NATIONAL ENERGY TECHNOLOGY LABORATORY

2011 Annual Site Environmental Report

2011 Annual Site Environmental Report

U.S. Department of Energy
National Energy Technology Laboratory
Albany, Oregon
Fairbanks, Alaska
Sugar Land, Texas
Morgantown, West Virginia
Pittsburgh, Pennsylvania

NETL Customer Service Line: (800) 553-7681
www.netl.doe.gov

Disclaimer

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

2011 NETL ANNUAL SITE ENVIRONMENTAL REPORT

EXECUTIVE SUMMARY

The National Energy Technology Laboratory (NETL) continued its exceptional success in its Environmental, Safety, & Health (ES&H) programs throughout 2011. Most notably, NETL continued to emphasize the need for a seamless organization with all of its sites being fully integrated with NETL's ES&H strategy. NETL's ES&H success is demonstrated by the fact that the Albany, Morgantown, and Pittsburgh operations maintained International Organization for Standardization (ISO) 14001 and Occupational Health and Safety Assessment Series (OHSAS) 18001 certifications in 2011. With its environmental management framework in place, NETL takes a tandem approach to planning and managing its activities in an effort to minimize its environmental impacts. Some activities require continuous management and monitoring for the foreseeable future, while other activities can be completed in a single effort. Those activities requiring continuous management are monitored through the Environmental, Safety, Security, &Health (ESS&H) Division. Specific activities that require a more concentrated effort are managed using environmental, safety, and health management plans, also referred to as EMPs.

The comprehensive and thorough approach to environmental compliance implemented at NETL uncovered no issues of noncompliance, and NETL was in full compliance with all applicable environmental executive orders (EO). Throughout the year, numerous inspections and audits were performed and documented to ensure that instances of environmental noncompliance did not occur. *Strengthening Federal Environmental, Energy, and Transportation Management,* EO 13423, was issued on January 26, 2007, and presented several new challenges to the laboratory. The EO instructs federal agencies to conduct their mission-specific environmental, transportation, and energy-related activities in an environmentally, economically, fiscally sound, integrated, continuously-improving, efficient, and sustainable manner. Through multi-state, site-wide coordination and integration, NETL was able to achieve substantial progress in implementing the requirements of this new order.

To effectively implement EO 13423, NETL uses an ES&H Management System (MS). A management review team (MRT) is in place to ensure that NETL's ES&H policy and system remain appropriate and effective. The ES&HMS representative conducts semi-annual review meetings with the MRT to consider the policy, objectives, targets, internal and external audits, and other related issues. Changes are documented and implemented. Management involvement ensures that the projects are funded and the appropriate priority is established. For example, the MRT encouraged upgrading or replacing the Assessment Information Input System (AIIS), the corrective action tracking system currently used at Morgantown, Pittsburgh, and Albany. NETL hopes to develop a new, consolidated, corrective action tracking system to replace the existing system. In addition to on-site laboratory efforts, NETL also manages off-site environmental projects. Three compliance activities were ongoing in Wyoming during 2011. One site has been cleaned up and is subject only to vegetation surveillance monitoring. The other two require on-going active remediation activities because the groundwater is contaminated with volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Organic contaminants of concern are primarily benzene, toluene, ethyl benzene, and isomeric xylene

(BTEX). Underground coal gasification and oil-shale retorting tests resulted in the groundwater contamination.

NETL does not typically generate, process, or treat any radioactive material. Except for some naturally-occurring radioactive materials (NORM) at the Albany site, most radioactive materials at NETL are limited to research instrumentation that contains sealed radioactive sources and radiation-generating devices. An inventory of radiation sources, including the source, isotope, quantity, custodian, location, status, and sealed-source activity, is actively maintained and monitored by the radiation safety officers for each site. Title 10 U.S. Code of Federal Regulations (CFR) 835.901(e), Department of Energy (DOE) Policy 441.1, and NETL Procedure 440.1-17 are the applicable regulations and requirements. In addition, NETL implements several best management practices that include following DOE implementation guides, US Environmental Protection Agency (USEPA) information, Nuclear Regulatory Commission (NRC) information, and Commonwealth of Pennsylvania recommendations and requirements.

NETL received an Office of Fossil Energy (FE) Excellence in ESS&H award in 2011 for its Incident Response Pre-plan. This NETL-created field-use pre-plan tool is based on extracting information from site maps in a geographic information system (GIS) platform for incidents involving NETL facilities and associated areas. It solves the need for emergency response personnel and incident commanders to quickly call up and retrieve physical data about the facilities. The application allows emergency personnel access to maps, floor plans, confined space data, hazards, fire hydrants, utility shutoffs, aerial photos, and the contact information of facility custodians. When an emergency occurs, quick response time is very important, and the goal of this system is to save time lost gathering information.

Details on each of the subjects mentioned above, as well as information on other NETL ES&H programs, are presented in this report. The report should answer questions the public may have about NETL’s activities to protect the environment. However, questions, comments, and concerns are always welcome and should be addressed, in writing, to Michael Monahan, U.S. Department of Energy – NETL, M/S P01D, 3610 Collins Ferry Road, P. O. Box 880, Morgantown, WV, 26507-0880; or by e-mail to Michael.Monahan@NETL.DOE.GOV.

INTRODUCTION

1.1 General Information

As part of DOE's national laboratory system, NETL supports the DOE mission to advance the national, economic, and energy security of the United States. It is the department's only national laboratory devoted to fossil energy research.

NETL has national and international expertise in coal, natural gas, and oil technology research; contracting and project management of fossil energy research; systems analysis of energy conversion technologies; and energy supply and production issues. In addition to research conducted on site, NETL's project portfolio includes research and development (R&D) conducted through partnerships, cooperative research and development agreements (CRADAs), financial assistance agreements, and contractual agreements with universities and the private sector. Together, these efforts focus a wealth of scientific and engineering talent on creating commercially viable solutions to energy and environmental problems.

NETL has laboratory sites in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania; and program office sites in Fairbanks, Alaska; Anchorage, Alaska; and Sugar Land, Texas. In total, these sites include 81 buildings and 14 major research facilities covering nearly 200 acres. As of December 31, 2011, 1,431 employees work at NETL's five sites; 591 are federal employees and 840 are site-support contractors.

NETL is organized into seven strategic units:

The **Strategic Center for Natural Gas and Oil** (SCNGO) integrates all elements of DOE's natural gas and oil research. SCNGO is charged with implementing science and technology development to resolve the environmental, supply, and reliability constraints of producing and using oil and gas resources, resources that account for more than 60 percent of the energy consumed in the United States. With core competencies and expertise in all aspects of natural gas and oil, SCNGO investigates and manages R&D, leading to improved natural gas and oil production and use. SCNGO invests in projects that promise tangible benefits, including a cleaner environment and increased domestic natural gas and oil production.

The **Strategic Center for Coal** (SCC) works to ensure national energy security and economic prosperity through the production of clean, affordable electricity and fuels, including hydrogen from coal, the nation's most abundant energy resource. SCC implements research, development, and demonstration activities to resolve the environmental, supply, and reliability constraints of producing and using coal resources. Environmentally responsible coal production technologies will allow the United States to continue to meet growing electricity demands and to lay the foundation for a sustainable hydrogen economy.

The **Office of Systems, Analyses, and Planning** (OSAP) studies large, complex systems, such as industrial or ecological processes, and the interactions among those systems, including the social, economic, political, regulatory, technological, design, and management properties, each of which are systems in their own right. The complex nature of these systems requires an interdisciplinary approach. System studies provide input to decisions on issues such as national

energy plans and programs, resource use, environmental and energy security policies, R&D directions, and deployment of energy technologies. System studies are also used to support planning exercises at various organizational levels. Systems analysis focuses on the production and processing of fossil fuels and energy and fuel systems synthesis and design. Benefits analysis performs prospective and retrospective analysis of benefits stemming from program investments in fossil fuel-based technologies. Situational analysis collects data and assesses current and long-term trends within the energy industry that may impact energy production and use.

The **Project Management Center** (PMC) harnesses expertise and talent for non-fossil energy research, development, and demonstration projects, including those with other federal organizations, such as DOE's Office of Electricity Deliverability and Energy Reliability, DOE's Office of Energy Efficiency and Renewable Energy, and the Department of Homeland Security. PMC performs overall management and implementation of these customers' advanced initiatives, providing technical expertise, analytical tools, and a full suite of implementation skills.

The **Office of Research and Development** (ORD) performs basic and applied R&D in fossil energy and environmental science. Building on historic laboratory strengths and competencies, ORD concentrates on four primary focus areas:

- The Energy System Dynamics Focus Area develops natural gas technologies with higher efficiencies and lower costs, such as advanced gas turbines and fuel cells.

- The Geological and Environmental Systems Focus Area concentrates on the minimization and abatement of environmental problems associated with the use of fossil fuels. Research topics include geological storage of carbon dioxide, oil and gas exploration and production, air pollution/particulate matter issues, and removal of toxins from the emissions in coal utilization systems.

- The Computational and Basic Science Focus Area develops tools that enable more rapid and efficient scale-up of new subsystems, devices, and components to commercial scale.

- The Materials Science Focus Area specializes in the life-cycle research of metals, alloys, and ceramics and in the recycling and remediation of waste streams associated with these processes.

The **Office of Institutional Operations** (OIO) performs and coordinates administrative, operational, construction, and staff support activities for the laboratory. These include: organization and human resource management; information technology management, maintenance and implementation; onsite ES&H program execution, compliance, and remediation activities; site management including design, construction, operation, and maintenance of NETL facilities; internal control program; security services; real and personal property management.

The **Office of Crosscutting Functions** (OCF) plans, directs, and coordinates policy, administrative, and site support contract management activities that crosscut laboratory activities.

OCF manages NETL's performance measurement system, conducts compliance reviews, and manages site support contracts. OCF's strategic drivers:

- Provide a creditable and efficient contractor work force that is temporary, flexible, and designed to enhance NETL's national laboratory status.

- Obtain best performance from the contractors who support NETL to achieve its strategic goals and fulfill its mission.

- Design and implement annual performance measurement systems to enhance NETL's status as a national laboratory.

1.2 Focused Standards List

NETL is committed to ensuring compliance with all of the environmental requirements impacting the Albany, Fairbanks, Morgantown, Pittsburgh, and Sugar Land sites. Compliance with the numerous requirements found in departmental directives; executive orders; federal, state, and local codes; federal, state, and local regulations; acquisition letters; negotiated agreements; and consensus standards is extremely challenging. To ensure compliance requirements are met, NETL established a list of requirements specific to NETL operations. This list, NETL's *Focused Standards List*, embodies all requirements that apply to NETL operations.

The *Focused Standards List* was created by NETL ES&H subject matter experts who oversee approximately 75 specific ES&H programs coordinated by the ESS&H Division. Standards and requirements determined by the subject matter experts to be applicable to the NETL ES&H activities are incorporated into one or more NETL directives. These directives provide the policy, programs, and procedures used to implement those standards and requirements. The 127 directives consist of 10 orders, 16 operating plans, and 101 procedures. All standards or requirements on the *Focused Standards List* are implemented through one or more of NETL's directives.

The *Focused Standards List* includes both the standard or requirement citation and the location where the standard or requirement may be found. On a quarterly basis, the location published for the standard or requirement is checked to ensure that it is still available at that location, and because most of the requirements in the *Focused Standards List* are accessible via NETL's Intranet, the check verifies that the link is still active. Most of the standards are copyrighted. The standards are purchased, and one copy is placed in both the Morgantown and Pittsburgh libraries. Annually, the *Focused Standards List* is analyzed to ensure that the standards and requirements listed are still applicable to NETL activities. In addition, approximately every three years, the subject matter expert for an NETL ES&H directive reviews the directive and develops an update if appropriate.

Verification that the standards and requirements listed on the *Focused Standards List* are being implemented occurs through the following approach:

- First, NETL utilizes a rigorous safety analysis and review system (SARS) to review the details of a project before authorizing any significant activities to proceed. Checklists have been developed for SARS to facilitate verification of the standards and requirements to be covered during the review. Also, ES&H subject matter experts provide support to the SARS process and ensure that applicable ES&H standards and requirements are addressed.

- Second, NETL has retained the services of an independent third-party auditor to perform comprehensive compliance assessments of specific ES&H programs. This auditor performed three such assessments in 2011: Lockout/Tag out Program; Confined Space Entry; and Waste Minimization, Pollution Prevention, and Recycling.

- Third, NETL performs regular walk-through inspections of site facilities, targeting specific facilities each month, so all NETL facilities are inspected each year. These walk-through inspections are performed by several ES&H subject matter experts who visually verify that NETL is in compliance with all standards and requirements.

- Finally, the preparation of this Annual Site Environmental Report requires a complete review of compliance with all major standards and requirements. More than 60 subject matter experts participate in this effort to review the past year's performance in complying with the ES&H standards, requirements on the Focused Standards List, and ISO 14001/OHSAS18001 conformance audits.

1.3 Discussion of Sites Within the Document

Three research sites and two field offices comprise NETL. Each office is located in a different state, is subject to different state and local laws, and focuses on different activities. This document splits the detailed discussion among the sites. The Albany, Morgantown, and Pittsburgh sites are laboratories with a broad array of environmental concerns, so a detailed discussion is provided for each in this report. The Sugar Land and Fairbanks field offices perform only administrative functions, and, as a result, their environmental impacts and any regulatory compliance issues are discussed in less detail.

1.4 Accomplishments

The mission of NETL is the advancement of energy-related science and technology to give our nation options for a clean, secure energy future. NETL focuses on resolving the environmental, supply, and reliability challenges concerning production and use of domestic fossil fuel resources.

To accomplish this mission, NETL draws on more than 1,400 federal and support-contractor employees to implement and manage a broad spectrum of research programs. Laboratories in Pittsburgh, Pennsylvania, and Morgantown, West Virginia, research how to increase the supply of traditional energy resources, improve the efficiency and environmental performance of power generation plants, and help end users conserve energy. Researchers at the site in Albany, Oregon,

are developing advanced materials for the energy industry. Additional sites in Sugar Land, Texas, and Fairbanks, Alaska, address challenges unique to those energy-rich regions.

In 2011, NETL won several awards in different areas:

NETL researchers were honored with two **2011 Secretary of Energy Achievement Awards** for significant contributions toward critical national efforts in 2010:

- Deepwater Horizon Oil Spill in the Gulf of Mexico: the Nodal Analysis Team, under NETL leadership, along with supporting the staff, was able to quickly determine the flow rate of the oil, which was a critical first step in identifying options for capping the well.

- Remediation Activities at the Hanford Nuclear Materials Production Site in Washington State: A team of NETL scientists evaluated computer models, reviewed completed verification and validation efforts, and provided feedback on whether the computational fluid dynamics analysis currently being used would confirm the validity of the site's pulse-jet mixer vessel design—a tool that would vitrify the site's nuclear waste into a stable glass form for safe, permanent storage.

NETL earned three prestigious **2011 R&D 100 awards**. Selected annually by an independent panel of judges and the editors of *R&D Magazine*, these awards are presented to the 100 most technologically significant new products to reach the market in a given year. These are innovations that "spotlight major breakthroughs—products and processes with the capacity to improve the standard of living for many people." NETL won awards for the following technologies:

- APECS v2.0 with ANSYS® DesignXplorer™ and ROM Builder: Developed jointly by NETL and ANSYS Inc., this versatile software toolkit makes it easier, faster, and cheaper to design next-generation power production and chemical processing plants using advanced process/equipment co-simulation and comprehensive design optimization.

- Electroplated Manganese-Cobalt Coating for Solid Oxide Fuel Cell (SOFC) Interconnects: This spinel coating prevents chromium poisoning, which reduces a fuel cell's electrical conductivity and operating lifetime. NETL co-developed the coating with West Virginia University, and the technology was then transferred to Faraday Technology Inc., where it continues to be developed and optimized.

- Platinum/Chromium Alloy for the Manufacture of Improved Coronary Stents: This novel alloy is the first austenitic stainless steel formulation with significant concentration of a highly "radiopaque" element to be produced for the stent industry. High radiopacity increases the stent's x-ray visibility inside a patient for easier and more precise vascular placement. It also reduces the chance of arterial damage. The alloy was jointly developed by NETL and Boston Scientific Corporation Inc. The stent became commercially available in Europe in 2010 and in the United States in 2011 after extensive FDA testing.

In addition to winning R&D 100 awards, these, as well as other technologies, were recognized by the Federal Laboratory Consortium (FLC). Comprising federal laboratories, research centers, and agencies created to promote technology transfer nationwide, FLC honors achievements by federal laboratories in transferring their technologies to the marketplace where they can be of service to our nation. In 2011, NETL earned five FLC awards:

- A **National FLC Award for Excellence in Technology Transfer** for the Basic Immobilized Amine Sorbent (BIAS) Process for CO_2 Capture, which reduces the costs and energy penalty associated with more conventional scrubbing processes.

- A **Far West Regional FLC Outstanding Commercialization Success Award** for development of the Platinum/Chromium Alloy mentioned above for the manufacture of improved coronary stents.

- Three **Mid-Atlantic Regional FLC Awards for Excellence in Technology Transfer** for the aforementioned APECS v2.0 with ANSYS® DesignXplorer™ and ROM Builder, and Electroplated Manganese-Cobalt Coating for SOFC Interconnects, as well as Novel Pyrochlore Catalysts for Hydrocarbon Reforming. The innovative pyrochlore catalysts are the first to be shown as highly effective in transforming diesel and other heavy-carbon fuels into syngas, which could be used in fuel cells and other power applications and lead to energy technologies that are more efficient and less polluting. NETL developed the pyrochlore catalysts in partnership with URS Corporation and Louisiana State University.

NETL was instrumental in achieving the following awards won by partnering organizations:

- The Council of State Governments bestowed its **Innovation Award** in the Natural Resources Program category to the Colorado Gas Conservation Commission for developing an electronic form for processing permits that increases the efficiency of data transfers to help protect groundwater resources. Co-developed with the Ground Water Protection Council in cooperation with NETL, the system reduces permit processing time between state agencies and industry operators.

- The Carbon Storage Leadership Forum presented the International Energy Agency Greenhouse Gas Weyburn-Midale CO_2 Monitoring and Storage Project with a global achievement award for pioneering carbon capture, utilization, and storage (CCUS) research at commercial operations in Canada. The project was one of three winners exemplifying global cooperation in implementing CCUS technologies while accommodating scientific research. NETL represents DOE's interest in this CCUS field study to determine the permanency and best practices of geologic carbon storage in conjunction with the world's largest CO_2 storage and enhanced oil recovery operation.

- Philips Lighting North America was awarded the **L Prize** for its light-emitting diode (LED) product that consumes under 10 watts to produce an amount of light equivalent to that of a 60-watt incandescent bulb, but with an energy savings of 83 percent. NETL administered the L Prize competition in partnership with Pacific Northwest National Laboratory on behalf of the DOE's Office of Energy Efficiency and Renewable Energy.

- The Pittsburgh Technology Council presented Aquion Energy, Inc. (developer and manufacturer of ambient-temperature sodium-ion batteries) with its 2011 Startup Company Tech 50 Award, which honors 50 of the Pittsburgh region's fast-growing technology industries and professionals. NETL manages this and other smart grid projects in support of the research and development program of DOE's Office of Electricity Delivery and Energy Reliability.

These award-winning projects are only highlights of NETL's 2011 accomplishments. For a more complete compilation, please visit the NETL website.

ENVIRONMENTAL, SAFETY, AND HEALTH MANAGEMENT SYSTEM

2.1 Introduction to NETL's Environmental, Safety, and Health Management System

The scope of the ES&HMS for the three sites covers on-site operations involving employees at the Albany, Morgantown, and Pittsburgh sites, including on-site R&D activities, site operations, and the supporting administrative functions related to these activities and operations. Operations not owned or controlled by NETL are excluded from the ES&HMS, such as the credit unions, childcare facilities, and a small facility owned by the U.S. Navy at the Morgantown site.

The underlying framework of the ES&HMS is DOE's Integrated Safety Management (ISM) System, whereby ES&H accountability is integrated into individual decisions and corporate planning processes. ISM, ISO 14001, and OHSAS 18001 all provide for a plan-do-check-act approach to maximizing the protection of the public, NETL employees, the environment, and property. The ES&HMS uses the same philosophy to protect the environment, both on site and off site, during the conduct of operations under NETL's control.

The Pittsburgh and Morgantown sites received certification to the ISO 14001 standard of August 31, 2003, while the Albany site received certification to the ISO 14001 standard of June 9, 2005. The Morgantown and Pittsburgh sites were recertified as a single entity in 2007 by Orion Registrar, Inc. As a follow up to the recertification audit, five additional ISO14001/OHSAS 18001 surveillance audits were conducted between 2007 and 2009. In addition, the Albany site underwent an ISO 14001 recertification audit by Orion Registrar, Inc., on November 23-24, 2009.

Subsequently, all three sites were recertified to the same scope by Orion Registrar, Inc., in 2010, with the Pittsburgh site being the primary site, and Morgantown and Albany being the auxiliary sites for purposes of the registration contract. The Morgantown and Pittsburgh sites underwent an ISO 14001/OHSAS 18001 recertification audit in June 2010. Both sites also underwent an ISO 9001 pre-assessment at that time. The Albany site underwent an ISO 14001 recertification audit, an OHSAS 18001 conformance assessment, and an ISO 9001 pre-assessment in August 2010. (The Houston and Fairbanks sites are not required to have an ES&HMS because these operations are not considered facilities as defined by EO 13148.)

To maintain certification, surveillance audits continue to be conducted at all three sites. Most recently, a surveillance audit was conducted at the Pittsburgh site (April 6, 2011), the Albany site (June 22, 2011); and the Morgantown and Pittsburgh sites (October 19-20, 2011). These audits demonstrate continual improvement in the ES&HMS and conformance to the ISO 14001 and OHSAS 18001 standards. By maintaining these certifications, NETL demonstrates to its workforce, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental stewardship.

The ES&HMS assures consideration of the environmental, safety, and health impacts of day-to-day activities and minimizes these impacts, as much as possible, consistent with the mission of NETL. The ES&HMS, as described in NETL Orders 440.1, Safety and Health Program, and 450.1, Environmental Management System, includes a policy statement, top-down responsibility,

personal accountability for work being performed, regulatory awareness, document control, goals, self assessments, and continual improvement activities.

2.2 Environmental, Safety, and Health Policy

NETL strives to reduce injuries to the workforce and to minimize hazards to the public and the environment. NETL requires consideration of potential environmental, safety, and health impacts when planning and executing work at all levels. NETL senior management created an ES&H policy as the basis for its ES&H programs. The original policy was updated and approved by senior management in 2005 to align with the 2004 version of the ISO 14001 standard. It was updated again in 2006 to include the Albany site and to incorporate safety and health considerations. The policy was last modified August 9, 2006.

Management commitment and employee involvement are required to maximize oversight and improve communications. However, responsibility for effective environmental, safety, and health performance rests with line management. Line management must involve workers in the planning and execution of environmental, safety, and health programs and must fully communicate information to site personnel.

NETL uses the acronym PRISM to illustrate its policy (see Figure A). PRISM demonstrates the successful incorporation of ISM into the EMS. The PRISM graphic is displayed widely at the sites and is provided to each employee in badge form, as a reminder of the policy. The PRISM logo was updated in 2006 to include safety and health, as well as to support the OHSAS 18001 certification.

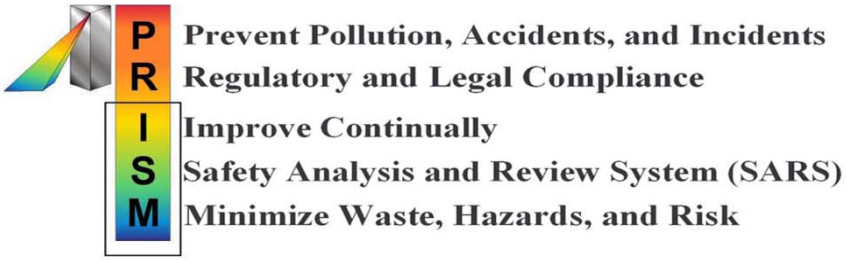


Figure A: Illustration of NETL's Environmental Policy.

2.3 Identification of ES&H Significant Aspects

Significant aspects are elements of an organization's activities that can interact with the environment and are under NETL control or influence. All research projects, operations, and facilities have been inventoried and scored based on their potential for impacting the environment, natural resources, and environmental laws and regulations. The ES&HMS Crosscutting Team—a group composed of the ES&H management system representative, the Environmental Branch chief, the Safety and Health Branch chief, a representative from the Site Operations Division, and a representative from the Engineering Research Division, along with the ES&H management system coordinator —reviews the scores and determines the most

significant aspects of NETL activities. The team recommends the list of significant aspects to the ES&HMS representative, who has final approval.

The 2011 registry (see Table 2.3.1: Environmental, Safety, and Health Significant Aspects for FY2011) provides a listing of the ES&H significant aspects. A new aspect for on-site construction activities was added for fiscal year 2011, based on the types of reviews of on-site construction activities occurring (i.e., daily, weekly, and monthly inspections); SARS activities associated with construction; and ES&H reviews of construction projects.

2.4 Environmental Objectives and Targets

Following an annual update and ranking of the significant aspects, NETL's environmental, safety, and health objectives and targets are revised and presented to the Management Review Team (MRT) for approval. The Management Review Team (MRT), a senior management team, reviews and approves ES&H objectives and targets, reviews ES&H performance, and takes appropriate action when needed to ensure that the ES&H programs continue to meet ES&H policy. At the MRT meeting held in September 2011, the MRT approved the list of significant aspects (see Table 2.4.1: Environmental, Safety, and Health Significant Aspects for FY2012), the objectives, and the targets for FY2012.

Objectives are the overarching goals for the organization, while the targets are specific measurable or quantifiable criteria which support those objectives. Performance measures are compared to targets to determine the degree of success in reaching associated objectives. Before establishing and reviewing its objectives, NETL considers regulatory and DOE requirements; technological options; financial, operational, and business requirements; and the views of interested parties.

Line managers within the organization assign responsibility for the objectives and targets to individuals with expertise in the respective subject areas. These individuals (known as responsible persons) develop ES&H management plans (EMPs) that specify how NETL will meet its objectives. The approved objectives and targets, and the actual performance data for the FY2011 aspects are presented in Table 2.4.2: FY2011 Environmental Management Plan Metrics for Albany, Morgantown, and Pittsburgh, and the performance data for the first quarter of FY2012 are presented in Table 2.4.3.

2.5 Environmental, Safety, and Health Planning and Analysis Procedures

NETL takes a tandem approach to planning and managing its activities in an effort to minimize environmental, safety, and health impacts. Some activities require continuous control for the foreseeable future, while others can be completed in a single effort. Those activities requiring continuous control are managed through ES&H programs.

ES&H Directives: Most activities that can impact the environment are routine and occur repeatedly during ongoing operations. Because these activities are not one-time events, they are best managed through programs documented in directives (orders, operating plans, and procedures). Directives are written to describe how routine actions are undertaken to achieve the safety and environmental goals. Managerial responsibilities are attached to ES&HMS/ES&H

function titles. NETL directives establish the foundation and control mechanisms of the ES&HMS. (The directives process is described in NETL Procedure 251.1-1, Directives.)

Environmental Management Plans (EMPs): Some activities that impact the environment can be addressed through a concentrated plan. The specifics of the process and elements of an EMP are explained in NETL Procedure 450.4-19, ES&H Significant Aspects, Objectives, and Targets. Each EMP specifies the nature of the action to be taken, the timeframe for the action, the person(s) responsible for the action, quantifiable targets, and measured performance against the targets. Quarterly status reports are collected for each of the EMPs to demonstrate progress.

2.6 Implementation and Operational Controls

The ES&HMS is implemented through an organizational structure shown in Figure B. Senior-level positions include the NETL director, who serves as the ultimate authority for the ES&HMS; the chief operating officer, who has authority for all on-site operations, including in-house R&D and administrative support and crosscutting functions, and is a lead member on the MRT; the director of the Office of Institutional Operations (OIO), who is the environmental, safety, and health steward and champion; and the division director for ESS&H, who functions as the program administrator and ES&HMS representative; the director of the Site Operations Division; and the director for the Engineering Research Division. Mid-level titles and responsibilities are defined in several NETL directives that specify key components of the ES&HMS. The ESS&H division director assigns employees to the functional titles and responsibilities.

Line managers are the primary means that NETL uses for achieving operational control within the ES&HMS. Communication also occurs through the NETL Intranet, a secure internal website containing current versions of all NETL directives, as well as general reference information, forms, and programmatic information. The ESS&H webpage contains a roadmap that provides an overview of available information about the NETL ES&HMS.

Another example of internal communication at NETL is the biweekly regulatory review, which promotes awareness of regulatory changes and new programs. Every two weeks, federal and state agency websites are reviewed to identify changes in environmental laws, regulations, guidance documents, compliance information, and regulatory agency programs. The DOE Headquarters' website is also reviewed to check for new DOE requirements and guidance. These reviews are circulated to the ESS&H staff and posted on the NETL Intranet homepage.

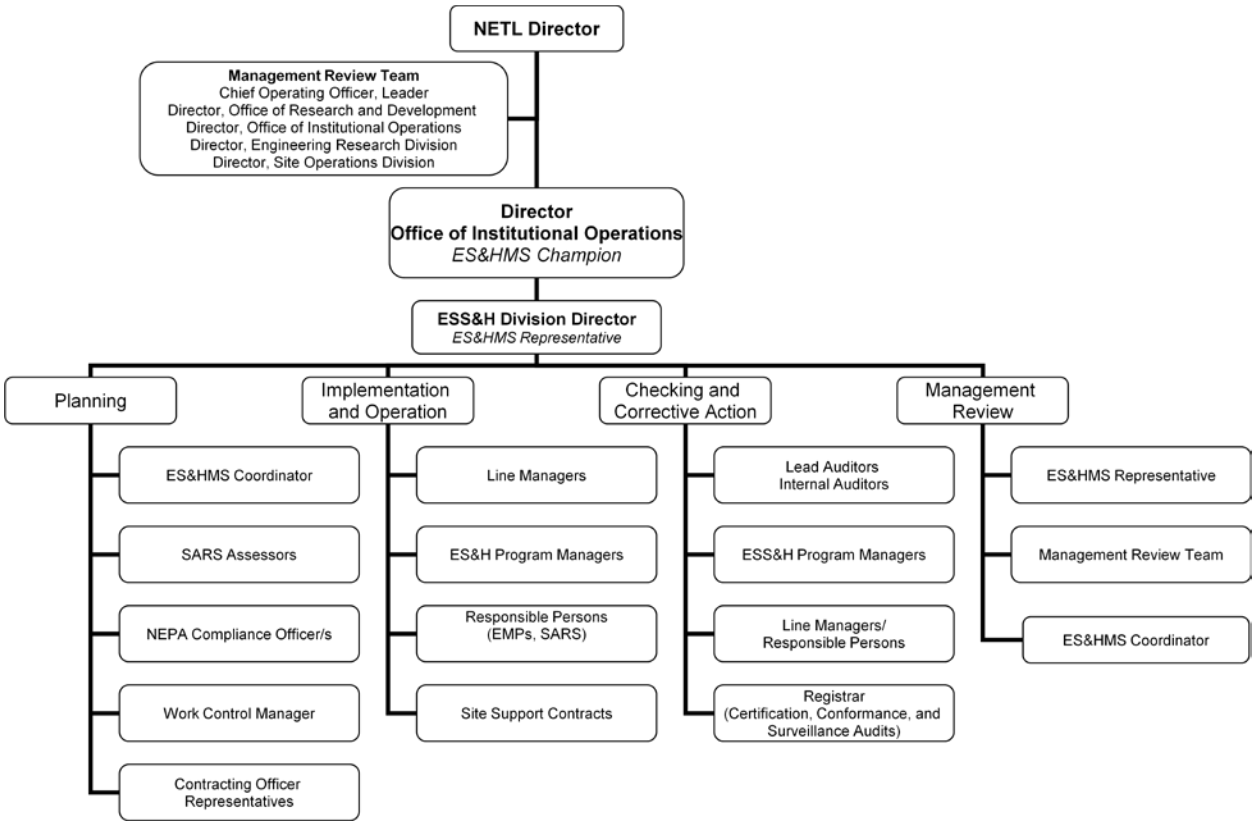


Figure B: NETL ES&HMS Organization.

NETL also communicates the ES&HMS to its employees through the NETL Intranet, training, staff meetings, e-mail, and posters. The training program includes general ES&HMS training designed to make employees aware of the ES&HMS by providing them with information about significant environmental, safety, and health aspects and the potential impacts on their work, employee roles, and responsibilities and the potential consequences of not following operating procedures. In addition to the general training, program- and job-specific training is required based on an employee's job duties. The computer-based training (CBT) system uses a job hazard survey that asks users about their work assignments to determine which training modules are needed. Job-specific training for an employee can also be requested directly by the employee or by his/her supervisor. Each employee and his/her supervisor are responsible for ensuring that all required training is complete before beginning an assignment.

For purposes of communication with external parties, NETL maintains an external webpage (www.netl.doe.gov) that provides ES&HMS information to the public, such as the ES&H policy and the significant ES&H aspects.

NETL conducts public participation activities under the requirements of the National Environmental Policy Act (NEPA). For projects conducted off site, NETL is required by law to use the NEPA process to identify potential environmental impacts, consider alternatives, invite public comment or participation, plan the project with due regard for the environment, impose mitigation requirements, and make informed decisions about whether to proceed with the

proposed project. The NEPA process provides a system for reviewing actions prior to a major expenditure of funds to ensure the environmental and social impacts have been identified and analyzed and will be mitigated to the extent practicable prior to committing to the project.

To effectively and efficiently implement the ES&HMS, NETL has to maintain operational control of its on-site R&D projects, facilities, and operations. This is accomplished through the SARS. This system requires proposed projects to be described in writing and subjected to ES&H and quality reviews by various subject matter experts and technical committees. Approval must be granted before a project, operation, or facility can proceed beyond the planning stage. Included within this process is a review of the potential environmental impacts, regulatory requirements, safety and health hazards, and monitoring plans. After a project begins, annual reviews are required to make sure the project remains within the bounds and constraints that were previously imposed. If the project requires changes, the SARS package must be modified, and the SARS review repeated. Other processes for operational control include the following:

Environmental Programs: Baseline programs have been established for both defined media (air, surface water, and ground water), and likely pollution routes (spills, hazardous waste, nonhazardous waste). Each program is described in an operating plan/procedure and is managed by a corresponding ES&H program manager.

Emergency Response System: NETL maintains processes to respond to accidents and emergency situations and for preventing or mitigating any environmental impacts that may occur. The Emergency Response Organization (ERO) conducts site-wide emergency response exercises annually and participates in emergency preparedness training monthly at each site.

Figure C: Members of the Morgantown NETL HAZMAT/Rescue Branch Responding to a (Simulated) Heart Attack Victim.

At the Morgantown site, the 2011 training exercise involved a forklift accident and subsequent ethanol release. The exercise was a full participation exercise and involved the participation of the Morgantown Fire Department. The scenario included a forklift operator experiencing a heart attack and hitting the ethanol storage tank located north of B-36, puncturing the tank. The operator was knocked off the forklift and landed in a pool of ethanol collecting in the spill

prevention catchment basin. The driver was immobile and unable to remove himself from the area. The 1,000-gallon tank continued leaking its contents while the injured forklift operator was saturated with the product. The scenario necessitated a full call out of the Morgantown emergency response organization, which coordinated their response with the Morgantown Fire Department.

The No-Notice Exercise (NNX) conducted by the DOE/NNSA Office of Emergency Management involved the response to a simulated leaking 1,365-pound propane tank. Contents of the tank were simulated to be discharged intermittently over a nearly two-hour period due to freeze plugs forming and thawing. There was no source of ignition for the propane, thus leading to a potential toxic gas impact, which was dispersed by a 3 mile-per-hour wind from the west.

The initiating event for the 2011 full-scale exercise at Pittsburgh involved a laboratory researcher who smelled a strong odor of rotten eggs coming from the building 84 east stairwell where the researcher saw, through the door window, a motionless employee and several gas cylinders laying at the bottom of the stairs. He also heard a hissing sound as if the cylinders were leaking. The researcher retreated to his laboratory and called extension 11 on a local NETL landline phone to report the situation, leading to an emergency response organization call out.

Figure D: Members of the Pittsburgh NETL HAZMAT/Rescue Branch Responding to a (Simulated)Leaking Cylinder.

Contract Requirements: Work performed by contractors is controlled at the NETL sites through contractual provisions and NETL directives that define the ES&H requirements for such work on NETL property, as well as for NETL-funded work at off-site locations.

Affirmative Procurement Program: A program has been established to require that certain procurements contain recycled content, as outlined in NETL Procedure 541.2-1, *Affirmative Procurement Program*.

Document Control: An integral part of operational control is documentation. Critical documents are controlled according to a defined process to ensure they can be located. They are also periodically reviewed and revised. This ensures that the current versions are readily available and obsolete documents are promptly disposed.

Core ES&HMS documentation is embodied primarily within NETL ES&H directives. The most recent and official hard-copy versions of NETL directives reside with the NETL directives coordinator. Electronic versions of these controlled directives are placed on the Intranet for employee use and are considered official versions. Official copies of ancillary tables, lists, and forms are also maintained on the intranet and are reviewed and updated as required.

2.7 Self-Assessment Procedures and Corrective Action

NETL uses self-assessment procedures to improve ES&H performance through identification of non-conformances and tracking of corrective and preventive actions. Several practices are employed, including internal audits, reviews, and inspections; independent assessments; and reporting through NETL's corrective action tracking system, the Assessment Input Information System (AIIS).

NETL conducts both internal and external audits of its ES&HMS as required by the ISO 14001 and OHSAS 18001 standards. This process is defined in Procedure 450.4-2, *ES&H Assessments Process*. An annual planning schedule is used to ensure both the ISO 14001 and OHSAS 18001 standards are audited against the ES&HMS. Six ES&HMS audits were performed in 2010, including three surveillance audits by the ISO14001/OHSAS 18001 registrar and two internal audits.

Management's commitment to the ES&HMS is evidenced by encouragement and management review of ES&H assessments. DOE and contractor ES&H specialists participate in regular site audits and inspections, covering all NETL facilities annually. These audits and inspections focus on observable conditions at the facilities (e.g., compliance with Occupational Safety and Health Administration (OSHA) regulations, National Fire Protection Association (NFPA) codes, the National Electric Code (NEC), and other environmental, safety, and health requirements). Findings are entered into AIIS, and the status of the corrective actions is provided on a semiannual basis to the management review team.

Annual SARS assessments are performed on new or modified R&D projects, facilities, and support operations. Annual assessments are performed to ensure continued ES&H compliance of existing projects, facilities, and support operations. A full discussion of the SARS process can be found in Section 3.16, Quality Assurance.

Program reviews are conducted every three years by the responsible program managers for each major environmental program (e.g., the Water Quality Program, the Air Quality Program, and the Ground Water Program). These reviews are informal and may vary in scope and detail. Respective program managers attempt to verify that the requirements stated in the procedure are still relevant and are actually being met. When discrepancies are found, the program managers must decide whether to remove a specific requirement from the directive or to enforce it. Some programmatic reviews occur more frequently or focus on monitoring results. These reviews look for trends, with the goal of identifying correctable problems and promptly taking actions.

Site-support contractor employees periodically inspect higher risk items, document their findings, and provide the results to program managers. For example, daily inspections are performed at the hazardous waste facility, at selected potential spill sources, and at storm water outfalls. Weekly inspections are made at industrial wastewater discharge points. Quarterly discharge monitoring reports are compiled and reviewed to determine if permit limits have been exceeded. Semi-annual surface water monitoring reports are compiled and reviewed. All of this information provides program managers an opportunity to assess the effectiveness of their programs.

Meaningful reviews for compliance can occur only if the program managers remain abreast of the changing laws and regulations, and DOE administrative requirements. NETL has several means of maintaining current awareness:

- A biweekly regulatory review covers significant changes in laws and regulations. The review information is gathered from websites of selected government agencies and DOE's Office of Health, Safety, and Security (HS-1).

- Private sector publications are received by program managers. These include: "Environmental Compliance in West Virginia," a quarterly regulatory update bulletin published by Business and Legal Reports, Inc.; environmental compliance updates on CD-ROM, published by the Bureau of National Affairs; and various trade journals.

- Program managers draw on the Pennsylvania Bulletin and the Pennsylvania Code, (produced by the Commonwealth of Pennsylvania) and the CFR (published by the National Archives).

- The NETL library subscribes to relevant regulatory documents, including most documents on the *Focused Standards List* (a list of all applicable legal requirements that NETL adheres to), which are available electronically on the NETL Intranet; others are available in the library.

- Program managers purchase updated lists of hazardous or regulated chemicals, as needed.

- Environmental program managers periodically check the websites of regulatory agencies, such as the West Virginia Department of Environmental Protection (WVDEP), the Pennsylvania Department of Environmental Protection (PADEP), and the Oregon Department of Environmental Quality (ODEQ).

- Albany uses a regulatory review service, RegScan™, to provide regular review of federal and State of Oregon regulatory changes to ensure continued compliance with regulatory requirements.

- To develop general awareness of new areas of responsibility, program managers may take training classes on relevant statutes and regulations.

Ultimately, subject matter experts, primarily in the ESS&H Division, are responsible for keeping NETL informed of changing laws and regulations. Part of the program manager's general job responsibilities is to stay abreast of regulatory issues that may affect the NETL ES&HMS and to take appropriate actions to implement these requirements.

Independent Program Assessments: In addition to internal audits, independent assessments are conducted by an external contractor. These assessments identify strengths, weaknesses, deficiencies, and opportunities for improvement. They provide a look at regulatory compliance and assure that non-compliances are identified and corrected. The contractor reviews internally

and externally generated documents and interviews program managers and other personnel. The independent assessments cover: (1) directives, policies, standards (including ISO 14001 and OHSAS 18001), permits, and regulations; (2) organization and administration; (3) staffing and training; (4) communication and dissemination of program information; (5) documentation and reporting; and (6) performance measurement. Three programs were assessed in 2011: the Lockout/Tag Out Program; the Confined Space Entry Program; and the Waste Minimization, Pollution Prevention, and Recycling Program. The assessments found these programs were working well and resulted in a few recommendations for improvement.

- Workplace Monitoring Program: In general, the systems in place for the workplace monitoring program are effective and contribute to the protection of NETL workers and the environment. The system is effective in identifying workplace hazards and screening employees for the potential of exposure to those hazards. Line managers and support staff work cooperatively to reduce or eliminate exposures to employees.

  Frequent industrial hygiene monitoring has not been necessary at NETL, because engineering controls reduce personnel exposure to minimal levels. Monitoring of most activities is largely driven by the SARS process, which establishes routines for safely operating facilities or research projects inclusive of workplace monitoring.

- Facility SARS Program: In general, the systems in place for the Facility SARS Program, Figure E, are effective and contribute to the protection of workers and the environment. NETL does an excellent job of training its employees to know their responsibilities, the regulations applicable to their jobs, and best practices related to structural engineering, mechanical engineering, and construction safety.

Figure E: Facility SARS Program.

The Facility SARS Program is used to determine the safety requirements for the design and construction of new and modified facilities. Certain selected renovation projects are done under a facilities SARS permit, rather than the Facility SARS Program, to reduce the administrative burden when a full SARS package would be unnecessary. The decision whether to obtain a use a permit or prepare a SARS package is made by the director of the Office of Institutional Operations after reviewing information provided by the responsible person or facility custodian and is based on experience and professional judgment.

Upon completion of a construction project, the facility is inspected by a team of ES&H personnel, who recommend any necessary remedies or approve the permit.

- Industrial Wastewater Program: The systems in place relative to the industrial wastewater program are effective and contribute to the protection of workers and the environment. Employees are trained to ensure that they know their responsibilities, applicable regulations, and best management practices related to chemical hazards, including management and disposal of hazardous materials. Additional training is provided when needed for exceptional circumstances.

  Nonconformance with any of the appropriate regulations or standards identified during any of the self-assessment audits mentioned above would be documented using NETL's corrective action tracking system, the Assessment Input Information System (AIIS). NETL Procedure 450.4-4, *Corrective and Preventive Action Process*, outlines how corrective and preventive action items identified in the various assessments performed at NETL are captured, prioritized, assigned, analyzed for their root cause, tracked, closed, and incorporated, as appropriate, into the lessons learned and training systems. This process holds responsible persons and line management accountable for timely closure of corrective actions within their programs, organizations, or facilities, and disseminates lessons learned across appropriate organizational elements at NETL.

  After completion of an assessment, the lead assessor uses the AIIS database to generate an assessment record, which is identified by a unique number. When a finding or concern is entered into the system, a unique 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 line manager. All actions taken regarding the finding are then documented in AIIS. To ensure that the findings have been fully addressed, follow up is done through the internal auditing process. Each month, a number of closed findings undergo verification audits to determine if the corrective actions address the findings appropriately.

  Other processes used for reporting corrective actions include NETL Procedure 151.1-2, *Emergency Categorizations, Classifications, and Notifications*, a procedure used to catalog and investigate major non-conformances related to emergencies, as required by DOE; and NETL Procedure 231.1-2, *Injury/Illness Investigation and Reporting*, which sets forth the minimum requirements for injury or illness and property damage investigation and reporting for NETL.

2.8 Quality Assurance

Please see Section 3.16 for a description of the NETL Quality Assurance (QA) Program, including QA for the ES&HMS.

2.9 Management Review Process

Management review of the ES&HMS ensures that the ES&H policy and MS remain appropriate and effective. The ES&HMS representative conducts semi-annual review meetings with the MRT (see Figure B) to allow the MRT to review current environmental, safety, and health policy; objectives; targets; internal and external audits; and other related issues. Changes are

documented and implemented. Management involvement ensures that projects are funded with the appropriate priority. Notes from the MRT meetings are posted to the Intranet.
The MRT met on March 29, 2011, and on September 20, 2011. The MRT meeting in March focused on progress towards NETL's objectives and targets. The meeting in September focused on ensuring that the aspects, objectives, and targets were appropriate for FY2012.

COMPLIANCE SUMMARY

3.1 Major Environmental Statutes

Throughout the year, numerous inspections and audits were performed and documented to ensure no instances of environmental noncompliance. The environmental statutes NETL considered when evaluating compliance included: the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Superfund Amendments and Reauthorization Act (SARA): Resource Conservation and Recovery Act (RCRA); Clean Air Act (CAA); Clean Water Act; Atomic Energy Act of 1954 (AEA); National Environmental Policy Act (NEPA), and Toxic Substances Control Act (TSCA). Each of these statutes is described in detail below.

3.2 Executive Orders

NETL was in full compliance with all applicable environmental executive orders in 2011. Throughout the year, numerous inspections and audits were performed and documented to ensure no instances of environmental noncompliance. Those include EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, described more fully in Section 3.6; and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. Also, those executive orders that apply to NETL, but for which no specific actions required in 2011, include EO 11514, *Protection and Enhancement of Environmental Quality*; EO 11738, *Providing For Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans;* EO 11987, *Exotic Organisms;* EO 12088, *Federal Compliance with Pollution Control Standards*; EO 11988, *Floodplain Management*; and EO 11990, *Protection of Wetlands*.

3.3 DOE Internal Environmental and Radiation Protection Orders

NETL was in full conformance with DOE Order 450.1, which is the single major internal environmental protection order applicable to NETL. NETL does not operate a radiological program of similar scope to the DOE national laboratories administered under the National Nuclear Security Administration's control. However, a limited number of sealed sources were administered in full compliance with DOE Internal Radiation Protection Order 5400.5, as discussed below.

3.4 Atomic Energy Act of 1954

The AEA and its amendments require federal control of radiation source materials for the protection of the public and workers. DOE orders, US EPA regulations, and Nuclear Regulatory Commission regulations are based on the AEA. To fulfill its obligations, DOE has implemented radiation protection programs at its facilities that process, produce, handle, use, or dispose of radiation source materials. Radiation exposure at NETL is managed based on the *as low as reasonably achievable* (ALARA) principle.

NETL's sites in Albany, Morgantown, and Pittsburgh do not process, produce, or dispose of radiation source materials as a part of its routine operations. The Morgantown and Pittsburgh sites use research instruments that contain sealed radiation sources. These are small quantity

emitters used to make various types of measurements. Albany uses research instruments that are considered radiation-generating equipment, but Albany does not have any sealed radiation sources. The Albany site does work with some materials that have measurable background radiation levels (NORM); the focus of the work is on qualities of the material other than its radiation. Radiation safety officers maintain an inventory of these radiation sources, tracking each item, isotope(s), quantity, custodian, location, status, and activity. Table 3.4.1 lists the 2011 source inventory at Morgantown; Table 3.4.2 lists the 2011 source inventory for Pittsburgh.

In 2011, the Morgantown and Pittsburgh sites did not release any of the radiation source materials into the environment. All of the source materials are sealed from escape or discharge. No radiation source materials were sent to off-site storage or disposal facilities. The Albany site has legacy radiological issues, which include the presence of ores that are naturally occurring radioactive materials. Any waste generated at the Albany site is packaged for proper waste disposal as low-level radioactive waste (LLRW) in accordance with applicable regulations in the licensed regional facility in the State of Washington (US Ecology), as authorized via an active site use permit with the State of Washington–Department of Ecology. No LLRW from Albany was disposed of during 2011. No LLRW was associated with operations at the Morgantown and Pittsburgh sites.

Radiation exposure monitoring at the Albany, Morgantown, and Pittsburgh sites consisted of the use of personal dosimeter badges. Leak testing of radiation-generating devices is conducted by independent contractors on an annual basis.

3.5 National Environmental Policy Act

The National Environmental Policy Act (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 (EIS), environmental assessments (EA), and categorical exclusions (CX). 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 those 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 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 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 does not 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. The 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, as well as the eligibility criteria for their application, is identified in DOE’s NEPA implementing procedures (10 CFR 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.

The following EIS activities took place in 2011:

Hydrogen Energy California IGCC Project

Hydrogen Energy California, LLC, was selected under the Clean Coal Power Initiative (CCPI) Program to demonstrate integrated gasification combined cycle (IGCC) technology with carbon capture in a new base-load electric generating plant located in Kern County, California. The IGCC demonstration plant will use blends of coal and petroleum coke (petcoke), or petcoke alone, as its feedstock and generate approximately 250 MW (net) of electricity. This combined-cycle approach of using gas and steam turbines in tandem increases the amount of electricity that can be generated from the energy content of the feedstock. An EIS determination was signed on March 8, 2010. A notice of intent was published in the Federal Register on April 6, 2010. A public scoping meeting was held in Bakersfield, California, on April 14, 2010. The public scoping period ended on May 24, 2010. At the end of 2010, the draft EIS was on hold pending project developments. On September 2, 2011, SCS Energy California, LLC (SCS Energy) acquired 100 percent ownership of Hydrogen Energy California, LLC from BP Alternative Energy North America, Inc., and Rio Tinto Hydrogen Energy, LLC. SCS Energy is a private power plant development company headquartered in Concord, Massachusetts. DOE plans to put out an amended notice of intent in the Federal Register in April 2012 explaining new features of the power plant design to include the addition of hydrogen processes that would be used to manufacture several types of nitrogen-based fertilizers.

Texas Clean Energy Project

Summit Texas Clean Energy, LLC, was selected under CCPI Round 3 to build the Texas Clean Energy Project adjacent to an oil field in Ector County, near Odessa, Texas. The goal of the project is to plan, design, construct, and operate a coal-fueled electric power and chemicals production plant integrated with carbon dioxide (CO_2) capture and geologic storage. The IGCC demonstration plant will use coal as its feedstock to generate approximately 400 MW (gross) of electricity, along with sulfuric acid, urea for fertilizer, or other chemicals. About 275 MW of electricity will be put onto the power grid, with the remaining power used for commercial loads on the project site, such as urea production and CO_2 compression. An EIS determination was signed on March 2, 2010. A notice of intent was published in the Federal Register on June 2, 2010. A public scoping meeting was held in Odessa, Texas, on June 17, 2010. The public scoping period ended on July 2, 2010. The draft EIS notice of availability was published in the Federal Register on March 18, 2011. A draft EIS public hearing was held on April 5, 2011, in Odessa, Texas. The comment period for the draft EIS ended May 2, 2011. The final EIS notice of availability was published in the Federal Register on August 5, 2011. The record of decision was published in the Federal Register on September 29, 2011.

Mountaineer CCS Demonstration Project

American Electric Power Service Corporation (AEP) was selected under CCPI Round 3 to build the Mountaineer CCS II Project near New Haven in Mason County, West Virginia. The objective is to design, construct, and operate a CO_2 capture and storage (CCS) system at AEP's existing Mountaineer Power Plant and other AEP-owned properties located near New Haven, West Virginia, using Alstom's chilled ammonia process. The project would remove up to 90 percent of the CO_2 from the 235-MWe flue gas slip stream taken from the 1,300-MWe Mountaineer Plant and would demonstrate a commercial-scale deployment of the chilled ammonia process for CCS in a saline formation. An EIS determination was signed on March 8, 2010. A notice of intent was published in the Federal Register on June 7, 2010. A public scoping meeting was held in New Haven, West Virginia, on June 22, 2010. The public scoping period ended on July 9, 2010. The raft EIS notice of availability was published in the Federal Register on March 4, 2011. The draft EIS comment period ended on April 18, 2011. In July 2011, AEP announced its intent to terminate the cooperative agreement with DOE at the end of Phase I, "Project Definition." At the end of 2011, a Federal Register Notice cancelling the EIS was in preparation.

Lake Charles CCS Project

Leucadia Energy, LLC was selected under the Industrial Carbon Capture and Sequestration (ICCS) Program to construct and operate the Lake Charles CCS Project in southern Calcasieu Parish, Louisiana. The proposed CCS project would be part of a larger project, the Lake Charles Cogeneration Gasification Project (LCC Gasification Project, a connected action for NEPA analysis), which would gasify petcoke and convert the syngas to methanol. The CCS project would involve the capture and storage of CO_2 from the gasification plant to be constructed on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana. The CO_2 would be captured, compressed, and transported for use in existing independent CO_2 enhanced oil recovery (EOR) operations. The CO_2 would be compressed and delivered via a new connecting pipeline to the existing Green Pipeline for transport and used in existing EOR operations along the Gulf Coast. Confirmation of permanent storage of a portion of the CO_2 injected as part of existing EOR operations in the Hastings oil field south of Houston, Texas, would be obtained through a research monitoring, verification, and accounting program. An EIS determination was signed on December 21, 2010. A notice of intent was published in the Federal Register on April 29, 2011. Public scoping meetings were held in Pearland, Texas, on May 16, 2011, and in Lake Charles, Louisiana, on May 17, 2011. The public scoping periods ended on May 29, 2011. The draft EIS was in preparation at the end of 2011.

FutureGen 2.0 Oxy-combustion Large-Scale Test Project

Ameren Energy Resources (Ameren) and the FutureGen Alliance were selected by DOE for funding for the FutureGen 2.0 initiative to help position the United States as a leader in innovative technologies for reducing carbon emissions from existing coal-fired plants. As part of this initiative, DOE will provide funding to the FutureGen Alliance to design, construct, and operate an oxy-combustion power facility that is fully integrated with a carbon capture, transport, and storage system. The large-scale test of oxy-combustion would be the first-of-a-kind commercial-scale, oxy-fired coal plant in the world. The second part of the FutureGen 2.0

initiative involves the repowering of the 200-MW Unit 4 at Ameren's Meredosia Power station in west central Illinois, using advanced oxy-combustion technology. The oxy-combustion facility may be capable of running on a range of coals and operating conditions. The plant's new boiler, air separation unit, and CO_2 purification and compression unit would capture 90 percent of the CO_2 and eliminate most mercury, oxides of sulfur and nitrogen, and particulate emissions. FutureGen 2.0 also includes the development of a geologic storage system integrated with operation of the power plant. Creation of the storage system requires selection of a suitable storage site, development of the subsurface storage field, development of any pipeline/CO_2 transport infrastructure, and design and construction of visitor, research, training, and educational facilities. An EIS determination was signed on November 9, 2010. A notice of intent was published in the Federal Register on May 23, 2011. Public scoping meetings were held in Taylorville, Illinois, on June 7, 2011, in Tuscola, Illinois, on June 8, 2011, and in Jacksonville, Illinois, on June 9, 2011. The public scoping periods ended on June 22, 2011. The draft EIS was in preparation at the end of 2011.

W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project

NRG Energy, Inc. was selected under CCPI Round 3 to design, construct, and operate a commercial-scale CO_2 capture facility at its existing W.A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas; deliver the CO_2 via a new pipeline to the existing West Ranch oil field in Jackson County, Texas, for use in EOR operations; and demonstrate monitoring techniques to verify the permanence of geologic CO_2 storage. The project would use an amine-based post-combustion technology to capture 90 percent of the CO_2 annually from a 250-MWe flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Captured CO_2 would be dried, compressed, and transported via the pipeline for use in EOR at the West Ranch oil field where it will ultimately be sequestered. An EIS determination was signed on July 6, 2011. A notice of intent was published in the Federal Register on November 14, 2011. Public scoping meetings were held in Needville, Texas, on November 30, 2011, and in Edna, Texas, on December 1, 2011. The draft EIS was in preparation at the end of 2011.

3.6 Executive Orders 13423 and 13514

On January 24, 2007, former President Bush signed EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*. This executive order established numerous sustainability goals for federal agencies, including:

- Acquiring goods and services that use sustainable environmental practices, including acquisition of bio-based, environmentally preferable, energy efficient, water efficient, and recycled content products.

- Using paper with at least 30 percent post-consumer fiber content.

- Reducing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.

- Increasing diversion of solid waste, as appropriate.
- Maintaining cost-effective waste prevention and recycling programs.
- Ensuring that at least 95 percent of electronic products that are procured meet the requirements for Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic products, unless EPEAT does not have a standard for such a product.
- Enabling the Energy Star feature on computers and monitors.
- Establishing and implementing policies to extend the useful life of electronic equipment.
- Using environmentally sound practices relative to disposition of electronic equipment that has reached the end of its useful life.

Subsequently, on October 5, 2009, President Obama signed EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. Because EO 13423 was not revoked by the signing of the new executive order; its goals and requirements continue to remain in effect, along with the requirements of EO 13514. In fact, the new EO (13514) established even more aggressive sustainability goals, which include:

- Increasing energy efficiency.
- Measuring, reporting, and ultimately reducing greenhouse gas (GHG) emissions from direct and indirect sources.
- Conserving and protecting water resources through efficiency, reuse, and storm water management.
- Eliminating waste, recycling, and preventing pollution.
- Leveraging departmental acquisition to foster markets for sustainable technologies and environmentally preferable materials, products, and services.
- Designing, constructing, maintaining, and operating high-performance sustainable buildings in sustainable locations.
- Strengthening the vitality and livability of the communities in which DOE facilities are located.
- Informing DOE employees about and involving them in achieving the goals of EO 13514.

The goals of these two executive orders are central to NETL's ES&HMS. NETL has considered the requirements of these orders when developing its list of significant ES&H aspects, its objectives and targets, and ultimately, the associated EMPs Below is a summary of the ES&H

significant aspects that address EO 13423 and EO 13514 and the EMPs used to achieve the respective objectives and targets.

Waste Minimization, Pollution Prevention, and Recycling

For FY2011, the EMPs addressing nonhazardous waste generation, hazardous waste generation, recycling, and construction waste recycling include objectives and targets that address the requirements of both EO 13423 and EO 13514. As an example, the objective of the *Nonhazardous Waste Generation Plan* is to reduce the amount of routine nonhazardous waste generated by 6 percent by the end of FY2011, based on the 2008 baseline of 222.5 metric tons; NETL achieved a 15 percent reduction in nonhazardous waste generation by the end of FY2011.

Likewise, based on EO 13423 and EO 13514 requirements, the objective of the FY2011 *EMP for Hazardous Waste Generation* was to reduce the amount of routine hazardous waste by 16 percent, using an FY2008 baseline of 2.5 metric tons. By the end of FY2011, NETL was able to achieve a reduction to 1.75 metric tons, a reduction of 30 percent.

Similarly, the objective of the FY2011 *EMP for Nonhazardous Waste Recycling* was to increase diversion of non-hazardous solid waste from disposal by 10 percent using an FY2010 baseline (632,723 lbs). By the end of FY2011, NETL had achieved 41 percent recycling of its sanitary waste streams. NETL also continued its efforts with regard to the *EMP for Recycling Construction Waste* in fiscal year 2011. The plan's objective is to recycle a minimum of 50 percent of construction/demolition waste and divert it from landfill disposal by the end of FY2015. In FY2011, NETL diverted 741 tons (84 percent) construction/demolition waste to recycling.

Hazardous Materials Procurement, Consumption, and Storage

For FY2011, the significant aspect for addressing hazardous materials procurement, consumption, and storage focused on NETL's chemical inventory, finding green chemical alternatives, and the removal of Class I refrigerants from the sites. The objective of the *Chemical Inventory EMP* was to reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed of by FY2015, based on EO 13514. Using an inventory of existing EPA priority chemicals, NETL was able to achieve a reduction of 635 containers (or 5.8 percent). This equates to an increase of 5,222 pounds of chemicals or a 2.2 percent increase, compared to the baseline established in FY2010, but is still within the no net gain of chemicals (+/- 10 percent) target for the fiscal year. For the *Green Chemical Alternatives EMP*, the FY2011 target was to increase the use of acceptable alternative chemicals and processes. In response, various articles and links for the use of green chemical alternatives were posted to NETL's internal webpage. The *EMP for Class I Refrigerants* had the objective of eliminating the use of Class I refrigerants at NETL by year 2010, to the extent economically practicable, and to the extent that safer alternatives are available. In FY2011, NETL was only able to eliminate 1.5 lbs of Class I refrigerants. However, the Site Operations Division has developed a plan for removal of the ODS-containing devices over time, including water coolers, refrigerators, etc.

Green Purchasing

The FY2011 *EMP for Green Purchasing* focused on various aspects of EO 13514, including maximizing site use of environmentally preferred products (EPPs) in operation and maintenance, janitorial, and general office activities; purchasing products that are recycled, bio-preferred, Energy Star, FEMP-designated, EPEAT-registered, Water Sense or otherwise water efficient; acquiring uncoated printing and writing paper containing at least 30 percent post-consumer fiber; reducing printing paper use; ensuring that 95 percent of new contract actions for products and services are energy and water efficient; have bio-based and environmentally preferable, non-ozone depleting, recycled content; and are non-toxic or less toxic than alternatives. The FY2011 targets were to achieve: 70 percent of janitorial cleaning products purchased shall be environmentally preferred products as defined by the General Services Administration's Green Purchasing Standards; 80 percent of maintenance products purchased shall be Energy Star rated, if such products are rated; and 98 percent of copier and printer paper shall contain a minimum of 30 percent recycled post consumer fiber. As a result, in FY2011, NETL achieved the following: 78 percent of janitorial cleaning products are environmentally preferred products through its storeroom purchases; 100 percent of maintenance products are Energy Star-rated through NETL storeroom purchases; and 100 percent of copier and printer paper contains a minimum 30 percent recycled post consumer fiber through storeroom purchases.

Electronic Stewardship

To further address the goals of EO 13514, *EMP for Purchase of Electronic Products* had the objective of ensuring that the procurement of EPEAT-registered electronic products, and the procurement of Energy Star- and Federal Emergency Management Program (FEMP)-designated electronic equipment. In FY2011, NETL was able to acquire 100 percent of its electronic products as EPEAT-registered and 100 percent of its electronic products were Energy Star- and FEMP-designated. In addition, in FY2011 the objective for the *EMP for Operation and Maintenance of Electronic Products* was to enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. In FY2011, 100 percent of the printers and 90 percent of PCs had power management settings in place.

Pest and Other Landscaping Management

To further address the goals of EO 13514, NETL expanded the EMP for Pest and other Landscaping Management with the continued objectives of maintaining the deer population at a sustainable level per the wildlife management plan and of implementing pest management and other landscaping management practices. In FY2011, NETL continued discussions with the U.S. Department of Agriculture (USDA) on *Wildlife Management Plan* implementation and culled 20 deer from the Morgantown site. Survey of deer numbers and any needed action is planned for the 1st Quarter of FY12 in Morgantown. Talks are planned with NIOSH concerning deer management at the Pittsburgh site, as NIOSH owns a majority of the land area which contains the Pittsburgh site.

Water Usage

To address the goals of EO 13514, NETL's FY2011 objective was to reduce water consumption intensity, relative to the baseline of 27.3 million gallons (which equates to 26.3 gallons/gross square foot (gal/gsf)) through life-cycle cost-effective measures by 2 percent annually through FY2020 or 26 percent by the end of FY2020 using a baseline of FY2007. NETL's FY2011 potable water intensity was 14.82 gal/gsf, which equates to a 44 percent reduction in water consumption. NETL also extended the plan for water consumption by establishing an *EMP for Landscaping Water Consumption*, with the objective of reducing landscaping water consumption by 2 percent annually, or 20 percent by the end of FY2020 using an FY2010 baseline of 2,000 gallons. However, it was determined that NETL's landscaping water use is covered under its potable water use, and therefore, the potable water use reductions would also cover landscaping water use.

Energy and Fuel Use

To address the goals of EO 13514, the revised FY2011 *EMP for Energy Intensity* required a 3 percent per year reduction in energy use, as well as a reduction in the energy intensity in buildings in an effort to reduce greenhouse gas emissions. NETL was able to meet its target of 18 percent reduction in energy intensity. In fact, NETL's energy intensity of 168,500 Btu/gsf equates to a 23.4 percent reduction, relative to FY2003 baseline of 219,903 Btu/gsf. This reduction includes an adjustment for the Pittsburgh purchasing landfill gas.

The objectives for the FY2011 *EMP for Renewable Energy* include increasing renewable energy consumption to 5 percent and ensuring that 50 percent of statutorily required renewable energy comes from sources developed after 1999. NETL's FY2011 renewable electric energy use was 0.7 percent of its total electric use. This did not meet the EPAct 2005 established a goal of 5 percent use of electric energy from renewable sources to the extent that it is economically feasible and technically practicable. This level of electric energy from renewable sources is not economically feasible or technically practicable for NETL due to its geographic location and weather. However, NETL did meet the EO 13423 goal for onsite renewable energy generation and renewable electrical energy purchase requirements (2.5 percent) equal to 50 percent of the EPAct 2005's goal of 5 percent relative to renewable sources developed after 1999. NETL's landfill gas consumption (NET-Pittsburgh) was equivalent to 14,889 mega-watt hours (MWh), or 49.2 percent of NETL's electricity consumption of 30,234 MWh).

The objective for the FY2011 *EMP for Petroleum Fuels* is to reduce the vehicle fleet's total consumption of petroleum products by 2 percent annually through the end of FY2015 (using a FY2005 baseline). NETL did not meet the target for FY2011 (12 percent) due to a DOE-HQ mandate directing the placement of 17 new petroleum-fueled hybrid vehicles. The new hybrid vehicles are credited as AFVs, but the gasoline used to fuel these vehicles must be reported as petroleum usage. Petroleum usage increased by 0.3 percent in FY 2011, which is an unfortunate increase from FY 2010 when NETL petroleum usage decreased 17.3 percent based on the FY2005 baseline. Also, in addressing the goals of EO 13514, the FY2011 EMP extended the requirement of a 2 percent annual reduction of petroleum fuels through FY2020. As a result, the

replacement mandate severely negatively impacted what had been a very successful Petroleum Consumption Reduction Plan.

Similarly, in addressing the goals of EO 13514, the FY2011 *EMP for Alternative Fuels*, NETL continued to promote alternative fuel consumption and to increase the use of low-GHG-emitting vehicles. The objective of the FY2011 *EMP for Alternative Fuels* is to increase total nonpetroleum-based fuel consumption by 10 percent annually through FY2020, using an FY2005 baseline. However, in FY 2011, NETL did not meet the plan goal due to a DOE Headquarter's mandate directing NETL to replace 17 vehicles with 17 petroleum-fueled hybrid vehicles. The new hybrid vehicles are credited as AFVs, but the gasoline used to fuel these vehicles must be reported as petroleum usage. The 17 vehicles NETL replaced were all alternative-fueled ethanol vehicles. The implementation of the replacement mandated in FY 2011 severely and negatively impacted NETL's Alternative Fuel Use Increase Plan. As a result, NETL only met 5 percent of the required 10 percent FY 2011 goal; while in FY 2010, NETL had been at 124.7 percent, which was well ahead of the cumulative goal of 50 percent. Furthermore, NETL's target for FY2011 was to increase the number of alternative fuel vehicles on site to 58.

Also, in the energy and fuel use area and regarding EO 13514, NETL's FY2010 *EMP for Advanced Metering*, the objective is threefold: (1) to implement a multi-year plan to install smart meters (by October 1, 2012); (2) to install advanced electrical metering in NETL's buildings that consume greater than 1,000 GSF of energy (by October 1, 2012); and (3) to install advanced metering for natural gas and potable water in NETL's buildings that consume greater than 1,000 gsf of energy (by October 1, 2015). The multi-year advanced metering plan was submitted on December 20, 2010. Installation is completed for advanced metering for electric, natural gas, and potable water in 42 NETL buildings. The advanced metering survey of the Albany site has been completed. The objective of the plan is to implement best management practices in energy efficient management of servers and federal data centers. In FY2010, NETL developed a *Data Center Energy Efficiency Optimization Plan* and submitted it to DOE headquarters (HQ).

Air Emissions/Greenhouse Gas (GHG) Emissions

The FY2010 EMP addressing GHG emissions was expanded in FY2011 to address the more rigorous requirements of EO 13514. The objectives for FY2010 were (1) to establish agency-wide GHG emission percentage reduction targets to be achieved by FY2020—to be established using an FY2008 baseline; (2) to prepare a baseline of GHG emissions for Scope 1 and Scope 2 emissions by January 3, 2010; and (3) to prepare a baseline of GHG emissions for Scope 3 emissions by June 2, 2010. Other objectives supporting EO 13514 include reporting a comprehensive GHG emission inventory annually by the end of January each subsequent year; implementing transit, travel, training, and conferencing strategies to support low-carbon commuting and travel; and implementing innovative policies to address Scope 3 emissions unique to agency operations. In FY2011, the GHG emission reduction percentage was identified as 28 percent by FY2020, using a FY2008 baseline. In addition, NETL's GHG emissions FY2008 baseline was updated in NETL's *Site Sustainability Plan.* In terms of FY2011 Scope 3 emissions, NETL reported 5,715.2 metric tons (MT) of CO_2 equivalent. Relative to FY2008 emissions of 5,278.5 MT of CO_2 equivalent, meaning NETL increased its Scope 3 emissions by 8.3 percent. NETL has developed a plan and methodology to reduce its Scope 3 emissions.

Estimated GHG emissions for Scope 1 and Scope 2 were submitted with NETL's Site Sustainability Plan on January 30, 2012. Note: CO_2 equivalent is a method by which all gases which affect GHG measures are given the same weight.

High-Performance Sustainable Building Implementation

EO 13423 identifies and EO 13514 re-establishes that all new construction or renovations of existing government facilities or buildings greater than 5,000 gsf comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (HPSB) Memorandum of Understanding* (2006). EO 13423 and EO 13514 also require that 15 percent of the existing federal capital asset building inventory meets the HPSB guiding principles. To that end, NETL's CY2010 activities included completing a survey of NETL's existing building inventory greater than 5,000 gsf to identify the buildings or facilities that would meet HPSB criteria through life-cycle cost-effective renovations. Additionally, DOE Order 430.2b states that any new building or facility designed and built to U.S. Green Building Council's (USGBC) rating system of Leadership in Energy and Environmental Design (LEED) specification and is awarded LEED Gold certification meets the HPSB requirements. Based on the CY2010 survey, the USGBC LEED Gold Certification (awarded in FY2010) for Morgantown's B-39 and the proposed USGBC LEED Platinum rating for NETL's Morgantown Daycare Facility, B-40, which began construction in FY2010, meet this requirement. Table 3.6.1 identifies NETL buildings that have met and/or will meet HPSB guidelines and lists existing buildings that will cost effectively meet the 15 percent goal of NETL buildings.

Activities included implementing the renovations proposed by DOE's Federal Energy Management Program as part of the Expert Energy Efficiency Evaluation (E-4 Assessment) and was performed for NETL's Morgantown and Pittsburgh Sites in FY2011. This E-4 Assessment provided NETL with more insight into the renovations required to help NETL meet the HPSB guidelines for the buildings identified in Table 3.6.1: 2011 NETL HPSB Candidates.

NETL continued implementing numerous actions to meet or exceed each of the mandated goals of EO 13423. This included procuring energy efficient products; utilizing energy-saving performance contracts; and, finally, updating design, construction, renovation, and maintenance packages to incorporate new federal building design and performance standards, procure renewable energy, and implement innovative energy management technologies and water conservation measures.

NETL issued a site sustainability plan as mandated by EO 13514 and per the requirements of DOE's *Strategic Sustainability Performance Plan* (SSPP). The new plan included strategies and annual implementation steps to insure compliance with EPAct05, EO 13423, DOE Order 430.2b, the Energy Independence and Security Act of 2007 (EISA07), and EO 13514. The plan includes requirements consistent with the new DOE Order 430.2b, as well as an energy curtailment plan for use during an emergency.

As a part of every decision to undertake new projects and investments, NETL performs life-cycle cost analyses. In 2011, these analyses were used for projects involving equipment retrofit and replacement; renewable energy; lighting retrofit; water savings; and heating, ventilation, and air

conditioning (HVAC) control. These analyses, coupled with energy efficiency, renewable energy, and water efficiency mandates by DOE, help to determine the optimum time to undertake a retrofit project during the life span of equipment or facilities. To further guide the decisions about priorities for energy efficiency improvements to infrastructure, NETL, during fiscal year renovations, conducts specific construction project energy audits. Additionally, NETL's *Ten-Year Site Plan* includes energy efficiency upgrades and water conservation projects in its general plant project (GPP) budget requests.

DOE Order 430.2b and EO 13514 also recommend that sites maximize utilization of third-party financing, in particular energy savings performance contracts (ESPC), to accomplish the mandated goals associated with the previously mentioned federal government directives. Under that premise, on August 28, 2009, NETL awarded the Biomass Alternative Methane Fuel Energy Savings Performance Contract (BAMF ESPC) to Constellation Energy, a Mid-Atlantic Energy Services Company (ESCO). The BAMF ESPC contract incorporates installation and implementation of 13 energy conservation measures (ECMs) at the laboratory's sites in Morgantown, Pittsburgh, and Albany.

NETL continued with the installation of the 13 ECMs identified in the BAMF ESPC through Constellation Energy's Delivery Order 4 schedule (DO-4), Table 3.6.1: 2011 NETL HPSB Candidates. The DO-4 schedule identifies guaranteed electrical energy, natural gas, and potable water savings, as well as implementation costs to install the ECMs. Once all the ECMs have been installed, commissioned, and accepted by NETL, the annual energy savings are guaranteed to be 23.8 BBtu, with an annual guaranteed cost savings of $757,929. Of the 13 ECMs identified in the BAMF ESPC, seven were completed in CY2009 and four were completed in CY2010.

The remaining 2 ECMs, ECM #2 *Upgrade of the On-Site Gas Well* and ECM #10 *Fume Hood Controls in B-25*, will be consolidated into a renewable energy project to be installed at the Morgantown campus in 2012. The consolidation of the remaining 2 ECMs into a renewable project will not affect the energy savings or impact the payback period for the project. Implementation of the BAMF ESPC will provide NETL with an energy savings of 24 percent from its FY2003 baseline, which is the equivalent to meeting 79 percent of its 2015 goal. The BAMF ESPC, when fully implemented using 2007 usage as a baseline, will provide NETL with a 13 percent water intensity savings, which equates to meeting 79 percent of its 2015 savings goal. This project does not require any capital equipment cost outlays by NETL. The guaranteed annual energy cost savings provides the funding for Constellation Energy to implement the project.

3.7 Compliance and/or Cleanup Agreements

Three compliance activities were ongoing in Wyoming in 2011. These activities are concerned with environmental issues related to former R&D field projects. While NETL has been granted final release from one site, a second site required ongoing active remediation activities due to groundwater contamination with volatile organic carbons (VOCs), the primary organic contaminant of concern being benzene. At a third site, the contaminant level has been remediated and groundwater stability monitoring continued. Underground coal gasification and oil-shale retorting tests resulted in ground-water contamination at these sites.

NETL was granted final release of reclamation liability for the DOE Hanna Underground Coal Gasification Project near Hanna, Wyoming. On March 10, 2011, the re-vegetation was approved. A final site inspection was conducted on November 8, 2011, by the Wyoming Department of Environmental Quality (WDEQ), and on November 23, 2011, NETL provided WDEQ with requested landowner consent information. NETL received a letter from WDEQ granting final release of reclamation liability on November 29, 2011.

Remediation activities continued at the Rock Springs Oil Shale Retort Project Site near Rock Springs, Wyoming, in 2011. Many of the groundwater sampling results were above the WDEQ water quality standard of 5 parts per billion (ppb) for benzene. Air-sparge remediation activities continued.

Remediation activities also continued at the Hoe Creek Underground Coal Gasification Project at the Hoe Creek III site in 2011. Groundwater monitoring continued to determine if the aquifer has been restored. Groundwater monitoring wells have had contaminant levels below the WDEQ standard of 5 ppb for benzene for the stability monitoring period of two years. On September 6, 2011, NETL requested a formal determination that the groundwater has been remediated. This determination is expected to be granted in 2012, followed by surface reclamation activities.

3.8 Environmental Violations Cited by Regulators

The Pennsylvania Department of Environmental Protection (PADEP) was notified when a water line break near Building 152, on National Institute of Occupational Safety and Health (NIOSH) property on August 31, 2011. The break resulted in the release of turbid water into Lick Run for about ¼ mile to the south outfall (Outfall 002) at the Pittsburgh site. While the break occurred on NIOSH property, DOE is responsible for the outfall permit compliance.

3.9 Notices Issued

On November 8, 2011, the U.S. Environmental Protection Agency (EPA) notified NETL – Albany of two violations of the Resource Conservation and Recovery Act (RCRA) and the Oregon federally authorized hazardous waste management program. The violations were the result of an EPA inspection of the Albany site on July 21, 2011. Specifically, EPA identified: (1) the "[s]orting of dangerous waste without a permit due to failure to mark containers of hazardous waste with the date accumulation began and the words 'Hazardous Waste,'" in violation of 40 CFR 262.34; and (2) the "failure to properly manage universal waste lamps," in violation of 40 CFR 273.13(d)(1). Each violation resulted in a $750.00 penalty assessed to NETL, for a total of $1,500.00. In December 2011, the violations were resolved through the EPA's expedited settlement process, with the two agencies executing a settlement agreement and NETL paying the resultant monetary penalties.

3.10 Groundwater

The Albany site began a ground-water monitoring program as a voluntary effort onsite in 2001 and offsite in March 2005. Certain volatile organic compounds (VOCs) at levels above the Oregon Department of Environmental Quality (ODEQ) risk-based standards were discovered in the ground water at the Albany site and beneath Liberty Elementary School, which is located

adjacent to the site, at the times noted previously. NETL continues to monitor the ground water both onsite and offsite, perform applicable site investigations, document applicable risk assessments, and act as a voluntary participant in ODEQ's cleanup program. At no time have students, faculty, or staff of the neighboring elementary school received any adverse or harmful exposures. NETL works closely with ODEQ to investigate the nature and extent of the contamination, as well as to assess appropriate remediation methods. No enforcement action has been initiated by ODEQ against DOE as of the end of 2010.

Current plans include the continued development of a site investigation report to document work efforts to date. Once the investigation is complete, subject to need and availability of funds, NETL will assess the results, conduct a phased risk assessment, and determine appropriate remedial actions. NETL will continue to cooperate with the Oregon DEQ in conducting these activities.

3.11 Reportable Occurrences

The Albany site filed one safety and health-related occurrence report and one environmental related occurrence report with DOE's Occurrence Reporting and Processing System (ORPS) in 2011. The safety and health incident involved a construction worker falling into an open trench while repositioning a protective cover. The worker broke his jaw in multiple places. The environmental-related occurrence involved the receipt of two Resource Conservation and Recovery Act (RCRA) violations from ODEQ and the U.S. EPA, Region X. A RCRA inspection revealed two separate observations by the EPA inspector. The first was that a bag containing a waste-mineral sample was located in the universal waste accumulation area (for; mercury devices). The sample was identified by NETL personnel as mercury ore (cinnabar). The EPA inspector noted that the waste should be classified as a hazardous waste, not as universal waste. The bag containing the sample was not marked with the words, "Hazardous Waste", nor did it include the date when the period of accumulation began, which is a violation of 40 CFR §262.34. The second observation was that two universal waste collection containers for waste fluorescent tubes were not closed properly. This was a violation of 40 CFR §273.13 (d) (1).

The Morgantown site filed one environmental-related occurrence report and four safety and health occurrence reports with ORPS in 2011. The environmental incident involved an ethylene glycol release associated with an air handling unit cooling coil leak. The site also filed four safety and health related occurrence reports with ORPS in 2011. The first incident involved electrical voltage being applied to and significantly exceeding the voltage limits of a multimeter. The second incident involved an employee falling on an uneven concrete sidewalk when leaving work, resulting in two broken bones, one in the employee's hand and the other in the employee's wrist. The third incident involved an electrical voltage being applied to a motor rotation indicator designed for testing with no voltage on the system. The final safety and health related incident concerned a concrete saw severing a 277-volt electric line during a repair job to the site parking garage.

The Pittsburgh site filed four environmental-related occurrence reports and one safety and health occurrence report with ORPS in 2011. Each of the four environmental occurrences involved storm water discharge turbidity incidents resulting from water line breaks on the NIOSH property. The incidents were each categorized as a release of a substance (turbidity) from a

DOE-permitted facility that must be reported to an outside agency. The safety and health related occurrence report involved a backhoe severing a 480-volt electric line powering outdoor lights; the incident occurred when contractors were digging a trench for a natural gas line.

3.12 Major Issues, Instances of Non-compliance, and Corrective Actions

No major issues, instances of noncompliance, or corrective actions were reported at NETL in 2011. Concerns over potential ground-water contamination with VOCs and surface contamination from beryllium at the Albany site are discussed in Section 9.7.

3.13 Status of Ongoing Third-Party Inspections, Self-Assessments, and Environmental Audits

The Pittsburgh and Morgantown sites originally received certification to the ISO 14001 standard on August 31, 2003, while the Albany site received certification for the ISO 14001 standard on June 9, 2005. All three sites were recertified to the same scope by Orion Registrar, Inc., in 2010. To maintain these certifications, surveillance audits are conducted to demonstrate continual improvement in the ES&HMS and conformance to the ISO 14001 and OHSAS 18001 standards.

Three surveillance audits were conducted in 2011. The first surveillance audit was conducted at the Pittsburgh site on April 6, 2011. No new nonconformities or opportunities were documented during this audit. However, two strengths were identified: (1) the internal audit program is comprehensively planned and well executed; and (2) the semi-annual management reviews were found to be comprehensive and effective in managing the ES&HMS.

The second surveillance audit was held at the Albany site on June 22, 2011. No new nonconformities were documented during this audit. Also, during the audit one opportunity for improvement was identified. The auditor found that several previously identified opportunities for improvement were not being addressed. It was suggested that management address this to make sure that valuable opportunities for improvement were not being overlooked. Also, two strengths were identified: (1) the SARS process continues to be an excellent tool for identifying and controlling hazards and environmental impacts; (2) chemical and waste handling was found to be well managed.

The third surveillance audit was at the Morganton and Pittsburgh sites October 19-20, 2011. The auditor identified one opportunity for improvement: the corrective and preventive action procedure does not require a timeframe to complete the root cause analysis to ensure that there will be sufficient time to address the required corrective action. Also, the auditor identified six strengths: (1) management reviews were found to be comprehensive and an effective means for managing the ES&HMS; (2) the organization met 85 percent of their ES&H objectives; (3) internal audits were found to be very comprehensive; (4) The SARS process continues to be an excellent tool for identifying and controlling hazards and environmental impacts; (5) a new practice has been instituted in the last year to have the industrial hygienist review the chemical list with the responsible person whenever a SARS package is issued or modified; and (6) the electronic SARS system for managing SARS packages has been implemented for R&D SARS, resulting in better access to the information and in faster processing via the use of electronic signatures. The auditor also identified a minor nonconformance in that when reviewing the AAD

Support Services SARS package it was found that the operational procedure requires that safe lifting training be conducted. However, this was contrary to the Training Requirements Form, which did not call this requirement out.

By maintaining its ISO 14001/OHSAS 18001 certifications, NETL demonstrates to its workforce, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental, safety, and health stewardship.

3.14 Summary of Environmental Permits

A summary of environmental permits for the Morgantown, Pittsburgh, and Albany sites is provided in Table 3.14.1 2011 Summary of Permits.

3.15 Emergency Preparedness

The regularly scheduled review of the hazards assessments for the Morgantown, Pittsburgh, and Albany sites was completed in 2011. Six emergency response-related NETL directives were reviewed, revised, and reissued in 2011. Emergency management directives are current in accordance with the review cycle established by the NETL directives coordinator.

The NETL Continuity of Operations Plan (COOP) was tested in 2011 through NETL's participation in the DOE continuity exercise with DOE HQ and the National Nuclear Security Agency service center in Albuquerque. The focus of the exercise was devolution of operations. NETL developed devolution plans with its DOE HQ stakeholders and hosted a training session for NETL employees who assume duties during COOP activation in the national capital region. NETL further explored the possibility of developing a memorandum of understanding with the health departments in counties where the NETL sites are located. The purpose of the MOUs would be to develop NETL sites as closed points of dispensing during public health emergencies. NETL has decided to pursue this route for pandemic planning.

Emergency response drills and exercises were held at the three NETL sites which sponsor emergency response programs and organizations. Special training events included spokesperson and other emergency communications training, with drills specialized for members of the emergency public information team.

3.16 Quality Assurance (QA)

NETL is responsible for a wide range of work activities, including basic and applied on-site research; contract administration for off-site research, development, and demonstration projects; design, construction, operation, modification, decommissioning, and environmental remediation of NETL facilities; and the management and oversight functions related to these activities. NETL's QA Program provides the tools to ensure that this work is accomplished safely while minimizing potential hazards to the public, site workers, and the environment. The QA Program is based on DOE's ISM principles: Figure F, ISM core functions, and DOE Order 414.1C, *Quality Assurance*. Line management accountability for ES&H issues is an integral part of the QA Program and ISM. NETL implements this through work performance goals, for which all

line managers are accountable. Internal assessments and audits also ensure that line managers are accountable for their ES&H responsibilities.

Another principle of ISM is competence commensurate with responsibilities. NETL's ES&H training program provides a process for ensuring that employees get the appropriate ES&H training they need to protect themselves, their coworkers, the public, and the environment.

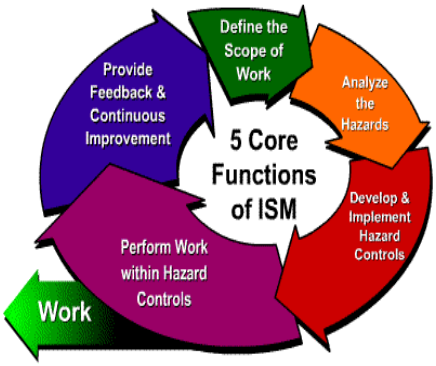


Figure F: DOE's ISM Principles.

The SARS process is the backbone of NETL's QA Program for ES&H. Much of the needed data regarding hazards and environmental impacts are generated from this process; therefore, its effective performance is important. NETL has three distinct SARS processes: one for R&D, one for facilities, and one for support operations.

At NETL, the R&D SARS procedure, NETL Procedure 421.1-1, describes the process and procedural requirements for a safety analysis and review of on-site R&D projects. Its purpose is to ensure that risks associated with on-site R&D projects are analyzed, understood, and then eliminated, mitigated, or controlled to a degree acceptable by line management before work begins. All on-site R&D projects receive a SARS operating permit after successful completion of the review.

An annual review is conducted on all SARS-permitted R&D projects by a team comprising, at a minimum, the project's responsible person (or designee), an ES&H representative, a project quality assurance engineer, and the site's environmental manager. The assessment includes: (1) checking for significant modifications made to the project without appropriate authorization and SARS review; (2) ESS&H Division inspection of the project area covering chemical hygiene, OSHA requirements, and environmental compliance; (3) review of the SARS files and the project area for engineering design and QA/quality control concerns; and (4) review of problems found in the project area or in the SARS file. Records from each annual assessment are added to the project's SARS file.

Findings from the annual assessment are assigned a priority by the assessor or ES&H representative: Priority 1 findings are urgent actions that must be corrected within 7 days; priority 2 findings are serious deficiencies that must be corrected within 45 days; priority 3 findings are considered non-serious deficiencies and must be corrected within 120 days; and priority 4 findings are considered minor deficiencies that must be corrected within one year. After assignment, findings are sent to the responsible person for correction using AIIS. The responsible person's supervisor is copied on the finding.

NETL's Facility SARS Procedure (NETL Procedure 421.1-3) covers on-site facilities including buildings, trailers, utilities, services, structures, roads, and walkways. Its purpose is to ensure that facilities are constructed, maintained, and modified in compliance with applicable codes, regulations, and standards. The procedure provides for construction permits, which are required

prior to new construction or modification of an existing facility, and for use permits, which are required prior to occupancy of a facility or changing the use of a facility.

An annual ES&H assessment is performed on all SARS-permitted facilities by an ES&H assessment team made of, at a minimum, the facility's custodian and ES&H staff, including NETL's OSHA safety manager, the chemical hygiene officer, the environmental manager, and the life-safety officer. Findings are assigned a priority based on significance and recorded in the AIIS database for tracking.

NETL's Support Operations SARS Procedure, NETL Procedure 421.1-2, covers on-site support operations conducted by site support contractors. It includes construction, operations, maintenance, and renovation activities for which the site support contractors are responsible and ensures that associated risks are analyzed, understood, and then eliminated, mitigated, or controlled to a degree acceptable by responsible line management prior to initiation of the project or operation.

An annual assessment is conducted on all SARS-permitted support operations. The purpose of the annual assessment is to determine the continued validity of the SARS package and to address any changes in the operations. Typical items that might be re-evaluated include changes in site conditions, worker training, operating procedures, and the effectiveness of controls.

3.17 Performance Measurement

Goal setting is used at NETL to motivate and monitor performance. NETL's environmental performance and progress toward goals is tracked and reported to satisfy both internal and external requirements. Throughout 2011, trained ES&H professionals performed extensive crosscutting audits and inspections of the NETL ES&H programs to ensure adequate performance. The performance measures used to monitor progress include EMP objectives and targets (see Section 2.4) and institutional environmental performance measures. This includes NETL's performance measures established under the Government Performance and Results Act of 1993. These measures are tracked on a fiscal year basis and cover performance goals and accomplishments for FY 2011. In addition to these measures, surveillance monitoring is conducted through routine reviews and inspections. The type of performance monitoring conducted through this program is presented in Table 3.17.1 2011 Surveillance Monitoring.

MORGANTOWN

4.1 Site Description

The Morgantown site 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, DC. Geographically, the facility 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 Morgantown site covers approximately 132 acres, 46 acres of which are developed as industrial. Two small streams border the site on the east and northeast sides, and all surface drainage goes into these two streams. Immediately surrounding the Morgantown site, the land use is a combination of residential, commercial, deciduous forest land, and pasture.

The Morgantown site focuses on technologies in coal utilization, natural gas production and utilization, and energy efficiency. The work is accomplished through both in-house R&D and contracted research. 712 employees work at the Morgantown site; 266 are federal employees and 466 are site support contractors.

As of the 2010 U. S. Census, Morgantown's population was 29,660, consisting of 9,706 households within the city limits. The population density was 2,917.0 /sq mi. There were 12,664 housing units at an average density of 1,245.2 /sq mi. The racial makeup of the city was 89.7 percent White, 4.1 percent African American, 3.4 percent Asian, 2.6 percent Hispanic or Latino of any race, 0.1 percent Native American, 0.1 percent Pacific Islander, and 2.0 percent from two or more races.

The median income for a household in the city was $25,804. The per capita income for the city was $16,491. About 36.6 percent of the population was below the poverty line. The major employers within the Morgantown area are West Virginia University (WVU); WVU Hospitals; Mylan Laboratories, Inc.; the Monongalia County Board of Education; the Monongalia Health System, Inc.; University Health Associates; the National Institute for Occupational Safety and Health; NETL; and the Health South Rehabilitation Hospital.

4.2 Major Site Activities

Facility Renovation

In 2011, several Morgantown facilities and several infrastructure areas underwent, or continued to undergo, renovation activities. These renovations not only improve the functionality of the building but also ensure that the infrastructure is in compliance with the most current revision of applicable codes and standards.

Building 26 – Renovation of office space on the second floor was completed. Design activities were completed and construction began for the renovation of office space on the first floor.

Building 17 – Facility infrastructure upgrades were completed on the ground floor to support the installation of an American Resource and Recovery Act (ARRA) -funded Appliance Testing and Evaluation Center.

Building 14 – Facility infrastructure upgrades were completed to support the installation of an ARRA-funded Appliance Testing and Evaluation Center.

Building 3 – A contract was awarded to replace the flooring in the occupational health unit and the exercise facility. Demolition of the old flooring was completed and the installation of the new flooring was initiated.

Building 33 – A project to recoat the flooring in the Chemical Handling Facility with a chemical resistant coating was completed.

Building 39 – A design/build contract was awarded to renovate the Visitor's Center. The design was completed and construction initiated.

Roadways – Standard resurfacing of portions of roadways and replacement of sections of sidewalks continued throughout the year. This is part of an ongoing effort to ensure that deteriorating or damaged pedestrian pathways are replaced before becoming a safety concern.

Facility Demolition

GPDU Project – Demolition activities were completed for the removal of the Gas Process Development Unit (GPDU). This project includes multiple buildings that are no longer useful to the site or are in a state of disrepair.

Utility Upgrades

Aging utility infrastructure and facility renovations/construction generated the need for partial or entire utility system upgrades.

High Voltage Electrical Distribution System – Construction activities were initiated for the project to replace the old electrical distribution cabling throughout the site. The upgrade will bring the system into compliance with the most recent codes, standards, and regulatory requirements.

Emergency Notification System – Construction activities continued for the new site wide emergency notification system. The installation and testing of the ENS was completed for the entire site except Building B-20. The ENS will now be installed in B-20 due to the cancellation of a project which would have demolished B-20. The upgrade will bring the system into compliance with the most recent codes, standards, and regulatory requirements.

Utility Metering – Construction activities to install meters throughout the site to monitor energy usage were continued. All electrical meter installations were completed. This is part of an ongoing effort to ensure compliance with DOE Order 430.2B, EO 13423, EPACT 2005, and EISA 2007.

Data and Communication Hub Relocation – A contract was awarded to relocate the data and communication hub from Building B-2 to Building B-39. Construction activities have begun which includes installing new fiber optic cable throughout the site.

B-1, B-25, and B-26 Chiller Replacement – A design/build contract was awarded to replace the existing chillers for B-1, B-25, and B-26. Design has been initiated.

100 PSI Air Line Replacement – A design/build contract was awarded to replace the existing 100 psi air lines throughout the site. Design has been initiated.

COMPLIANCE STATUS

5.1 Environmental Restoration and Waste Management

CERCLA

Morgantown had no National Priorities List (NPL) sites in 2011 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 2011.

During the past 30 years, several on-site cleanup activities have occurred. Some of these activities followed the closure of facilities that had leaked for a number of years. Other cleanup activities followed discrete spills. Table 5.1.1: 2011 Potential Contamination Sources and Cleanup Actions –Morgantown lists the sources, the contaminants, and the current status of the sources and contaminants at the site. A list of the specific chemicals or materials of concern is presented in Table 5.1.2: Properties of Potential Contaminants.

SARA Title III

Superfund Amendments and Reauthorization Act (SARA) Title III requires the reporting of hazardous chemicals that were present at a facility in excess of certain 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, liquids in amounts greater than or equal to 55 gallons, or amounts greater than or equal to the threshold planning quantity (TPQ). It 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. Table 5.1.3 lists those chemicals reported by the Morgantown site for 2011, known as the Tier II Chemical Inventory Reporting List. NETL maintains, through its Facility Tracking System (see Figure G), an active inventory of all hazardous and extremely hazardous chemicals onsite, along with an MSDS for each of these substances.

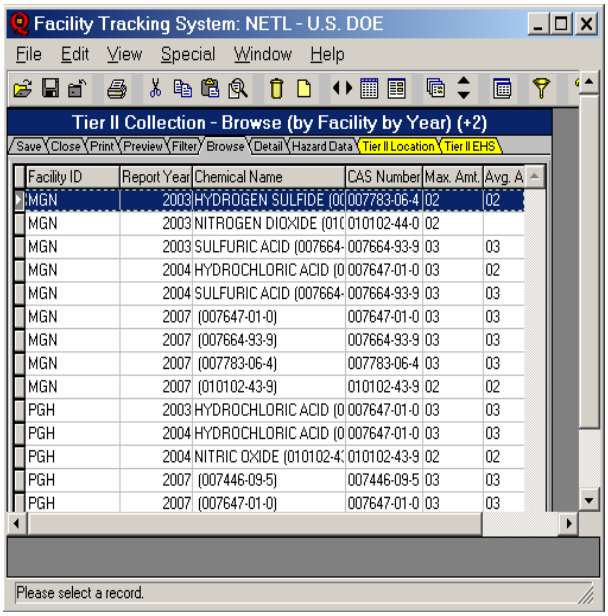


Figure G: NETL Facility Tracking System.

The Morgantown site does not prepare a Toxic Release Inventory (Form R) because the site does not use, produce, or process any of the listed toxic materials in quantities that exceed the threshold amounts. During 2011, no releases occurred that would trigger emergency notification

as required by either the Emergency Planning and Community Right-to-Know Act (EPCRA) or CERCLA.

NETL provides Tier II chemical inventory reports to the Monongalia County Local Emergency Planning Committee and the Morgantown Fire Department as a courtesy to these organizations and to document the actual quantities that remain onsite.

As part of the on-going commitment to improve emergency planning under the SARA Title III Program, NETL has established targets for reducing the accumulation of hazardous chemicals onsite. The intent of these targets is to avoid the unnecessary accumulation of potentially hazardous chemicals in the laboratories while maintaining sufficient chemical stores to complete mission-related research.

RCRA

The Resource Conservation and Recovery Act (RCRA) designates sites as generators, transporters, or treatment, storage, and disposal (TSD) facilities. Morgantown is regulated as a large-quantity generator under the jurisdiction of the WVDEP. Although hazardous waste generation rates are low most months, occasional laboratory activities result in the generation of larger quantities that exceed the threshold for large quantity generators. See Table 5.1.4: 2011 Hazardous Waste Generation – Morgantown for summary information on waste generation and management. NETL is not a licensed transporter or TSD facility for hazardous waste, nor does it hold a permit for treatment or disposal of nonhazardous waste that would be regulated under RCRA Subtitle D. Hazardous waste may be stored on site for no more than 90 days without a permit. In 2011, hazardous waste materials were transported to the treatment, storage, and disposal facilities of American Environmental Services (AES), Inc., located in Calvert City, Kentucky, for ultimate disposition in accordance with regulatory requirements. Nonhazardous wastes (normal office wastes that are not recycled and cafeteria waste); as well as nonhazardous industrial wastes are transported by Allied Waste to the Veolia E.S. Chestnut Valley L/F, Inc., landfill in McClellandtown, Pennsylvania.

Figure H: Morgantown Drum Crusher.

NETL complies with RCRA manifest requirements by initiating documentation when hazardous wastes are shipped from the Morgantown site. The hazardous waste coordinator initiates the documentation and files copies of the manifests, forms, waste profiles, and contracts. Ultimately, these documents are sent to the NETL ES&H Records Center. NETL does not have an on-site program to treat hazardous waste or render it harmless; however, NETL does recycle some universal wastes as classified under RCRA. During 2011, NETL recycled batteries, fluorescent light bulbs, drums (Figure H), and various items containing mercury.

On-site hazardous waste handling is governed by NETL Procedure 450.1-9, *RCRA Hazardous Waste Management*. This procedure requires laboratory workers to place their hazardous waste in labeled containers (drums, buckets, bottles) in their laboratories. An internal manifest is used for tracking and identification. Laboratories have satellite accumulation areas where the waste awaits transport by technicians to the Hazardous Waste Accumulation Area. The technicians who transport the waste on site inspect the waste for proper containment, labels, and completed documentation and will not move waste that lacks these items. When unlabeled and unidentified materials are found, NETL sends samples to a contracted laboratory to test for RCRA hazardous characteristics (i.e., toxicity, ignitability, reactivity, and corrosiveness). The waste may be repackaged into lab packs for transportation. The hazardous waste coordinator assures proper labeling on the waste at the time of pickup by the contracted transporter. According to the procedure, the collection occurs bi-monthly, or as needed.

Despite training and the various administrative controls, including the planning that precedes the issuance of a SARS permit, the possibility exists that someone may dispose of hazardous materials down a sink, toilet, or floor drain. It is a violation of NETL procedures to put hazardous materials into sinks, toilets, floor drains, or regular garbage cans. During annual inspections and during periodic walk-through inspections, ESS&H staff members visually evaluate garbage cans for evidence of improper disposal practices. To check for improper flushing of chemicals, ESS&H staff sample wastewater discharges monthly for metals, various organic compounds, pH, biological oxygen demand (BOD), total suspended solids (TSS), and total organic halogens (TOX). A full suite of chemical analyses are conducted annually on wastewater. If anomalous readings are obtained during the monitoring of the dedicated laboratory wastewater sewer system, troubleshooting begins. If necessary, ESS&H staff will sample fixture traps and drains to locate the source of the chemicals. Spill kits are provided in areas where chemicals are handled, and floor drains are connected to the on-site pretreatment facility, where NETL staff may be able to detain and neutralize spilled chemicals before release off site.

Morgantown accumulates its waste inside the Hazardous Waste Accumulation Areas in Building 33. Extra spill protection is provided by an epoxy coating on the concrete floor, which drains to fully contained sumps. The building is constructed with blast abatement and spill containment features to minimize the potential risks of spark-induced ignition and the spread of contaminants in the event of an explosion or leak. Each waste class is stored in a separate room to minimize the chance that a leaked material could come into contact with an incompatible substance and cause a reaction. Daily inspections are performed and records kept of the inspections. RCRA-required worker training is mandatory for all technicians who collect and handle hazardous waste. The initial training is supplemented annually with refresher courses. All NETL employees take general awareness training. Employees who generate hazardous waste in the laboratories take additional, lecture-based training.

No hazardous waste ponds or underground storage tanks exist at the Morgantown site. These items were phased out in the past, and most contaminated soils associated with these items were removed. Currently, aboveground storage tanks hold gasoline, diesel fuel, ethanol, and fuel oil. The tanks holding gasoline are visually inspected weekly for leaks. Quarterly interstitial

monitoring is performed on the double-walled tanks. NETL installed most of these tanks during the mid-1990s. Aboveground fuel tanks do not require certifications in West Virginia.

To deal with the possibility of emergencies, the Morgantown site maintains an emergency response system, including a hazardous materials team. Several NETL directives specify the response to emergencies. If a spill occurs, the first person to notice the spill has the responsibility to report it immediately to site security. This will initiate an investigation and response that is proportional to the perceived potential threat or risk. NETL personnel who participate on the hazardous materials team or other response teams are trained to contain and control a spill or cleanup, as warranted. Emergency response drills are conducted annually. Where potentially needed, laboratory-specific operating procedures specify how to control and shut down various laboratory activities in the event of an emergency.

In 2011, hazardous waste management inspections continued to focus on proper control of hazardous materials within laboratory spaces. Any deficiencies were entered into AIIS and appropriate actions were taken to correct these findings. The WVDEP Division of Water & Waste Management conducted an inspection in 2011 and discovered no deficiencies or findings.

5.2 TSCA

No unplanned releases of air pollutants covered by CERCLA or TRI regulations occurred during 2011. Asbestiform fiber concentration air monitoring is conducted annually in Buildings 1, 2, 3, 4, 5, and 7, because asbestos-containing building materials were used in the construction of these facilities. All known friable asbestos-containing material has been removed or encapsulated. No samples taken in 2011 contained fiber concentrations in excess of US EPA or the State of West Virginia clearance levels (0.01 fibers/cc). Occasionally, fiber concentrations do exceed that limit, but second-level analysis has consistently verified that the excess was caused by non-asbestos fibers. The observed concentrations of asbestos fibers have always been below the clearance level.

NETL tests for lead paint before demolition projects or elimination of materials through excess property, or recycling, and notifies property recipients and haulers if lead is present. NETL-Morgantown does not manufacture chemicals and so is not subject to sections of the Toxic Substances Control Act (TSCA) related to manufacturing.

5.3 FIFRA

No restricted-use pesticides, herbicides, or defoliants were kept on site during 2011, as regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Only general-use pesticides were kept and used for routine insect control. A professional pest control company is under contract to spray around the base of office trailers and for pest control in the cafeteria. Herbicides are not used for weed control except for extremely limited cases. No defoliants are used.

5.4 Radiation Protection Program

NETL-Morgantown does not generate radioactive materials, nor does the Morgantown site transport, process, treat, store, or provide on-site disposal of radioactive waste. Radioactive

materials inventory is primarily instrument test sources, as can be seen in Table 3.4.1. Sources are returned to the instrument manufacturers for disposal. Items that are not sources and that cannot be returned to the original manufacturer are retained on site at a secure and remote location. For these reasons, the radiological program at the Morgantown site has been described within our regular ES&H (non-radiological) program information. Additional information may be found in Section 3.4 (AEA), and Section 3.3 (DOE Internal Environmental and Radiation Protection Order). No program for protection of the public and the environment from radiation hazards is needed because all radiation sources are all small, sealed instrumentation sources with low-level, or very old low-level radioactive materials.

5.5 Air Quality and Protection Activities

The first of three environmental media protection programs is the Ambient Air Quality Program. Significant requirements and responsibilities of this program are listed in Procedure 450.1-1, *NETL Ambient Air Quality Management*. Under this program, the air quality manager prepares permit applications; obtains permit renewals, as needed; and oversees monitoring programs and reporting. Several previous EMPs were created focusing on various emission categories or sources where NETL can make the most improvement. To maintain quality control, NETL selects and subcontracts analytical work only to certified laboratories. These laboratories must submit their QA/quality control (QC) manuals to NETL for inspection, and the NETL site-support subcontractors submit quality control samples (duplicates, blanks, and spikes) to the laboratories to verify the quality of the analyses. Air emissions data for the site is calculated and maintained to ensure compliance with regulatory requirements.

Several EMPs direct continuous improvement efforts in air-quality protection. For example, one EMP calls for an increase in the use of acceptable alternative chemicals and processes for janitorial and other institutional uses. By decreasing the use of toxic and hazardous chemicals, NETL will be able to achieve its GHG emission reduction targets. Another EMP requires the reduction of energy usage per square foot by 3 percent annually through the end of FY2015 (using an FY2003 baseline of 219,903 Btu/ft^2). This EMP will reduce energy intensity in buildings to achieve GHG reductions. Finally, a third EMP is directed at reducing the Scope 1 and 2 GHG emissions attributed to facility use through life-cycle, cost-effective measures by 28 percent by FY2020, relative to an FY2008 baseline (54,440,814 lbs CO_2). Other EMPs call for reducing petroleum-based fuels and increasing the use of alternative fuels and renewable energy to reduce NETL's impact on the ambient air quality.

The approved objectives and targets, and the actual performance data for the FY2011 aspects are presented in Table 2.4.2 for Albany, Morgantown, and Pittsburgh, and the performance data for the first quarter of FY2011 is presented in Table 2.4.3.

The WVDEP generally evaluates air quality on a county by county basis, although the regional data may be aggregated into Air Quality Control Region (AQCR) #6 for north central West Virginia. Monitoring is performed in Monongalia County on a daily basis at several sites, and these data are available from the WVDEP website's air-quality index and from the EPA AirNOW webpage. The Morgantown site is not a significant contributor to ambient air quality issues.

In 2011, no new source reviews (i.e., CAA pre-construction reviews) occurred for any Morgantown facility, and no Morgantown facilities had the potential to emit more than 100 tons/year of any designated air pollutant.

The Morgantown site is not regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program. Nor does the site emit more than 10 tons/year of any single designated toxic air pollutant or more than 25 tons/year in aggregate of all toxic air pollutants, which would otherwise qualify it as a major source requiring regulation under the Clean Air Act for listed toxic air pollutants. The Morgantown site does not perform nuclear program work and does not have radiological emissions, which would be covered by NESHAP. The Morgantown site estimates its air emissions in quarterly and annual air emission inventories to analyze the cumulative effect of all of the projects and facilities. This analysis showed that no regulatory or other environmental impact occurred during 2011.

Figure I: Building 39 Meteorological Tower.

Additionally, the Morgantown site maintains two small meteorological towers, one located on the roof of Building 19 and the other is on the roof of Building 39 (Figure I). The data collected at the Building 19 location includes air temperature, wind speed and direction, relative humidity, and total rainfall. The Building 39 station monitors wind speed and direction, as well as air temperature. The data is collected every second, averaged over fifteen minutes, and over 24 hours to provide critical meteorological information to the ERO during emergency situations and provide meteorological information used in the models for the air emissions program.

5.6 Water Quality and Protection Activities

Surface water protection at Morgantown is controlled by NETL Procedure 450.1-3, *Surface Water Quality Management*, which is administered by the surface water quality manager (SWQM). Generally, this program includes spill prevention, hazardous waste control, and emergency actions, which are addressed specifically in other directives. The surface water program covers permits and monitoring for stormwater sewers (which are separate from sanitary sewers) and for construction-related disturbances that potentially increase sediment loads in streams. The applicable directives are supplemented by more detailed instructions found in the Storm Water Pollution Prevention Plan, which documents various potential sources of pollution and prescribed methods for managing the various types of sources. Under the plan, designated stormwater outfalls are sampled twice per year and tested for basic pollutants that can indicate contamination from site applications of fertilizer or leaking sewer lines (see Table 5.6.1). The testing results are presented in Table 5.6.2. 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. For all water protection programs, quality control in sample analysis is maintained, in part, by choosing an analytical laboratory from a list of EPA-approved laboratories. QA/QC samples are submitted at least annually to further verify the quality of the analytical results.

On the developed portion of the Morgantown site, four drainage areas have rainwater runoff collection systems and regulated outfalls to the nearby surface streams.

1. Outfall 002 drains an area that holds the majority of the facilities for material handling and is approximately 509,652 square feet in area.
2. Outfall 003 receives drainage from a hillside beside B-17 and drains an area of 43,560 square feet. The permit does not require monitoring of this outfall.
3. Outfall 005 drains an area that includes Building 19 (warehouse, machine shop), Building 33 (hazardous materials temporary storage), and various research facilities. It drains an area of 209,088 square feet.
4. Outfall 010, Figure M, drains parking areas, offices, and a large section of undeveloped land. It drains an area of 3,197,304 square feet.

Figure J: Morgantown Outfall 010.

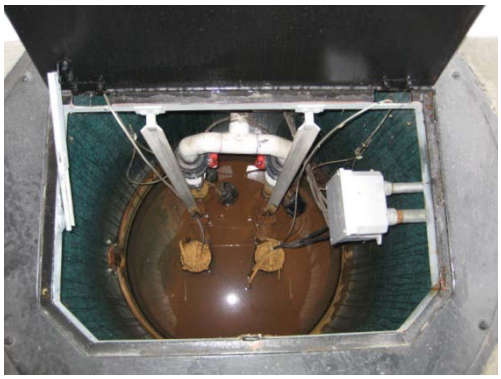


Figure K: Morgantown Parking Lot Oil-Water Separator.

The outfalls at the Morgantown site are monitored according to General Permit Registration #WVG610042 under National Pollutant Discharge Elimination System (NPDES) Permit #WV0111457. Potential sources of spills of petroleum products and oils are aboveground storage tanks, oil-filled transformers and switches, a hazardous waste accumulation facility, and 55-gallon drums stored at several locations (Buildings 5, 19, and 36). Five aboveground storage tanks contain petroleum products (diesel fuel and gasoline), and one contains ethanol, for a total capacity of 2,850 gallons. Two of the aboveground storage tanks are located inside the area drained by Outfall 002. One storage tank is located in the drainage area of Outfall 005, and the remaining two are in the drainage area of Outfall 010. The site has 25 oil-filled transformers and two oil-filled switches, all of which have been tested for polychlorinated biphenyls (PCBs). No buried or partially buried storage tanks exist at the Morgantown site.

An oil-water separator, Figure K, is installed inside the runoff collection system of the new parking garage, but no other treatment systems are available for storm water at the Morgantown site. Based on previous test results, the primary concern with surface water impacts from the site has been sediment loading. Sediment loading of surface water runoff affects 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. 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. Burroughs Run drains an area of

significant urban and suburban development, which contributes typical urban/suburban pollution (e.g., oil, salt, pesticides, and herbicides).

Figure L: Morgantown Clarifier.

Stormwater runoff is handled by stormwater sewer systems. A completely separate and dedicated sewer system handles the industrial wastewater. A third separate and dedicated sewer system handles the domestic sewage. Industrial wastewater quality is controlled by NETL Procedure 450.1-4, *Industrial Wastewater Management*, which is administered by the industrial wastewater quality manager. At the Morgantown site, industrial wastewater is that wastewater conveyed from laboratory sinks and laboratory facilities where pollutants other than normal domestic sewage might enter the wastewater stream. The industrial wastewater enters a clarifier, Figure L, located on site, where the wastewater is sampled monthly. From the clarifier, the industrial wastewater is treated for pH, if necessary, and then enters the on-site domestic sewage lines that empty into the municipal sewers owned and operated by MUB. The discharge is regulated under Pretreatment Permit Number MUB 012. Periodic sampling is performed, and the samples are analyzed by a laboratory chosen from a list certified by the EPA. Discharge monitoring reports (DMRs) detailing monthly sampling and analysis are provided to the MUB, and those reported in 2011 are provided in Table 5.6.3: 2011 Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One Sample/Month – Morgantown.

NETL's monitoring activities help enforce the requirement that hazardous wastes are not permitted in the laboratory drains or other drains, except in the trace quantities that normally originate from washing laboratory equipment and glassware. Managers are required to provide suitable containers in laboratories for hazardous waste collection.

If hazardous materials or petroleum products accidentally spill into the sewer system, NETL must follow the emergency response and notification procedures specified by the *Spill Prevention and Control Management* and the *Comprehensive Emergency Management System* directives (NETL P 450.1-5 and NETL O 151.1, et seq., respectively). Hazardous waste must be handled in accordance with NETL's directives on this subject. If pollutant concentrations repeatedly exceed permit limits, NETL will initiate surveillance of drains and fixtures that discharge into the industrial wastewater system to identify the source.

Protection of surface water and groundwater requires the prevention of leaks from storage tanks. Accordingly, NETL instituted a program under NETL Procedure 450.1-5, *Spill Prevention and Control Management*, which is under the oversight of the surface water quality program manager. As required by the NPDES storm water permit, this program mandates a written spill prevention, control, and countermeasures plan (SPCC) for each site and a written operations and maintenance plan for each individual storage tank system. Every system capable of contributing to fires, explosions, emissions, or spills of hazardous materials must have written operating plans that address precautions to prevent an emergency and actions to be taken during an emergency.

The program manager must identify potential spill sources on site, establish visual inspection programs, generate lessons learned (and program improvements) from past spills, and coordinate the implementation of this procedure with NETL's emergency response activities. No reportable spills of toxic or hazardous materials occurred within the notification period (November 1996 to the present) of the current general storm water permit.

Figure M: Ethanol Storage Tank.

Aboveground storage tanks, such as Figure M, are visually inspected on a weekly basis and have their interstitial cavity checked quarterly. Visible leaks are corrected immediately. Oil-filled transformers and switches are visually inspected daily. If leaked materials are observed within secondary containment or on the surrounding ground surface, the material is collected or absorbed with spill kits.

Collected contaminated soil and rainwater are disposed in accordance with regulations. Steel 55-gallon drums are stored in areas protected from rainwater and within a secondary containment. Large spill containment kits are used routinely as a means of secondary containment under the drums, and spill kits are kept nearby. The Hazardous Waste Accumulation Facility (Building 33) was designed and constructed to be compatible with the materials stored there and with the conditions of storage. Leaks within this facility drain to sump areas with manual sump pumps for collection of liquids. All of the storage area of Building 33 is inside, and the facility is inspected each week. Hazardous materials are not conveyed through underground pipes. All aboveground pipe valves are inspected when the associated tanks are inspected. All tank-filling operations must be attended constantly, and off-site personnel are accompanied by NETL personnel when they enter the site for refueling or loading operations.

Absorbent materials are placed at the source of the spill, at any potentially affected drains, and at the entrances and exits of culverts for emergency containment. Any contaminated materials collected following a spill would be disposed in accordance with applicable regulations. Spill kits of varying types are placed at numerous locations throughout the site. Personnel and equipment are on standby to respond to spills, and emergency notification procedures are taught to the staff.

Morgantown has only one discharge to the municipal sewer system, which is regulated by the MUB (Permit MUB 012). MUB establishes the pretreatment requirements and the effluent standards. Annually, MUB inspects the pretreatment facility, plus the sewer connection. When the permit is renewed, MUB requests an update to the description of the industrial wastewater system and the sources of wastewater on site. When the industrial wastewater system is modified or when effluent composition changes, notification is required. MUB may elect to change the monitoring or pretreatment requirements in response to the changes made by NETL. MUB requires monthly sampling and analysis for the parameters listed in Table 5.6.3. They require that NETL annually sample and analyze for priority pollutants in accordance with the MUB

permit, and MUB conducts an independent sampling and analysis to verify the results. Biological testing is neither required nor performed. MUB requires that the Morgantown pretreatment system have at least a settling clarifier and a pH control system. Industrial wastewater from the Morgantown site could contain chemicals from laboratories and projects, oil and grease from the motor pool maintenance area, or glycols (ethylene and propylene) from the chiller units (for air conditioning). History has shown that the primary concerns for discharges to the municipal sewer have been trace acids from research projects and alkaline boiler blow downs from the main boiler room.

5.7 Groundwater and Soil Quality Protection Activities

Groundwater protection on site is administered through NETL Procedure 450.1-2, *Groundwater Quality Management*, which is managed by the groundwater quality manager. This is a program that covers regulatory requirements and best management practices for preventing leaks and spills, monitoring groundwater and soil, removing contaminated soil, and closeout actions. The directive is supplemented by more detailed information and instructions that are found in the *Groundwater Protection Management Plan*, which documents the site hydrogeology, various potential sources of pollution, potential contaminants that should be monitored, methods of well installation and sampling, a monitoring strategy, and QA/QC processes related to having water/soil samples analyzed by a contracted laboratory.

Maps of the site aquifers and wells are contained in the plan. Under the plan, selected monitoring wells are sampled and tested twice each year for general water quality parameters. Should a spill occur, containment and cleanup would commence, and the affected soil would be monitored, as necessary, for the contaminants of concern. Highly contaminated soil would be removed, if practical. Alternatively, in-situ treatment would begin, unless the contamination levels were sufficiently low to warrant only monitoring. For all water protection programs, quality control in sample analysis is maintained, in part, by choosing an analytical laboratory from a list of certified laboratories. QA/QC samples are submitted at least annually to further verify the quality of the analytical results.

Figure N: Morgantown Monitoring Wells.

The primary strategy for groundwater protection is one of spill and leak prevention. Together, an SPCC and a storm water pollution prevention plan lay out the strategy for minimizing the risk of unintentional releases and quickly responding to an unintentional release in an effort to minimize environmental contamination. In addition to these efforts, the Morgantown site initiates new projects only after a rigorous ES&H review is conducted in accordance with the SARS directives. As part of the SARS process, the responsible person for each project must prepare a set of written procedures documenting how the project is to be operated, how waste and feedstocks are to be safeguarded, and how to contain and control unintended releases. When a leak or spill does occur and the environment is threatened, the on-site emergency response team is activated, and the facility makes the appropriate internal and regulatory-driven notifications.

Twenty active monitoring wells exist at the Morgantown site (see Figure N). The locations of the wells are displayed in Figure 5.7.1: Active Monitoring Wells at the Morgantown Site. 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. Figure 5.7.2 shows a generalized cross-section through the site and the relationship between the aquifers.

No groundwater contaminants have ever been consistently detected above regulatory levels at the site. Groundwater monitoring at the Morgantown site has been focused primarily on past spills and leaks and the effectiveness of the cleanup actions undertaken. The section on CERCLA Section 5.1.1 lists the past events and the current status of these spill sites.

The only contaminants consistently found in significant amounts in the groundwater at the Morgantown site are those related to the application of salts for deicing purposes. Sodium chloride is applied to the parking lots and roads, and calcium chloride is applied to the sidewalks and outdoor steps. Wells located near these features and near the runoff routes from these features show significantly elevated levels of chloride compared to background levels. This impact on groundwater is a problem shared with many businesses and road maintenance activities in this region, but it is considered a necessary safety practice to prevent injuries to site personnel and visitors.

The overall groundwater monitoring strategy has been to monitor any flow coming onto the site through each aquifer and to monitor the flow after it passes beneath the facilities and moves toward the springs and seeps. Groundwater monitoring at the Morgantown site from 1993 to 2002 was driven by two reasons. The first was the mandate of the WVDEP regarding the closure of Pond 005. The second was the mandate of DOE Order 5400.1, *General Environmental Protection Program*. Although DOE Order 5400.1 no longer exists, samples from a large number of wells were analyzed between 1993 and 2002 for a lengthy list of analytes. This list of analytes included all organic compounds known to have been detected in analyses of the coal tar waste from the aforementioned gasifier, the Pond 005 bottom sludge, and the sampled soils beneath Pond 005. It also included metals alleged to have been present in the Stretford solution used to remove sulfur oxides in the off-gas from the gasifier. No organic compounds were consistently detected during 10 years of sampling, and no consistent indications of contaminant concentrations above the state limits have been found. Only one analyte (cadmium), traceable to the operation of the closed pond, has been detected, but not above West Virginia groundwater regulatory limits.

After more than 15 years of monitoring, groundwater conditions are well understood. Spills and leaks in the past have not significantly degraded the groundwater on site. The facilities and most of the underlying contaminated soils associated with spills and leaks in the past have been removed. In recent years, operations have changed greatly, and now few large projects could create significant groundwater contamination. At this point, most of the research is bench-scale and uses small quantities of chemicals and solvents. Accordingly, the groundwater analyses have been significantly curtailed. Under the new scheme, wells will be sampled each spring and fall. Wells located around the perimeter of the developed portion of the site in the two shallow

aquifers will be tested to check water quality as it enters and leaves the developed area. For the deep aquifer (Morgantown Sandstone), sampling will continue for one up-gradient well and three down-gradient wells. The original list of measurements and analyzed compounds, which was presented in the annual site environmental reports of previous years, has been reduced to the list presented in this year's report. The results of the ground water monitoring conducted during 2011 are presented in the Appendix as Tables 6.7.1 through 6.7.6.

PITTSBURGH

6.1 Site Description

The Pittsburgh site lies within Allegheny County, Pennsylvania, at the Bruceton Research Center. The site is approximately 13 miles south of Pittsburgh, Pennsylvania, in South Park Township. It is approximately 60 miles north of Morgantown, West Virginia. Geographically, the facility sits within the rolling hills and steeply incised stream valleys that are tributaries of the Monongahela River. The Pittsburgh site is a partially wooded tract with scattered industrial and office buildings. When the Pittsburgh site was first developed, the immediate vicinity was completely rural. However, the population and housing densities have increased dramatically in recent years.

Immediately west of the site is a low ridge top with a road and scattered houses. Another road with scattered houses borders the north side of the site. The east side of the site is bordered by Lick Run, the Pleasant Hills Sewage Treatment Plant, and a major local road. Housing development is increasing around the 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. About 40 percent of the immediately surrounding land is forested and about 25 percent is pasture or fallow field. The remainder is residential.

At the Pittsburgh site, work is accomplished through both in-house R&D and contracted research. 594 employees work at the Pittsburgh site; 269 are federal employees and 325 are site support contractors.

As of the 2010 U. S. Census, Pittsburgh's population consisted of 305,704 people and 138,739 households within the city limits. The population density was 5,521.4 /sq mi. There were 156,165 housing units at an average density of 2,820.39 /sq mi. The racial makeup of the city was 66.0 percent White, 26.1 percent African American, 4.4 percent Asian, 2.3 percent Hispanic or Latino of any race, 0.2 percent Native American, and 2.5 percent from two or more races.

The median income for a household in the city was $35,732. The per capita income for the city was $24,616. About 21.7 percent of the population was below the poverty line. The major employers within the Pittsburgh area are the University of Pittsburgh Medical Center, U.S. Government, Commonwealth of Pennsylvania, University of Pittsburgh, West Penn Allegheny Health System, Giant Eagle, and Wal-Mart.

6.2 Major Site Activities

Facility Renovation

Numerous Pittsburgh facilities and general infrastructure areas underwent, or continued to undergo renovation activities. These renovations not only improve the functionality and sustainability of the buildings, but also ensure that the infrastructure is in compliance with the most current revision of applicable DOE orders, the International Building Codes, and industry standards.

Building 83 – Renovations on the second and third floors have been completed. Commercial Interior LEED Gold certification is being pursued for those floors. The renovations provided needed additional research and development laboratory spaces and personnel offices. These renovations included the installation of water- saving devices for controlling potable water usage, installation of occupancy sensors for controlling air flow and lighting usage, and the installation of an exhaust-air desiccant-plate heat recovery system to temper the building's supply air. Design activities for the partial renovation of the first floor are underway. Once construction is complete, the renovations will provide a visitor's center, assembly room, visualization laboratory, personnel offices, SBEUC center and director's suite. Once completed the building will meet or exceed the EO 13423, High Performance Sustainable Building Guiding Principles.

Building 86 – The project was expanded in 2011, by the on-site research group, to include demolition of the top four floors of Building 89, a five-story abandoned research facility adjacent to Building 86. Demolition of both buildings' structural components began in the 4th quarter of 2010. Once demolition of both facilities is complete in the spring of 2012, B-86 will house the Pittsburgh machine shop, support operations offices, support operations drafting, calibration laboratories and support operations storage facilities. The renovations to these buildings will meet LEED Gold certification standards.

Figure O: Building 86/89 Renovation Project.

Modular Office Complex Trailers – In FY2011, the modular units were installed and the operational infrastructure to support the modular building was completed. The complex has a white roof, water-saving restroom fixtures, energy-saving lighting with sensors, R-30 roof and R-18 floor and wall insulation, high-efficiency triple-glazed windows, no VOCs, recycled carpeting, and non-chlorofluorocarbon high-efficiency HVAC Systems. The modular units meet or exceed the requirements of EO 13514. The units were leased from a U.S. General Service Administration (GSA) modular green building schedule; the complex was leased for 5 years with a two-year base period and three additional one-year options.

Building 94 – In 2011, the new ORD mission-directed modifications to the fourth floor construction of research laboratories, and adjacent personnel office space was completed. Renovations included installation of high-efficiency fume hoods in the laboratories; installation of occupancy sensors for offices to control lighting; installation of occupancy sensors in the laboratories to control both lighting and setback conditions for fume hoods during unoccupied periods; upgrades to the Building Management System; and installation of water-saving devices in laboratory sinks, kitchen areas, and restrooms to reduce the use of potable water. The demolition and reconstruction of the third floor was awarded and is scheduled to begin the second quarter of FY2012.

Figure P: Building 94 4th Floor Laboratory Renovation Project.

Roadways – During 2011, the 900 Area Roadway/Parking Lot was paved. The new roadway and parking lots for the north end of the R&D Plateau is in-process and will be paved in the 3rd Quarter of FY2012.

Building 900 – In 2011, Building 900 was decommissioned back to the block walls and reconstructed to meet EO 13514. The building will have a cool roof with a thermal resistance of at least R-30, double-pane energy efficient windows, and a high efficiency (95 percent or higher) boiler. Construction will be completed in the 3rd Quarter of FY2012.

Facility Demolition

Building 71 and High-Pressure Gas Storage Cylinders – All the high-pressure gas storage cylinders and distribution piping were decommissioned and removed in FY2011. Building 71 Pump Building has been decommissioned and is scheduled for demolition in 2nd Quarter of FY2012.

Figure Q: Building 900 Reconstruction Project.

Utility Upgrades

Aging utility infrastructure, facility renovations, and new construction generated the need for partial or entire utility system upgrades. Because additional on-site roadways were scheduled for resurfacing in FY2011, underground utility systems that ran beneath new roadway surfaces were prioritized for upgrade or replacement.

Telecommunications – The Information Technology (IT) fiber optic and telecommunication backbone infrastructure was replaced to the Building 900 plateau. This included installation of new IT fiber optic and copper telecommunication lines and hardware to Building 141 and the new Modular Office Complex and Buildings 900, 901, 902, and 903 from the Building 922 Data Center. This new IT infrastructure was installed in new or existing conduit duct banks for sustainability and code compliance.

Electrical Distribution – NETL installed a new 2,400-volt feed line from Master Substation 6 to the new 750-kVA transformer at new substation 617, which was designed to provide electrical service for Buildings 86, 89, 90, and 93 in the future. All old transformers and switch gear were removed and consolidated into this new substation. The new transformer includes on-line electrical metering. The 480-volt switchgear, servicing the Building 900 Area, was also upgraded. Existing switchgear was removed and replaced with a new enclosure, switchboard and bus duct. This upgrade provides power to Buildings 900, 901, 902, 903, 911 and the new modular trailer site (T-1).

COMPLIANCE STATUS

7.1 Environmental Restoration and Waste Management

CERCLA

CERCLA Section 120 (40 CFR 300-310; 43 CFR 11) requires federal facilities to comply with the provisions of CERCLA and imposes an additional set of regulations related to site studies and to notices for the sale and other transfers of federal real property. Specifically, this section makes all CERCLA guidelines, rules, regulations, and criteria applicable to federally owned or operated facilities, including: (1) preliminary assessments for facilities at which hazardous substances are located; (2) possible inclusion of such facilities on the National Priority List (NPL); and (3) remedial actions at these sites. Federal facilities are not required to comply with CERCLA provisions regarding financial responsibility and removal/remediation contracts with state governments. Federal facilities that are not on the NPL still may be subject to state laws concerning removal and remediation actions. However, these state laws and regulations may not impose provisions more stringent than those applicable to non-federal facilities.

EPA administers the CERCLA program in cooperation with the Commonwealth of Pennsylvania for the Pittsburgh site. The CERCLIS database lists information about the Pittsburgh site; however, the site was not listed as an NPL site in 2011, or at any other time in the past. The Pittsburgh site is listed as "undetermined" on the EPA CERCLA Section 120 List. This is because NETL detected on-site soil and groundwater contamination prior to 1997, but has not been issued a further remedial action plan letter. Periodically NETL provides a status report to the U.S. EPA through the Office of Fossil Energy, ESS&H. The status report states the following:

> *The site sampling and analysis program has been completed. Remediation for areas of concern was completed during FY1997. Based on the sampling and analysis, no further significant soil remediation is planned. The human health and ecological risk assessment is in the process of being updated. The current conclusion is that exposure to media at the facility is not expected to generate adverse health effects in on-site or current receptors. Groundwater monitoring continued on a routine basis. EPA has been requested to perform a Docket Review and the Laboratory is waiting on the Docket Status Determination [which is "Undetermined"].*

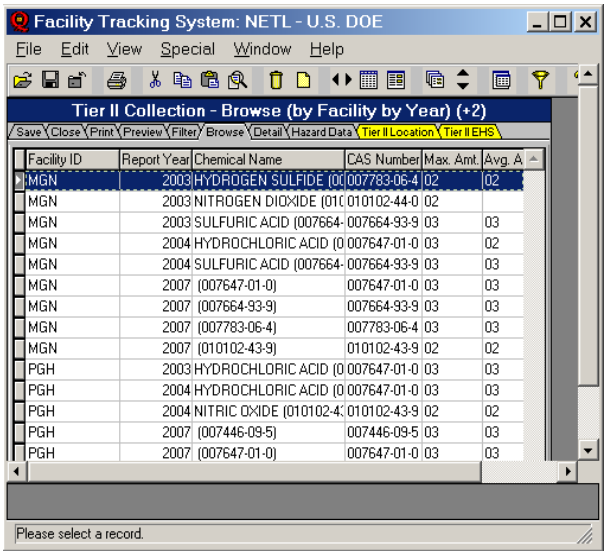


Figure R: NETL Facility Tracking System.

SARA Title III

SARA Title III requires the reporting of hazardous chemicals that were present at a facility in excess of certain 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, liquids in amounts greater than or equal to 55 gallons, or amounts greater than or equal to the TPQ. It 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. Table 7.1.3 lists those chemicals reported by the Pittsburgh site for 2011. NETL maintains, through its Facility Tracking System (see Figure R), an active inventory of all hazardous and extremely hazardous chemicals on site, along with a material safety data sheet (MSDS) for each of the substances.

The Pittsburgh site does not prepare 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. In 2011, no releases that would trigger emergency notification, as required by either the Emergency Planning and Community Right-to-Know Act (EPCRA) or CERCLA, occurred.

Section 312 of SARA Title III requires NETL to provide an MSDS to the Pennsylvania Department of Labor and Industry as part of the Bureau of PENNSAFE, the Allegheny County Department of Emergency Services, the South Park Local Emergency Planning Commission, the South Park Township Police, the Library Volunteer Fire Department, and the Broughton Volunteer Fire Department for each hazardous chemical and each extremely hazardous substance that was reported for the previous year. The Pennsylvania Emergency Response Commission, the local emergency planning commission, and the local fire departments have been advised of all materials and quantities and their locations at the Pittsburgh site.

As part of NETL's ongoing commitment to improve emergency planning under the SARA Title III Program, NETL has established targets for reducing the accumulation of hazardous chemicals on site. The intent of these targets is to avoid the unnecessary accumulation of potentially hazardous chemicals in laboratories, while maintaining sufficient chemical stores to complete mission-related research.

RCRA

Hazardous waste operations at the Pittsburgh site (see Figure S) complied with all applicable federal, state, and local regulations for the handling, storage, and disposal of hazardous waste in 2011. RCRA (42 U.S. Code 6901 et seq.) is regulated through 40 CFR Parts 260-271, and the transportation of hazardous waste is regulated through 49 CFR Parts 171-179. The regulations found in 40 CFR 261, Identification and Listing of Hazardous Waste; 40 CFR 262, Standards Applicable to Generators of Hazardous Waste; and 49 CFR Parts 171-179, Department of Transportation (DOT) Hazardous Materials regulations apply to the NETL hazardous waste program. NETL Procedure 435.1-1B (now P 450.1-9A), *Waste Handling, Storage and Disposal*, is used to implement these regulatory requirements.

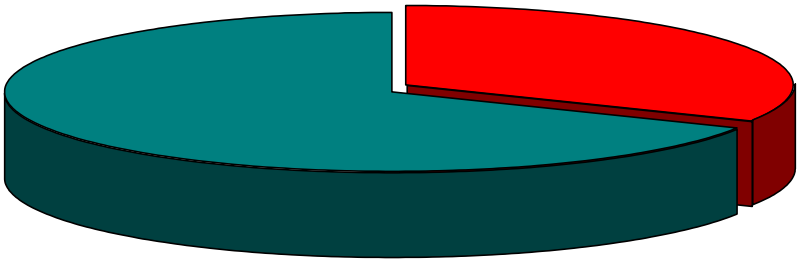


Figure S: Pittsburgh FY2011 RCRA Hazardous Waste Disposition Profile.

The PADEP is authorized to enforce the federal and state hazardous waste management requirements at the Pittsburgh site. The hazardous waste operations personnel frequently review current waste industry newsletters and bulletins, receive information from the Alliance of Hazardous Materials Professionals, read NETL's regulatory compliance reviews, annually attend the hazardous waste operations training, and attend the hazardous materials transportation training every three years.

Pittsburgh is a large quantity hazardous waste generator and has an EPA Large Quantity Generator Identification Number. Although Pittsburgh generates relatively small amounts of hazardous waste during most months of the year, occasionally laboratory activities result in the generation of larger quantities that exceed the threshold for small quantity generators. Hazardous waste is not retained on site for more than 90 days because NETL does not have a permit to store non-universal hazardous waste for a longer period of time. Most waste is shipped in laboratory packs (lab packs) containing combinations of several different compatible chemicals within a single container (see Figure T).

Figure T: Packaging Hazardous Wastes.

The Pittsburgh site is not authorized to transport, and therefore, does not transport hazardous waste. All hazardous waste removed in 2011 was transported by AES to its storage and treatment facilities. The AES facility combines small packages of similar waste and repackages the waste for more cost-effective shipment to a final disposal facility which is selected by AES and monitored by NETL. Nonhazardous waste (normal office waste that is not being recycled and cafeteria waste) is transported to a local landfill using commercial waste disposal services.

The amount of hazardous materials and waste removed from the site remained relatively the consistent with previous years. Pittsburgh generated 6,207 pounds of hazardous waste in 2011. Pittsburgh also continues an aggressive program to reduce the chemical footprint. The latter was done by contacting various researchers to verify that chemical materials are still needed.

Any items deemed unusable were disposed. See Section 2.4, Environmental Objectives and Targets, for an explanation of how this quantity was established. This reduction was accomplished using a number of efforts. For example, when unused and unopened chemicals were received for disposal, they were offered to other researchers for potential use. Less hazardous or nonhazardous chemicals were substituted for requested hazardous chemicals when possible. Batteries and fluorescent bulbs were sent to recyclers. Used computers were offered to schools or offered for sale as excess government property.

Liquid wastes are kept in drums. The Pittsburgh site does not have a storage or treatment pond, nor are underground storage tanks in Pittsburgh available for petroleum or hazardous waste. No aboveground storage tanks for hazardous waste exist. Liquid acids and bases are collected monthly at satellite accumulation areas and are analyzed. Waste handling and management personnel ensure regulatory compliance by:

- Weekly walk-through inspections of the Chemical Handling Facility.
- Monthly pickups at satellite accumulation areas.
- Battery pickups at various locations.
- Participation in the SARS process.
- Participation in ERO exercises.
- Training on hazardous waste management.
- Regulatory reviews.
- Attendance at conferences addressing hazardous waste requirements.

Pittsburgh complies with the RCRA hazardous waste manifest requirements before wastes are shipped from the site. The NETL hazardous waste coordinator initiates the documentation and coordinates the completion of the manifest with AES and the hazardous waste manager. When AES is ready to ship the waste, the manifest is again checked against the actual shipment to ensure accuracy. All information collected for the manifests, including waste generation forms, waste profiles, and contracts, is retained by the hazardous waste manager.

At Pittsburgh, hazardous waste generators have full responsibility for managing the waste that they generate from the moment of creation until it is transferred to the waste management organization. The waste generators ensure that all hazardous or potentially hazardous wastes are properly contained and identified at the point of generation. Generators are held accountable for wastes that are not properly contained or identified or are otherwise mismanaged.

Waste-handling personnel who collect the hazardous wastes first inspect the container, the labels, and the internal documentation to ensure that the wastes are properly packaged and labeled, and that the required documentation is complete and accurate. Waste-handling personnel are not

permitted to accept or move any hazardous waste without proper packaging, labeling, and identification. The responsibility for identifying the waste rests primarily with the hazardous waste generator.

Figure U: Chemical Waste-Handling Techniques.

NETL's hazardous waste manager ensures compliance with applicable regulations by overseeing the entire hazardous waste program. Periodically, the hazardous waste manager reviews the program and brings any deficiencies to the attention of the appropriate individuals or managers, and ensures the development, accuracy, and submission of the Biennial Hazardous Waste Report to the Commonwealth of Pennsylvania, and the Pollution Prevention Tracking and Reporting System information to DOE headquarters. The hazardous waste manager also audits hazardous waste management operations, hazardous waste generators, and TSD facility subcontractors.

NETL's hazardous waste manager signs the RCRA manifests and other relevant documentation (e.g., land disposal restriction (LDR) forms, waste profiles, and bills of lading) and maintains the original copy of the RCRA manifests, biennial reports, and certificates of disposal or destruction.

The manager ensures that training is provided to employees who require the annual hazardous waste operations and emergency response training (HAZWOPER), so they may properly perform their duties and responsibilities. This includes instruction on the proper handling techniques and disposal methods for chemical waste (Figure U).

7.2 TSCA

No TSCA-regulated substances are manufactured by NETL-Pittsburgh, and therefore, the site is not subject to TSCA reporting requirements. No polychlorinated biphenyls (PCB) are kept on site for laboratory use or as a dielectric fluid inside electrical transformers. Oil-filled equipment is occasionally discovered on site. If it cannot be ascertained whether it was manufactured after July 2, 1979, the oil is presumed to contain PCBs at a concentration greater than 50 parts per million until it is tested and proven otherwise.

Non-friable asbestos present at the NETL-Pittsburgh site is inventoried and maintained. Most is contained within floor tile and floor tile mastic installed on the floors of several laboratory buildings (e. g., Buildings 94, 141, and 903). The remainder is contained in roofs or laboratory furniture (Buildings 83, 86, 94, and 921.) Asbestos remaining inside buildings is well encapsulated by the matrix material (e.g., floor tiles, laboratory table tops). Air monitoring has revealed no shedding of asbestos fibers. Asbestos is also found in some gaskets and inside some laboratory devices, such as muffle and tube furnaces. Asbestos is removed as part of any remodeling or reworking job in a room, building, or facility where asbestos is present is handled by a licensed asbestos abatement/removal contractor.

NETL tests for lead paint before demolition projects or elimination of materials through excess property, or recycling, and notifies property recipients and haulers if lead is present.

7.3 FIFRA

No restricted-use pesticides, herbicides, or defoliants were kept or used on site in 2011. Only general-use herbicides were kept and used for routine vegetation control along fence lines, guard rails, and flower beds. A private professional pest control company is under contract to provide insecticides. Talstar® crystals are spread on the grass to control insects. Demand® is used in the cafeteria, at the daycare center on door thresholds and window sills, and outside Buildings 95 and 903 to prevent insects from entering the building.

7.4 Radiation Protection Program

Use of radioactive materials at NETL-Pittsburgh is limited to research instrumentation. The 2011 source inventory is displayed in Table 3.4.2. NETL-Pittsburgh does not generate, process, or treat any radioactive material, nor does it have any temporary or permanent facility for radioactive waste disposal on site. An inventory of radiation sources is maintained and monitored by the radiation safety officer. Information is retained about the item, isotope, quantity, custodian, location, status, and sealed-source activity. All of the radioactive sources are sealed and are used in instrumentation. The site support contractor has the required NRC license for the three Ronan Engineering Company level density gauges. Pittsburgh has two sealed-source electron capture devices that are licensed through the manufacturer.

Radiation monitoring performed at Pittsburgh consisted of body thermoluminescent dosimeters (TLD) and finger rings for the employees in the mail facility. In addition, specific radiological control areas have dosimeter badges continually displayed. No radiation leakage or exposure problems occurred in 2011.

7.5 Air Quality and Protection Activities

The NETL Ambient Air Quality Management Program is concerned with protection of outdoor air quality. This includes applications for air emission permits that allow NETL to conduct research into the science of reducing air emissions. The program is regulated by the Allegheny County Health Department (ACHD), which is authorized to administer Title V permits under the CAA Amendments.

The air quality manager prepares permit applications, obtains permit renewals as needed, and oversees monitoring programs and reporting. Air emissions are reported annually in accordance with the three air permits maintained at the site. On January 5, 2009, the site was issued a Title V permit designating NETL-Pittsburgh as a synthetic minor source, with a permit expiration date of January 4, 2014. (A synthetic minor is any source that has its emissions administratively limited below certain thresholds by means of a federally enforceable order, rule, or permit condition.) Several regulatory requirements are outlined in the permit that must be followed, especially an emissions inventory that is submitted to the Department by March 15th of each year for the preceding calendar year.

The inventory model used by the ACHD, Bureau of Environmental Quality, Division of Air Quality to calculate the emissions inventory is based on fuel usage and provides a worst-case scenario for potential emissions. The model takes into account the type, quantity, and total burn time of the fuel to determine the estimated emission level. The results of the modeling are summarized in Table 7.3.1. Additionally, NETL must submit semi-annual reports to the Department in accordance with General Condition III.15.d. The semi-annual report includes a pilot-scale boiler (B-003), comfort-heat boilers (B-004 through B-009), and emergency generators (EG-001 through EG-003).

There were no Notices of Violation, nor were there any unplanned air emission occurrences in 2011.

NETL actively participates in a program for a reduction in the use of Class I ozone-depleting substances (ODS). This program aims to recover and reclaim chlorofluorocarbon refrigerants from HVAC equipment for subsequent reuse. The inventory of ODS-containing equipment on site is steadily decreasing. Older ODS-containing equipment is being replaced, and the use of Class I ODS is being phased out from the HVAC equipment. For example, water fountains that contained Class I ODS in their chiller units continued to be replaced across the site in 2011. Systems and appliances with environmentally friendly substitutes are being used to replace the Class I ODS-containing systems and appliances.

Figure V: Pittsburgh Rain Gauge.

The site maintains three 30-foot meteorological towers that monitor temperature, relative humidity, precipitation, wind speed, and wind direction. The towers are not used for emissions monitoring. Data are collected twice per week for use by the site's HVAC programs to provide critical meteorological information to the ERO during emergency situations and provide meteorological information used in the models for the air emissions program. A rain gauge (Figure V) monitors rainfall at the site.

7.6 Water Quality and Protection Activities

The topography of the Pittsburgh site consists of rolling hills separating the natural flow of water on the site. As a result, the surface water quality and protection program is essentially divided into two distinct areas. One area is located north of Experimental Drive and the other area is south of Wallace Road. The northern area houses the laboratory and process facilities for the DOE portion of the site, and the southern area houses administrative, project management, and contractor maintenance operations. The former area is termed the "R&D Plateau" and the latter the "Main Plateau".

The laboratory maintains a staff of ES&H professionals to review activities to ensure that the activities do not result in contamination of storm water, industrial wastewater, or sanitary wastewater discharges. All on-site research projects and support activities are reviewed by ESS&H staff as part of the SARS process for potential impacts on air, surface water, groundwater, and soil. Applicable federal, state, and local regulations affecting these activities

Figure W: Pittsburgh WWTF Absorbers.

are reviewed, and compliance is ensured before approval to proceed is given. Laboratory wastewater from the northern area of the site is routed to the wastewater treatment facility (WWTF) in Building 74. Treated industrial wastewater, which consists of laboratory and process wastewater from the site's R&D operations, is regulated by the Pleasant Hills Industrial Sewer Use Permit Program. Treatment in the WWTF consists of flow equalization, with subsequent pH adjustment through the addition of caustic soda or ferric chloride.

Metals and particulates are removed by agglomeration in the flocculation tank, coupled with solids separation in the plate separator. Final removal of the metals and particulates occurs in the filter press. An activated clay/activated carbon filtration system, Figure W, provides additional removal of organics and metals from the treated wastewater, prior to discharge to the sanitary sewer.

The treated effluent can be recirculated from within the effluent monitoring tank prior to discharge to the sanitary sewer. This recirculation is pH-driven; i.e., if the pH is outside the allowable range (6 to 9), a diverter valve opens automatically, allowing the off-specification treated effluent to be recirculated within the system for additional treatment until the pH meets requirements. Final effluent pH adjustment occurs in a chamber inside the effluent monitoring tank prior to discharge. Treated industrial wastewater effluent from the WWTF is then routed to the Pleasant Hills Sewage Treatment Plant for final treatment.

The Pleasant Hills Authority (PHA) issued the current Industrial Sewer Use Permit to NETL on October 14, 2009. Permit conditions limit the quantity and quality of effluent constituents (total cyanide, mercury, copper, lead, and pH level) discharged into the wastewater. The permit requires all wastewater analysis data for effluent discharged through the WWTF be submitted on a semi-annual basis to the PHA's consulting engineering firm, Gannett Fleming, Inc. Table 7.4.1: Industrial Sewer Use Permit (B-74) Monitoring Analysis – Pittsburgh provides the results of the 2011 monitoring. As part of the semi-annual sampling, the PHA also independently conducts sampling and analysis. NETL also provides the PHA with the monthly sampling analysis at their request, although these data are not required by the permit. Additionally, NETL prepares an annual wastewater report with information about the site's industrial wastewater discharge, including the volume of wastewater discharged, the number of site employees, the type of waste discharged, and the type of pretreatment performed.

Table 7.4.2 provides the industrial WWTF effluent sampling results taken at the WWTF during 2011. No permit limits were exceeded in 2011.

The southern area of the site does not require an industrial wastewater sewer system separate from the sanitary sewer system that drains to the Clairton Municipal Sewage Treatment Plant

since the southern area houses administrative, project management, and contractor maintenance operations, rather than laboratory operations. All NETL sanitary sewage from the southern area is routed to, and treated in, the Clairton Municipal Sewage Treatment Plant.

On the other hand, Pittsburgh's sanitary sewage from the northern area is combined with sanitary sewage from the other major federal agency on the site, CDC/NIOSH. This sanitary sewage discharge is separate from the discharge of the treated laboratory/process wastewater (via the wastewater treatment facility).

In addition to the sampling and analysis performed by NETL and CDC/NIOSH, the PHA conducts independent sampling and analysis of wastewater effluent from all these locations. This information is used by the PHA to determine whether any discharges of the treated effluent were in excess of the local limits and required the issuance of an NOV.

Figure X: Pittsburgh Salt Storage Facility.

The Mine Safety and Health Administration (MSHA) is the other federal agency sharing the environment of the Bruceton Research Center. MSHA is also located on the northern area but has a separate sanitary sewer line from the NETL/NIOSH sub-interceptor discharge positioned on the north side of the site. The MSHA sanitary sewer line discharges directly into the South Park (PA) main sanitary line. The NETL/NIOSH sub-interceptor sanitary sewer line also discharges into the South Park main sanitary line, but at a point much closer to the PHA WWTF. Storm water (surface water) runoff from the 69-acre NETL northern portion of the site exits the site through the northern storm drainage system, a dedicated storm water system that drains directly into nearby Lick Run. This discharge occurs at the NPDES-permitted North Outfall (001). Lick Run is a small natural stream that flows along the eastern boundary of the 238-acre Bruceton Research Center.

Contaminants to the storm water effluent (such as the salt storage facility, Figure X) are regulated by an NPDES storm water permit. The contaminants consist of air-conditioning condensate, runoff from various impervious surfaces into the site storm sewers, and treated acid-mine drainage from a research coal mine operated by CDC/NIOSH.

An NPDES storm water permit issued to the Bruceton Research Center lists three outfalls: North Outfall (001), South Outfall (002), and North Outfall Extension (101). Storm water collected from the southern side of the site exits through the southern storm drainage system, a dedicated storm water system that enters Lick Run through the NETL NPDES-permitted South Outfall (002). NETL is required to monitor and report the results for the two storm water discharge outfalls on a quarterly basis, although no discharge limits are mandated.

The North Outfall Extension discharges directly into the North Outfall. The North Outfall receives storm water from NETL, NIOSH, and Mine Safety and Health Administration (MSHA). The North Outfall Extension receives treated acid mine drainage from the NIOSH mine before it is discharged to the North Outfall.

Storm water discharged from the northern side of the site is regulated through an NPDES permit issued to NETL, NIOSH, and MSHA. Storm water discharged from the southern side of the site is regulated through an NPDES permit issued only to NETL. Table 7.4.3: 2011 National Pollutant Discharge Elimination System Storm Water Analysis Results – Pittsburgh provides the storm water North Outfall monitoring results for flow, suspended solids, carbonaceous biochemical oxygen demand 5-day test (CBOD5), oil and grease, aluminum, iron, manganese, lead, mercury, pH, and ammonia.

The South Outfall receives storm water from NETL and NIOSH. Table 7.4.3 also provides the storm water South Outfall monitoring results for flow, suspended solids, aluminum, iron, manganese, lead, pH, and ammonia.

7.7 Groundwater and Soil Quality Protection Activities

The Pittsburgh site (see Figure 7.5.1: Topographic Site Map – Pittsburgh) is located within the Appalachian Plateau physiographic province. The topography, consisting of rolling hills and ridges, reflects the dendritic drainage erosion of the uplifted Allegheny Peneplain.
All rocks in the area are of sedimentary origin. They are almost exclusively of Pennsylvanian or Permian Age, with the exception of alluvium in the stream and river valleys, which is of Quaternary Age. At the Bruceton location, bedrock is of Pennsylvanian Age and belongs to the Monongahela and Conemaugh Groups. The contact is identified by the Pittsburgh Coal, which is the basal member of the Monongahela Group (see Figure 7.5.2: General Geologic Column – Pittsburgh).

The Monongahela Group forms the tops of the hills on the site and consists of cyclic and inter-fingering sequences of shale, limestone, sandstone, and coal. Two prominent coal beds, the Redstone Coal and the Pittsburgh Coal, outcrop onsite. The Pittsburgh Coal, however, has been heavily mined, so very little remains. The resultant mine voids and their possible effect on ground water are subsequently discussed.

The Conemaugh Group is exposed lower on the hills and in the valleys of the site. The upper member of this group is the Casselman Formation and consists of thinly bedded limestone inter-bedded with calcareous, variegated shale, and sandstone.

In the general area are two major anticlines and two major synclines. The axis of one of the anticlines, the Amity Anticline, trends northeast to southwest and passes just southeast of NETL. As a result, rock units under the site dip gently to the northwest at about a 10° angle. Locally, minor folding and faulting also occur.

Groundwater in the region is known to occur in unconsolidated deposits in stream valleys and in fractures, spaces between pores, bedding planes, and solution channels in consolidated rock

layers. No water-bearing zones have been encountered in overburden soils during previous drilling on NETL property.

The shallowest aquifer on NETL property is found in the weathered bedrock just below the rock/soil contact and occurs over most of the site, except where it is undermined. Recharge of this unit occurs where rainfall percolates downward into the weathered strata until a continuous horizon of low vertical permeability (unweathered bedrock) is encountered. A total of 19 wells are screened in shallow weathered bedrock; seven are located in the R&D Plateau area, and 12 are in the Valley Fill area. Figure 7.5.3: Groundwater Management Program R&D Plateau Well Locations – Pittsburgh and Figure 7.5.4: Groundwater Management Program Valley Fill Well Locations – Pittsburgh show the locations of the monitoring wells.

A deeper, water-bearing zone has been noted at the contact between the Connellsville Sandstone and the Clarksburg Clay and Limestone. A total of four wells are screened in this deeper zone (located in the Main Plateau area). This deeper aquifer had extremely low yield in the Valley Fill area.

Four wells (two at the Main Plateau and two in the Valley Fill area) were originally screened in the depth interval between the two aquifers, within fractured strata. These wells had extremely low yields and were subsequently abandoned. The minimal amount of groundwater occurring in this intermediate zone is probably the result of leakage from the overlying shallow, weathered bedrock zone.

The Pittsburgh Limestone, with its inter-bedded shales, is generally impermeable except where weathered or fractured or where bedding plane separations have been formed by solution. On-site monitoring wells installed in the Pittsburgh Limestone formation have had highly variable water production. Weathered or fractured portions of this unit have been capable of supporting submersible pumps, and a spring emanating from a limestone outcrop in the bed of McElhaney Creek flows freely and constantly year-round. Conversely, where the unit is unweathered or exhibits poorly developed fracture zones, yields have been very poor.

Although the Connellsville Sandstone has been reported to yield up to 25 gallons per minute in some southern portions of Allegheny County, previous on-site drilling into the upper Connellsville revealed it to be shale and relatively unproductive. However, the lower Connellsville at the contact with the Clarksburg group was highly fractured, and, at some locations, it exhibited water-filled voids.

The Lick Run Valley, which borders the eastern edge of the Pittsburgh site, is made up of silt and sand alluvial deposits. The alluvial deposits comprise a water-bearing unit, which discharges to form the stream base flow within Lick Run. Although shallow piezometers have been established in these deposits, the thickness of this water-bearing unit is unknown.

The vast majority of domestic water supplies for the area surrounding the Pittsburgh site are provided by the Pennsylvania American Water Company, which processes water from the Monongahela River. However, at least one groundwater well is listed for domestic usage within a one-mile radius of the site. This well, situated near central Bruceton, is 140 feet deep and was

completed in the Monongahela Group, according to the computerized PADEP Water Well Inventory. Upon topographic review of the well's location based on reported longitude and latitude, this well was possibly completed in the Conemaugh Group, due to the reported depth of the well. The well is located to the north of the Pittsburgh site, so it should not be affected by NETL groundwater impacts, because groundwater is assumed to flow in a southerly direction beneath the Lick Run Valley. A domestic water well was reported on Piney Fork Road (approximately 1-1/2 miles south of the Pittsburgh site), but this well could not be located or confirmed by preliminary physical exploration and was not included on the water well inventory.

Figure Y: Lick Run.

The PADEP Water Well Inventory reported no other domestic wells in Jefferson Borough or South Park Township. It should be noted, however, that the inventory does not list those wells that may have been drilled prior to 1966.

The Pittsburgh site has two groundwater flow patterns. Groundwater flowing in the shallow, weathered bedrock aquifer may percolate along the soil/bedrock interface and/or along near-vertical stress relief fractures and follows the general site topography, flowing from the tops of hills on the site and generally perpendicular to ground surface elevation contours. This flow is 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, Figure Y. Some of this flow also discharges as springs on the hillsides or in the valleys.

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

The Pittsburgh Coal seam outcrops throughout the Pittsburgh site and underlies a small portion of NETL property, particularly the Building 167 area. The coal outcrop can be seen in the hillside above the Main Plateau area. The 900 and 920 areas are built on fill very near to where the coal probably outcropped, but the seam probably has been removed by crop mining or stripping during construction.

The Pittsburgh Coal has been extensively mined since the beginning of the 20th century and is mined out in the area, except for remaining roof support pillars and a small working portion of the NIOSH-owned experimental mine. The coal seam, as with the other strata, dips to the northwest at an approximate 10° angle. Near the eastern boundaries of the site, the top of the coal is located at an elevation ranging from 1,015 to 1,020 feet above mean sea level. The dip is such that the top of the coal is found near 990 feet above mean sea level at the western end of the site.

The coal seam and associated mine workings have influence on groundwater at those locations underlain by them. Fracturing of overlying strata and actual roof collapse has created conduits that act to dewater the overlying rock. This is the case at Building 167 (and the adjacent triangle

parking lot) where the shallow, weathered bedrock zone was dry. Also, the voids created during mining leave open conduits that allow water to flow down freely, possibly exiting at old portals. Mining may have removed underlying fireclays usually associated with the bottom of coal seams, opening up the possibility for downward migration of water into the underlying rock.

The Groundwater Monitoring Program (GMP) has as its primary objective the monitoring of the shallow, weathered bedrock zone as the first significant aquifer or water-bearing unit beneath the Pittsburgh facilities of NETL. Contamination entering the ground from soil surface sources would be expected to impact this zone first and foremost; hence, the majority of wells are placed in this zone. The GMP also monitors the wells screened in the deeper water-bearing zone to provide data on water quality and contaminant migration.

Another goal of the monitoring program is to identify and characterize ground water flow and relate it to surface water flow conditions to better evaluate potential environmental effects of any groundwater contamination.

By properly characterizing local groundwater conditions, it is possible to ensure that potential contamination and potential contaminant migration routes have been suitably identified and investigated. This enables the groundwater program manager to be cognizant of potential continuing contamination and to remediate these contamination sources if warranted.

The 2011 groundwater monitoring (Figure Z) was performed according to the NETL-PGH 2011 Groundwater Detection Monitoring Plan. The results were compared against federal and state standards for groundwater.

Figure Z: Pittsburgh Groundwater Monitoring.

The following is a summary of the results:

- Well VFW-3 exceeded the state drinking water primary maximum contaminant level (MCL) and the EPA Region III risk based tables for tetrachloroethene and the EPA Region III risk-based tables for trichlorethene and chloroform. Well VFW-3 is located adjacent to a laboratory wastewater holding tank, which the overflow was connected to a French drain. The overflow was connected to the sanitary sewer more than thirteen years ago. Well MPW-8 exceeded the EPA Region III risk-based tables for 1,1-dichloroethane. This well is near a previously removed underground gasoline storage tank. Well MPW-11 exceeded the EPA Region III risk based tables for chloroform. Chloroform is a common laboratory contaminant.

- Iron, manganese, chloride, sulfate, and total dissolved solids exceeded standards for sixteen (state drinking water secondary MCL and Act 2 secondary MCL), fifteen (state drinking water secondary MCL and Act 2 secondary MCL), seventeen (state drinking water secondary

MCL and Act 2 secondary MCL), four (state drinking water secondary MCL), and nineteen (state drinking water secondary MCL) wells, respectively. This has been contributed to past mining activities.

- Wells MPW-2 and VFW-12 exceeded EPA Region III risk-based tables for nickel. The level has been contributed in the past to the interaction of the sodium and chloride with the stainless steel well casing.

- Well VFW-1 exceeded state drinking water secondary MCL standards for pH.

Statistical analysis was conducted on the indicators of groundwater contamination (pH, specific conductance, total organic carbon (TOC), and total organic halogens (TOX)) of nineteen NETL-PGH Groundwater Monitoring Wells on the 2011 monitoring data. The analysis compared the upgradient wells to the downgradient wells. The upgradient wells are MPW-1, VFW-2, and VFW-10. The results of the statistical analysis for pH showed that, for the tolerance interval-two tailed method, wells MPW-4D, MPW-9, MPW-10, and VFW-1 were outside of the background tolerance intervals. The results of the statistical analysis for specific conductance showed that, had no significant change for the Wilcoxon Rank-Sum Test for Two Groups was used for the Main Plateau Wells while for the tolerance interval two-tailed method, Wells VFW-2 and VFW-7 were outside the background tolerance limit. The results of the statistical analysis for TOC showed that, for the tolerance interval two-tailed method, no wells were outside of the background tolerance intervals. The results of the statistical analysis for TOX showed that there was no significant change for the Wilcoxon Rank-Sum Test for Two Groups for all wells.

Figure AA: Pittsburgh Piezometers.

Monthly groundwater elevation measurements to determine contaminant transport were completed in accordance with the Groundwater Protection Management Program. The elevations are consistent with the general ground water flow patterns described previously.

An element of the Groundwater Protection Program is the surface water-groundwater interaction. A piezometer was monitored monthly in 2011 along Lick Run upstream of the site, and another piezometer was monitored weekly along Lick Run, adjacent to the site to determine if Lick Run is a gaining or losing stream, Figure AA. (A gaining stream has groundwater flowing to the stream, while a losing stream has surface water flowing to the groundwater).

The data collected indicates that Lick Run upstream of the site is a gaining stream for one out of the 12 months, while Lick Run adjacent to the site is always a gaining stream.

ALBANY

8.1 Site Description

The Albany site is located in Albany, Oregon, which is in both Benton and Linn Counties in the western part of the state, Figure AB. It is the county seat of Linn County. The site is approximately 45 miles north of Eugene, 69 miles south of Portland, and 24 miles south of Salem.

Figure AB: Albany Site.

Geographically, the facility is located in the Willamette Lowland, a structural and erosional lowland between uplifted marine rocks of the Coast Range and volcanic rocks of the Cascade Range. The Albany site covers approximately 42 acres and approximately 220,000 square feet of building working area. The site is relatively flat, 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, around the laboratory on the west to north of the laboratory, where it flows into the Willamette River. Immediately surrounding the Albany site, the land use is a combination of residential housing developments, small businesses, and public school properties.

The Albany site, formerly known as the Albany Research Center, is a materials research laboratory, focusing on fundamental mechanisms and processes; melting, casting, and fabrication of materials (up to one ton); characterization of chemical and physical properties of materials; and dealing with the waste and byproducts of materials processes (including carbon storage). 115 employees work at the Albany site; 51 are federal employees and 64 are site support contractors.

As of the 2010 census, there were 50,158 people and 18,164 households in the city. The population density was 2,860.1/sq mi. There were 20,979 housing units at an average density of 1,198.8/sq mi. The racial makeup of the city was 87.8 percent White, 11.4 percent Hispanic or Latino of any race, 1.2 percent Native American, 1.4 percent Asian, 0.7 percent African American, 0.2 percent Pacific Islander, and 3.6 percent from two or more races.

The median income for a household in the city was $45,390. The per capita income for the city was $22,230. About 15.5 percent of the population was below the poverty line. The major employers in Albany are Samaritan Health Services; Allvac-Oremet-Wah Chang Metals; Linn Benton Community College; Greater Albany Public Schools; and Linn County.

8.2 Major Site Activities

Facility Repairs Completed

Figure AC: Building 4 Upgrade.

In 2011, various site-wide repairs and upgrades to electrical distribution systems, electrical outlets, and electrical gutters were completed based on a 2010 survey to ensure code compliance, appropriate ground fault circuit interrupter (GFCI) protection, and grounding/isolation to improve the overall site safety. Also, in 2011, various site-wide repairs and upgrades to roof gutters and stormwater drainage systems continued to prevent pooling and infiltration of water in building attics to reduce the potential for mold and improve the overall condition of facilities and the health of site employees. Pigeon droppings were remediated in Building 25. All cranes were inspected and a plan was developed to repair or replace cranes essential to R&D operations. Cranes that did not pass inspection were tagged out-of-service pending repair or excess. All cracks in sidewalks that posed potential for tripping hazards were repaired. The concrete floor in Building 5 was leveled and repaired to eliminate significant tripping hazards.

Abatement Completed

Figure AD: Building 24 Electrical Upgrade.

In 2011, asbestos abatement was completed in a number of critical, high-traffic and office areas in Buildings 1, 4, 5, 23, 24, 25, 26, and 31. These areas had severely degraded asbestos flooring which was remediated and replaced with non-asbestos vinyl tile. This work was performed to ensure site employees health and to ensure that employees are not exposed to friable asbestos. In addition, lead paint was abated in Building 4.

Facility Projects Completed

Various facility projects were completed in 2011. These projects included: (1) Buildings 24 and 25 lighting and electrical infrastructure cleanup and upgrades were completed to provide code compliant, upgraded space for research activities and to ensure personnel safety; and (2) all wall/ceiling penetrations were sealed with fire-resistant material where required to maintain fire walls in Buildings 4, 23, 24, and 25. These projects were performed to ensure the space was code compliant, to increase personnel health and safety, to meet facility needs, and to increase energy efficiency.

Ventilation/IAQ

In 2011, the heating/cooling capacity was either repaired and/or replaced in Buildings 17, 23, and 24. An engineering study of a ventilation upgrade in Building 30 was completed to assist in assessing the need to increase the number of air changes and to ensure that employees are working in an atmosphere that has acceptable indoor air quality (IAQ).

COMPLIANCE STATUS

9.1 Environmental Restoration and Waste Management

CERCLA

The Albany site had no off-site remediation activities that were ongoing in 2011 and no NPL sites for which they had liability under CERCLA/SARA.

SARA Title III

The Albany site does not use, produce, process, or store hazardous materials in excess of threshold quantities that would trigger EPCRA reporting. Therefore, TRI reporting (Sec. 3.13) is not necessary. However, emergency response planning has been implemented at the site which utilizes/maintains an electronic chemical inventory and MSDS database to aid in the efficient use/storage of chemicals and for worker safety and knowledge.

No on-site CERCLA/SARA cleanups occurred at the Albany site in 2011. No releases that would trigger reporting to DOE Headquarters Emergency Operations Center, the U.S. Coast Guard National Response Center, or any other governmental agency occurred.

RCRA

In 2011, no spills or leaks from facilities, operations, or other activities occurred that would lead to RCRA cleanups. Also, no cleanups or surveillance activities for leaks or spills occurred in prior years. The Albany site maintains an active groundwater monitoring network, which is described below.

9.2 NEPA

Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. In 2011, all funded projects at the Albany site were determined to be categorically excluded.

9.3 TSCA

Albany did not have any spills or releases of TSCA-regulated substances (e.g., pesticides, PCBs, formaldehyde, methylene chloride, asbestos) in 2011.

9.4 Radiation Protection Program

Ionizing Radiation Program

X-ray generating devices are used for analytical applications at the Albany site, including scanning and transmission electron microscopes, x-ray diffraction and fluorescence instruments, and a particle-size analyzer. Table 9.2.1: 2011 Albany X-Ray Radiation Generating Devices lists the x-ray radiation generating devices at Albany. All are examined annually for leaks and safety

interlocks/controls to ensure employee safety. A dosimetry program has been in place since the 1950s to check for employee exposures. No sealed sources are located at the site. No new radioactive materials are brought to the site; however, a few legacy items remain stored in the Building 28 hot cell and other controlled locations across the site awaiting disposal (scheduled for FY2012). The site maintains an active site use permit with the Department of Ecology of the State of Washington that allows for the disposal of low-level radioactive wastes at the regional waste handling facility, U.S. Ecology Washington.

Laser Program

The Albany site uses Class I lasers in common office devices, including laser pointers, compact disk readers within personal computers, and fiber-optic communication lines. These lasers are built into commercial devices that protect the consumer through engineering design. Staff members also have laser pointers or other equipment that are either Class II or Class III, which have been approved via the SARS process. Based on lasers currently used at the Albany site, a nominal laser safety program has been implemented at the site that adequately protects personnel.

9.5 Air Quality and Protection Activities

Albany has no emissions that require monitoring, reporting, or permitting based on current operations. In 2011, no new source (pre-construction) reviews for any facilities or projects owned or managed by the Albany site occurred. Operation of the Albany site does not contribute significantly to any emissions under the National Ambient Air Quality Standards (NAAQS). No Albany facilities or projects are regulated under NESHAP. Albany facilities and projects do not 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 toxic air pollutants, nor are any facilities or projects regulated for any of the 189 toxic air pollutants.

Ozone-depleting refrigerants are used for air conditioning, refrigeration, and chilling. A list of existing ODS is maintained, and they are being replaced with more environmentally friendly units on a continual basis.

9.6 Water Quality and Protection Activities

Albany holds a wastewater discharge permit with the City of Albany, which was last renewed in 2011 on a four-year renewal cycle. In addition, Albany has also filed a slug discharge control plan with the city, which must be renewed every two years. No storm water permit is held by Albany, because regulation is augmented by the city through the wastewater permit. Albany site activities in 2011 resulted in no unplanned releases, leaks, or spills that required reporting to governmental agencies.

9.7 Executive Orders and DOE Orders

EO 13423 – *Strengthening Federal Environmental, Energy, and Transportation Management* and EO 13514 – *Federal Leadership in Environmental, Energy, and Economic Performance*

These executive orders require Albany to ensure that all necessary actions are taken to integrate environmental, safety, and health accountability into day-to-day decision making and long-term planning processes across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of Albany policies, operations, planning, and management. Albany, like the rest of the sites, achieves this requirement through its development and implementation of the NETL ES&H management system. Through the ES&HMS, NETL ensures that strategies are established to support environmental, safety, and health leadership programs, policies, and procedures, and that senior-level managers explicitly and actively endorse these strategies. The goals of the two executive orders have become the cornerstone of NETL's ES&HMS. NETL has considered the requirements of these orders when developing its list of ES&H Significant Aspects, its Objectives and Targets, and ultimately, the associated EMPs. For more specific information, please refer to Section 1.1, EO 13423 and EO 13514.

Albany was recertified to the ISO 14001:2004 standard on August 5, 2010, (to the same scope as the Morgantown and Pittsburgh sites). ISO 14001 certification was maintained throughout 2011, as verified by internal and external audits. The Albany site also underwent an OHSAS 18001:2007 certification audit in August 2010. The results indicated that the Albany site conformed to the OHSAS 18001 standard. The Albany site underwent a surveillance audit in June 2011.

DOE Order 435.1—Radioactive Waste Management

The small amount of radioactive waste on the site is a result of historic operations and is managed under the program described in Section 9.2 Radiation Protection.

9.8 Groundwater and Soil Quality Protection Activities

In 2001, Albany initiated a groundwater protection and monitoring program in accordance with DOE requirements. The program follows the ODEQ Cleanup Programs, with regulatory input from Oregon DEQ. Albany installed 14 monitoring wells on site in July 2002, and sampled the wells for a broad range of contaminants, including VOCs, SVOCs, metals, nitrates, and PCBs from all of the wells.

Albany also screened for pesticides, herbicides, dioxins, and radiological constituents from a selected subset of the wells. Initial periodic sampling showed concern over elevated levels of VOCs, metals, and radiological constituents, necessitating continued periodic monitoring. Subsequent periodic monitoring events have shown concern regarding excessive turbidity of samples directly influencing metals and radiological results, which resulted in a review of sampling protocols and a change to require future collection of ground water samples be performed using EPA low-stress protocols. The use of the low-stress protocol yielded metal and radiological contaminant levels in groundwater being at or near background levels for the Willamette Valley in Oregon, where the site is located.

VOC detections during periodic monitoring prompted Albany to further investigate areas of suspected contamination, with planning efforts starting in September 2004 and on-site work initiated in January 2005. Results from samples taken in February 2005 showed contaminants of

potential concern (COPCs) were likely crossing the eastern boundary of the site and migrating toward Liberty Elementary School. After meeting with Oregon DEQ and the Greater Albany Public School (GAPS) District personnel, actions were taken to perform site investigations onsite and offsite during March-December 2005. Results of the site investigation showed no concern over surface soils, subsurface soils, soil gas, or ambient air at off-site properties. The only concern identified was with elevated levels of COPCs in groundwater, including trichloroethene (TCE), carbon tetrachloride, and chloroform. Additional monitoring wells have been installed both on site and off site at Liberty Elementary School property, which is adjacent to the site (see Figure 9.6.1: Monitoring Well Locations – Albany for well locations). The results of the 2011 monitoring program are presented in Tables 9.6.1 and 9.6.2.

ODEQ initiated sampling of residential wells within an approximate two-block radius of the site due to concerns of residents voiced at town hall meetings and further reviews of the sampling results. A total of 31 residential wells were sampled, with some residential wells (including some used as drinking water) showing elevated levels of COPCs. All of the owners of those wells used for drinking water (10) have been connected to City of Albany potable water supplies by NETL. NETL has properly removed any wells that residents requested to be abandoned.

Albany is continuing its site investigation activities, periodic monitoring, and remedial actions in accordance with ODEQ requirements and will pursue actions to protect human health and the environment by eliminating risk and minimizing potential exposures. The most current activities include the upgrade of six well locations. The upgrades will improve the overall understanding of subsurface lithology and hydrogeologic conditions.

9.9 Other Major Environmental Issues and Actions

Chronic Beryllium Disease Prevention Program (CBDPP). Albany has developed a CBDPP based on the requirements of 10 CFR 850. The program plan was issued in October 2005 and will be updated based on current beryllium requirements. The initial site inventory of the beryllium contaminations at the Albany site was completed in 2007 and showed several areas across the site to have residual beryllium concentrations above background levels (those attributable to soils and building materials). Remedial actions, as well as protective health measures, were instituted at the Albany site, with remedial activities occurring from September 2008 through September 2009. Now that the remedial activities are completed, the Albany site is considered to be beryllium-free and the only remaining program activities will be long-term medical monitoring of personnel who worked at the Albany site during times of known potential beryllium exposure.

SUGAR LAND

10.1 Site Description

Figure AE: City of Sugar Land.

The Sugar Land office, which has no laboratory facilities, does not engage in the same compliance assessment processes as the Morgantown, Pittsburgh, or Albany sites. Because building and facility operations and maintenance are under the control of the landlord, the Sugar Land office itself has to comply with few ES&H regulations. The Sugar Land office does not undertake in-house audits, external audits, or subject matter reviews. Regulatory agencies do not conduct ES&H inspections or investigations of activities. However, in-house inspections and regulatory agency inspections (e.g., by the local fire marshal or municipal building inspectors) of the building and facilities could occur, with any subsequent findings assessed against the landlord. Eight employees work at the Sugarland location; four are federal employees and four are site support contractors.

Building occupants participate in fire drills, which are conducted according to local fire marshal requirements and in cooperation with the building management. Volunteer fire wardens conduct roll call during drills and facilitate orderly evacuations. Tornado drills are announced through a building-wide public address system and are conducted in accordance with Occupational Safety and Health Administration emergency response requirements.

The City of Sugar Land (Figure AE) does not impose recycling requirements that would apply directly to office space leases. Nevertheless, building management has a recycling program throughout the office building complex. The landlord has a building-wide recycling plan and procedure for tenant participation.

No citations for violations of ES&H laws, regulations, or ordinances occurred in 2011.

As of the 2011 census, there were 84,511 people and 23,615 households in the city. The population density was 2,434.2/sq mi. There were 27,727 housing units at an average density of 856.3/sq mi. The racial makeup of the city was 52.0 percent White, 10.6 percent Hispanic or Latino of any race, 35.3 percent Asian, 7.4 percent African American, and 2.8 percent from two or more races.

The median income for a household in the city was $111,261. The per capita income for the city was $39,991. About 5.8 percent of the population was below the poverty line. The major employers in Sugarland are Fluor, Schlumberger, Methodist Sugar Land Hospital, Nalco, St. Luke’s Hospital, Memorial Hermann, Noble, Camelot Desserts, Aetna, and Baker Petrolite.

10.2 Major Site Activities

All facilities of the NETL office in Sugar Land are located in The Granite Towers, an office building complex. The offices are leased by DOE/NETL under its own leasing authority. In 2011, the Sugar Land office undertook no actions to alter facilities or operations in a manner that could change the current impacts on the environment around the offices.

COMPLIANCE STATUS

11.1 Environmental Restoration and Waste Management

The Sugar Land office had no off-site remediation activities, no on-site CERCLA/SARA cleanups, and no spills or leaks from facilities or operations that were ongoing in 2011. No NPL sites for which NETL-Sugar Land had liability under CERCLA/SARA exist. No cleanups or surveillance activities for leaks or spills or other activities that would lead to RCRA cleanups occurred in prior years.

Sugar Land office does not have a program to deal with hazardous waste; however, building management does recycle some RCRA universal (hazardous) waste materials through an E-cycling program. This program is designed for pickup and disposal of electronics, dry-cell batteries, etc. through a local vendor on a biannual basis.

11.2 NEPA

Sugar Land does not conduct NEPA reviews for proposed off-site federal actions. These actions relate to contract awards or grants to other governmental organizations, educational institutions, and private industry, and were completed by NEPA staff in Morgantown, West Virginia. Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals under consideration for funding or financial support. The completed forms are evaluated by the NEPA compliance officer at the Morgantown site for a determination of the appropriate level of NEPA review (i.e., EIS, EA, or CX). In 2011, all funded projects were determined to be CXs.

11.3 TSCA and FIFRA

Sugar Land housed no TSCA-regulated substances, and no restricted-use pesticides, herbicides, or defoliants were kept within the offices in 2011 or any other years. The landlord and building management organization provide pest control services and grounds-keeping services.

11.4 Radiation Protection

Ionizing Radiation Program

No ionizing radiation sources are at Sugar Land.

Laser Program

The Sugar Land office has Class I lasers in common office devices, such as laser printers, CD readers within PCs, and fiber-optic communication lines. These lasers are built into devices which protect the consumer through engineering design. Staff members may also have laser pointers that are either Class II or Class III and are commonly used by speakers during lectures and presentations. A laser safety program has not been implemented at the Sugar Land site and is currently viewed as unnecessary due to the absence of more dangerous, higher class lasers on site.

11.5 Air Quality and Protection Activities

Because it is strictly a project management office implementing oil and gas programs, Sugar Land has no air quality protection program and no emissions that require monitoring, reporting, or permits. In 2011, no new source (pre-construction) reviews for any facilities or projects owned or managed by the Sugar Land office occurred. Operation of the Sugar Land office does not contribute significantly to any violations of NAAQS. No Sugar Land office facilities or projects are regulated under the NESHAPS program. Sugar Land office facilities and projects do not 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 toxic air pollutants, nor are any facilities or projects regulated for any of the 189 toxic air pollutants.

Any ozone-depleting refrigerants used for air conditioning inside the offices are under the control of the building management organization. No plans or activities related to the phase out of ozone-depleting substances at Sugar Land are planned.

11.6 Water Quality and Protection Activities

The building landlord and the landlord's building management contractor deal with sewer use permits and storm water runoff control and permits. The level of impact on surface water is assumed to be about the same as for other office complexes in the region. Sugar Land office activities in 2011 resulted in no unplanned releases, leaks, or spills that would require reporting to governmental agencies.

In 2011, tests of the potable water supplies on site occurred to verify compliance with the Safe Drinking Water Act standards. Testing was performed by the City of Sugar Land (municipal water authority) in compliance with the Safe Drinking Water Act standards, and the report can be reviewed at http://www.sugarlandtx.gov/utilities/reports index. Sugar Land's water supply comes from the municipal water distribution network (City of Sugar Land).

11.7 Executive Orders

EO 13423 – *Strengthening Federal Environmental, Energy, and Transportation Management*

This executive order requires federal agencies to implement an EMS. However, as previously discussed, the Sugar Land office engages in minimal ES&H activities. The office consists of part of one floor of leased space inside an office building complex. On-site ES&H activity primarily focuses on Order 231.1 reporting (e.g., worker injury and lost workday data), the NEPA process, and affirmative procurement of office supplies and miscellaneous items. The Sugar Land office does not maintain an EMS and is not covered by NETL's system in effect at the Albany, Pittsburgh, and Morgantown sites. Inclusion of the Sugar Land office may be considered in the future. The Sugar Land office does not have a formal pollution prevention program; however, staff members are involved through activities described under the Pollution Prevention Program above.

Sugar Land's electricity costs are included in the rent. Lights and air conditioning are governed by a building energy management system that uses timers, which are on between 6:00 a.m. and 6:00 p.m. and off at night, on weekends, and on holidays. Windows in the building are tinted and sealed, further reducing the need for cooling. Energy-efficient lighting has replaced conventional bulbs, and the staff purchases Energy Star® products when the opportunity arises. The Sugar Land tenant improvements included energy-saving light sensors within the office space. Granite Tower II has received a certification as an Energy Star® building and has applied for LEED Silver certification. Although no formal energy efficiency training is in place for the Sugar Land office staff, they receive informal education through the use of posters throughout the office. Also, the offices have containers for recyclables.

Sugar Land does participate in NETL's recycling program. As an example, surplus electronic personal property is disposed through qualified recycling vendors both in-place at the Sugar Land office, as well as returned to the Morgantown, West Virginia, site for sanitization prior to disposal. No statistics on the amount of materials recycled on behalf of Sugar Land are available. Statistics for the personal property disposals of electronic equipment are maintained as part of the personal property record. Individuals who regularly purchase items are instructed to give preference to the purchase of items with recycled content. Large volume items are purchased through the Morgantown warehouse.

11.8 Groundwater and Soil Quality Protection Activities

No additional groundwater or soil quality protection activities are required at Sugar Land.

11.9 Other Major Environmental Issues and Actions

The Sugar Land site is not aware of any ongoing or pending lawsuits, NOVs, public accusations of regulatory violations, environmental occurrences, or any non-routine releases of pollutants. No violations of any compliance agreements or cleanup agreements or any unresolved compliance issues occurred. No audits were conducted in 2011 under the sponsorship of DOE Headquarters.

FAIRBANKS

12.1 Site Description

NETL's Arctic Energy Office supports research into oil and natural gas extraction and utilization. Activities include the development of technical and economic analysis of potential fossil energy recovery activities, evaluation of environmental practices associated with tundra access in support of oil exploration, and facilitating communications with key stakeholders. One federal employee worked at the Fairbanks location in 2011.

Figure AF: City of Fairbanks.

Fairbanks, Alaska, (Figure AF) is located in the heart of Alaska's Interior, on both banks of the Chena River, near its confluence with the Tanana River in the Tanana Valley. By air, Fairbanks is 55 minutes from Anchorage and 3.5 hours from Seattle. It lies 358 road miles (576 km) or approximately a 6-hour drive north from Anchorage.

As of the 2011 census, there were 31,535 people and 12,004 households in the city. The population density was 995.0/sq mi. There were 13,056 housing units at an average density of 412.0/sq mi. The racial makeup of the city was 66.1 percent White, 10.0 percent Native American, 9.0 percent African American, 3.6 percent Asian, 2.6 percent Hispanic, Latino or some other race, 0.8 percent Pacific Islander, and 7.9 percent from two or more races.

The median income for a household in the city was $51,365. The per capita income for the city was $25,757. About 10.4 percent of the population was below the poverty line. The major employers in Fairbanks are the University of Alaska at Fairbanks, the U.S. Government, the Fairbanks North Star Borough School District, the State of Alaska, Banner of Health System, Fred Meyer, and Wal-Mart.

The Fairbanks office consists of 1,707 sq ft of usable lease space rented by GSA on behalf of NETL. The Fairbanks office is located in the same building and on the same floor as the U.S. Small Business Administration and U.S. Army Corps of Engineers. Building operations, maintenance and janitorial services are under control of the landlord, and therefore, minimal compliance assessments and ES&H inspections and investigations are required. The Fairbanks office does not undertake in-house audits, external audits, or subject matter reviews. However, in-house inspections and regulatory agency inspections (e.g. by the local fire marshal or municipal building inspectors) of the building and facilities may occur, with any subsequent findings assessed against the landlord.

GSA implements inspection of the Fairbanks lease space at random and on a multi-year basis to ensure the building is compliant with all government requirements and local codes. However, no actions were taken in 2011 to alter the facility or operations in a manner that could change the current impacts on the environment around the Fairbanks office.

12.2 Environmental Compliance

The Fairbanks office provides office space to a single employee. Due to the nature of the work (contracts administration, interagency, and intergovernmental coordination, and industry outreach), the waste management services are minimal and are provided by the landlord under the terms of the rental agreement.

The Fairbanks office is not required to implement an environmental compliance program. It has never formally implemented a pollution prevention program. Fairbanks staff practice affirmative procurement whenever possible (i.e., the procurement of goods containing recycled content or having less life-cycle impact on the environment). No formal recycling program exists within the Fairbanks community. However, the single Fairbanks employee contributes to the local recycling efforts that are available.

For example, the Army Corps of Engineers, located adjacent to the Arctic Energy Office, has arranged for a local job training center for disadvantaged youth to pick up empty toner cartridges for local recycling. The Arctic Energy Office has joined in this program and provides its empty cartridges to the same organization.

12.3 NEPA

Any contract performed through or supported by the Arctic Energy Office is reviewed independently by NETL for its potential environmental impact before the project is undertaken. The Fairbanks office does not conduct NEPA reviews for such proposed, offsite actions. These actions typically involve contract awards to other governmental organizations, educational institutions, and private industry. Project proponents fill out a questionnaire addressing the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. The completed questionnaire is then reviewed by NETL's NEPA compliance officer for a determination of the appropriate level of NEPA review (i.e., EIS, EA, or CX). In 2011, all projects supported by the Fairbanks office were determined to fall within the level of CXs.

12.4 Radiation Protection

The only sources of potentially harmful radiation in the Fairbanks office are Class I lasers commonly found in printers and CD/DVD readers/recorders. Fairbanks staff ensured protection from these lasers through proper engineering design of the electronic devices.

12.5 Air Quality and Protection Activities

The city of Fairbanks is encompassed by a 24-hour $PM_{2.5}$ nonattainment area (NAA), in violation of the $PM_{2.5}$ National Ambient Air Quality Standards. There is currently a focused effort and collaboration among major federal, state, and local agencies to identify the sources and mechanisms that form air pollution in the city of Fairbanks, and ultimately to restore the air quality in the entire city-wide area. The conditions and sources that cause or contribute to air pollution in the city of Fairbanks are not well understood, due to the extreme weather and

complexity of sources. However, due to the nature of the work performed (contracts administration, interagency, and intergovernmental coordination, and industry outreach), the Fairbanks office is not a major source of air emissions, nor does it contribute to the 24-hour $PM_{2.5}$ violation.

12.6 Water Quality and Protection Activities

The Fairbanks office landlord is responsible for maintaining sewer and storm water and any other related permits.

12.7 EO 13423: *Strengthening Federal Environmental, Energy, and Transportation Management*

NETL-Fairbanks engages in minimal ES&H activities. The office consists of approximately 1,700 sq ft of usable space inside a commercial office building. On-site ES&H primarily focuses on affirmative procurement of office supplies and miscellaneous items. The office does not maintain an EMS, nor is it covered by NETL's EMS system in effect at the Albany, Pittsburgh, and Morgantown sites.

12.8 Other Major Environmental Issues and Actions

Fairbanks staff is not aware of any ongoing or pending lawsuits, NOVs, public accusations of regulatory violations, or environmental occurrences. No violations of compliance agreements or cleanup agreements or any unresolved compliance issues have occurred. No audits were conducted in 2011 under the sponsorship of DOE Headquarters, independent regulators, or other independent third parties.

ANCHORAGE

13.1 Site Description

Figure AG: City of Anchorage.

Anchorage is Alaska's primary government, transportation, industry and population center. The Anchorage office was established in 2010 to support the role and function of NETL's Arctic Energy Office in Fairbanks. Anchorage (Figure AG) is located in south-central Alaska on the northern end of the Cook Inlet, and is situated between the Chugach Mountains and the tidal inlets known as the Turnagain and Knick Arms. By air, Anchorage is 55 minutes from Fairbanks and 3.5 hours from Seattle. It lies 358 road miles (576 km) south of Fairbanks. One site support contractor employee worked at the Anchorage location in 2011.

As of the 2011, there were 291,826 people and 107,332 households in the city of Anchorage. The population density was 153.4/ sq mi, with 113,032 housing units at an average density of 59.1/sq mi. The racial makeup was 66.0 percent White, 7.9 percent Native American, 8.1 percent Asian, 5.6 percent African American, 2.0 percent Pacific Islander, 2.3 percent Hispanic, Latino or some other race, and 8.1 percent from two or more races.

Additionally, the median income for a household in Anchorage was $72,128 and the per capita income was $34,516. About 9.0 percent of the population was below the poverty line. The major employers in Anchorage are the U.S. Department of Defense, the Alaskan State Government, the Federal Government (civilian sector), the University of Alaska at Anchorage, the Anchorage School District, the Ted Stevens International Airport, and Providence Health and Services.

The Anchorage office consists of commercial lease space rented by GSA on behalf of NETL. The lease includes 725 sq ft of usable space, as well as one covered and one surface parking space. The Anchorage office is located in the same building and on the same floor as the U.S. Arctic Research Commission and the U.S. Small Business Administration. The five-story building additionally provides office space to several private companies, as well as storefront space to one retail business and one restaurant. The building is located in downtown Anchorage and is surrounded by numerous other commercial office buildings, parking facilities, retail businesses, hotels, and restaurants.

Building operations, maintenance and janitorial services are under the control of the landlord, and therefore, minimal compliance assessments and ES&H inspections and investigations are required. The Anchorage office does not undertake in-house audits, external audits, or subject matter reviews. However, in-house inspections and regulatory agency inspections (e.g. by the local fire marshal or municipal building inspectors) of the building and facilities may occur, with any subsequent findings assessed against the landlord. Although fire drills are not practiced, the building is equipped with a fire detection and suppression system that is tested by the landlord on an annual basis.

GSA implements inspection of the Anchorage lease space at random and on a multi-year basis to ensure the building is compliant with all government requirements and local codes. However, no actions were taken in 2011 to alter the facility or operations in a manner that could change the current impacts on the environment around the Anchorage office.

13.2 Environmental Compliance

The Anchorage office provides office space to a single employee. Due to the nature of the work (contracts administration, interagency, and intergovernmental coordination, and industry outreach), the waste management services are minimal and are provided by the landlord under the terms of the rental agreement. The city of Anchorage does not impose recycling requirements that applies to leased office space. There is no formal recycling program in place at the Anchorage office; however, designated containers exist for the recycling of paper and plastic.

The Anchorage office is not required to implement an environmental compliance program. It does not formally implement a pollution prevention program. Anchorage staff practice affirmative procurement whenever possible (i.e., the procurement of goods containing recycled content or having less life-cycle impact on the environment).

The Anchorage office had no off-site remediation activities, no on-site CERCLA/SARA cleanups, and no spills or leaks from facilities or operations that were ongoing in 2011. There were no NPL sites for which NETL-Anchorage had liability under CERCLA/SARA. There were no cleanups or surveillance activities for leaks or spills or other activities that would lead to RCRA cleanups.

13.3 NEPA

Any contract performed through or supported by the Anchorage office is reviewed independently by NETL for its potential environmental impact before the project is undertaken. The Anchorage office does not conduct NEPA reviews for such proposed, offsite actions. These actions typically involve contract awards to other governmental organizations, educational institutions, and private industry. Project proponents fill out a questionnaire addressing the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. The completed questionnaire is then reviewed by NETL’s NEPA compliance officer for a determination of the appropriate level of NEPA review (i.e., EIS, EA, or CX). In 2011, all projects supported by the Anchorage office were determined to fall within the level of CXs.

13.4 Radiation Protection

The only sources of potentially harmful radiation in the Anchorage office are Class I lasers commonly found in printers and CD/DVD readers/recorders. Anchorage staff is ensured protection from these lasers through proper engineering design of the electronic devices.

13.5 Air Quality and Protection Activities

The air quality in the city of Anchorage is in compliance with all governing regulations. The Anchorage office landlord is responsible for maintaining sufficient air quality in the building, and implements ventilation air filter changes on a quarterly basis. Any ozone-depleting refrigerants that may be used for air conditioning are under the control of the landlord.

Due to the nature of the work performed (contracts administration, interagency, intergovernmental coordination, and industry outreach), the Anchorage office is not a major source of air emissions and therefore it is unnecessary to implement air quality monitoring, regulation or protection programs.

13.6 Water Quality and Protection Activities

The Anchorage office landlord is responsible for maintaining sewer and storm water and other related permits. The landlord tests the domestic water supply annually to ensure compliance with Safe Drinking Water Act standards.

13.7 EO 13423: *Strengthening Federal Environmental, Energy, and Transportation Management*

NETL-Anchorage engages in minimal ES&H activities. The office consists of approximately 725 sq ft of usable space inside a commercial office building. On-site ES&H primarily focuses on affirmative procurement of office supplies and miscellaneous items. The Anchorage office does not maintain an EMS and is not covered by NETL’s EMS system in effect at the Albany, Pittsburgh, and Morgantown sites. There were no citations for violations of ES&H laws, regulations, or ordinances in 2011.

The Anchorage office landlord additionally practices affirmative procurement and has been phasing out low-cost, low-efficiency T12 lamps with higher efficiency replacements, per DOE’s 2009 energy efficiency standards for general-service fluorescent lamps.

13.8 Other Major Environmental Issues and Actions

Anchorage staff is not aware of any ongoing or pending lawsuits, NOVs, public accusations of regulatory violations, or any environmental occurrences. No violations of compliance agreements or cleanup agreements or any unresolved compliance issues have occurred. No audits were conducted in 2011 under the sponsorship of DOE Headquarters, independent regulators, or other independent third parties.

APPENDIX

14.1 Acronym List

AAD	Acquisition and Assistance Division
ACHD	Allegheny County Health Department
AEA	Atomic Energy Act of 1954
AEP	American Electric Power Service Corporation
AES	American Environmental Services, Inc.
AIIS	Assessment Information Input System
ALARA	As low as reasonably achievable
ANWR	Alaska National Wildlife Refuge
AQCR	Air Quality Control Region
ARRA	American Recovery and Reinvestment Act
B-	Building
BAMF	Biomass Alternative Methane Fuel
BOD	Biochemical oxygen demand
CAA	Clean Air Act
CBDPP	Chronic Beryllium Disease Prevention Program
CBOD5	Carbonaceous biochemical oxygen demand 5-day test
CBT	Computer-based training
CCPI	Clean Coal Power Initiative
CCUS	Carbon Capture, Utilization, and Storage
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFC	Chlorofluorocarbon
CFO	Chief Financial Officer
CFR	U.S. Code of Federal Regulations
COD	Chemical oxygen demand
COPC	Contaminants of potential concern
CRADA	Cooperative Research and Development Agreement
CWA	Clean Water Act
CX	Categorical exclusion
CY	Calendar year
DMR	Discharge monitoring reports
DOE	U.S. Department of Energy
DOT	Department of Transportation
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
EOR	Enhanced Oil Recovery
EPA	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	Environmental, Safety, and Health
ES&HMS	Environmental, Safety, and Health Management System
ESCO	Mid-Atlantic Energy Services Company
ESPC	Energy Savings Performance Contract
ESS&H	Environmental, Security, Safety and Health
FCOG	Facility Contractors Group
FE	Office of Fossil Energy
FEMP	Federal Emergency Management Program
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLC	Federal Laboratory Consortium
FONSI	Finding of no significant impact
FY	Fiscal Year
GAPS	Greater Albany Public Schools
GCFI	Ground-fault circuit interrupter
GHG	Greenhouse gas
GIS	Geographic Information System
GMP	Groundwater Management Program
GPDU	Gas Process Development Unit
GPP	General plant project
GRE	Great River Energy
GSA	U.S. General Services Administration
HAZWOPER	Hazardous waste operations and emergency training
HPSB	High Performance and Sustainable Buildings
HVAC	Heating, Ventilation, and Air Conditioning
HQ	Headquarters
IAQ	Indoor air quality
ICCS	Industrial Carbon Capture and Sequestration
IGCC	Integrated Gasification Combined Cycle
ISM	Integrated Safety Management
ISO	International Organization for Standardization
LDR	Land Disposal Restriction
LED	Light-emitting diode
LEED	Leadership in Energy and Environmental Design
LLRW	Low-level radioactive waste
MAA	Mutual Aid Agreement
MGN	Morgantown, West Virginia
MRT	Management Review Team
MSHA	Mine Safety and Health Administration
MUB	Morgantown Utility Board
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NEC	National Electric Code

NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NETL-RUA	NETL-Regional University Alliance
NFPA	National Fire Protection Association
NIMS	National Incident Command System
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
NPRA	National Petroleum Reserve
NRC	Nuclear Regulatory Commission
OCF	Office of Crosscutting Functions
ODEQ	Oregon Department of Environmental Quality
ODS	Ozone-Depleting Substance
OHSAS	Occupational Health and Safety Assessment Series
OIO	Office of Institutional Operations
ORD	Office of Research and Development
ORPS	Occurrence Reporting and Processing System
OSAP	Office of Systems, Analyses, and Planning
OSHA	Occupational Safety and Health Administration
PADEP	Pennsylvania Department of Environmental Protection
PCB	Polychlorinated biphenyl
PGH	Pittsburgh, Pennsylvania
PHA	Pleasant Hills Authority
PMC	Project Management Center
QA	Quality Assurance
QC	Quality Control
R&D	Research and development
RCRA	Resource Conservation and Recovery Act
RIP	Incident Response Pre-plan
SARA	Superfund Amendments and Reauthorization Act
SARS	Safety Analysis and Review System
SCC	Strategic Center for Coal
SCNGO	Strategic Center for Natural Gas and Oil
SECA	Solid State Energy Conversion Alliance
SMS	Safety Management System
SOFC	Solid Oxide Fuel Cell
SPCC	Spill Prevention, Control, and Countermeasures Plan
SSP	Site Sustainability Plan
SVOC	Semi-volatile organic compound
SWQM	Surface water quality manager
TLD	Thermo-luminescent dosimeter
TMDL	Total maximum daily loading

TOX	Total organic halogens
TPH	Total petroleum hydrocarbons
TPQ	Threshold Planning Quantity
TRI	Toxic release inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and disposal
TSS	Total suspended solids
USDA	U.S. Department of Agriculture
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
VE-PSI	Virtual Engineering-Process Simulator Interface
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

14.2 Tables and Figures

Table 1.2.1: ES&H Programs
Affirmative Procurement Advocate/Greening Acquisition Program
Air Quality Program
Alarms Oversight Program
Asbestos and Lead Abatement Program
Authority Having Jurisdiction (AHJ)/Exemptions Program
Assessment Information Input System (AIIS) Program
Beryllium Program
CAIRS Program (Injury/Illness Reporting)
Chemical Handling Facility
Chemical Hygiene Program
Chemical Inventory and MSDS Program
Confined Space Program
Construction and Maintenance Safety Program
Cryogenic Safety Program
Directives Program Electrical Safety Program
Emergency Preparedness Program/Emergency Response Program
Environmental Management System (EMS) and Safety Management System (SMS) – Management Review Program
Environmental Program
Ergonomics Program
ES&H Communications Program
ES&H Training Program
Facility and Area Custodian Program
Facility Work Authorization Program (SOD)
Facility Safety Committee Program
Fire Protection Program
Fire Warden Program
Ground Water Quality Program
Hazard Communication Program
Hazardous Waste Program
Hearing Conservation Program
Illumination Quality Program
Inactive Waste Sites/Off-Site Remediation Program
Indoor Air Quality and Ventilation Program
Industrial Hygiene Program

Table 1.2.1: ES&H Programs
Industrial Wastewater Quality Program
Laser Safety Program
Lessons Learned Program
Life Safety Program
Medical Monitoring Program
NEPA Compliance Program
Non-RCRA Waste Program
Occupational Medicine Program
Occurrence Reporting and Processing System (ORPS) Program
Organization Incident Reporting Program
OSHA Safety Program
R&D Projects Program
Radiation Safety Program
Records Program
Respiratory Protection Program
Safety & Health Program
SARA Title III Program
SARS Program
Soil Quality Program
Storage Tank Program
Surface Water Quality Program
Waste Management Oversight Program
Waste Minimization and Pollution Prevention Program
Water Quality Program
Workers' Compensation Program Worker Protection Program

Table 2.3.1: Environmental, Safety, and Health Significant Aspects for FY2011
Waste Minimization, Pollution Prevention, and Recycling
High Performance Sustainable Building Implementation
Hazardous Materials Procurement, Consumption, and Storage
Electronic Stewardship
Energy and Fuel Use
Greenhouse Gas Air Emissions
Green Purchasing
Pest and Other Landscaping Management
Accidents/Incident Rates
Water Usage
Infrastructure Safety
Groundwater Legacy Issues

Table 2.4.1: Environmental, Safety, and Health Significant Aspects for FY2012
Waste Minimization, Pollution Prevention, and Recycling
High Performance Sustainable Building Implementation
Hazardous Materials Procurement, Consumption, and Storage
Electronic Stewardship
Energy and Fuel Use
Greenhouse Gas Air Emissions
Green Purchasing
Pest and Other Landscaping Management
Accidents/Incident Rates
Water Usage
Groundwater Legacy Issues
Infrastructure Safety
On-site Construction Activities

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Waste Minimization, Pollution Prevention, and Recycling				
Nonhazardous Waste Generation	Reduce the amount of routine nonhazardous waste generated based on an FY2008 baseline of 222.5 metric tons. (EO 13423) Maintain cost-effective waste prevention and recycling programs (EO 13423), and minimize generation of waste and pollutants through source reduction. (EO 13514)	222.5 metric tons	**209.2 metric tons** **(6% Reduction)**	**190.06 metric tons** **(15% Reduction)**
Hazardous Waste Generation	Reduce the amount of hazardous waste based on an FY2008 baseline of 2.5 metric tons. (EO 13423)	2.5 metric tons	**2.10 metric tons** **(16%** Reduction**)**	**1.75** **(30% Reduction)**
Recycling	Using a FY2010 baseline (632,723 lbs) divert 50% of nonhazardous solid waste from disposal, and increase recycling 10% by end of FY2015. (EO 13514)	632,723 lbs. (287 metric tons)	**63,272 lbs (29 metric tons)** **10%** Increase	**259,161 lbs (116 metric tons)** **41% Increase**
Recycling Construction Waste	Recycle a minimum of 50% of construction/demolition waste diverted from landfill disposal by the end of FY2015. (EO13514) Increase recycling construction waste to 38%.		**38%**	**83.8%**
High Performance Sustainable Building Implementation				
High Performance Sustainable Buildings	Ensure all new construction, major renovation, or repair and alteration complies with the Guiding Principles. (EO 13514) Ensure 15% of existing facilities and building leases (above 5,000 gross square feet) meet the Guiding Principles by FY2015. (EO 13514) Make annual progress towards 100% conformance with the Guiding Principles. (EO 13514)		**Track the completion status of upgrades/renovations to High Performance Sustainable Buildings (HPSB) identified in its HPSB FY2010 Survey and Site Sustainability Plan as part of its Site Sustainability Plan.**	**NETL's FY2011 HPSB building candidates have been reassigned to NETL's FY2012 General Plant Projects (GPP) Plan.**

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Historic Buildings	Promote long-term viability of agency-owned historic buildings by ensuring that rehabilitation utilizes best practices and technologies in retrofitting. (EO 13514)		**Consider 10% of the historic buildings for potential renovation or demolition at the Albany site.**	**Two projects were initiated (*Bldgs. 26 and 1; awaiting programmatic agreement between NETL and Oregon State Historic Preservation Officer (SHPO) to begin site construction work.**
Hazardous Materials Procurement, Consumption, and Storage				
Chemical Inventory	Reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed by FY2015 by quantifying the number of containers on site at NETL at the end of FY2010 as a baseline. (EO 13514)	10,986 containers 229,661 lbs	**No net gain of chemicals (by weight in pounds) +/- 10%.**	**10,351 containers (5.8% decrease)** **234,883 lbs. (2.2% increase)**
Green Chemical Alternatives	Increase the use of acceptable alternative chemicals and processes for janitorial and other institutional uses. Decrease chemical use to assist in achieving GHG reduction targets. (EO 13514)		**Complete implementation of a new webpage with links to instructions for finding green chemical alternatives.**	**Completed implementation of webpage.**
Class 1 Refrigerants	Eliminate use of Class I refrigerants by year 2010, to the extent economically practicable, and to the extent that safer alternatives are available. (Baseline inventory = 190 lbs in 2002.) (Clean Air Act)	190 lbs	**0**	**3.3 lbs eliminated** **35.3 lbs remaining**
Electronic Stewardship				
Purchase of Electronic Products	Ensure procurement reference for EPEAT-registered electronic products and the procurement of Energy Star- and FEMP-designated electronic equipment. (EO 13514)		**95% of products purchased that have EPEAT standards are EPEAT registered.** **95% of specific electronic products are Energy Star- and FEMP-designated.**	**100% of products are EPEAT registered** **100% of products are Energy Star and FEMP-designated.**

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Operation and Maintenance of Electronic Products	Enable power mgmt., duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. (EO 13514) Ensure that 90% of managed workstations and printers have power mgmt. settings. (IG findings)		**Develop a methodology to collect the statistics to measure the number of managed workstations and printers with power management in place by the end of FY2011.**	**Methodology developed which yielded 100% of printers and 90% of PCs have power management.**
Energy and Fuel Use				
Energy Use	Reduce energy usage/square foot by 3% annually through the end of FY2015 based on the FY2003 baseline - 219,903 Btu/sq ft. (EO 13423) Reduce energy intensity in buildings to achieve GHG reductions. (EO 13514)	219,903	**180,320** **(18% Reduction)**	**168,490** **(23% Reduction)**
Advanced Metering and Measurement	Install advanced electrical metering in NETL's buildings that consume greater than 1,000 gsf of energy by October 1, 2012. (EPAct 2005) Install advanced metering for natural gas and potable water in NETL's buildings that consume greater than 1,000 gsf of energy by October 1, 2015. (EPAct 2005)		**Complete installation of advanced metering for natural gas, electricity, and potable water for 46 of NETL's buildings that consume greater than 1,000 gsf of energy.**	**Installation was completed for advanced metering for electric, natural gas, and potable water in 44 NETL buildings.** **The Albany site list is under development.**
Management of Servers and Data Centers	Implement best management practices in energy efficient management of servers and federal data centers. (EO 13514)		**Continue to investigate best management practices in managing servers and data centers.**	**Four out of four data centers assessed. Continue to investigate best management practices in managing servers and data centers.**

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Renewable Energy	Continue renewable energy consumption at 5% in FY2011. (EPAct 2005 - Total energy consumption is estimated to be 7,089 MWh)	5%	**5%** **354.45 MWh**	**39%** **2,764 MWh**
	Ensure that 50% of statutorily required renewable energy comes from "new" (developed after 1999) sources. (EPAct 2005 - 2.5% of 7,089 MWh)	7,089 MWh	**177.23 MWh** **50%** **(2.5% of all energy sources)**	**976.55 MWh** **100%** **(14% of all energy sources)**
	Implement new renewable energy generation projects for agency use and on agency property. (EO 13514)	7,089 MWh	**7.5% of all electricity on site should be renewable electricity generation. (531.68 MWh)**	**9.68 MWh Estimated**
Petroleum Fuels	Reduce the vehicle fleet's total consumption of petroleum products by 2% annually through the end of FY2020 using a FY2005 baseline. (EO 13514)	22,942 Gallons	**20,189** **(12%)**	**23,009** **0.3%**
Alternative Fuels	Increase the total fuel consumption that is non–petroleum-based by 10% annually through the end of FY2015 based on FY2005 baseline. (EO 13423)	12,547 Gallons	**20,075** **60%**	**19,483 gallons** **55.3%**
	Use low-GHG emitting vehicles. (EO 13514)	57 AFVs of 74 vehicles on site	**58 AFVs of 74 vehicles on site**	**58 AFV's of 74 vehicles are on site currently.**
Greenhouse Gas Air Emissions				
Greenhouse Gases	Reduce Scope 1 and 2 GHG emissions attributed to facility use through life-cycle cost-effective measures by 28% by FY2020, relative to a FY2008 baseline. (54,440,814 lbs CO_2) (EO 13514)	54,440,814 lbs CO_2e	**51,718,773 lbs CO_2e** **5%**	**47,317,401 lbs CO_2e** **13.1%**

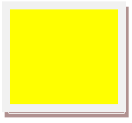
Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
GHG Emission Reporting	Report comprehensive GHG emission inventory for FY2010 by January 5, 2011, and annually thereafter by the end of January. (EO 13514)		**Report emission inventories on a quarterly basis for year-end (FY) wrap up by January 31, 2012.**	**Emission inventories for Scope 1 and Scope 2 submitted with NETL Site Sustainability Plan on January 3, 2012. Total emissions = 60,107,388 lbs CO_2e**
Scope 3 Emissions	Implement transit, travel, training, and conferencing strategies to support low-carbon commuting and travel. (EO 13514)		**Emphasize employee ridesharing through NETL's green transportation pool, Plugged-In articles, and Post-Its.**	**Ridesharing emphasized through articles and other postings, but still in process of being completely determined how to convey information.**
	Implement innovative policies to address Scope 3 emissions unique to agency operations (EO 13514).		**By the end of FY2011, issue a training course to educate personnel on reducing GHG emissions**	**Training in process of being determined**
	Reduce Scope 3 GHG emissions by 13% by FY2020, relative to a FY2008 baseline. (EO 13514)	8,530,627 lbs CO_2e	**8,325,892 lbs CO_2e** **2.4%**	**12,789,987 lbs** CO_2e **49.93%**
Green Purchasing				
Environmentally Preferred Products (Sustainable Acquisition)	Maximize site use of EPPs in operation and maintenance, janitorial, and general office activities. Purchase products that are: recycled, biopreferred, Energy Star, FEMP-designated, EPEAT, Water Sense- or otherwise water efficient. (EO 13423) Acquire uncoated printing and writing paper containing at least 30% post		**70% of janitorial cleaning products purchased shall be environmentally preferred products as defined by the General Services Administration's Green Purchasing Standards.** **80% of maintenance products shall be Energy Star rated if such products are rated.**	**78% of janitorial products are environmentally preferred products.** **100% of maintenance products are Energy Star rated.** **100% of copier and printer paper contains a minimum 30%**

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
	consumer fiber. Reduce printing paper use. (EO 13514)		**98% of copier and printer paper shall contain a minimum of 30% recycled post consumer fiber.**	**recycled post consumer fiber.**
Contractual Green Purchasing	Ensure that 95% of new contract actions for products and services are energy efficient, water efficient, bio-based content, environmentally preferable, non-ozone depleting, recycled content, and non-toxic, or less toxic than alternatives. (EO 13514)		**During each ES&HMS internal audit (every six months), audit 5% of new contracts to determine whether the contracts contain the appropriate contractual requirements per EO 13514 in terms of sustainable acquisition.**	**NETL continues to await guidance from HQ that will enable us to track data that is credible.**
Pest and Other Landscaping Management				
Pest Management	Reduce the deer population at the PGH and MGN sites at a sustainable level per the wildlife management plan. (NETL—Deer Population Problem) Implement pest management and other landscaping management practices. (EO 13514)		**Implement the Wildlife Management Plan.**	**Continue to study deer population and perform any needed actions.**
Accidents/Incident Rates				
Recordable Case Rate	Continue to maintain NETL's OSHA recordable case rate to or below 1.0. (FE ESS&H Commitment to ESS&H)		**1.0**	**0.5**
	Issue quarterly Post-It addressing workplace safety issues.		**Complete Quarterly Post-It addressing workplace safety issues.**	**The Post-It message for each quarter was posted to the NETL Intranet**
Days Away/Restricted (DART) Case Rate	Continue to maintain NETL's OSHA days away/restricted (DART) case rate to or below 0.4 in FY2011. (FE ESS&H Commitment to ESS&H)		**0.4**	**0.38**

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
	Review types of accidents that occurred in FY2010; conduct semi-annual audits of work areas.		**Review accidents and conduct audit.**	**Accidents have been reviewed as part of NETL injury reporting and the CAIRS process; work area inspections have been completed as scheduled.**
Water Usage				
Potable Water Consumption	Reduce water consumption intensity, relative to the baseline of 27.3E6 gallons which equates to 26.3 gal/gsf through life-cycle cost-effective measures by 2 percent annually through FY2020 or 26% by the end of FY2020 using a baseline of FY2007 water consumption. (EO 13514)	26.3	**24.20** **(8% Reduction)**	**14.82 gal/gsf** **(44% Reduction)**
Landscaping Water Consumption	Reduce landscaping water consumption by 2% annually, or 20% by the end of FY2020 using a baseline of FY2010 industrial consumption. (EO 13514)	2000 gallons	**1960 gallons** **2%**	**NETL's landscaping water consumption is covered under potable water consumption.**
Groundwater Legacy Issues				
Remediate Groundwater	Remediate the groundwater at the Albany site to the standards established by the Oregon Department of Environmental Quality.		**Completion of 80% of conceptual model.**	**65% of conceptual model completed.**
Infrastructure Safety				
Electrical Safety	To identify all electrical infrastructure issues, develop plans to address these issues, and to eliminate the issues by FY2015.		**Develop a comprehensive list of the electrical infrastructure issues and a plan to address these issues.** **50% should be complete in FY2011.**	**50% of the list has been completed.**

Table 2.4.2: FY2011 Environmental Management Plan Metrics				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Life Safety Code Issues	Eliminate all life safety code issues by the end of FY2013.		**36% reduction of life safety code deficiencies by the end of FY2011 (70% overall for FY2010-2011 from 2008 baseline).**	**42% (FY2011)** **76% overall (from 2008 Baseline)**

Objective/target not met in FY2012 quarter 1



Objective/target partially met in FY2012 quarter 1

Objective/target met in FY2012 quarter 1

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Waste Generation, Management, and Disposal Practices				
Non-hazardous Waste Generation	Reduce the amount of routine non-hazardous waste generated (3% per year) using a FY2008 baseline of 222.5 metric tons. (EO 13423) Maintain cost effective waste prevention and recycling programs, and minimize generation of waste and pollutants through source reduction. (EO 13514)	222.5	**202.5** **(9%)**	**42.85** **(81%)**
Hazardous Waste Generation	Reduce the amount of hazardous waste using a FY2011 baseline of 3 metric tons. (EO 13423 and EO 13514)	3.0	**2.8** **(6.7%)**	**0.17** **(94%)**
Recycling	Using a FY2010 baseline (632,723 lbs), divert 50% of non-hazardous solid waste from disposal and increase recycling 20% by the end of FY2015. (EO13514)	632,723 lbs (278 metric tons)	**126,545 lbs** **20%**	**55,625 lbs** **8%**
Recycling Construction Waste	Recycle a minimum of 50% of construction/demolition waste diverted from landfill disposal by the end of FY2015. (EO 13514) Increase recycling construction waste to 41%.		**41%**	**51.4%**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
High Performance Sustainable Building Implementation				
High Performance Sustainable Buildings	Ensure all new construction, major renovation, or repair and alteration complies with the Guiding Principles. (EO 13514) Ensure 15% of existing facilities and building leases (above 5,000 gross square feet) meet the Guiding Principles by FY2015. (EO 13514) Make annual progress towards 100% conformance with the Guiding Principles. (EO 13514)		**Track the completion status of upgrades/renovations to High Performance Sustainable Buildings (HPSB) identified in its HPSB FY2010 Survey and Site Sustainability Plan as part of its Site Sustainability Plan.**	**NETL's FY 2011 HPSB building candidates have been reassigned to NETL's FY 2012 GPP plan. NETL's MGN B-40 (day care) has been completed and will meet LEED Gold/Platinum Certification. NETL PGH B-900 office has been designed and constructed to meet HPSB Guiding Principles with a completion date of February 2012.**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter				
Environmental Management Plan	**Objective/Target**	**Baseline**	**Target**	**Actual**
Historic Buildings	Promote long-term viability of agency-owned historic buildings by ensuring that rehabilitation utilizes best practices and technologies in retrofitting. (EO 13514)		**Development of a Historic Preservation Plan that allows for conformance to the Historic Preservation Act while having facilities that effectively support program and missions needs at the Albany site.**	**In the 1st Quarter, FY2012, two Projects began to renovate Building 26 and to renovate significant portions of Building 1, both of which are contributing structures to the Historic District. These designs are going to great lengths to preserve and/or restore the integrity of the historic appearance while providing increased functionality and Life Safety. These two projects total approximately $5.2M. Now that a site consolidation plan is approved, pending NETL Legal input on a revised Programmatic Agreement between ALB and Oregon SHPO.**
Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter				

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Hazardous Materials Procurement, Consumption, and Storage				
Chemical Inventory	Reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed by FY2015 using the number of containers onsite at NETL at the end of FY2010 as a baseline. (EO 13514)	10,986 containers 229,161 pounds	**No net gain of chemical (by weight in pounds) +/- 10%.**	**10,483 containers (4.6% decrease)** **237,655 pounds (3.4% increase)**
Electronic Stewardship				
Purchase of Electronic Products	Ensure procurement reference for EPEAT-registered electronic products and the procurement of Energy Star- and FEMP-designated electronic equipment. (EO 13514)		**95% of all products purchased that have EPEAT standards are EPEAT registered.** **95% of specific electronic products are Energy Star- and FEMP-designated.**	**100% of products are EPEAT registered.** **100% of electronic products are Energy Star and FEMP-designated.**
Operation and Maintenance of Electronic Products	Enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible DOE electronic products. (EO 13514) Ensure that 90% of managed workstations and printers have power management settings in place. (IG findings)		**Annual target of this plan is to ensure that 90% of managed workstations and printers have power management settings in place.**	**100% of Printers and 96.8% of PCs have power management settings in place.**
Energy and Fuel Use				
Energy Use	Reduce energy usage/square foot by 3% annually through the end of FY2015 based on the FY2003 baseline of 219,903 Btu/sq ft. (EO 13423) Reduce energy intensity in buildings to achieve GHG reductions. (EO13514).	219,903	**173,723** **(21%)**	**43,910 BTU/gsf** **(20.1%)**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Advanced Metering and Measurement	Install advanced electrical metering in NETL's buildings that consume greater than 1,000 gsf of energy by October 1, 2012. (EPAct 2005) Install advanced metering for natural gas and potable water in NETL's buildings that consume greater than 1,000 gsf of energy by October 1, 2015. (EPAct 2005)		**Install utility meters for NETL MGN as follows:** **B3 - Gas, Steam, and Water** **B14 - Steam and Water** **B36 - Gas and Water** **Install electric meters in ALB's energy consuming facilities.**	**No work has been completed during this qtr. due to weather restrictions.** **The MGN project is expected to start during the spring.** **Currently the ALB work is on the FY12 general plant projects (GPP) list and will be either accepted or eliminated by the Control Configuration Board (CCB).**
Management of Servers and Data Centers	Implement best management practices in energy efficient management of servers and federal data centers. (EO 13514)		**Continue to investigate best management practices in managing servers and data centers.**	**Permanent meter installed in B-922 Data Center, which is one of Four to be installed.**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Renewable Energy	Continue renewable energy consumption at 5% in FY2012 (EO 13423). (Total renewable electrical energy consumption is estimated to be 1,403 MWh). Total energy consumption is estimated to be 28,073 MWh.	5%	**5%** **1,403 MWh (326 MWh/qtr.)**	**14.5%** **4,080 MWh**
	Ensure that 50% of statutorily required renewables come from "new" (developed after 1999) sources. (EO 13423) (2.5% of 28,073 MWh)	701.5 MWh	**701.5 MWh** **50% (2.5% of all energy sources)**	**4,080 MWh** **100%**
	Implement new renewable energy generation projects for agency use and on agency property. (EO 13514 and EPAct 2005.)	752 MWh/yr	**7.5% of all electricity on site should be renewable electricity generation. (752 MWh)**	**0.7 %**
Petroleum Fuels	Reduce the vehicle fleet's total consumption of petroleum products by 2% annually through the end of FY 2020 based on a FY2005 baseline. (EO 13423)	22,942	**19,730** **(14%** Reduction**)**	**4,788 gallons**
Alternative Fuels	Increase the total fuel consumption that is non-petroleum-based by 10% annually through the end of FY2015 based on a FY2005 baseline. (EO 13423)	12,547	**21,330** **70%**	**3,911 gallons**
	Use low-GHG-emitting vehicles. (EO 13514)	57 AFVs of 74 vehicles on site	**58 AFVs of 74 vehicles on site**	**55 AFVs of 66 vehicles**
Greenhouse Gas Air Emissions				
Greenhouse Gases	Reduce Scope 1 and 2 GHG emissions attributed to facility use through life-cycle cost-effective measures by 28% by FY2020, relative to a FY2008 baseline. (54,440,814 lbs CO_2e) (EO 13514)	**54,440,814 lbs CO_2e**	**53,079,794 lbs CO_2e** **2.5% reduction**	**13,229,541.81 lbs CO_2e**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
GHG Emission Reporting	Report comprehensive GHG emission inventory for FY2010 by January 5, 2011, and annually thereafter by the end of January. (EO 13514)		**Report emission inventories on a quarterly basis for year-end (FY) wrap up by January 31, 2013.**	**Scope 3 emissions are calculated on an annual basis only. Therefore, this number can only be reported once per year.**
Scope 3 Emissions	Implement transit, travel, training, and conferencing strategies to support low-carbon commuting and travel. (EO 13514)		**Emphasize employee ridesharing through NETL's green transportation pool, Plugged-In articles, and Post-Its.**	**NETL is reducing travel for training and conferences to reduce greenhouse gas emissions.**
	Implement innovative policies to address Scope 3 emissions unique to agency operations. (EO 13514).		**By the end of FY2012, issue a training course to educate personnel on reducing GHG emissions.**	**NETL is increasing the use of tele-conferencing and tele-video. conferencing between sites to reduce Scope 3 emissions.**
	Reduce Scope 3 GHG emissions by 13% by FY2020, relative to a FY2008 baseline. (EO 13514)	**8,530,627 lbs CO_2e**	**8,325,899 lbs CO_2e** **2.6%**	**Scope 3 emissions are calculated on an annual basis only. Therefore, this number can only be reported once per year.**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Green Purchasing				
Environmentally Preferred Products	Maximize site use of EPPs in operation and maintenance, janitorial, and general office activities. Purchase products that are recycled, bio-preferred, Energy Star, FEMP-designated, EPEAT, Water Sense, or otherwise water efficient. (EO 13423) Acquire uncoated printing and writing paper containing at least 30% post- consumer fiber. Reduce printing paper use. (EO 13514)		**70% of janitorial cleaning products purchased shall be environmentally preferred products as defined by the General Services Administration's Green Purchasing Standards.** **80% of maintenance products purchased shall be Energy Star rated if such products are rated.** **98% of copier and printer paper shall contain a minimum of 30% recycled post-consumer fiber.**	**100% of janitorial products purchased** **100% of maintenance products purchased** **100% of copier and printer paper purchased**
Pest and Other Landscaping Management				
Pest and Other Landscaping Management	Reduce the deer population at the PGH and MGN sites to a sustainable level per the wildlife management plan. (NETL—Deer Population Problem) Implement pest management and other landscaping management practices. (EO 13514)		**Implement the Wildlife Management Plan.**	**A survey and culling activities resulted in the removal of 29 deer from the Morgantown site. 3 deer on the site were observed after those actions. An agreement was reached with NIOSH to conduct a survey at the Pittsburgh site. USDA Wildlife Services was contacted to start coordinating the survey process.**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Accidents/Incident Rates				
Recordable Case Rate	Continue to maintain NETL's OSHA recordable case rate to or below 1.0 in FY2012. (FE ESS&H Commitment to ESS&H)		**1.0**	**1.09**
	Issue quarterly Post-It addressing workplace safety issues.		**Complete quarterly Post-It.**	**One Post-It sent to the Intranet Manager for posting.**
Days Away/Restricted (DART) Case Rate	Continue to maintain NETL's OSHA days away/restricted (DART) case rate to or below 0.4 in FY2012. (FE ESS&H Commitment to ESS&H)		**0.4**	**0.55**
	Review types of accidents that occurred in FY2011; conduct semi-annual audits of work areas.		**Review accidents and conduct audit.**	**No audit performed this quarter.**
Water Usage				
Potable Water Consumption	Reduce water consumption intensity, relative to the baseline of 27.3 million gallons which equates to 26.3 gal/gsf through life-cycle cost-effective measures by 2 percent annually through FY2020 or 26 percent by the end of FY2020 using a baseline of FY2007 water consumption. (EO 13514)	26.3	**23.67** **(10%)**	**3.82 gal/gsf**
Groundwater Legacy Issues				
Remediate Groundwater	Remediate the groundwater at the Albany site to the standards established by the Oregon Department of Environmental Quality.		**Complete 80% of the conceptual site model.**	**60% of the conceptual model completed.**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

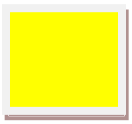
Environmental Management Plan	Objective/Target	Baseline	Target	Actual
Infrastructure Safety				
Electrical Safety	To identify all electrical infrastructure issues, develop plans to address these issues, and to eliminate the issues by FY2015.		**Develop a comprehensive list of the electrical infrastructure issues and a plan to address these issues. The additional 50% should be completed in FY2012.**	**10% additionally completed** **(60% total)**
Life Safety Code Issues	Eliminate all life safety code issues by the end of FY2013.	0%	**Reduce the overall number of life safety code issues at the Albany site to 100% by the end of FY2013 (based on the 2008 baseline).**	**1% (for FY 2012 qtr. 1)** **1% (total for FY2012)** **77% overall (from 2008 baseline)**

Table 2.4.3: FY 2012 Environmental Management Plan Metrics – First Quarter

Environmental	Objective/Target	Baseline	Target	Actual

Management Plan				
On-Site Construction Activities				
On-Site Construction Activities	Continually evaluate and improve ES&H performance related to on-site construction activities in order to minimize work stoppages, OSHA violations, and reporting to external agencies.		**Track inspections and reviews of on-site construction activities, which includes daily, weekly, and monthly inspections; SARS activities associated with construction; and ES&H reviews of construction projects.** **Identify potential problems and their resulting preventive actions, mitigations, or need to report to external regulatory agencies.** **Minimize the number of work stoppages resulting from unsafe work practices (either temporary or stop work) annually, or the number of reports to external agencies to be less than or equal to one.**	**0%**

Objective/target not met in FY2012 quarter 1



Objective/target partially met in FY2012 quarter 1

Objective/target met in FY2012 quarter 1

Table 3.4.1: 2011 Radioactive Materials Inventory – Morgantown			
Isotope	**Activity/Date Determined**	**Source**	**Location**
Kr-85	2 mCi 03/30/81	Model #3077, Serial #700T, Thermosystems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 01/02/79	Model #3012, Serial #467T, Thermosystems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 05/19/80	Model #3012, Serial #626T, Thermosystems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 05/78	Model #3077, Serial #373T, Thermosystems Inc.	B-25, Room 212
Kr-85	2 mCi 03/30/81	Model #3077, Serial #697T, Thermosystems Inc.	B-25, Room 212
Ni-63	10 mCi 03/01/04	Analyzer S/N 787AN, cell serial #2103, Molecular Analytics, Inc.	B3 150
Sc-46	0.065 mCi 07/01/90	University of Missouri	B-16, Radioactive Material Storage Cabinet
Sc-46	0.046 mCi 02/12/91	University of Missouri	B-16, Radioactive Material Storage Cabinet
Ra-226	9 uCi 01/56	Model #B-5, Serial #11205, Mettler Corp.	B-25, Room 206
Ra-226	21 uCi 01/56	Model #M-5, Serial #17032, Mettler Corp.	B-25, Room 112
Ra-226	9 uCi 01/56	Model #B-5 GD, Serial #13805, Mettler Corp.	B-3, Area 150
Phosphate Rock	Consumer Product	Model #1080, Sun Nuclear Corp.	B-16, Radioactive Material Storage Cabinet
H-3	20 Ci 5/94	Model #B100/U10, Serial #575263, SRB Technologies	B-33
H-3	20 Ci 5/94	Model #B100/U10, Serial #574434, SRB Technologies	B-33
H-3	20 Ci 5/94	Model #B100/U10, Serial #574435, SRB Technologies	B-33
H-3	20 Ci 5/94	Model #B100/U10, Serial #574436, SRB Technologies	B-33
Co-57	12 mCi 12/95	Model #IPL CUS, Serial #EE661, Isotope Products Lab	B-16, Industrial Hygiene Laboratory
Cs-137	1 uCi 2/99	Tele-Atomic, Inc	B-25, Room 202
Cs-137	10 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Ba-133	1 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Ba-133	10 uCi 2/99	Tele-Atomic, Inc	B-25, Room 202
Tl-204	1 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Tl-204	10 uCi 2/99	Tele-Atomic, Inc.	B-25, Room 202
Cd-109	10 mCi 5/04	Model #XFB3205, Serial #NR2032, IPL Inc.	B-33
Po-210	5mCi 9/06	P-2042 Cell Serial #A2FH133, NRD, Inc.	B13 Diesel Test Cell

Table 3.4.2: 2011 Radioactive Material – Pittsburgh				
Isotope	**Qty.**	**Activity**	**Supplier/Source**	**NRC License**
Ni-63	2	15 mCi	Gas Chromatograph Electron Capture Device – **Out of Service**	Held by Hewlett Packard
Cs-137	3	40 mCi (2); 20 mCi (1)	Ronan Engineering Company, Model 137; Level Density Gauge – **Out of Service**	Held by Parsons
Assorted	80	Consumer Product	Smoke Detectors	Not Required

Table 3.6.1: 2011 NETL HPSB Candidates				
Building	**Site**	**Gross Sq. Ft.**	**% HPSB Guiding Principles Achieved**	**FY HPSB Met**
B-39	MGN	108,000	100%	2009
Day Care	MGN	9,800	100%	2011
B-925	PGH	9,326	60%	2011
B-58	PGH	32,240	55%	2011
B-921	PGH	25,033	50%	2012
B-920	PGH	12,363	60%	2012
B-26	MGN	63,616	45%	2014
B-1	MGN	51,598	45%	2015
Albany site buildings are being reevaluated for HPSB guiding principles				

Table 3.14.1: 2011 Summary of Permits, Except IH, 2011				
Permit No. and Name	**Site**	**Issue Date, Exp. Date**	**Regulatory Agency**	**Description**
8731-02 12/14/14	Albany	Industrial Wastewater Discharge	City of Albany	Discharge industrial wastewater to sanitary sewer.
G2140 2/29/12	Albany	Site Use Permit	State of Washington – Department of Ecology	Site use permit for the low-level radioactive waste disposal facility.
MUB 012 Industrial Wastewater Discharge Permit	Morgantown	02/17/2011, 02/16/2016	MUB	This permit allows for the operation of wastewater pretreatment facilities and discharge into MUB's sanitary sewer system. It sets discharge limits and monitoring requirements, compliance with the Morgantown Industrial Waste Ordinance, reporting requirements including accidental discharge reporting, and testing procedures.
WV0111457 General WV/NPDES Storm Water Permit	Morgantown	04/01/2009 03/31/2014	WVDEP, Office of Water Resources	This general permit covers storm water associated with industrial activity. It identifies activities that are covered by the permit and the associated monitoring and analysis requirements for each. Also discussed are the Storm Water Pollution Prevention Plan and Groundwater Protection Management Plan required by the permit.
WVG610042 Registration Permit for General WV/NPDES Storm Water Permit	Morgantown	07/10/09, 03/31/2014	WVDEP, Office of Water Resources	The general permit registration allows NETL to operate under permit WV0111457, above. The registration establishes the schedule for submission of discharge monitoring reports, as well as discussions on monitoring, sampling, and analysis requirements. This registration makes the general WV permit applicable to NETL.
7032056-000-00500 A Title V permit was formally issued 01/06/09. The expiration date is 01/05/14.	Pittsburgh	Air	ACHD	PGH site is a minor source for PM, PM10, SO2, VOCs, NO_x, CO, and HAPs as defined in section 2101.20 of Article XXI of ACHD.
GF 47497.009 The permit was issued 04/28/09. A minor revision was made 10/14/09.	Pittsburgh	Industrial Sewer Use	PHA	Establishes the permissible waste water effluent discharge of certain process/laboratory/wastewater constituents.

Table 3.14.1: 2011 Summary of Permits, Except IH, 2011				
Permit No. and Name	**Site**	**Issue Date, Exp. Date**	**Regulatory Agency**	**Description**
PA0025844 07/11/01 A renewal application was submitted 01/11/09, but a new permit has not yet been issued.	Pittsburgh	Storm Water Discharge	PADEP	NPDES permit for the discharge of site storm water into the public waterways of Pennsylvania.
PA0297201 N/A	Pittsburgh	Industrial Settling Weir	PADEP	Permit for an industrial settling weir owned by the U.S. National Institute of Occupational Safety and Health.
02-81183008A 10/04/2012	Pittsburgh	Aboveground Storage Tank Registration	PADEP	Permit for tank containing ferric chloride.
02-81183009A 10/04/2012	Pittsburgh	Aboveground Storage Tank Registration	PADEP	Permit for tank containing caustic soda.
S-343	Pittsburgh	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground gasoline storage tank.
S-343	Pittsburgh	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground diesel fuel storage tank.
S-343	Pittsburgh	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground No. 2 fuel oil storage tank.
S-1018	Pittsburgh	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground ethanol storage tank.
S-1102	Pittsburgh	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground gasoline storage tank.
S-1102	Pittsburgh	Certificate of Fire and Explosion Safety	Allegheny County Fire Marshal	Approval for the storage and handling of the contents of an aboveground diesel fuel storage tank.
PAA-100505	Pittsburgh	Asbestos	ACHD	Asbestos Abatement Permit for B-86. Removal of 1,230 square feet of siding.
PAA-100573	Pittsburgh	Asbestos	ACHD	Asbestos Abatement Permit for 10 cubic feet misc materials B-907, 2 cubic feet misc materials B-92 and a small furnace from B-84.

Table 3.17.1: 2011 Surveillance Monitoring					
Type of Surveillance	**Contact**	**Type of Monitoring**	**Key Characteristics**	**Frequency**	**Location**
SARS review	ES&H Division	Review of requirements in SARS procedure	Operational control, document control	Annually	Various laboratories, support operations, and facilities
Transformer Inspections	URS	Visual assessment of oil-filled transformer	Regulatory compliance	Weekly	Site-wide
Storage tank Inspections	URS	Visual assessment of oil-filled storage tanks	Regulatory compliance	Weekly	Site-wide
Interstitial Storage Tank Monitoring (MGN)	URS	Interstitial monitoring of dual-wall tanks	SPCC plan compliance, regulatory compliance	Quarterly	B-29, B-36, Navy facility fuel storage tanks
Water Usage (PGH)	Site Operations Division	Document water usage	Operational	Daily	B-83, B-84, B-93, B-94, chillers, boiler house
Backup Generators	URS	Backup generator inspection	Operational	Weekly	Site-wide
Chemical Handling Facility	URS	CHF operations inspection checklist	Operational	Daily	B-64, B-91, B-92, B33

Table 5.1.1: 2011 Potential Contamination Sources and Cleanup Actions – Morgantown		
Potential Source	**Potential Contamination**	**Current Status**
Underground storage tanks	BTEX	All tanks removed 1991 or before.
42-inch coal gasifier	Coal tar, polynuclear hydrocarbons, BTEX	Gasifier removed; soil removed to a depth of 10 feet in 1994.
Stretford Pad	Stretford solution (vanadium and cadmium compounds)	Pad removed; soil removed to a depth of 10 feet in 1994.
Wastewater Pond 001	Coal tar, polynuclear hydrocarbons, BTEX, metals	Removed in 1995; site filled and re-graded.
Wastewater Pond 002	Coal tar, polynuclear hydrocarbons, BTEX, metals	Removed in mid-1980s.
Wastewater Pond 005	Coal tar, polynuclear hydrocarbons, BTEX, cyanide, metals	Removed in 1985; backfilled and paved as a parking lot.
Contaminated sewer lines	Mercury	Removed the contaminated portion of the lines, which stretched from B-1 to a point east of B-3. The line from B-3 to Burroughs Run was left in place and is still being used as the major storm water drainage line for the site. This is a 15" vitrified tile line that discharges to Burroughs Run at the 002 outfall.
Underground process lines used to convey contaminated process water from the old 42" fixed-bed gasifier and/or B-4 to an activated carbon treatment system and Pond 005.	Coal tar, polynuclear hydrocarbons	Capped and abandoned in place. They were/are not part of any NETL sewer system (e.g., storm, sanitary, or contaminated).

Table 5.1.2: Properties of Potential Contaminants						
Contaminant Suite	**Potential Contaminant**	**Density (g/ml)**	**Physical State**	**Water Solubility**	**Sorption Coefficient**	**Carcinogenic**
			@ approx. 20° C		log KOC	
Coal Tar	Acenaphthylene	0.899	Solid	3.93 mg/L	3.68	
Polynuclear Hydrocarbons	Acenaphthene	1.069	Solid	3.47-3.93 mg/L	3.79	
	Benzo(b)fluoranthene		Solid	0.0012 mg/L	5.74	potential
	Benzo(k)fluoranthene		Solid	0.00055 mg/L	6.64	potential
	Benzo(a)anthracene	1.274	Solid	0.01-0.44 mg/L	6.14	+
	Benzo(a)pyrene	1.351	Solid	0.003 mg/L	5.60-6.29	+
	Benzo(e)pyrene	0.8769	Solid	0.004 mg/L	5.6	+
	Biphenyl (diphenyl)	0.866	Solid	7.5 mg/L	3.23	
	Chrysene	1.28	Solid	0.0015-0.006 mg/L	5.39	weak
	Coronene		Solid	0.00014 mg/L	7.8	
	o-Cresol (2-methylphenol)	1.041	Solid	24,500 mg/L	1.34	
	Dibenzofuran	1.0886	Solid	10 mg/L	3.91-4.10	
	Dibenz(a,h)anthracene	1.282	Solid	0.005 mg/L	6.22	+
	Fluoranthene	1.252	Solid	0.275 mg/L	4.62	potential
	Fluorene	1.203	Solid	1.9 mg/L	3.7	potential
	Indene	1.006	Liquid			
	3-Methylcholanthrene					+
	Methyldibenzofuran					
	Methylphenanthrene (1,2,3,4-)	1.161	Solid	0.073 mg/L	4.56	
	1-Methylnaphthalene	1.025	Liquid	26-28 mg/L		
	2-Methylnaphthalene	1.006	Solid	24.6-25.4 mg/L	3.87-3.93	
	4-Methylphenol (p-Cresol)	1.0347	Solid	19,400 mg/L	1.69	
	Naphthalene	1.152	Solid	30 mg/L	2.74-3.52	-
	Phenanthrene	1.025	Solid	1.6 mg/L	3.72-4.59	-
	Phenol (carbolic acid)	1.0576	Solid	82,000 mg/L	1.24-1.43	
	Pyrene	1.271	Solid	0.16 mg/L	4.22-5.65	+
	Triphenylene	1.302	Solid	0.38 mg/L	4.0-6.9	
BTEX	Benzene	0.878	Liquid	1,780 mg/L	1.69-2.00	+
	Ethylbenzene	0.867	Liquid	152 mg/L	1.98-2.41	
	Toluene	0.8669	Liquid	538 mg/L	1.89-2.49	
	m-Xylene	0.8842	Liquid	146-160 mg/L	2.26	
	o-Xylene	0.8802	Liquid	176 mg/L	1.68-1.83	
	p-Xylene	0.8611	Liquid	156-185 mg/L	2.52	
Stretford Solution	Vanadium	6.11	Solid			
	Cadmium	8.642	Solid			
Contaminated Sewer	Mercury	13.534	Liquid			

Table 5.1.3: 2011 Tier II Chemical Inventory Reporting List – Morgantown			
Chemical Name	**CAS #**	**Ave. and Max. Daily Amount (lbs)**	**TPQ (lbs)**
Carbon dioxide	124-38-9	1669	-
Hydrochloric Acid	7647-01-0	966	500
Hydrogen sulfide	7783-06-4	13	500
Nitrogen dioxide	7727-37-9	12680	100

Table 5.1.4: 2011 Hazardous Waste Generation – Morgantown		
Waste Stream	**Qty. Generated (lbs)**	**Qty. Shipped (lbs)**
Poison (Toxic Solids & Liquids)	79	79
Mercury/Mercury Compounds	29	29
Flammable Solids	56	56
Waste Solvents/Flammable Liquids	90	90
Waste Oxidizers	5	5
Waste Paint	165	165
Jet Fuel	82	82
Activated Carbon	2	2
Other RCRA Compounds	2,498	2,498
Abrasive Cutter Waste	3,483	3,483
Fluorescent Light Tubes (Universal Waste)	173	173
Batteries (Universal Waste)	613	613
Mercury Containing Equip. (Universal Waste)	15	15
TOTAL	**7,339**	**7,339**

Table 5.6.1: 2011 NPDES Permit Storm Water Monitoring Requirements – Morgantown			
Outfall	**Pollutants of Concern**	**Low Concentration Cutoff Waiver**	**Frequency**
002	Nitrite and nitrate	0.68 mg/L	6 month
	Fecal coli form	Report only	6 month
005	TSS	100 mg/L	6 month
	Fecal coli form	Report only	6 month
010	Biochemical oxygen demand (BOD)	30 mg/L	6 month
	TSS	100 mg/L	6 month
	Ammonia	4 mg/L	6 month
	Fecal coliform	Report only	6 month
	pH	9 s.u.	6 month
	Chemical oxygen demand (COD)	120 mg/L	6 month
	Oil and grease	15 mg/L	6 month
TSS = total suspended solids			

Table 5.6.2: 2011 NPDES Storm Water Analysis Results – Morgantown							
		Outfall 002		Outfall 005		Outfall 010	
Constituents	Low Conc. Cutoff Waiver	May	July	May	July	May	July
Nitrate + Nitrite (Grab)	0.68 mg/L	0.33 mg/L	0.80 mg/L	NS	NS	NS	NS
Ammonia (Grab)	4 mg/L	NS	NS	NS	NS	0.21 mg/l	ND
Fecal Coli Form (Grab)	---	5,800 col/ 100 mL	>6,000col/ 100 mL	3,200 col/ 100 mL	4,800 col/ 100 mL	680 col/ 100 mL	>6,000col/ 100 mL
TSS (Grab)	100 mg/L	NS	NS	35.6 mg/L	2.0 mg/L	381 mg/L	46 mg/L
BOD	30 mg/L	NS	NS	NS	NS	4.6 mg/L	2.1 mg/L
pH	9 s.u.	NS	NS	NS	NS	7.6 s.u.	7.8 s.u.
COD	120mg/L	NS	NS	NS	NS	23.2 mg/L	28.0 mg/L
Oil and Grease	15 mg/L	NS	NS	NS	NS	ND	ND
ND = not detected; NS = not sampled; TSS = total suspended solids							

Table 5.6.3: 2011 Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One Sample/Month – Morgantown													
Parameter	Limit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Flow (MGD)													
Monthly Avg.	0.09	0.01	0.01	0.01	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Daily Max.	0.15	0.02	0.03	0.03	0.03	0.01	0.03	0.04	0.06	0.04	0.02	0.03	0.03
BOD5													
Monthly Avg.	None	0.3	0.2	ND	0.2	0.2	ND	0.4	0.2	ND	0.2	0.6	ND
Daily Max.	None	0.6	0.6	ND	0.5	0.4	ND	1.7	1.1	ND	0.4	1.7	ND
TSS													
Monthly Avg.	None	ND	ND	0.7	0.9	0.2	0.2	1.2	0.5	ND	ND	0.6	ND
Daily Max.	None	ND	ND	2.2	2.7	0.3	0.7	4.7	3.2	ND	ND	1.8	ND
Arsenic													
Monthly Avg.	0.005	0.0001	ND	0.0001	0.0002	0.00006	0.0001	0.0001	0.0004	0.0002	0.0001	ND	0.0001
Daily Max.	0.008	0.0002	ND	0.0003	0.0005	0.0001	0.0003	0.0003	0.003	0.0007	0.0002	ND	0.0003
Cadmium													
Monthly Avg.	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium													
Monthly Avg.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper													
Monthly Avg.	0.04	0.001	0.001	0.002	0.001	0.001	0.002	0.003	0.003	0.001	0.003	0.001	0.004
Daily Max.	0.06	0.002	0.003	0.005	0.003	0.002	0.005	0.010	0.020	0.003	0.005	0.003	0.013
Cyanide													
Monthly Avg.	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead													
Monthly Avg.	0.025	ND	ND	ND	0.0001	ND	ND	ND	ND	ND	ND	ND	0.0002
Daily Max.	0.038	ND	ND	ND	0.0003	ND	ND	ND	ND	ND	ND	ND	0.0005
Mercury													
Monthly Avg.	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.0009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 5.6.3: 2011 Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One Sample/Month – Morgantown													
Parameter	**Limit**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**
Nickel													
Monthly Avg.	0.010	0.0002	0.0001	0.0003	0.0003	0.0001	0.0002	0.0002	0.0003	0.0001	0.0002	0.0001	0.0002
Daily Max.	0.015	0.0004	0.0003	0.0008	0.0008	0.0002	0.0005	0.0005	0.0015	0.0003	0.0003	0.0003	0.0005
Silver													
Monthly Avg.	0.011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max.	0.017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc													
Monthly Avg	0.2	0.003	0.001	0.003	0.004	0.002	0.003	0.01	0.01	0.002	0.003	0.003	0.002
Daily Max	0.3	0.006	0.003	0.010	0.013	0.003	0.010	0.03	0.07	0.013	0.005	0.008	0.005
Iron													
Monthly Avg	None	0.02	0.02	0.07	0.05	0.01	0.02	0.06	0.15	0.01	0.03	0.03	0.05
Daily Max	None	0.04	0.05	0.21	0.16	0.03	0.07	0.22	0.90	0.05	0.05	0.08	0.15
Manganese													
Monthly Avg	None	0.004	0.003	0.008	0.008	0.009	0.01	0.02	0.01	0.003	0.003	0.001	0.01
Daily Max	None	0.008	0.010	0.025	0.023	0.020	0.04	0.07	0.04	0.010	0.005	0.003	0.03
Phenolics													
Monthly Avg	None	0.006	ND	0.001	ND	ND	ND	ND	ND	ND	0.008	ND	ND
Daily Max	None	0.012	ND	0.003	ND	ND	ND	ND	ND	ND	0.017	ND	ND
TOX													
Monthly Avg	None	0.01	0.02	0.003	0.005	0.001	ND	0.03	0.07	0.004	0.006	0.009	0.023
Daily Max	None	0.02	0.06	0.008	0.015	0.002	ND	0.10	0.40	0.017	0.012	0.028	0.070
Organics													
Alachlor-													
1254	None	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS	NS
All others	None	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS	NS
pH (s.u.)													
Minimum	6.0	7.3	6.5	7.2	6.8	7.9	7.7	7.4	7.6	7.3	7.2	7.3	6.9
Maximum	9.0	8.3	8.6	8.3	8.6	8.7	8.5	7.7	8.5	8.4	7.9	8.1	8.5
MGD = millions of gallons per day; NS = not sampled; ND = not detected; TSS = total suspended solids; BOD5 = biological oxygen demand for 5-day period; s.u. = standard units													

Table 6.7.1: May 2011 Data for "A" Aquifer - Morgantown										
	Sample Location									
Parameter	A	B	GAS-4	I	J	L	M	N	SP1-A	SP4-A
pH (field)	6.36	6.37	6.00	6.62	5.05	5.66	4.23	4.53	6.12	6.08
Specific Conductance (field)	280	259	386	281	1092	3230	750	1235	365	354
Temperature (field)	15.7	15.5	15.6	15.4	13.7	14.0	12.9	14.1	15.1	15.2

Table 6.7.2: May 2011 Data for "B-C" Aquifer - Morgantown					
	Sample Location				
Parameter	11	31	32-A	GAS-5	SP2-BC
pH (field)	6.34	5.54	5.14	6.48	6.35
Specific Conductance (field)	203	717	3380	1137	420
Temperature (field)	15.4	15.7	13.5	13.7	14.6

Parameter	Table 6.7.3: May 2011 Data for Morgantown Aquifer			
	Sample Location			
	D1-M	D2-M	D3-M	D4-M
pH (field)	6.48	9.17	NS	6.95
Specific Conductance (field)	426	545	NS	472
Temperature (field)	15.5	15.0	NS	13.9

Parameter	Table 6.7.4: Nov. 2011 Data for "A" Aquifer – Morgantown									
	Sample Location									
	A	B	GAS-4	I	J	L	M	N	SP1-A	SP4-A
pH (field)	6.64	6.68	6.46	6.86	4.88	5.68	4.11	4.73	6.40	6.28
Specific Conductance (field)	281	251	515	371	1356	1849	779	1481	353	459
Temperature (field)	15.4	15.2	16.8	14.8	14.9	15.9	15.5	13.9	14.4	15.5

Parameter	Table 6.7.5: Nov. 2011 Data for "B-C" Aquifer - Morgantown				
	Sample Location				
	11	31	32-A	GAS-5	SP2-BC
pH (field)	6.58	5.58	5.42	6.32	6.60
Specific Conductance (field)	192	733	2780	1562	350
Temperature (field)	15.2	17.8	18.8	17.5	13.6

Parameter	Table 6.7.6: Nov. 2011 Data for Morgantown Aquifer			
	Sample Location			
	D1-M	D2-M	D3-M	D4-M
pH (field)	5.88	9.20	NS	6.91
Specific Conductance (field)	435	540	NS	490
Temperature (field)	13.7	15.1	NS	13.2

Table 7.1.3: 2011 Tier II Chemical Inventory Reporting List – Pittsburgh			
Chemical Name	**CAS #**	**Ave. and Max. Daily Amount (lbs)**	**TPQ (lbs)**
Nitrogen, liquid	7727-37-9	74,195	10,000
Nitric oxide	10102-43-9	284	100
Nitrogen dioxide	10102-44-0	120	100

Table 7.2.1: 2010 X-Ray Radiation Generating Devices – Pittsburgh		
Device	**Quantity**	**Location**
X-Ray Tube	1	B-902, Mail Sorting Facility
X-Ray Diffraction Instrument	1	B-94, X-Ray Diffraction Laboratory
Scanning Electron Microscope (SEM)	1	B-94, SEM Laboratory
Electron Spectroscopy for Chemical Analysis	2 X-Ray Tubes	B-94, Electron Spectroscopy for Chemical Analysis Laboratory

Table 7.3.1: 2011 Air Emissions Based on Fuel Usage – Pittsburgh					
Estimated Emissions (Tons/Yr.)					
Pollutant	**MMCF**	**Combined Boilers**	**Unpaved Roads**	**Paved Roads**	**Total Site**
CO	46.3	1.94	.03	0.0	1.97
Lead	46.3	0	0	0	0
NO_2	46.3	2.30	0.03	0.0	2.33
PM_{10}	46.3	0.07	0.55	0.004	0.62
PM Total	46.3	0.08	1.10	0.005	1.19
SO_2	46.3	0.014	0.0004	0	0.014
VOCs	46.3	0.21	0.02	0.00	0.23

Table 7.4.1: 2011 Industrial Sewer Use Permit (B-74) Monitoring Analysis – Pittsburgh									
Constituent		**Total Cyanide**	**Phenol**	**Copper**	**Mercury**	**Zinc**	**Lead**	**Chloroform**	**pH**
Permit Limit	**NA**	**3.21 mg/L**	**NA**	**0.32 mg/L**	**< 0. 12 mg/L**	**NA**	**10.6 mg/L**	**NA**	**6.0 – 9.0 s.u.**
Sampling Date: 04/27/11									
B-74 Effluent									
Composite	NA	ND	NA	0.012 mg/l	ND	NA	ND	NA	N/A
Grab #1	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.21 s.u.
Grab #2	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.36 s.u.
Grab #3	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.01 s.u.
Grab #4	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.11 s.u.
Sampling Date: 10/25/11									
B-74 Effluent									
Composite	NA	ND	N/A	0.027 mg/l	0.000066 mg/l	N/A	0.0017 mg/l	N/A	N/A
Grab #1	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.17 s.u.
Grab #2	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.40 s.u.
Grab #3	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.56 s.u.
Grab #4	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.42 s.u.
ND = not detected; s.u. = standard units; N/A= not applicable									

Table 7.4.2: B-74 2011 Monthly Monitoring Results (mg/L) – Pittsburgh

Constituent	Permit Limit	Sampling Date											
		01/05	02/09	03/09	04/27	05/11	06/08	07/06	08/03	09/15	10/25	11/09	12/07
Aluminum	None	0.070	0.082	0.167	0.113	0.130	0.081	0.160	0.096	0.263	0.220	0.330	0.420
Cadmium	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	None	0.001	0.003	0.002	0.0006	0.002	ND	ND	ND	ND	ND	0.0009	0.00063
Copper	0.32	0.048	0.077	0.076	0.009	0.054	0.019	0.018	0.015	0.028	0.020	0.0073	0.009
Cyanide Total	None	ND	0.10	0.021	ND	0.003	ND	ND	ND	0.0017	ND	ND	ND
TOX	None	0.484	0.027	0.164	0.027	0.137	0.510	0.13	0.21	0.040	0.065	0.079	0.023
Iron	None	2.00	3.59	1.02	0.222	1.26	1.00	0.18	0.098	0.381	1.20	0.047	0.088
Lead	None	0.002	0.003	0.002	ND	0.008	ND	ND	ND	ND	0.002	ND	ND
Mercury	<0.12	0.00013	0.00020	0.00015	ND	0.00043	0.00008	0.00005	0.00005	0.00013	0.00009	ND	ND
Nickel	None	0.007	0.005	0.003	ND	0.003	0.002	ND	0.002	0.003	0.002	0.0012	0.0017
Oil and Grease	None	ND	ND	ND	2.8	2.0	ND	ND	ND	ND	2.0	ND	2.8
pH (s.u.)	6.0-9.0	8.0	7.6	6.7	7.3	7.7	7.8	7.8	6.5	6.9	7.4	7.7	8.6
Phenolics	None	ND	ND	ND	ND	0.083	0.016	0.007	0.013	ND	ND	ND	ND
TSS	None	2.8	7.2	2.0	ND	6.4	ND	4.4	ND	ND	2.0	ND	ND
Tin	None	ND	0.005	0.003	ND	0.005	ND	0.002	ND	ND	ND	ND	ND
Trichloromethane	None	0.150	0.004	0.310	0.007	0.001	0.041	0.001	0.005	0.0013	0.0006	0.00053	0.0002
Zinc	None	0.095	0.138	0.123	0.019	0.127	0.088	0.099	0.058	0.033	0.064	0.012	0.015

ND = not detected; s.u. = standard units; TOX = total organic halogens; TSS = total suspended solids; NA-not applicable

Table 7.4.3: 2011 National Pollutant Discharge Elimination System Storm Water Analysis Results – Pittsburgh

Constituent	Sample Date			
	03/15/11	06/07/11	09/19/11	11/14/11
North Outfall – PGH				
Flow	0.201 MGD	0.699 MGD	0.103 MGD	1.165 MGD
Suspended Solids	14.4 mg/L	36 mg/L	120 mg/L	140 mg/L
CBOD5	ND (< 2.0 mg/L)	13 mg/L	4.1 mg/L	5.7 mg/L
Oil and Grease	ND (<4.8 mg/L)	2.4 mg/L	ND (< 5.0 mg/L)	2.9 mg/L
Aluminum	0.262 mg/L	0.550 mg/L	1.70 mg/L	1.50 mg/L
Iron	0.428 mg/L	1.50 mg/L	5.10 mg/L	3.40 mg/L
Manganese	0.226 mg/L	0.230 mg/L	0.280 mg/L	0.320 mg/L
Lead	ND (<3.0 µg/L)	4.0 µg/L	6.1 µg/L	7.4 µg/L
Mercury	ND (<0.20 µg/L)	0.25 µg/L	0.17 µg/L	1.1 µg/L
pH	8.10 s.u.	8.31 s.u.	8.54 s.u.	7.63 s.u.
Ammonia	0.20 mg/L	1.2 mg/L	0.35 mg/L	0.33 mg/L
South Outfall – PGH				
Flow	0.005 MGD	2.49 MGD	0.006 MGD	0.156 MGD
Suspended Solids	64 mg/L	50 mg/L	450 mg/L	72 mg/L
Aluminum	6.44 mg/L	1.00 mg/L	17 mg/L	1.40 mg/L
Iron	0.562 mg/L	1.10 mg/L	9.10 mg/L	1.50 mg/L
Manganese	0.711 mg/L	0.110 mg/L	0.660 mg/L	0.130 mg/L
Lead	ND (<3.0 µg/L)	1.6 µg/L	9.7 µg/L	2.1 µg/L
pH	7.62 s.u.	8.11 s.u.	7.53 s.u.	7.59 s.u.
Ammonia	0.70 mg/L	0.65 mg/L	1.3 mg/L	0.43 mg/L

ND = not detected; MGD = millions of gallons per day; s.u. = standard units

Table 7.5.1: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Main Plateau – VOC Constituents (ug/L) – Pittsburgh					
	Well Number, Sample Date				
	MPW-7	MPW-8	MPW-9	MPW-10	MPW-11
Constituent	10/19/11	10/19/11	10/20/11	10/20/11	10/19/11
Acetone	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	2.0
Chloromethane	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	16	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND
Methyl acetate	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND
Methylcyclohexane	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND
Methyl tert-butyl ether	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	ND	ND
Trichlorofluromethane	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND

Table 7.5.1: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Main Plateau – VOC Constituents (ug/L) – Pittsburgh

Constituent	Well Number, Sample Date				
	MPW-7	MPW-8	MPW-9	MPW-10	MPW-11
	10/19/11	10/19/11	10/20/11	10/20/11	10/19/11
Vinyl chloride	ND	ND	ND	ND	ND
Xylenes (total)	ND	ND	ND	ND	ND

Exceeded EPA Region III Risk Based Table

ND = not detected

Table 7.5.2: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Filled – VOC Constituents (ug/L) – Pittsburgh

Constituent	Well Number, Sample Date				
	VFW-2	VFW-3	VFW-10	VFW-10-I	VFW-14
	10/17/11	10/17/11	10/18/11	10/18/11	10/18/11
Acetone	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Chloroform	ND	1.1	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	8	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND
2-Hexanone	ND	1.3	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND
Methyl acetate	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND
Methylcyclohexane	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND
Methyl tert-butyl ether	ND	ND	ND	ND	ND

Table 7.5.2: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Filled – VOC Constituents (ug/L) – Pittsburgh

Constituent	Well Number, Sample Date				
	VFW-2	VFW-3	VFW-10	VFW-10-I	VFW-14
	10/17/11	10/17/11	10/18/11	10/18/11	10/18/11
Styrene	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	0.51	ND	ND
Tetrachloroethene (PCE)	ND	14	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	1.1	ND	ND	ND
Trichlorofluromethane	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND	ND	ND
Toulene	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND
Xylenes (total)	ND	ND	ND	ND	ND

ND = not detected

	Exceeded Pennsylvania Primary Drinking Water MCL and EPA Region III Risk Based Table
	Exceeded EPA Region III Risk Based Table

Table 7.5.3: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Filled – SVOC Constituents (ug/L) – Pittsburgh

Constituent	Well Number, Sample Date		Constituent	Well Number, Sample Date	
	VFW-2	VFW-14		VFW-2	VFW-14
	10/17/11	10/18/11		10/17/11	10/18/11
Acenaphthene	ND	ND	2,4-Dinitrotoluene	ND	ND
Acenaphthylene	ND	ND	2,6-Dinitrotoluene	ND	ND
Acetophenone	ND	ND	Di-n-octyl phthalate	ND	ND
Anthracene	ND	ND	Fluoranthene	ND	ND
Atrazine	ND	ND	Fluorene	ND	ND
Benzo(a)anthracene	ND	ND	Hexachlorobenzene	ND	ND
Benzo(a)pyrene	ND	ND	Hexachlorobutadiene	ND	ND
Benzo(b)fluoranthene	ND	ND	Hexachlorocyclopentadiene	ND	ND
Benzo(ghi)perylene	ND	ND	Hexachloroethane	ND	ND
Benzo(k)fluoranthene	ND	ND	Indeno(1,2,3-cd)pyrene	ND	ND
Benzaldehyde	ND	ND	Isophorone	ND	ND
1,1-Biphenyl	ND	ND	2-Methylnaphthalene	ND	ND
Bis(2-chloroethoxyl) methane	ND	ND	2-Methylphenol (o-Cresol)	ND	ND
Bis (2-chloroethyl) ether	ND	ND	4-Methylphenol (p-Cresol)	ND	ND
Bis(2-ethylhexyl) phthalate	ND	ND	Naphthalene	ND	ND
4-Bromophenyl phenyl ether	ND	ND	2-Nitroaniline	ND	ND
Butyl benzyl phthalate	ND	ND	3-Nitroaniline	ND	ND
Caprolactam	ND	ND	4-Nitroaniline	ND	ND
Carbazole	ND	ND	Nitrobenzene	ND	ND
4-Chloroaniline	ND	ND	2-Nitrophenol	ND	ND
4-Chloro-3-methylphenol	ND	ND	4-Nitrophenol	ND	ND

Table 7.5.3: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Filled – SVOC Constituents (ug/L) – Pittsburgh

Constituent	Well Number, Sample Date		Constituent	Well Number, Sample Date	
	VFW-2	VFW-14		VFW-2	VFW-14
	10/17/11	10/18/11		10/17/11	10/18/11
2-Chloronaphthalene	ND	ND	N-Nitrosodi-n-propylamine	ND	ND
2-Chlorophenol	ND	ND	N-Nitrosodiphenylamine	ND	ND
4-Chlorophenyl phenyl ether	ND	ND	2,2-Oxybis (1-Chloropropane)	ND	ND
Chrysene	ND	ND	Pentachlorophenol	ND	ND
Dibenz(a,h)anthracene	ND	ND	Phenanthrene	ND	ND
Dibenzofuran	ND	ND	Phenol	ND	ND
3,3'-Dichlorobenzidine	ND	ND	Pyrene	ND	ND
2,4-Dichlorophenol	ND	ND	2,4,5-Trichlorophenol	ND	ND
Diethyl phthalate	ND	ND	2,4,6-Trichlorophenol	ND	ND
2,4-Dimethylphenol	ND	ND	1,3-Dichlorobenzene	ND	ND
Dimethyl phthalate	ND	ND	1,4-Dichlorobenzene	ND	ND
Di-n-butyl phthalate	ND	ND	1,2-Dichlorobenzene	ND	ND
4,6-Dinitro-2-methlyphenol	ND	ND	1,2,4-Trichlorobenzene	ND	ND
2,4-Dinitrophenol	ND	ND			

ND = not detected

Table 7.5.4: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Fill - TPH Constituents (mg/L) – Pittsburgh

Constituent	Well Number, Sample Date								
	VFW-2		VFW-4		VFW-7		VFW-7-I	VFW-9	
	05/26/11	10/17/11	05/26/11	10/17/11	05/26/11	10/18/11	05/26/11	05/26/11	10/18/11
TPH-DRO	ND	ND	ND	ND	ND	1.9	0.340	0.300	1.8

Constituent	Well Number, Sample Date								
	VFW-10		VFW-10-I	VFW-11		VFW-12		VFW-14	
	05/26/11	10/18/11	10/18/11	05/26/11	10/18/11	05/26/11	10/18/11	05/26/11	10/18/11
TPH-DRO	0.360	1.4	ND	0.340	ND	0.270	ND	0.330	ND

ND = not detected; TPH = total petroleum hydrocarbons; TPH-DRO = total petroleum hydrocarbons - diesel range organics

Table 7.5.5: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Main Plateau – Groundwater Characteristics Constituents – Pittsburgh

	Well Number, Sample Date							
	MPW-2	MPW-4	MPW-4D	MPW-8	MPW-4-1	MPW-9	MPW-10	MPW-11
Constituent	10/19/11	10/19/11	10/19/11	10/19/11	10/19/11	10/20/11	10/20/11	10/19/11
Inorganics (ug/l)								
Aluminum	150	48	650	220	61	ND	ND	140
Boron	22	69	190	27	66	110	130	28
Calcium	530,000	440,000	5,300	670,000	420,000	36,000	2,400	100,000
Iron	21,000	620	1,000	2,600	780	2,400	53	580
Magnesium	99,000	160,000	1,100	100,000	150,000	10,000	380	19,000
Manganese	2,900	460	25	140	460	41	4.7	61
Nickel	4,400	310	36	370	310	180	ND	21
Potassium	2,900	5,900	850	6,500	5,800	1,100	ND	1,900
Silica	5,800	11,000	11,000	9,000	10,000	8,700	8,800	3,300
Sodium	340,000	290,000	260,000	870,000	270,000	190,000	220,000	180,000
Strontium	960	1,600	200	1,300	1,500	1,700	110	280
Quality Parameters (mg/L)								
Chloride	1,900	1,400	210	3,400	1,400	210	140	370
Fluoride	0.20	0.24	1.7	0.099	0.17	0.50	0.33	0.37
Nitrate	0.28	0.37	0.078	ND	0.39	0.44	ND	0.79
Sulfate	96	110	18	230	120	11	8.3	53
Total Dissolved Solids	3,900	3,500	550	7,900	2,700	460	410	750
Total Alkalinity (Bicarbonate)	39	200	290	160	180	250	280	48
Total Alkalinity (Carbonate)	ND	ND	6.2	ND	ND	ND	19	ND

ND = not detected

	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table, Pennsylvania Secondary Drinking Water MCL and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table
	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level

Table 7.5.6: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Filled – Groundwater Characteristics Constituents – Pittsburgh

Constituent	Well Number, Sample Date												
	VFW-1	VFW-2	VFW-3	VFW-4	VFW-5	VFW-6	VFW-7	VFW-9	VFW-10	VFW-10-I	VFW-11	VFW-12	VFW-14
	10/17/11	10/17/11	10/17/11	10/17/11	10/17/11	10/17/11	10/18/11	10/18/11	10/18/11	10/18/11	10/18/11	10/18/11	10/18/11
Inorganics (ug/l)													
Aluminum	36	84	550	68	36	110	120	600	53	58	58	85	89
Boron	280	160	45	55	250	220	60	53	100	97	36	260	110
Calcium	1,500	390,000	310,000	280,000	110,000	240,000	580,000	220,000	260,000	250,000	230,000	280,000	310,000
Iron	75	3,200	2,300	530	1,300	690	5,500	890	240	220	280	1,400	800
Magnesium	360	80,000	120,000	83,000	15,000	39,000	130,000	52,000	44,000	42,000	53,000	77,000	64,000
Manganese	4	2,000	130	280	3.5	270	1,800	26	2,100	2,100	370	340	2,500
Nickel	ND	ND	49	160	14	ND	ND	66	21	21	180	870	ND
Potassium	ND	5,000	5,400	3,000	2,700	14,000	6,000	4,700	18,000	17,000	2,000	4,600	3,100
Silica	7,700	19,000	9,700	11,000	16,000	10,000	12,000	9,200	14,000	13,000	7,800	9,600	12,000
Sodium	290,000	400,000	260,000	34,000	220,000	820,000	650,000	320,000	720,000	690,000	69,000	280,000	220,000
Strontium	110	4,000	1,600	2,600	300	1,100	7,500	580	730	700	540	2,100	1,700
Quality Parameters (mg/L)													
Chloride	20	850	1,200	660	290	1,700	2,400	980	1,400	1,400	450	800	870
Fluoride	1.7	1.3	0.25	0.34	1.3	0.90	0.15	0.090	0.63	0.58	0.25	0.49	0.30
Nitrate	0.049	ND	2.0	ND	1.7	ND	ND	3.0	0.86	0.81	0.14	ND	ND
Sulfate	1.0	890	130	81	230	420	150	190	410	380	190	330	230
Total Dissolved Solids	740	2,900	2,900	1,600	970	3,300	5,100	2,300	3,000	3,100	1200	2,400	2,300
Total Alkalinity Bicarbonate	530	240	250	280	280	66	190	100	230	240	200	300	250
Total Alkalinity Carbonate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table, Pennsylvania Secondary Drinking Water MCL and Act 2 Secondary Maximum Contaminant Level
	Exceeded EPA Region III Risk Based Table
	Exceeded Pennsylvania Secondary Drinking Water Maximum Contaminant Level

ND = not detected

Table 7.5.7: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Main Plateau – Contamination Indicator Constituents – Pittsburgh

Constituent	Well Number, Sample Date						
	MPW-2	MPW-4	MPW-4D	MPW-8	MPW-9	MPW-10	MPW-11
	10/19/11	10/19/11	10/19/11	10/19/11	10/20/11	10/20/11	10/20/11
pH (standard units)	6.99	7.14	8.41	7.05	7.85	8.80	7.48
Specific Conductance (uS)	11040	5188	1203	10590	1150	1008	2440
Temperature (^{0}C)	16.0	18.1	14.8	19.0	10.4	11.7	17.2
TOX (ug/l)	680	830	170	1000	150	110	320
TOC (mg/L)	1.7	1.1	0.82	0.67	0.69	0.45	5.1

ND = not detected; TOX = total organic halogens; TOC = total organic carbon; specific conductance unit = umhos/cm @ 25 E C;

Exceeded Pennsylvania Secondary Drinking Water MCL

Table 7.5.8: 2011 Groundwater Detection Monitoring Program, Results of Analysis – Groundwater Samples, Valley Fill – Contamination Indicator Constituents – Pittsburgh

Constituent	Well Number, Sample Date												
	VFW-1		VFW-2		VFW-7-1	VFW-3		VFW-4		VFW-5		VFW-6	
	05/26/11	10/17/11	05/26/11	10/17/11	05/26/11	05/26/11	10/17/11	05/26/11	10/17/11	05/26/11	10/17/11	05/26/11	10/17/11
pH (standard units)	NS	6.10	6.81	6.84	6.83	NS	7.09	6.85	7.24	NS	7.41	NS	7.36
Specific Conductance (uS)	NS	2,977	6,220	5,994	6,550	NS	3,998	2,590	2,555	NS	1,782	NS	1,962
Temperature (^{0}C)	NS	15.6	12.9	13.3	14.7	NS	15.4	16.5	17.0	NS	13.8	NS	13.8
TOX (ug/l)	NS	52	NS	120	NS	NS	490	NS	220	NS	81	NS	96
TOC (mg/L)	NS	1.4	NS	1.6	NS	NS	1.3	NS	0.77	NS	2.9	NS	2.8
	VFW-7		VFW-9			VFW-10		VFW-11		VFW-12		VFW-14	
	05/26/11	10/18/11	05/26/11	10/18/11		05/26/11	10/18/11	05/26/11	10/18/11	05/26/11	10/18/11	05/26/11	10/18/11
pH (standard units)	6.83	7.06	6.71	6.95		7.07	7.33	7.24	7.36	7.05	7.50	6.82	7.21
Specific Conductance (uS)	6,550	6,743	2,560	3,322		3,290	4,670	1,980	1,962	3,340	3,550	3,460	3,103
Temperature (^{0}C)	14.7	12.9	12.0	13.1		11.7	15.1	13.1	13.8	12.1	14.9	13.5	15.0
TOX (ug/l)	NS	420	NS	65		NS	370	NS	210	NS	180	NS	430
TOC (mg/L)	NS	1.1	NS	2.2		NS	1.5	NS	1.1	NS	5.2	NS	1.7

ND = not detected; NS = not sampled; TOX = total organic halogens; TOC = total organic carbon; specific conductance unit = umhos/cm @ 25 E C;

Exceeded Pennsylvania Secondary Drinking Water MCL

Table 9.2.1: 2011 Albany X-Ray Radiation Generating Devices

Device	Quantity	Location
X-Ray Florescence Instrument	1	B-1, Room 101
X-Ray Diffraction Instrument	2	B-1, Rooms 105 & 115
Scanning Electron Microscope	2	B-1, Rooms 109 & 119
Transmission Electron Microscope	1	B-1, Room 102
Sedigraph	1	B-17, Room 110

Table 9.6.1: NETL-ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis–Groundwater Samples–VOC Constituents (ug/L)

Constituent	Well Number, Sample Date															
	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8	
	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11
1,1,1,2-Tetrachloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorpropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	NS	NS	NS	NS	ND	0.570	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	NS	NS	NS	NS	ND	0.430	ND	ND	ND	ND	ND	1.70	ND	ND	ND	ND
cis-1,3-Dichloropropene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 9.6.1: NETL-ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis–Groundwater Samples–VOC Constituents (ug/L)																
Methyl tert butyl ether	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.09	ND
trans-1,2-Dichloroethene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	0.140	ND	ND	ND	ND
trans-1,3-Dichloropropene	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	NS	NS	NS	NS	ND	0.790	ND	ND	ND	ND	ND	0.110	ND	ND	ND	ND
Trichlorofluoromethane	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	NS	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Well Number, Sample Date															
	MW-9		**MW-10**		**MW-11**		**MW-12**		**MW-13**		**MW-14**		**MW-15**		**MW-16**	
Constituent	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorpropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	0.400	ND	ND	ND	ND

Table 9.6.1: NETL-ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis–Groundwater Samples–VOC Constituents (ug/L)																
Bromoform	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	24.3	28.3	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	2.55	8.62	10.3	10.6	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	0.5	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	2.80	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	ND	0.160	ND	ND	NS	NS	ND	ND	ND	ND	676	516	ND	0.0900
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
	Well Number, Sample Date															
	MW-17		**MW-18**		**MW-19**		**MW-20**		**MW-21**		**MW-22**		**MW-23**		**MW-24**	
Constituent	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**	**03/11**	**08/11**
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorpropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	0.130	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND

Table 9.6.1: NETL-ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis–Groundwater Samples–VOC Constituents (ug/L)																
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	10.2	10,100	1,560	ND	ND	1,230	1,140	NS	NS	202	161	6.51	4.06	16.1	15.3
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Chloroform	ND	1.40	975	161	ND	ND	120	128	NS	NS	23.1	19.5	1.75	1.08	4.34	4.48
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	1.95	ND	0.910	ND	ND	ND	ND	NS	NS	ND	2.40	ND	0.110	ND	0.150
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	1.05	ND	ND	ND	ND	ND	10.5	NS	NS	ND	0.850	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	255	62.6	ND	ND	ND	6.0	NS	NS	ND	2.00	ND	ND	ND	0.130
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	170	622	425	185	ND	ND	276	210	NS	NS	17.4	18.8	8.91	6.36	26.2	27.7
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	ND	ND	ND	ND	ND	ND

Table 9.6.1: NETL-ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis–Groundwater Samples–VOC Constituents (ug/L)

Constituent	Well Number, Sample Date															
	MW-25		MW-26		MW-27		MW-28		MW-29		MW-30		MW-31		MW-100	
	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11	03/11	08/11
1,1,1,2-Tetrachloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,1-Dichloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,1-Dichloroethene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,1-Dichloropropene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2,3-Trichlorpropane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2-Dibromoethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2-Dichloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,2-Dichloropropane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,3-Dichloropropane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
2,2-Dichloropropane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
2-Butanone	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
2-Chlorotoluene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
2-Hexanone	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
4-Chlorotoluene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
4-iso-Propyltoluene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Acetone	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Benzene	ND	ND	NS	0.280	NS	NS	NS	NS	NS	1.44	NS	ND	NS	ND	ND	ND
Bromobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Bromochloromethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Bromodichloromethane	ND	ND	NS	0.500	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Bromoform	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Bromomethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Carbon Disulfide	ND	ND	NS	ND	NS	NS	NS	NS	NS	0.500	NS	ND	NS	ND	ND	ND
Carbon Tetrachloride	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	0.430	ND	4.27
Chlorobenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Chloroethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Chloroform	ND	ND	NS	18.4	NS	NS	NS	NS	NS	0.610	NS	ND	NS	0.140	ND	0.970
Chloromethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	7.00	NS	ND	ND	0.290
cis-1,3-Dichloropropene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Dibromochloromethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Dibromomethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Dichlorodifluoromethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Ethylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Hexachlorobutadiene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Isopropylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND

Table 9.6.1: NETL-ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis–Groundwater Samples–VOC Constituents (ug/L)																
Methyl tert butyl ether	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Methylene chloride	ND	ND	NS	4.77	NS	NS	NS	NS	NS	1.00	NS	ND	NS	ND	ND	ND
Naphthalene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
n-Butylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
n-Propylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
sec-Butylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Styrene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
tert-Butylbenzene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Toluene	ND	ND	NS	0.760	NS	NS	NS	NS	NS	1.02	NS	ND	NS	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	0.730	NS	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Trichloroethene (TCE)	ND	ND	NS	0.370	NS	NS	NS	NS	NS	ND	NS	0.290	NS	0.190	56.8	296
Trichlorofluoromethane	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Vinyl chloride	ND	ND	NS	ND	NS	NS	NS	NS	NS	ND	NS	ND	NS	ND	ND	ND
Xylene, Total	ND	ND	NS	ND	NS	NS	NS	NS	NS	0.0800	NS	ND	NS	ND	ND	ND

Table 9.6.1 (cont.): NETL ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis-Groundwater Samples-VOC Constituents (ug/L)						
	Well Number and Sample Date					
	MW-101		MW-102		MW-103	
Constituent	03/11	08/11	03/11	08/11	03/11	08/11
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorpropane	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND
4-iso-Propyltoluene	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND

Table 9.6.1 (cont.): NETL ALBANY 2011 Groundwater Detection Monitoring Program, Results of Analysis-Groundwater Samples-VOC Constituents (ug/L)

Constituent	Well Number and Sample Date					
	MW-101		MW-102		MW-103	
	03/11	08/11	03/11	08/11	03/11	08/11
Bromochloromethane	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	1.33	1.37	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	1.13	1.26	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	1.34	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	0.110	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ND	ND	74.0	76.3	1.14	1.42
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND

Exceeds Oregon Dept. of Environmental Quality Standards

ND = Not detected

NS= Not Sampled

Table 9.6.2: NETL-ALBANY 2011 Groundwater Detection Monitoring Program: Results of Analysis-Groundwater Samples-Metals (mg/L) and Radium (pCi/L)

	Well Number, Sample Date							
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8
Constituent	3/11	3/11	3/11	3/11	3/11	3/11	3/11	3/11
Aluminum	NS	NS	0.117	ND	NS	ND	NS	NS
Antimony	NS	NS	ND	ND	NS	ND	NS	NS
Arsenic	NS	NS	ND	0.00358	NS	ND	NS	NS
Barium	NS	NS	0.00587	0.0421	NS	0.0123	NS	NS
Beryllium	NS	NS	ND	ND	NS	ND	NS	NS
Cadmium	NS	NS	ND	ND	NS	ND	NS	NS
Calcium	NS	NS	21.5	39.2	NS	11.7	NS	NS
Chromium	NS	NS	ND	ND	NS	0.00284	NS	NS
Cobalt	NS	NS	ND	ND	NS	ND	NS	NS
Copper	NS	NS	ND	ND	NS	ND	NS	NS
Iron	NS	NS	0.369	1.30	NS	0.181	NS	NS
Lead	NS	NS	ND	ND	NS	ND	NS	NS
Magnesium	NS	NS	11.1	19.6	NS	6.30	NS	NS
Manganese	NS	NS	0.00937	0.0381	NS	0.0153	NS	NS
Mercury	NS	NS	ND	ND	NS	ND	NS	NS
Nickel	NS	NS	ND	ND	NS	ND	NS	NS
Potassium	NS	NS	ND	1.11	NS	ND	NS	NS
Radium 226	NS	NS	0.129	0.0962	NS	0.147	NS	NS
Radium 228	NS	NS	0.772	0.773	NS	0.736	NS	NS
Selenium	NS	NS	ND	ND	NS	ND	NS	NS
Silver	NS	NS	ND	ND	NS	ND	NS	NS
Sodium	NS	NS	8.63	18.6	NS	7.14	NS	NS
Thallium	NS	NS	ND	ND	NS	ND	NS	NS
Vanadium	NS	NS	0.00526	0.00427	NS	0.00454	NS	NS
Zinc	NS	NS	ND	ND	NS	ND	NS	N

	Well Number, Sample Date							
	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Constituent	3/11	3/11	3/11	3/11	3/11	3/11	3/11	3/11
Aluminum	NS	NS	NS	NS	ND	ND	1.06	0.224
Antimony	NS	NS	NS	NS	ND	ND	ND	ND
Arsenic	NS	NS	NS	NS	0.00105	ND	ND	0.00749
Barium	NS	NS	NS	NS	0.0159	0.00276	0.0672	0.0244
Beryllium	NS	NS	NS	NS	ND	ND	ND	ND
Cadmium	NS	NS	NS	NS	ND	ND	ND	ND
Calcium	NS	NS	NS	NS	16.2	21.2	735	40.0
Chromium	NS	NS	NS	NS	ND	ND	ND	ND
Cobalt	NS	NS	NS	NS	ND	ND	0.00212	ND
Copper	NS	NS	NS	NS	ND	ND	ND	ND
Iron	NS	NS	NS	NS	ND	ND	1.45	7.10
Lead	NS	NS	NS	NS	ND	ND	ND	ND
Magnesium	NS	NS	NS	NS	7.85	7.83	349	17.9
Manganese	NS	NS	NS	NS	0.170	0.00215	0.273	1.20
Mercury	NS	NS	NS	NS	ND	ND	ND	ND
Nickel	NS	NS	NS	NS	ND	ND	0.00344	ND
Potassium	NS	NS	NS	NS	ND	ND	6.32	1.34
Radium 226	NS	NS	NS	NS	0.214	0.135	0.199	0.189
Radium 228	NS	NS	NS	NS	0.691	0.749	0.719	0.495
Selenium	NS	NS	NS	NS	ND	ND	ND	ND

Table 9.6.2: NETL-ALBANY 2011 Groundwater Detection Monitoring Program: Results of Analysis-Groundwater Samples-Metals (mg/L) and Radium (pCi/L)								
Silver	NS	NS	NS	NS	ND	ND	ND	ND
Sodium	NS	NS	NS	NS	6.23	12.5	103	15.0
Thallium	NS	NS	NS	NS	ND	ND	ND	ND
Vanadium	NS	NS	NS	NS	0.00594	0.00374	0.00481	ND
Zinc	NS	NS	NS	NS	ND	ND	ND	ND
	Well Number, Sample Date							
	MW-17	**MW-18**	**MW-19**	**MW-20**	**MW-21**	**MW-22**	**MW-23**	**MW-24**
Constituent	**3/11**	**3/11**	**3/11**	**3/11**	**3/11**	**3/11**	**3/11**	**3/11**
Aluminum	ND	0.166	ND	0.166	NS	0.236	0.679	0.528
Antimony	ND	ND	ND	ND	NS	ND	ND	ND
Arsenic	0.00115	ND	ND	0.00148	NS	0.00157	ND	0.00128
Barium	0.00595	0.00648	0.0168	0.0140	NS	0.00906	0.00845	0.00859
Beryllium	ND	ND	ND	ND	NS	ND	ND	ND
Cadmium	ND	ND	ND	ND	NS	ND	ND	ND
Calcium	37.9	26.6	16.0	35.9	NS	23.3	30.6	23.0
Chromium	ND	ND	ND	ND	NS	ND	ND	ND
Cobalt	ND	ND	ND	ND	NS	0.00128	0.00184	0.00118
Copper	ND	ND	ND	ND	NS	ND	ND	ND
Iron	0.115	0.352	0.124	0.342	NS	0.608	1.87	1.94
Lead	ND	ND	ND	ND	NS	ND	ND	ND
Magnesium	18.5	12.7	8.22	16.3	NS	10.5	16.6	13.5
Manganese	0.0168	0.0222	0.819	0.573	NS	0.0920	0.0272	0.0312
Mercury	ND	ND	ND	ND	NS	ND	ND	ND
Nickel	ND	ND	ND	ND	NS	ND	ND	ND
Potassium	1.08	ND	ND	1.07	NS	ND	ND	ND
Radium 226	0.191	0.128	0.139	0.138	NS	0.152	0.223	0.211
Radium 228	0.509	0.462	0.526	0.516	NS	0.526	0.855	0.692
Selenium	ND	ND	ND	ND	NS	ND	ND	ND
Silver	ND	ND	ND	ND	NS	ND	ND	ND
Sodium	18.0	19.3	8.17	24.3	NS	21.2	14.4	15.1
Thallium	ND	ND	ND	ND	NS	ND	ND	ND
Vanadium	0.00643	0.0105	ND	0.0104	NS	0.00731	0.0129	0.0144
Zinc	ND	ND	ND	ND	NS	ND	ND	ND

Table 9.6.2 (cont.): NETL-ALBANY 2011 Groundwater Detection Monitoring Program: Results of Analysis-Groundwater Samples-Metals (mg/L) and Radium (pCi/L)				
		Well Number and Sample Date		
	MW-25	**MW-101**	**MW-102**	**MW-103**
Constituent	**03/11**	**03/11**	**03/11**	**03/11**
Aluminum	NS	NS	NS	NS
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Calcium	NS	NS	NS	NS
Chromium	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Iron	NS	NS	NS	NS

Table 9.6.2 (cont.): NETL-ALBANY 2011 Groundwater Detection Monitoring Program: Results of Analysis-Groundwater Samples-Metals (mg/L) and Radium (pCi/L)

		Well Number and Sample Date		
	MW-25	MW-101	MW-102	MW-103
Constituent	03/11	03/11	03/11	03/11
Lead	NS	NS	NS	NS
Magnesium	NS	NS	NS	NS
Manganese	NS	NS	NS	NS
Mercury	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Potassium	NS	NS	NS	NS
Radium 226	NS	NS	NS	NS
Radium 228	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Silver	NS	NS	NS	NS
Sodium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
Zinc	NS	NS	NS	NS

Exceeds Oregon Dept. of Environmental Quality Standards

ND = Not detected

NS= Not Sampled

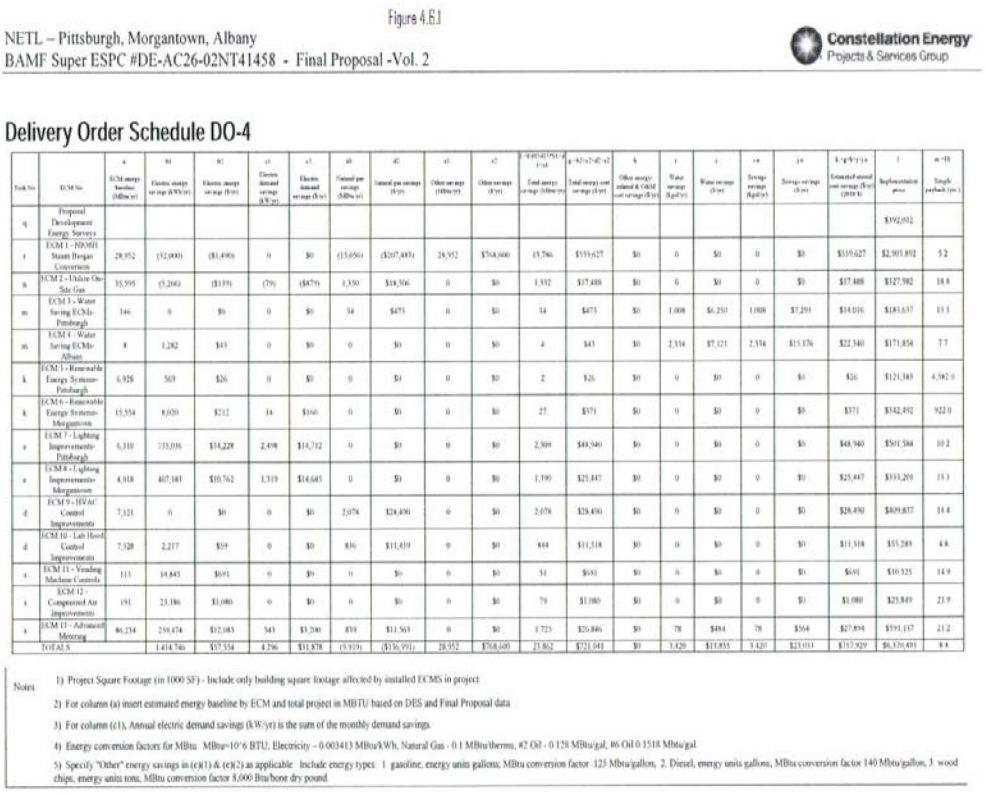


Figure 4.6.1

NETL – Pittsburgh, Morgantown, Albany
BAMF Super ESPC #DE-AC26-02NT41458 - Final Proposal -Vol. 2

Constellation Energy
Projects & Services Group

Delivery Order Schedule DO-4

Task No	ECM No	a ECM energy baseline (MBtu/yr)	b1 Electric energy savings (kWh/yr)	b2 Electric energy savings ($/yr)	c1 Electric demand savings (kW/yr)	c2 Electric demand savings ($/yr)	d1 Natural gas savings (MBtu/yr)	d2 Natural gas savings ($/yr)	e1 Other savings (MBtu/yr)	e2 Other savings ($/yr)	f=d1/d1+e1+d2+e2 Total energy savings (MBtu/yr)	g=b2+c2+d2+e2 Total energy cost savings ($/yr)	h Other energy-related & O&M cost savings ($/yr)	i Water savings (kgal/yr)	j Water savings ($/yr)	i+k Sewage savings (kgal/yr)	j+l Sewage savings ($/yr)	k=g+h+j+l+n Estimated annual cost savings ($/yr) (2008 $)	l Implementation price	m=f/k Simple payback (yrs.)
q	Proposal Development - Energy Surveys																		$192,032	
r	ECM 1 - 100,000 Steam Boiler Conversion	29,952	(52,000)	($1,490)	0	$0	(15,056)	($207,683)	28,952	$764,600	13,786	$559,627	$0	0	$0	0	$0	$559,627	$2,903,892	5.2
n	ECM 2 - Utilize On-Site Gas	35,595	(5,266)	($139)	(79)	($479)	1,350	$18,506	0	$0	1,332	$17,488	$0	0	$0	0	$0	$17,488	$327,582	18.8
m	ECM 3 - Water Saving ECMs-Pittsburgh	146	0	$0	0	$0	34	$471	0	$0	34	$471	$0	1,008	$6,250	1,008	$7,293	$14,016	$183,637	13.1
m	ECM 4 - Water Saving ECMs-Albany	8	1,282	$43	0	$0	0	$0	0	$0	4	$43	$0	2,334	$7,121	2,334	$13,376	$22,340	$171,854	7.7
k	ECM 5 - Renewable Energy Systems-Pittsburgh	6,928	503	$26	0	$0	0	$0	0	$0	2	$26	$0	0	$0	0	$0	$26	$121,303	4,582.0
k	ECM 6 - Renewable Energy Systems-Morgantown	15,554	8,020	$212	14	$160	0	$0	0	$0	27	$371	$0	0	$0	0	$0	$371	$342,492	922.0
s	ECM 7 - Lighting Improvements-Pittsburgh	5,310	733,036	$34,229	2,498	$14,712	0	$0	0	$0	2,309	$48,940	$0	0	$0	0	$0	$48,940	$501,584	10.2
s	ECM 8 - Lighting Improvements-Morgantown	4,918	407,383	$10,762	1,319	$14,685	0	$0	0	$0	1,390	$25,447	$0	0	$0	0	$0	$25,447	$333,201	13.1
d	ECM 9 - HVAC Control Improvements	7,321	0	$0	0	$0	2,078	$28,490	0	$0	2,078	$28,490	$0	0	$0	0	$0	$28,490	$409,837	14.4
d	ECM 10 - Lab Hood Control Improvements	7,328	2,217	$59	0	$0	836	$11,459	0	$0	844	$11,518	$0	0	$0	0	$0	$11,518	$55,289	4.8
s	ECM 11 - Vending Machine Controls	113	14,845	$691	0	$0	0	$0	0	$0	51	$691	$0	0	$0	0	$0	$691	$10,325	14.9
s	ECM 12 - Compressed Air Improvements	191	23,186	$1,080	0	$0	0	$0	0	$0	79	$1,080	$0	0	$0	0	$0	$1,080	$25,849	23.9
s	ECM 13 - Advanced Metering	86,234	259,474	$12,083	543	$3,200	858	$11,563	0	$0	1,725	$26,846	$0	78	$484	78	$564	$27,894	$591,137	21.2
	TOTALS		1,414,746	$57,554	4,296	$31,878	(9,919)	($136,991)	28,952	$764,600	23,862	$721,041	$0	3,420	$13,855	3,420	$21,033	$757,929	$6,329,493	8.4

Notes

1) Project Square Footage (in 1000 SF) - Include only building square footage affected by installed ECMS in project

2) For column (a) insert estimated energy baseline by ECM and total project in MBTU based on DES and Final Proposal data

3) For column (c1), Annual electric demand savings (kW/yr) is the sum of the monthly demand savings

4) Energy conversion factors for MBtu MBtu=10^6 BTU; Electricity – 0.003413 MBtu/kWh, Natural Gas - 0.1 MBtu/therms, #2 Oil - 0.128 MBtu/gal, #6 Oil 0.1518 Mbtu/gal

5) Specify "Other" energy savings in (e)(1) & (e)(2) as applicable. Include energy types: 1. gasoline, energy units gallons, MBtu conversion factor .125 Mbtu/gallon, 2. Diesel, energy units gallons, MBtu conversion factor 140 Mbtu/gallon, 3. wood chips, energy units tons, MBtu conversion factor 8,000 Btu/bone dry pound.

July 25, 2008 (Revised)

Page 8

Figure 3.6.1: Constellation Energy's Delivery Order 4 schedule (DO-4)

NETL Morgantown Site
Active Groundwater Monitoring Wells
January 2010

Morgantown Sandstone well

B-C Aquifer well

A Aquifer well

100 0 100 200 300 400 500 Feet

Figure 5.7.1: Active Monitoring Wells at the Morgantown Site

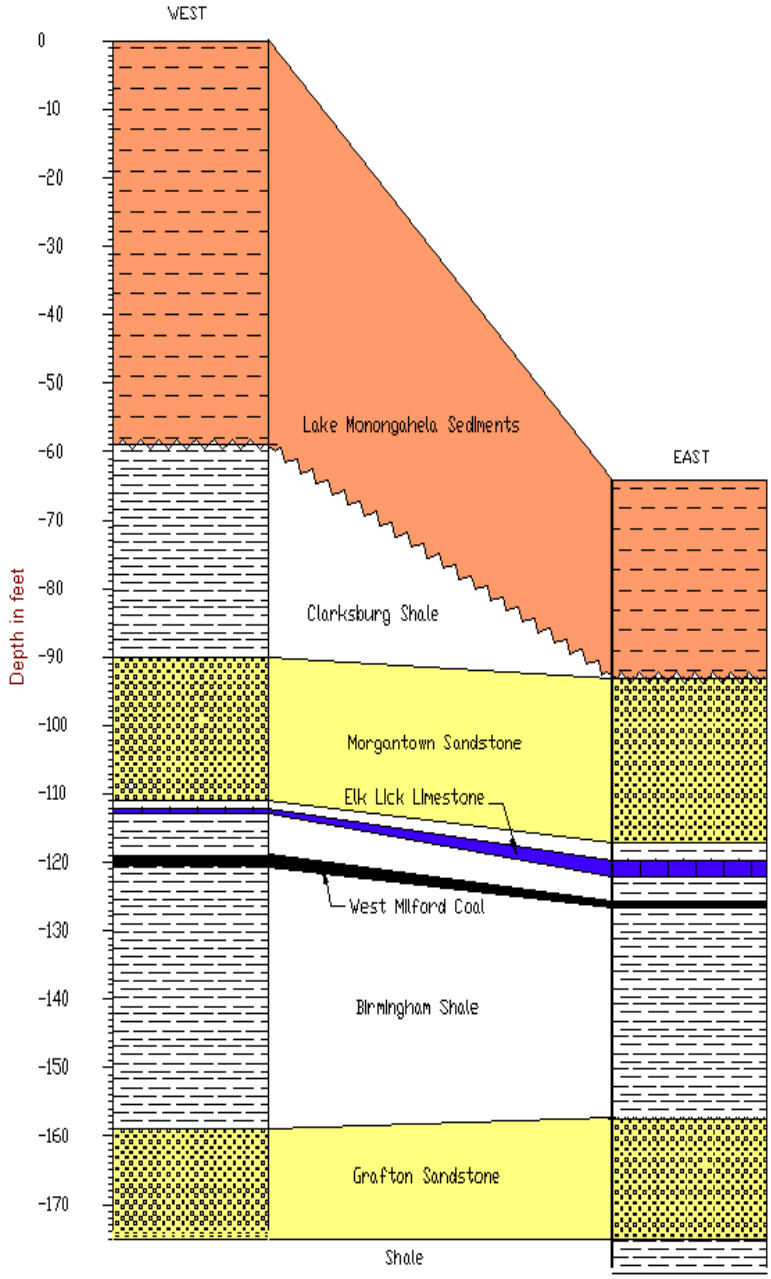


Figure 5.7.2: Generalized Cross-Section of Aquifer Units at the Morgantown Site

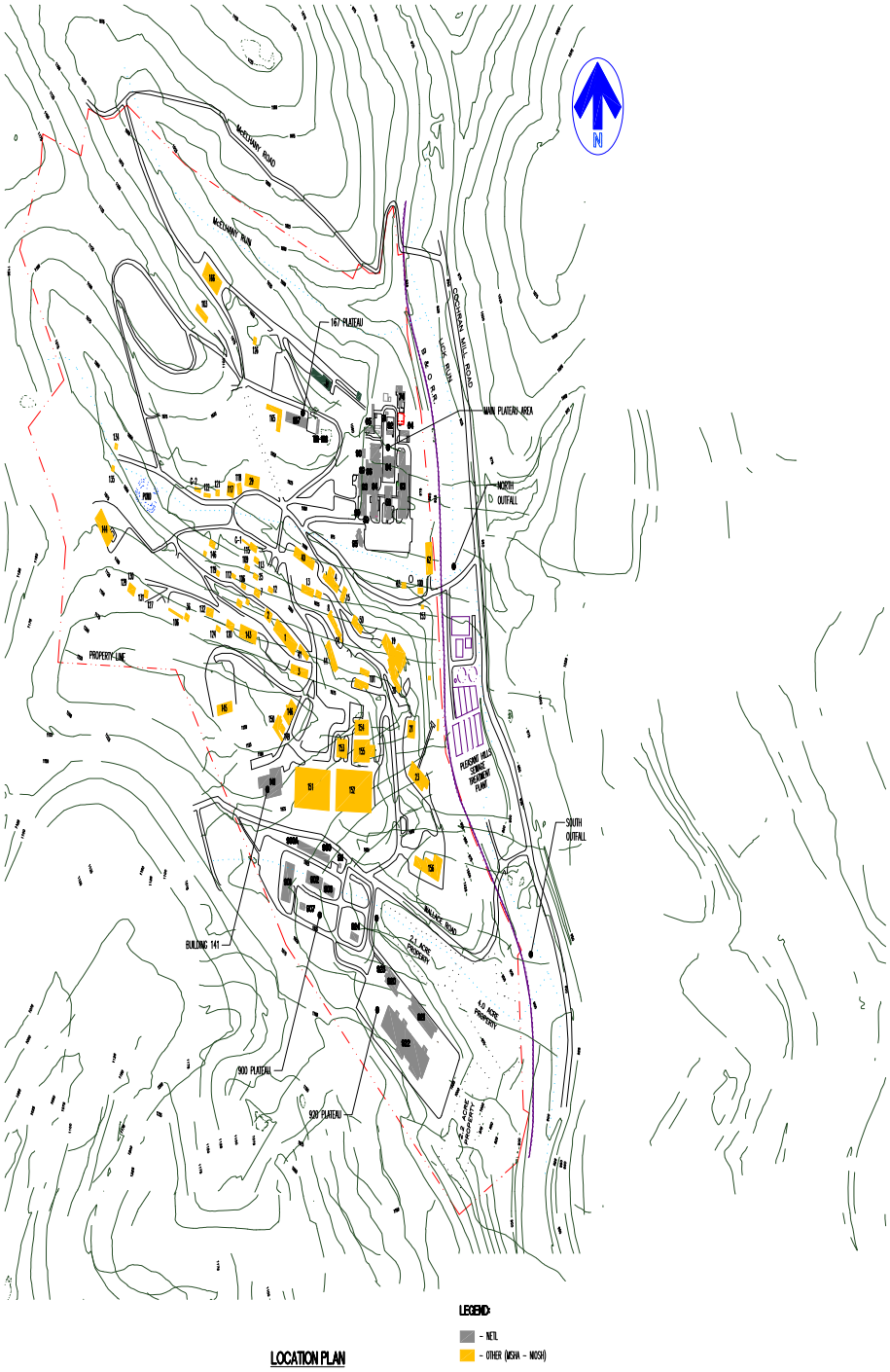


Figure 7.5.1: Topographic Site Map – Pittsburgh

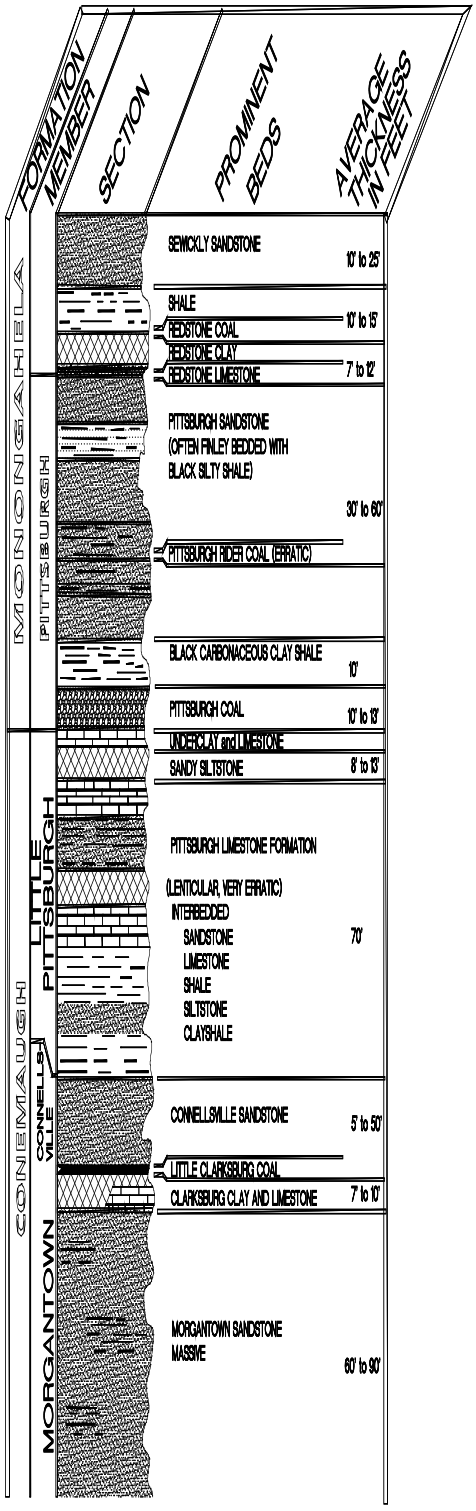


Figure 7.5.2: General Geologic Column – Pittsburgh

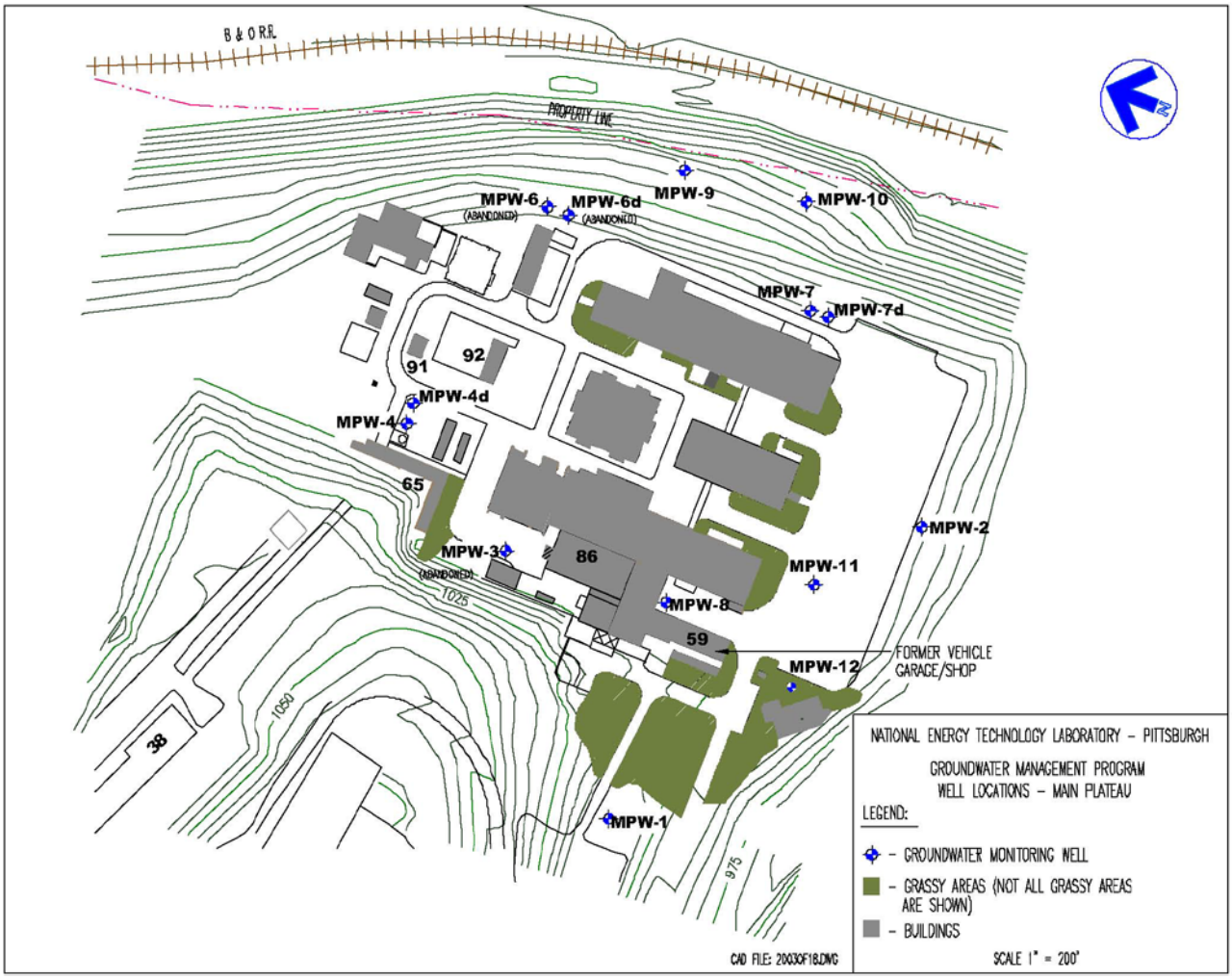


Figure 7.5.3: Groundwater Management Program R&D Plateau Well Locations – Pittsburgh

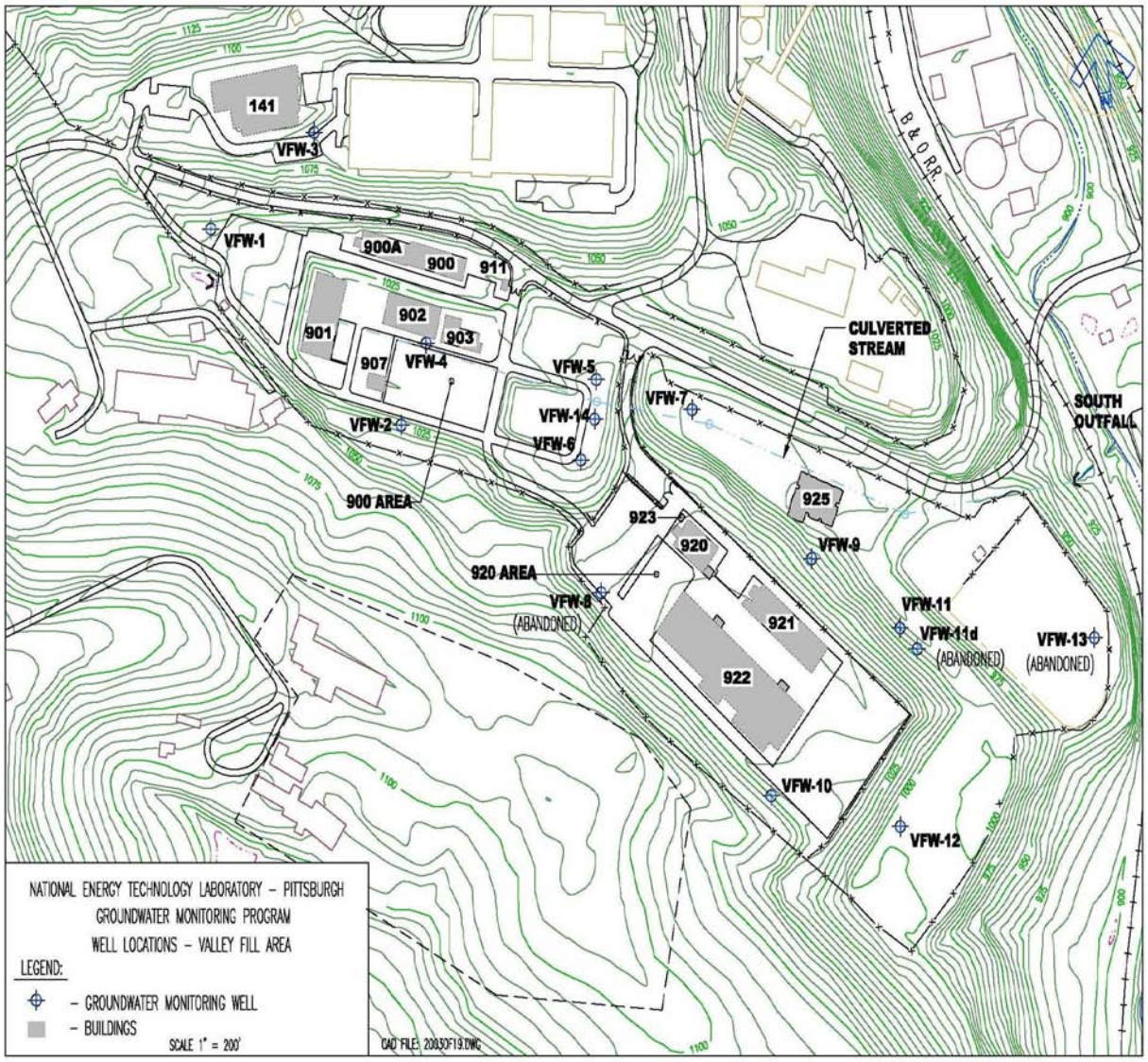


Figure 7.5.4: Groundwater Management Program Valley Fill Well Locations – Pittsburgh

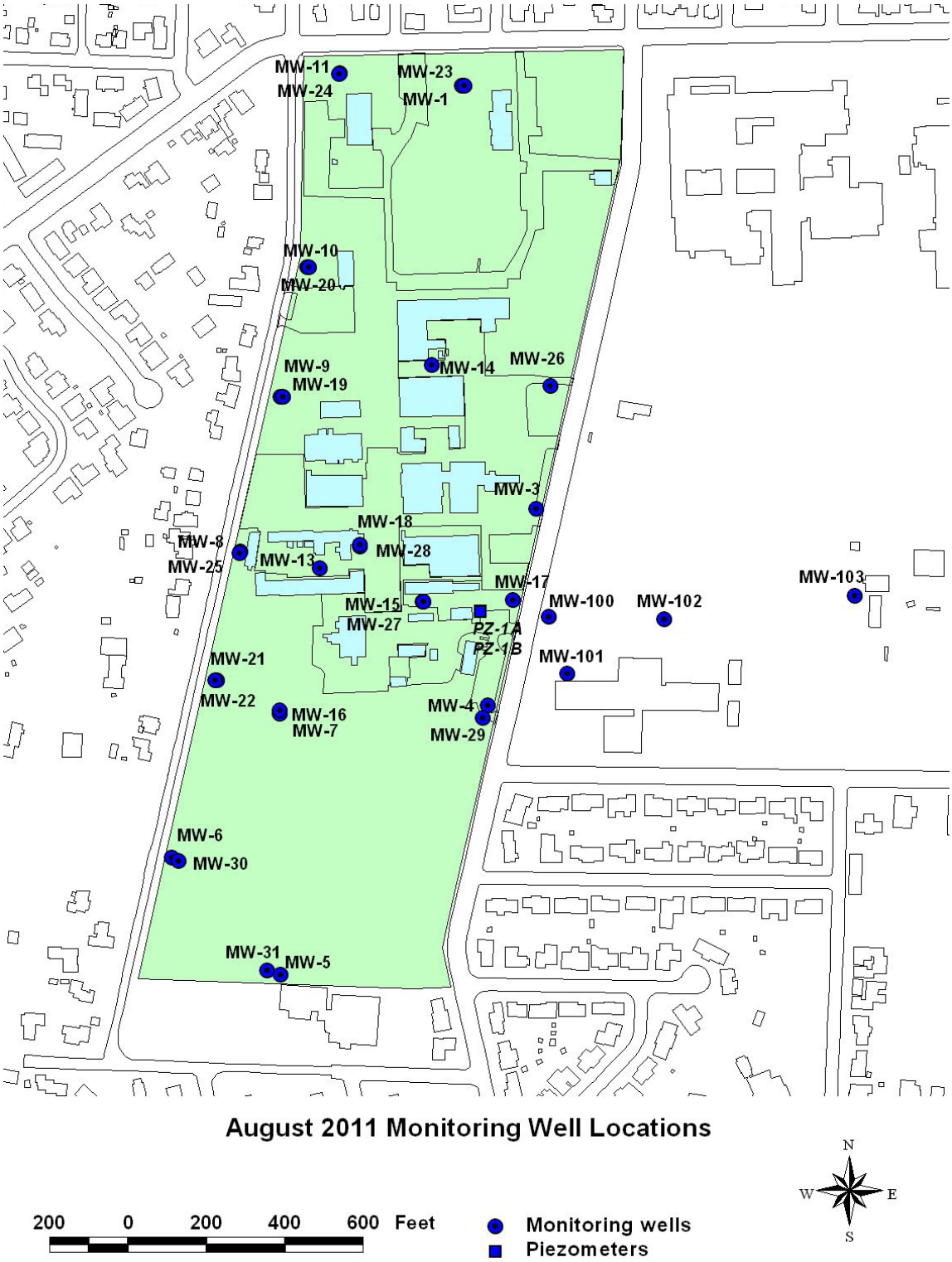


Figure 9.6.1: Monitoring Well Locations – Albany