials. Due to the health hazards associated with generating airborne particulates when working with radioactive materials and NORM/TENORM, NETL currently is not allowing any research project or activity to generate airborne particulates. Air monitoring is not routinely performed at NETL. 10 C.F.R. § 835.403(a)(1) states that "Air sampling equipment shall be used where an individual is likely to receive an annual exposure of 40 or more derived air concentration (DAC)-hours." This intake generally represents a committed effective dose to an individual of approximately 100 mrem. Through SARS, NETL continually evaluates weather air monitoring as required based on the work that is performed within the SARS project.

5.2 DOE ORDER 435.1, RADIOACTIVE WASTE MANAGEMENT

Minor amounts of legacy items continue to be stored in controlled locations at NETL. While there are no time constraints on the disposal of the radioactive waste, legacy items are removed when it is practical to do so.

The Albany site maintains an active site-use permit with the State of Washington – Department of Health (DOH). This permit allows for the disposal of low-level radioactive wastes (LLRW), such as those generated during the scoping survey, at a regional waste handling facility, U.S. Ecology – Washington, or other facilities owned by U.S. Ecology. Radiological waste generated at the Albany site is packaged for disposal as LLRW in accordance with applicable regulations. One LLRW disposal occurred at NETL-ALB in 2024, which included 20 cubic yards of foundry bricks and sand from B-23. The material was shipped to U.S. Ecology – Idaho, via non-hazardous waste manifest number 113259.

5.3 CLEARANCE OF PROPERTY CONTAINING RESIDUAL RADIOACTIVE MATERIALS

In Albany, B-23 was previously abated for legacy radioactive materials and contamination as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). This investigation was intended to clear a portion of B-23 that had not been included in the previous remediation since it will be renovated as part of the proposed structural updates. In February 2024, a radiation scoping survey was conducted in B-23 (Room 100) under Radiological Work Permit ALB-24-001. The investigation included conducting alpha and beta surveys, surface contamination smears, and sampling of brick and sand. Photo 5.3.1a and Photo 5.3.1b illustrate the brick floor removal and exposed underlying sand.

The results of the scoping survey indicate that the radiation contamination criteria levels are below the established DOE release criteria levels for Thorium (Th)-232 (3 pCi/g for volume metric contamination or 1,000 dpm/cm2 for surface contamination). Based on these results, B-23 was released for construction and renovation activities.

Photo 5.3.1a: Contaminated brick and sand.

Photo 5.3.1b: B-23 Scoping survey work.

While the brick readings were below the surface contamination levels prescribed, the levels noted in the survey require the materials to be categorized as naturally occurring radioactive material (NORM). As a result, according to the Oregon Administrative Rule 345, Division 50, NORM must be collected and disposed of as LLRW.

6.0 ENVIRONMENTAL NON-RADIOLOGICAL PROGRAM INFORMATION

6.1 NON-RADIOLOGICAL ENVIRONMENTAL MONITORING

NETL has programs for monitoring non-radiological parameters that include Industrial Wastewater Management, Surface Water Quality Management and Ambient Air Quality Management.

6.2 AMBIENT AIR QUALITY MANAGEMENT

NETL's Ambient Air Quality program ensures compliance with all federal, state and local regulations, and DOE directives. The program includes monitoring, permitting, and reporting. Additionally, historical Environmental Safety and Health Management Plans (EMPs) have been used to track various emission categories or emissions sources where NETL can make the most improvement.

To maintain quality control, NETL subcontracts its analytical work to certified laboratories. These laboratories must submit their quality assurance/quality control manuals to NETL for review prior to work. Upon submission of sampling materials, NETL submits quality control samples (i.e., duplicates, blanks and spikes) to the laboratories to verify the quality of the analyses. Site air emissions data are calculated and maintained to ensure compliance with regulatory requirements.

At this time, only the Pittsburgh site holds a Title V Operating Permit. For specific information about the ambient air quality program at each site, see the following sections: 3.1.4 (Albany), 3.2.4 (Pittsburgh) and 3.3.4 (Morgantown).

6.3 STORMWATER MANAGEMENT PROGRAM

NETL's Surface Water Quality Management Program ensures the management of local surface water quality, stormwater discharges, and site-specific storage tanks. The program maintains full compliance with all applicable federal, state and local requirements; prevents spills of toxic, hazardous or other pollutants into the environment; and ensures the safety of workers and the public to protect the environment.

NETL-Albany, NETL-Pittsburgh and NETL-Morgantown each manages its stormwater programs differently based on regulatory guidelines. For specific information about the Stormwater Management program at each site, see the following sections: 3.1.5.1.1 (Albany), 3.2.5.1 (Pittsburgh) and 3.3.5.1.1 (Morgantown).

7.0 GROUNDWATER PROTECTION PROGRAM

Groundwater protection at NETL is administered through the Groundwater Quality Management Program. The program addresses regulatory requirements and best management practices to prevent leaks and spills; monitor groundwater and soil; remove contaminated soil; and address regulatory-driven close-out actions. Each site (Albany, Pittsburgh and Morgantown) has its own groundwater protection plan documenting site hydrogeology, potential pollution sources, potential contaminants to be monitored, well installation, sampling methods, monitoring strategy and quality assurance/quality control processes. The plans include maps of the site aquifers and wells.

Photo 7.0.1: Morgantown Monitoring Wells.

7.1 GROUNDWATER AND SOIL QUALITY PROTECTION ACTIVITIES — ALBANY

The groundwater protection and monitoring program in Albany, initiated in 2001, is aligned with the Oregon Department of Environmental Quality (ODEQ) Voluntary Cleanup Program. The program includes 33 groundwater wells (29 wells on NETL property and four wells on school district property). While the wells were originally sampled for a broad range of contaminants, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, nitrates and polychlorinated biphenyls (PCBs), over time the range of contaminants narrowed. Program activities have continued to include development of a conceptual site model to document

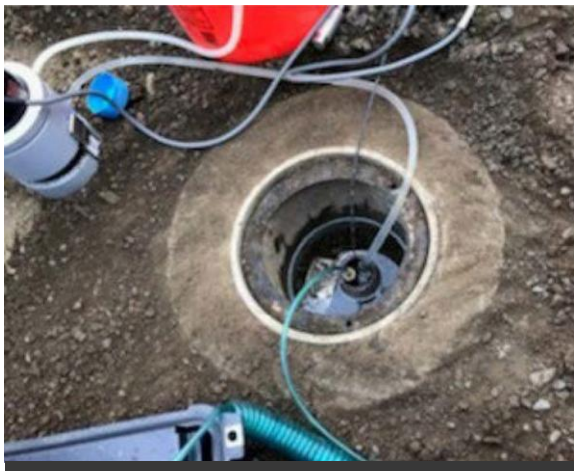


Photo 7.1.1: Albany Groundwater Sampling.

potential migration of the groundwater plume and contaminant trends. As the program has evolved, monitoring efforts have followed the requirements of the ODEQ Voluntary Cleanup Program.

In 2024, eight soil-vapor wells were installed inside the property boundary to investigate the potential for on-site and off-site vapor intrusion into buildings, which may pose a public and occupational health hazard. NETL also installed five temporary groundwater monitoring wells on public rights-of-way to the northwest of the federal government property. Results from the monitoring effort identified contaminants in exceedance of the applicable regulatory thresholds at two of the five temporary wells. As a result, in the 2025-2026 timeframe, NETL plans to install permanent groundwater and soil-vapor monitoring wells outside of the property boundary to further delineate the extent of contaminant spread.

Table 7.1.1a, NETL-Albany 2024 Groundwater Detection Monitoring Program, indicates groundwater monitoring was performed for environmental surveillance purposes and that 98.4% of the analyses were within an acceptable range. Table 7.1.1b, NETL-Albany Ranges of Results for Positive Detections (On-site Monitoring) lists the parameters sampled and indicates that trichloroethylene (TCE) was detected above the applicable regulatory standard, as evidenced in Table 7.1.1c.

Table 7.1.1c, NETL-Albany Ranges of Results for Positive Detections (Off-site Monitoring) lists the parameters sampled at the off-site wells.

Table 7.1.1a: NETL-Albany 2024 Groundwater Detection Monitoring Program

Groundwater Detection Monitoring	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Number of Active Wells Monitored On-site	NA	NA	29	NA
Number of Active Wells Monitored Off-site	NA	NA	4	NA
Number of Samples Taken	NA	NA	62	NA
Number of Analyses Performed	NA	NA	4305	NA
% of Analyses That Are Non-Detects	NA	NA	88.6	NA
% of Analyses Within an Acceptable Range*	NA	NA	98.4	NA

* Acceptable range generally means within applicable regulatory limits (e.g., in a RCRA permit or stemming from a consent order), or in the case of environmental surveillance or emerging contaminants, may be defined as values that the site and regulators agree is protective of public health and the environment (e.g., below regional screening levels).

NA = Not Applicable

Table 7.1.1b: NETL-Albany 2024 Ranges of Results for Positive Detections (On-site Monitoring)				
Parameters Measured	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Carbon Tetrachloride	NA	NA	0.31-1000 ug/L	NA
Chloroform	NA	NA	0.27-100 ug/L	NA
Cis-1, 2-DCE	NA	NA	0.42-5 ug/L	NA
Perchloroethylene (PCE)	NA	NA	0.42-5.3 ug/L	NA
Trichloroethylene (TCE)	NA	NA	0.26 – 130 ug/L	NA
Tritium	NA	NA	NA	NA
Krypton-85	NA	NA	NA	NA
Heavy Metals	NA	NA	NA	NA
Trans-1, 2-DCE	NA	NA	0.42 ug/L	NA
NA = Not Applicable ND = Non-detect				

Table 7.1.1c: NETL-Albany 2024 Ranges of Results for Positive Detections (Off-site Monitoring)				
Parameters Measured	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Carbon Tetrachloride	NA	NA	ND	NA
Chloroform	NA	NA	ND	NA
Cis-1, 2-DCE	NA	NA	ND	NA
Perchloroethylene (PCE)	NA	NA	ND	NA
Trichloroethylene (TCE)	NA	NA	0.39 – 22.0 ug/L	NA
Tritium	NA	NA	NA	NA
Krypton-85	NA	NA	NA	NA
Heavy Metals	NA	NA	NA	NA
Trans-1, 2-DCE	NA	NA	ND	NA
NA = Not Applicable ND = Non-detect				

POTENTIAL CONTAMINANTS

Historically, NETL-Albany's periodic groundwater monitoring events have detected volatile organic compounds (VOCs), prompting further investigation into areas of suspected contamination. However, investigations conducted in the early 2000s found no concerns related to surface soils, subsurface soils, soil gas, or ambient air at off-site properties. The only identified issue was elevated VOC levels in the groundwater, specifically trichloroethylene (TCE), carbon tetrachloride, and chloroform.

In 2006, in consultation with the Oregon Department of Environmental Quality (ODEQ), NETL sampled residential wells within an approximate two-block radius of the site. Out of 31 residential wells sampled, 10 wells used for drinking water were found to be impacted. By December 2006, NETL connected all owners of these impacted wells to the city of Albany's potable water supply.

Additionally, ODEQ requested an independent health consultation with the Agency for Toxic Substances and Disease Registry (ATSDR), under the U.S. Department of Health and Human Services, Public Health Services. This consultation focused on the groundwater investigation, radioactive waste disposal, and beryllium dust concerns. The ATSDR results concluded that current and future exposures to VOCs from contaminated groundwater would pose an apparent public health hazard. Similarly, the ATSDR results also concluded that past exposures at most residences with contaminated wells would have no apparent public health hazard. However, past exposure at one residence was identified as a public health hazard for potential exposure to carbon tetrachloride and TCE. In this case, NETL provided a connection to City of Albany water. NETL continues its site investigation activities and periodic monitoring at NETL-Albany in accordance with ODEQ requirements.

Regarding PFAS contamination, NETL-Albany is not considered a significant user of per- and polyfluoroalkyl substances (PFAS). The site does not possess significant quantities of R&D chemicals categorized as PFAS, nor does it operate any fixed aqueous film-forming foam (AFFF) fire suppression systems or its own firefighting program. Albany does not have an active sampling, analysis, tracking, and monitoring program for PFAS-related compounds, as it is not required by the site's industrial wastewater permit. While an active groundwater monitoring program exists for other contaminants, PFAS-related substances have never been part of historical sampling. Furthermore, neither groundwater nor surface water is used as a drinking water source, as drinking water is provided by the local public drinking water system.

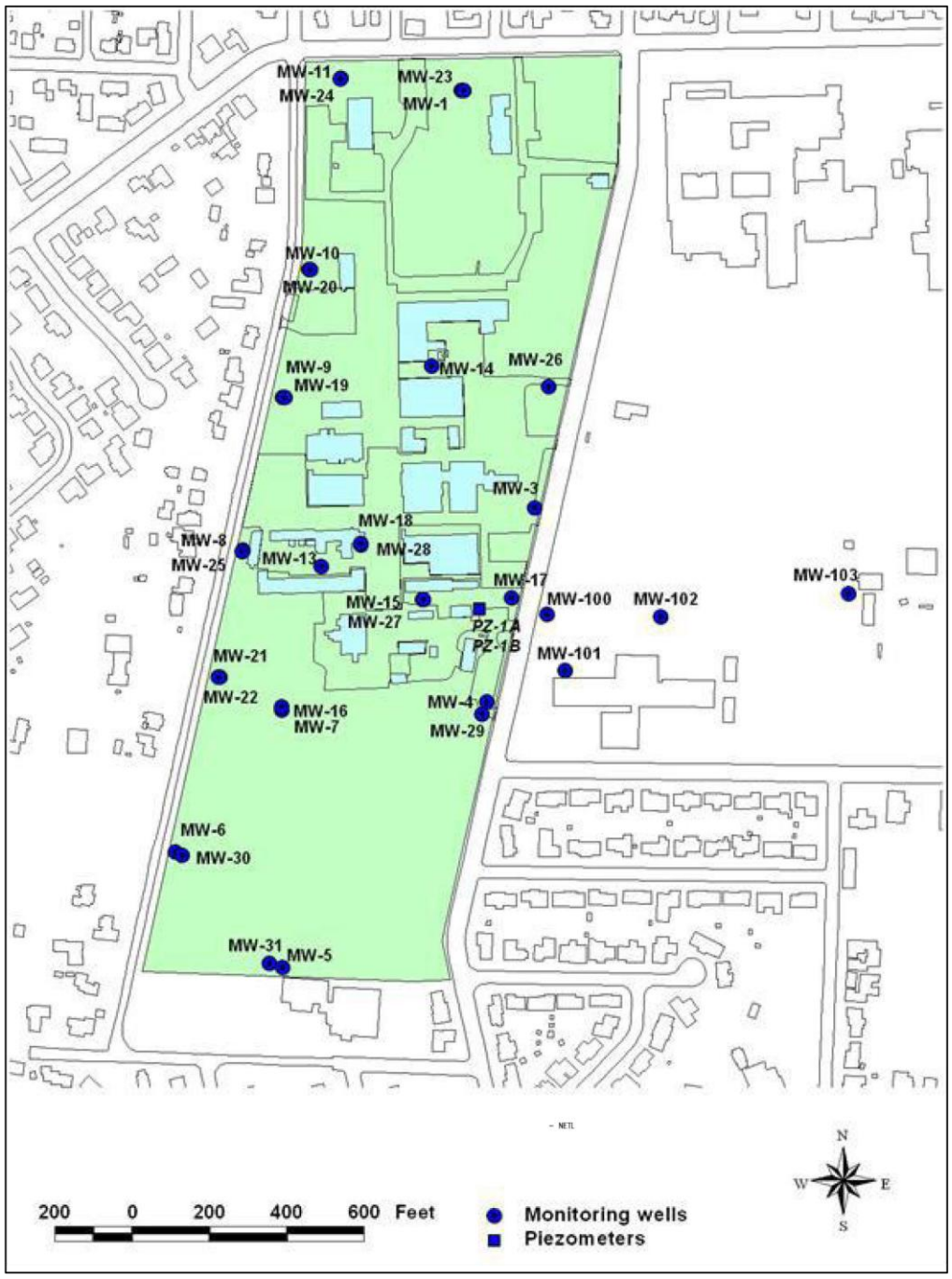


Figure 7.1.1: Monitoring well locations at NETL-Albany.

7.2 GROUNDWATER AND SOIL QUALITY PROTECTION ACTIVITIES — PITTSBURGH

The groundwater protection and monitoring program at NETL-Pittsburgh includes 23 groundwater monitoring wells (19 of which are screened in shallow weathered bedrock). Seven wells are in the research and development (R&D) plateau area and 12 are in the valley fill area (which includes administrative and maintenance areas). The topography, consisting of rolling hills and ridges, reflects the dendritic drainage erosion of the uplifted Allegheny Peneplain. The primary objective of the groundwater monitoring program is to monitor the shallow, weathered bedrock zone as the first significant aquifer, or water-bearing unit, beneath the Pittsburgh facilities. Contamination entering the ground from soil surface sources would be expected to impact this zone first and foremost; hence, most wells are placed in this zone. The program also includes monitoring four wells screened in the deeper water-bearing zone to provide data on water quality and contaminant migration. Additionally, the data is used to identify and characterize groundwater flow and relate it to surface water flow conditions.

NETL-Pittsburgh has two groundwater flow patterns. Groundwater flows in the shallow weathered bedrock aquifer, directed by the intervening valleys toward the Lick Run Valley, where it joins the water-bearing unit located in the valley and adds to the base flow of Lick Run itself (see Photo 7.2.1a). Some of this flow also discharges as springs on the hillsides or in the valleys.

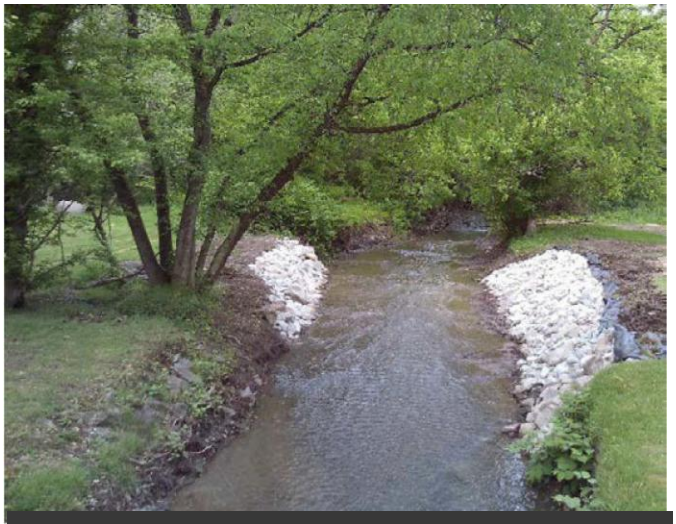


Photo 7.2.1a: Lick Run.

The second flow pattern is associated with the deeper aquifer. Groundwater in this zone generally flows east toward the Lick Run Valley, where it comingles with water of the shallow zone as it flows off the hillsides.

Most domestic water supplies for the area surrounding NETL-Pittsburgh are provided by the Pennsylvania American Water Company, which processes water from the Monongahela River. However, according to the Pennsylvania Department of Environmental Protection Water Well Inventory, there is a groundwater well listed for domestic usage within a one-mile radius of the site. This groundwater well, situated near central Bruceton, is located to

the north of NETL-Pittsburgh and it should not be affected by potential NETL groundwater impacts because groundwater is assumed to flow in a southern direction beneath the Lick Run Valley.

A second groundwater well is listed as being located on Piney Fork Road, approximately 1½ miles south of NETL-Pittsburgh. The Pennsylvania Department of Environmental Protection Water Well Inventory reported no other domestic groundwater wells in Jefferson Borough or South Park Township; however, the inventory does not list wells drilled prior to 1966.

Table 7.2.1a, NETL-Pittsburgh 2024 Groundwater Detection Monitoring Program, indicates groundwater monitoring was performed for environmental surveillance purposes and that 100% of the analyses were within an acceptable range. Table 7.2.1b, indicates NETL-Pittsburgh Ranges of Results for Positive Detections (On-site Monitoring) provides summary of sampling analysis.

Table 7.2.1a: NETL-Pittsburgh 2024 Groundwater Detection Monitoring Program

Groundwater Detection Monitoring	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Number of Active Wells Monitored On-site	NA	NA	17	NA
Number of Active Wells Monitored Off-site	NA	NA	0	NA
Number of Samples Taken	NA	NA	19	NA
Number of Analyses Performed	NA	NA	457	NA
% of Analyses That Are Non-detects	NA	NA	49	NA
% of Analyses Within an Acceptable Range*	NA	NA	100	NA

* Acceptable range generally means within applicable regulatory limits (e.g., in a RCRA permit or stemming from a consent order), or in the case of environmental surveillance or emerging contaminants, may be defined as values that the site and regulators agree is protective of public health and the environment (e.g., below regional screening levels).

NA = Not Applicable

Table 7.2.1b: NETL-Pittsburgh Ranges of Results for Positive Detections (On-site Monitoring)				
Parameters Measured	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Tritium	NA	NA	NA	NA
Krypton-85	NA	NA	NA	NA
TCE	NA	NA	ND	NA
Heavy Metals	NA	NA	8.2-640,000 ug/L	NA
VOCs	NA	NA	ND - 3.4 ug/l	NA
Chloride (mg/L)	NA	NA	316-2,420	NA
Fluoride (mg/L)	NA	NA	0.092-1.15	NA
Nitrate (mg/L)	NA	NA	0.314-2.80	NA
Sulfate (mg/L)	NA	NA	10.5-242	NA
Total Dissolved Solids (mg/L)	NA	NA	680-4,100	NA
Total Alkalinity (mg/L)	NA	NA	55-270	NA
Total Organic Halogens (mg/L)	NA	NA	0.018-0.210	NA
Total Organic Carbon (mg/L)	NA	NA	0.75-6.1	NA
pH (S.U.)	NA	NA	6.59-8.78	NA
Specific Conductance (ms/cm)	NA	NA	1.226-8.350	NA
Temperature (°C)	NA	NA	13.3-21.7	NA

NA= Not Applicable

ND=Non-detect

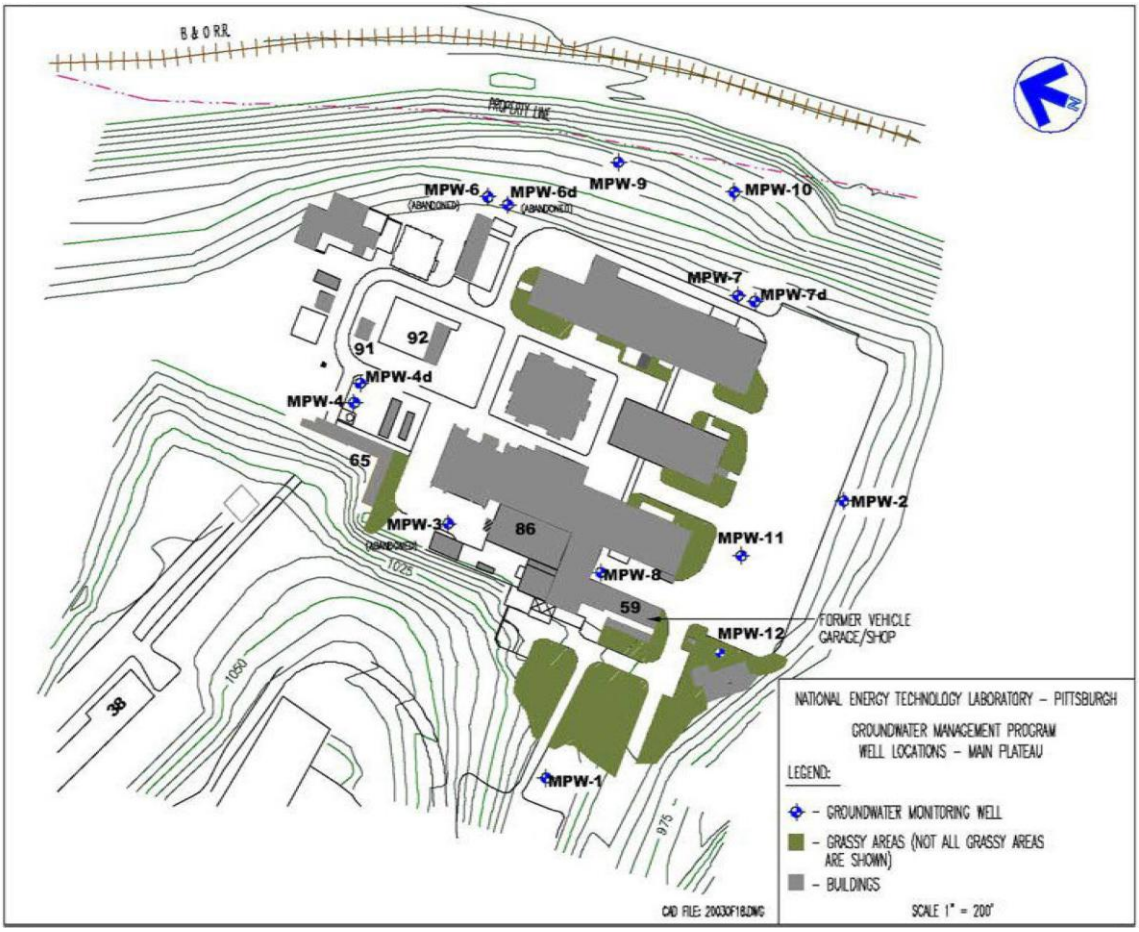


Figure 7.2.1a: Groundwater Management Program R&D Plateau Well Locations — Pittsburgh.

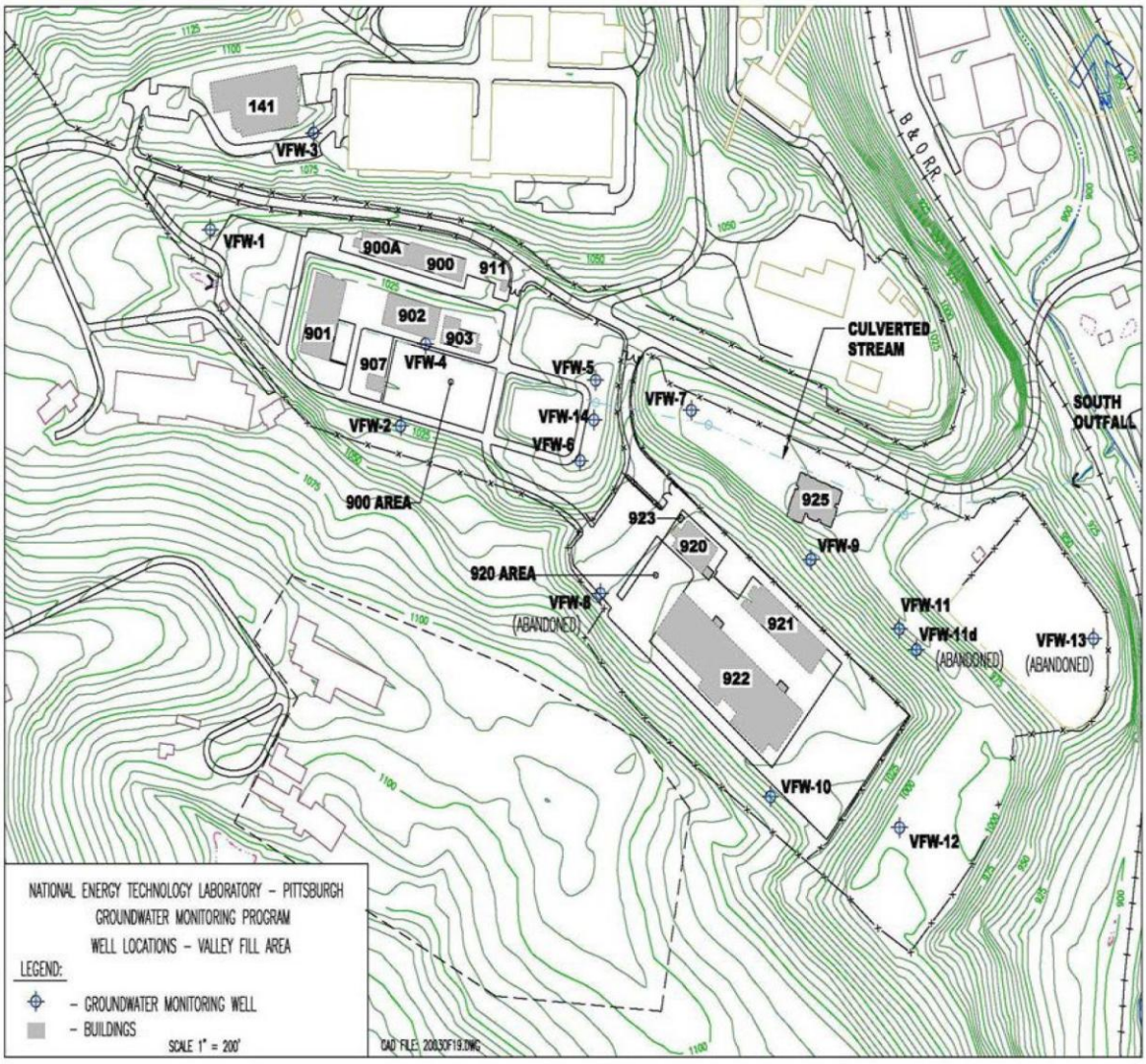


Figure 7.2.1b: Groundwater Management Program R&D Plateau Well Locations — Pittsburgh.

POTENTIAL CONTAMINANTS

Groundwater monitoring in 2024 was performed per the NETL-Pittsburgh 2024 Groundwater Detection Monitoring Plan. The results of the NETL-Pittsburgh Groundwater Detection Monitoring Program are presented in Tables 7.2.1a and 7.2.1b, and the results were compared against federal and state standards for drinking water and groundwater. This is done to evaluate long-term groundwater quality. Statistical data comparisons on a semi-annual basis are used to determine and identify potential groundwater contamination. Exceedances are monitored and tracked to detect trends and any areas of significant contamination. If any areas of significant contamination are identified, a formal investigation to define the nature, severity and extent of contamination will be conducted. Detection of significant contamination will require notification to the Pennsylvania Department of Environmental Protection and possible inclusion into mandatory groundwater monitoring programs.

Monthly groundwater elevation measurements to determine contaminant transport were completed in accordance with the GPMP. The elevation measurements are consistent with the general groundwater flow patterns described previously.

Pittsburgh is not a major user of PFAS because the site only maintains limited quantities of R&D chemicals considered as PFAS; it has two fixed AFFF systems for fire suppression which only are discharged for emergency purposes; and it does not operate its own firefighting program.

Photo 7.2.1b: Pittsburgh Groundwater Monitoring.

Pittsburgh does not have an active sampling, analysis, tracking and monitoring program for PFAS-related compounds because it is not required per the site's industrial wastewater permit or the stormwater NPDES permit held by CDC/NIOSH. While Pittsburgh has an active GMP, PFAS-related substances have never been part of any historical sampling. Site groundwater is not used as a drinking water source; drinking water is provided by the local public drinking water system.

7.3 GROUNDWATER AND SOIL QUALITY PROTECTION ACTIVITIES — MORGANTOWN

Morgantown's groundwater protection program addresses regulatory requirements for monitoring, compliance and reporting, including best management practices for preventing leaks and spills, monitoring groundwater and soil quality, emergency releases, and quality control. The program is implemented to obtain data for the purpose of determining baseline conditions of groundwater quality and quantity, demonstrating compliance, identifying existing and potential groundwater contamination sources and documenting the site's hydrogeology. Spills and accidental discharge cleanup procedures are also addressed. Should a spill occur, containment and cleanup would commence, and the affected soil would be monitored, or removed, as necessary.

The primary strategy for Morgantown site groundwater protection is spill and leak prevention. Together, the site's Spill Prevention, Control and Countermeasures Plan and the Stormwater Pollution Prevention Plan lay out the strategy for minimizing the risk of unintentional releases and quickly responding to minimize environmental contamination. In addition, R&D projects are only initiated or modified after a rigorous environment, health and safety review is conducted in accordance with the Safety Analysis and Review System process.

Twenty (20) active monitoring wells exist at NETL-Morgantown, the locations of which are displayed in Figure 7.3.1. These wells monitor two shallow aquifers within the unconsolidated Lake Monongahela sediments and one bedrock aquifer, the

Morgantown Sandstone. None of these aquifers are used as a source of water in the immediate area.

Table 7.3.1a, NETL-Morgantown 2024 Groundwater Detection Monitoring Program, indicates groundwater monitoring was performed for environmental surveillance purposes and that all analyses were within an acceptable range. Table 7.3.1b, NETL-Morgantown Ranges of Results for Positive Detections (On-site Monitoring) lists the parameters sampled and indicates no groundwater contaminants have been consistently detected above regulatory levels at the site.

Figure 7.3.1: Active monitoring wells at NETL-Morgantown.

Table 7.3.1a: NETL-Morgantown 2024 Groundwater Detection Monitoring Program				
Groundwater Detection Monitoring	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Number of Active Wells Monitored On-site	NA	NA	20	NA
Number of Active Wells Monitored Off-site	NA	NA	0	NA
Number of Samples Taken	NA	NA	10	NA
Number of Analyses Performed	NA	NA	10	NA
% of Analyses That Are Non-detects	NA	NA	20	NA
% of Analyses Within an Acceptable Range*	NA	NA	100	NA

* Acceptable range generally means within applicable regulatory limits (e.g., in a RCRA permit or stemming from a consent order), or in the case of environmental surveillance or emerging contaminants, may be defined as values that the site and regulators agree is protective of public health and the environment (e.g., below regional screening levels).

NA = Not Applicable

Table 7.3.1b: NETL-Morgantown Ranges of Results for Positive Detections (On-site Monitoring)				
Parameters Measured	PURPOSE OF MONITORING			
	Remediation	Waste Management	Environmental Surveillance	Other Drivers
Tritium	NA	NA	NA	NA
Krypton-85	NA	NA	NA	NA
TCE	NA	NA	NA	NA
Heavy Metals	NA	NA	NA	NA
VOCs	NA	NA	NA	NA
Cadmium, total	NA	NA	ND - 2.9 µg/L	NA
Cadmium, dissolved	NA	NA	ND - 2.6 µg/L	NA

NA= Not Applicable

ND=Non-detect

POTENTIAL CONTAMINANTS

Groundwater monitoring in 2024 was performed per the NETL-Morgantown 2024 Groundwater Detection Monitoring Plan. The results of the NETL-Morgantown Groundwater Detection Monitoring Program are presented in Tables 7.3.1a-7.3.1b, and the results were compared against federal and state standards for drinking water and groundwater. This is done to evaluate long-term groundwater quality. Statistical data comparison on a semi-annual basis are used to determine and identify potential groundwater contamination. Exceedances are monitored and tracked to detect trends, and any areas of significant contamination are identified, a formal investigation to define the nature, severity and extent of contamination will be conducted. Detection of significant contamination will require notification to the West Virginia Department of Environmental Protection and possible inclusion into mandatory groundwater monitoring program.

Morgantown is not a major user of per- and polyfluoroalkyl substances (PFAS) because it only maintains limited quantities of R&D chemicals considered as PFAS; it has limited fixed aqueous film forming foam (AFFF) systems for fire suppression; and it does not operate its own firefighting program. The site has no history of any AFFF discharges. Accordingly, Morgantown does not have an active sampling, analysis, tracking and monitoring program for PFAS-related compounds, as it is not required per the site's industrial wastewater permit or stormwater National Pollutant Discharge Elimination System (NPDES) permits. While there is an active groundwater management program (GMP), PFAS-related substances have never been part of any historical sampling. Site groundwater is not used as a drinking water source; drinking water is provided by the local public drinking water system.

ACRONYM LIST

ABI	Asbestos Building Inspector
ACHD	Allegheny County Health Department
ACM	Asbestos-Containing Material
AEA	Atomic Energy Act of 1954
AES	American Environmental Services, Inc.
AFFF	Aqueous Film Forming Foam
AHA	Activity Hazard Analysis
ALARA	As Low as Reasonably Achievable
ALB	Albany, Oregon
AST	Aboveground Storage Tank
ATSDR	Agency for Toxic Substances and Disease Registry
B-	Building
BOD	Biochemical Oxygen Demand
CO_2e	Carbon Dioxide Equivalent
CAA	Clean Air Act
CATS	Corrective Action Tracking System
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFC	Chlorofluorocarbon
C.F.R.	U.S. Code of Federal Regulations
COD	Chemical Oxygen Demand
COPC	Contaminants of Potential Concern
CSE	Computational Sciences and Engineering
CWA	Clean Water Act
CX	Categorical Exclusion

DCE	Dichloroethylene
DMR	Discharge Monitoring Report
DOE	U.S. Department of Energy
EA	Environmental Assessment
ECM	Energy Conservation Measure
EISA	Energy Independence and Security Act
EIS	Environmental Impact Statement
EMP	ES&H Management Plan
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
EPP	Environmentally Preferred Product
ERO	Emergency Response Organization
ES&H	Environment, Safety and Health
ES&HMS	Environment, Safety and Health Management System
FACP	Fire Alarm Control Panel
FECM	Office of Fossil Energy and Carbon Management
FEMP	Federal Emergency Management Program
FFCA	Federal Facility Compliance Agreement
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GMP	Groundwater Management Program
GPMP	Groundwater Protection and Monitoring Program
GPP	General Plant Project
GSA	U.S. General Services Administration
HFC	Hydrofluorocarbon

HPSB	High-Performance Sustainable Buildings
HVAC	Heating, Ventilation and Air Conditioning
HQ	Headquarters
ISM	Integrated Safety Management
ISO	International Organization for Standardization
LLRW	Low-Level Radioactive Waste
MGN	Morgantown, West Virginia
MRB	Management Review Board
MUB	Morgantown Utility Board
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NIOSH	National Institute of Occupational Safety and Health
NNSA	National Nuclear Security Administration
NORM	Naturally Occurring Radioactive Material
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
ODEQ	Oregon Department of Environmental Quality
ODS	Ozone-Depleting Substance
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PADEP	Pennsylvania Department of Environmental Protection
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene
PFAS	Per- and Polyfluoroalkyl Substances
PGH	Pittsburgh, Pennsylvania
PHA	Pleasant Hills Authority
R&D	Research and Development

RCRA	Resource Conservation and Recovery Act
RGD	Radiation Generating Device
RSOSRTS	Rock Springs Oil Shale Retort Site
SARA	Superfund Amendments and Reauthorization Act
SARS	Safety Analysis and Review System
SBEUC	Simulation-Based Engineering User Center
SHPO	State Historic Preservation Officer
SMS	Safety Management System
SPCC	Spill Prevention, Control and Countermeasures Plan
SVOC	Semi-Volatile Organic Compound
SWPP	Stormwater Pollution Prevention
TCE	Trichloroethylene
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage and Disposal
VOC	Volatile Organic Compound
WDEQ	Wyoming Department of Environmental Quality
WVDEP	West Virginia Department of Environmental Protection
WVU	West Virginia University
WWTF	Wastewater Treatment Facility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1450 Queen Avenue SW
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541-967-5892

3610 Collins Ferry Road
P.O. Box 880
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304-285-4764

626 Cochran Mill Road
P.O. Box 10940
Pittsburgh, PA 15236-0940
412-386-4687

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