



**NATIONAL ENERGY TECHNOLOGY LABORATORY**



## **2008 Annual Site Environmental Report**

# **2008 Annual Site Environmental Report**

December 21, 2009

U.S. Department of Energy  
National Energy Technology Laboratory  
Albany, Oregon  
Fairbanks, Alaska  
Morgantown, West Virginia  
Pittsburgh, Pennsylvania  
Tulsa, Oklahoma

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

## **Disclaimer**

This report was prepared as an account of work sponsored by an agency of the U.S. Government. Neither the U.S. Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately-owned rights. Reference therein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government or an agency thereof. The views and opinions of authors expressed therein do not necessarily state or reflect those of the U.S. Government or any agency thereof.

**Table of Contents**

**1 EXECUTIVE SUMMARY ..... 1**

**2 INTRODUCTION..... 3**

    2.1 *General Information*..... 3

    2.2 *Focused Standards List*..... 6

    2.3 *Discussion of Sites within the Document* ..... 8

    2.4 *Accomplishments*..... 8

**3 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)..... 11**

    3.1 *Introduction to the NETL ES&HMS*..... 11

    3.2 *ES&H Policy*..... 12

    3.3 *Identification of Environmental Aspects* ..... 13

    3.4 *Environmental Objectives and Targets*..... 14

    3.5 *Environmental, Safety, and Health Planning and Analysis Procedures* ..... 14

    3.6 *Implementation and Operational Controls* ..... 15

    3.7 *Self-Assessment Procedures and Corrective Action*..... 20

    3.8 *Quality Assurance* ..... 24

    3.9 *Management Review Process*..... 24

**4 COMPLIANCE SUMMARY..... 25**

    4.1 *Major Environmental Statutes* ..... 25

    4.2 *Environmental Executive Orders* ..... 25

    4.3 *DOE Internal Environmental and Radiation Protection Orders* ..... 25

    4.4 *Atomic Energy Act of 1954*..... 25

    4.5 *National Environmental Policy Act (NEPA)*..... 26

    4.5.1 *Executive Order 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management*..... 28

    4.6 *Compliance and/or Cleanup Agreements*..... 36

    4.7 *Environmental Violations Cited by Regulators*..... 37

    4.8 *Notices of Violation, Notices of Deficiency, Notices of Intent to Sue, and Other Enforcement Actions Issued* ..... 37

*Groundwater*..... 37

    4.9 *Reportable Occurrences*..... 38

    4.10 *Major Issues, Instances of Non-compliance, and Corrective Actions*..... 39

    4.11 *Status of Ongoing Third-Party Inspections, Self-Assessments, and/or Environmental Audits*..... 39

    4.11 *Summary of Environmental Permits*..... 39

4.12	<i>Emergency Preparedness</i> .....	39
4.13	<i>Quality Assurance</i> .....	40
4.14	<i>Performance Measurement</i> .....	42
<b>5</b>	<b>MORGANTOWN</b> .....	<b>42</b>
5.1	<i>Site Description</i> .....	42
5.2	<i>Major Site Activities</i> .....	43
<b>6</b>	<b>COMPLIANCE STATUS</b> .....	<b>44</b>
6.1	<i>Environmental Restoration and Waste Management</i> .....	44
6.1.1	<i>CERCLA</i> .....	44
6.1.2	<i>SARA Title III</i> .....	44
6.1.3	<i>RCRA Program</i> .....	46
6.2	<i>Toxic Substances Control Act (TSCA)</i> .....	48
6.3	<i>Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)</i> .....	49
6.4	<i>Radiation Protection Program</i> .....	49
6.5	<i>Air Quality and Protection Activities</i> .....	50
6.6	<i>Water Quality and Protection Activities</i> .....	51
6.7	<i>Groundwater and Soil Quality Protection Activities</i> .....	55
<b>7</b>	<b>7 PITTSBURGH</b> .....	<b>58</b>
7.1	<i>Site Description</i> .....	58
7.2	<i>Major Site Activities</i> .....	58
<b>8</b>	<b>COMPLIANCE STATUS</b> .....	<b>60</b>
8.1	<i>Environmental Restoration and Waste Management</i> .....	60
8.1.1	<i>CERCLA</i> .....	60
8.1.2	<i>SARA Title III</i> .....	61
8.1.3	<i>RCRA Program</i> .....	62
8.2	<i>Toxic Substances Control Act (TSCA)</i> .....	65
8.3	<i>Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)</i> .....	66
8.4	<i>Radiation Protection Program</i> .....	66
8.5	<i>Air Quality and Protection Activities</i> .....	67
8.6	<i>Water Quality and Protection Activities</i> .....	69
8.7	<i>Groundwater and Soil Quality Protection Activities</i> .....	71
<b>9</b>	<b>ALBANY</b> .....	<b>76</b>
9.1	<i>Site Description</i> .....	76
9.2	<i>Major Site Activities</i> .....	77
<b>10</b>	<b>COMPLIANCE STATUS</b> .....	<b>77</b>
10.1	<i>Environmental Restoration and Waste Management</i> .....	77
10.1.1	<i>CERCLA</i> .....	77
10.1.2	<i>SARA Title III</i> .....	77

10.1.3	RCRA Program.....	78
10.2	National Environmental Policy Act (NEPA).....	78
10.3	Toxic Substances Control Act (TSCA).....	78
10.4	Radiation Protection Program.....	78
10.4.1	Ionizing Radiation Program.....	78
10.4.2	Laser Program.....	79
10.5	Air Quality and Protection.....	79
10.6	Water Quality and Protection Activities.....	79
10.7	Executive Orders (EO) and DOE Orders.....	80
10.7.1	EO 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management.....	80
10.8	Groundwater and Soil Quality Protection Activities.....	81
10.9	Other Major Environmental Issues and Actions.....	82
<b>11</b>	<b>TULSA.....</b>	<b>84</b>
11.1	Site Description.....	83
11.2	Major Site Activities.....	84
<b>12</b>	<b>COMPLIANCE STATUS.....</b>	<b>84</b>
12.1	Environmental Restoration and Waste Management.....	84
12.2	National Environmental Policy Act (NEPA).....	84
12.3	Toxic Substances Control Act (TSCA) and Federal Insecticide, Fungicide, Rodenticide Act (FIFRA).....	84
12.4	Radiation Protection.....	85
12.4.1	Ionizing Radiation Program.....	85
12.4.2	Laser Program.....	85
12.5	Air Quality and Protection Activities.....	85
12.6	Water Quality and Protection Activities.....	85
12.7	Executive Orders.....	86
12.7.1	EO 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management.....	86
12.8	Groundwater and Soil Quality Protection Activities.....	86
12.9	Other Major Environmental Issues and Actions.....	87
<b>13</b>	<b>FAIRBANKS.....</b>	<b>87</b>
13.1	Site Description.....	87
13.2	Environmental Compliance.....	89
13.3	National Environmental Policy Act (NEPA).....	89
13.4	EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management.....	90
13.5	Other Major Environmental Issues and Actions.....	90
	APPENDIX.....	91
	Table 3.3 NETL Significant Environmental Aspects.....	96
	Table 3.4.1 CY 2008 Environmental Management Plan Metrics.....	96

*Pittsburgh and Morgantown* ..... 96

*Table 3.4.2 CY 2008 Environmental Management Plan Metrics* ..... 98

*Albany* 98

*Table 4.4.a Radioactive Materials Inventory – Morgantown*..... 99

*Table 4.4.b X-Ray Radiation Generating Devices – Pittsburgh*.....100

*Table 4.5.1 Delivery Order Schedule D-4*.....101

*Table 4.6.1 EPAAct05 Mandated Energy Intensity Reductions & Renewable Electric Procurement* ....102

*Table 4.11.a Summary of Permits – Morgantown*.....102

*Table 4.11.b Summary of Permits – Pittsburgh*.....104

*Table 4.14 Surveillance Monitoring – Pittsburgh and Morgantown*.....105

*Table 6.1.1 Potential Contamination Sources and Cleanup Actions - Morgantown*.....106

*Table 6.1.2 Properties of Potential Contaminants*.....106

*Table 6.1.3 Hazardous Waste Generation -- Morgantown* .....107

*Table 6.5 Air Emission Permits – Morgantown* .....108

*Table 6.6.1.a NPDES Permit Storm Water Monitoring Requirements -- Morgantown* .....109

*Table 6.6.1.b NPDES Storm Water Analysis Results -- Morgantown* .....109

*Table 6.6.1.c Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One sample/month -- Morgantown*.....110

*Figure 6.7.1 Active Monitoring Wells at the Morgantown Site*.....112

*Figure 6.7.3 Average cadmium concentrations in wells, “A” Aquifer, Lake Monongahela unconsolidated sediments -- Morgantown* .....114

*Table 6.7.1a November 2008 Groundwater Data for “A” Aquifer -- Morgantown*.....115

*Table 6.7.2 November 2008 Groundwater Data for “B-C” Aquifer -- Morgantown*.....116

*Table 6.7.3 November 2008 Groundwater Data for Morgantown Aquifer*.....117

*Table 8.1.2 Tier II Chemical Inventory Reporting List -- Pittsburgh*.....117

*Table 8.2.1 TSCA Chemicals Held Onsite In Excess Of 10 Lbs. -- Pittsburgh*.....118

*Table 8.4.1 2008 Radioactive Material (RM) -- Pittsburgh* .....118

*Table 8.4.2 2008 Other Radiation Generating Devices: X-ray Devices -- Pittsburgh*.....118

*Table 8.5.1 Air Emissions Based on Fuel Usage -- Pittsburgh*.....118

*Table 8.6.1 Industrial Sewer Use Permit (Building 74) Monitoring Analysis -- Pittsburgh* .....119

*Table 8.6.2 Building 74 2008 Monthly Monitoring results (mg/l) -- Pittsburgh* .....120

*Table 8.6.3 National Pollutant Discharge Elimination System Storm Water Analysis Results -- Pittsburgh* .....121

*Figure 8.7.2 General Geologic Column -- Pittsburgh* .....123

*Figure 8.7.3 Groundwater Management Program Main Plateau Well Locations – Pittsburgh*.....124

*Figure 8.7.4 Groundwater Management Program Valley Fill Well Locations -- Pittsburgh* .....125

*Figure 10.8 Monitoring Well Locations at the Albany Site*.....127

## 2008 NETL ANNUAL SITE ENVIRONMENTAL REPORT

### 1 EXECUTIVE SUMMARY

NETL continued its exceptional success in its environment, safety, and health programs throughout 2008. Most notably, substantial progress was made to ensure that the Albany site is fully integrated with NETL's environmental strategy. This is demonstrated by the fact that the Albany, Morgantown, and Pittsburgh operations all maintained ISO 14001 certification. Also, the Morgantown and Pittsburgh operations maintained OHSAS 18001 certification, while the Albany site became certified to ISO 9001.

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 environment, safety, and health programs. Those specific activities that require a concentrated effort are managed using environmental management plans (EMPs).

In addition to the success of the environmental management system, another highlight in 2008 was that there were no environmental violations cited. Furthermore, 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. Throughout the year, numerous inspections and audits were performed and documented to ensure that there were no instances of environmental noncompliance. Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, was issued on January 26, 2007, and presented several new challenges. The Order instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and 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 its EMS/SMS (Environmental Management System/Safety Management System). A Management Review Team (MRT) is in place to ensure that NETL's ES&H policy and system remain appropriate and effective. The EMS/SMS 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) and the Albany Trackwise® system, corrective action tracking systems currently in use in Morgantown and Pittsburgh (AIIS) and in Albany (Trackwise), respectively.

NETL is working to develop a new, consolidated, corrective action tracking system to replace the two existing systems. The new system will be used by all of NETL and is expected to incorporate a host of improvements based on user feedback. Several commercial and in-house systems have been reviewed, and it is hoped that a new system will be available for testing sometime in 2009.

Another notable success for the laboratory is the completion of the new Technology Support Facility (TSF) in Morgantown during 2008; it was dedicated on August 14, 2008. The TSF is a multi-story, 106,000-square foot structure housing approximately 168 offices. It is designed and constructed to U. S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Gold Certification standards, and is expected to be one of the most energy efficient and cost effective federally owned structures built to date.



In addition to on-site laboratory efforts, NETL also manages off-site environmental projects as well. NETL sponsors three compliance activities in the State of Wyoming during 2008. Two sites required ongoing active remediation activities, and one site has been cleaned up and is subject only to vegetation surveillance monitoring. The other two are active sites, in which the groundwater is contaminated with volatile (VOCs) and semi-volatile organic contaminants. Organic contaminants of concern are primarily benzene, toluene, ethyl benzene, and isomeric xylene (BTEX) compounds. Underground coal gasification and oil shale retorting tests resulted in ground water contamination at the two active sites.

Similarly, NETL's ongoing commitment to improve emergency planning under Title III of the Superfund Amendments and Reauthorization Act (SARA) has established targets for reducing 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. NETL achieved a reduction in the total number of containers holding hazardous materials, surpassing the target of 1,614 by 294 containers. This was achieved through laboratory cleanouts and removal of chemicals that were no longer needed. This reduction was assisted by a real-time chemical inventory system that allows employees to update chemical inventory reports in a timely manner, thus avoiding a time lag in removing chemicals from the inventory list.

While NETL does not generate, process, or treat any radioactive material, it houses any temporary or permanent facilities for radioactive waste disposal. Except for some naturally occurring radioactive materials (NORM) at the Albany site, all radioactive materials at NETL are limited to research instrumentation that contains sealed radioactive sources and radiation-generating devices. An inventory of radiation sources is actively maintained and monitored by the radiation safety officers for each site. Information is retained about the source, isotope, quantity, custodian, location, status, and sealed-source activity. Title 10 CFR 835.901(e), 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, EPA information, NRC information, and Commonwealth of Pennsylvania recommendations and requirements. All of the radioactive sources are sealed and are used in instrumentation.

Finally, in 2008, NETL won a 2008 Fossil Energy Environment, Safety, Security, and Health Award for the initiative on “Use of NETL’s Small Purchasing System to Control Electronic Product Environmental Assessment Tool (EPEAT) Purchases.” And, for the second year in a row, NETL has been identified as an EnviroStar award winner by the Allegheny County Health Department located in Pennsylvania. NETL



was one of seven organizations in the Pittsburgh area to receive the award, but the only organization to receive a three-star rating. The rating was based on NETL’s efforts under its environmental management system which sets goals for non-hazardous waste reduction, hazardous waste recycling, chemical inventory reduction, and improvements in energy efficiency.

Details on each of the above-mentioned subjects, as well as information on other NETL environment, safety, and health programs are presented in this report. Questions the public may have about what NETL is doing to protect the environment should be answered through this report. However, questions and comments are always welcome and should be addressed in writing to: Dr. Robert Reuther, U. S. Department of Energy – NETL, M/S N03, 3610 Collins Ferry Road, P. O. Box 880, Morgantown, WV, 26507-0880; or by e-mail to [Robert.Reuther@NETL.DOE.GOV](mailto:Robert.Reuther@NETL.DOE.GOV).

## 2 INTRODUCTION

### 2.1 General Information

The National Energy Technology Laboratory (NETL) is part of the Department of Energy’s (DOE) national laboratory system. It is the Department’s only national laboratory devoted to fossil energy research. NETL supports the DOE mission to advance the national, economic, and energy security of the United States.

NETL has 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 from both a national and international perspective. In addition to research conducted onsite, the NETL project portfolio includes research and development conducted through partnerships, cooperative research and development agreements, 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 sites in Albany, Oregon; Fairbanks, Alaska; Morgantown, West Virginia; Pittsburgh, Pennsylvania; and Tulsa, Oklahoma. In total, these sites include 81 buildings and 14 major research facilities covering nearly 200 acres. More than 1,100 employees work at NETL's five sites; roughly half are federal employees and half 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 research and development 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. The SCC is charged with implementing 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, research and development directions, and deployment of energy technologies. System studies are also used to support planning exercises at various organizational levels. Systems analysis focuses on 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 research and development in fossil energy and environmental science. Building on historic laboratory strengths and competencies, ORD concentrates on four primary research topics, or 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 sequestration 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 and Business Operations** (OIBO) plans, directs, and coordinates administrative, operational, construction, and staff support activities for the laboratory, including organization and human resource management; budgetary and financial analysis and administration; information technology management, maintenance and implementation; onsite environmental, safety, and health (ES&H) program execution, compliance, and remediation activities; acquisition and assistance services; site management, including design, construction, operation, and maintenance of NETL facilities; security services; real and personal property management; and administration of the non-primary site support contracts. Particular functional and technical specialists participate individually or on teams to ensure timely information exchange, to coordinate responses to action items affecting FE and DOE crosscutting functional issues, and to provide support to specific functional offices.

The **Office of Crosscutting Functions** (OCF) plans, directs, and coordinates policy, administrative, and site support contract management activities that crosscut laboratory activities. The Office provides policy direction for the Federal Project Management function, oversight of the performance measurement system, and site support contract management support to OIBO. Particular functional and technical analysts participate individually or with teams to ensure timely information exchange and coordinate responses to action items affecting the Office of Fossil Energy and DOE.

## 2.2 Focused Standards List

NETL is committed to ensuring compliance with all of the environmental requirements impacting the Albany, Fairbanks, Morgantown, Pittsburgh, and Tulsa 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 of the requirements that apply to NETL operations.

The Focused Standards List was created by NETL ES&H subject matter experts. These ES&H subject matter experts 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. There are 127 directives, consisting of 10 orders, 16 operating plans,

and 101 procedures. Each directive contains a set of requirements. All standards or requirements on the Focused Standards List are implemented through one or more of the NETL 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 that is published for the standard or requirement is checked to ensure that it is still available at that location. Most of the requirements identified in the Focused Standards List are accessible via the Internet. The quarterly location check verifies that the Internet 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. On an annual basis, the Focused Standards List is analyzed to ensure that the standards and requirements listed are still applicable to NETL activities. In addition, approximately every 3 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:

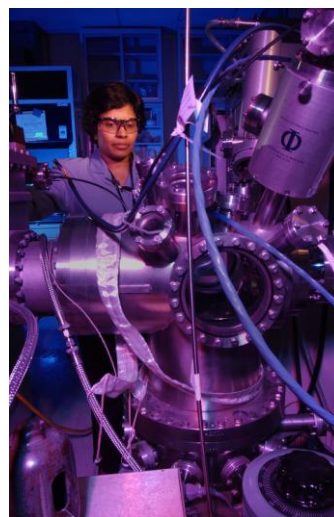
- First, NETL utilizes a rigorous safety analysis review system (SARS) to review the details of a project before authorizing any significant activities to proceed. Checklists have been developed for the SARS to facilitate verification of the standards and requirements to be covered during the review. 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 2008: the Environmental Noise Monitoring Program; the Non-RCRA Waste Management Program; and the Environmental Control of External Storage Program.
- Third, NETL performs regular walkthrough inspections of site facilities, targeting specific facilities each month so that all NETL facilities are inspected each year. These walkthrough inspections are performed by several ES&H subject matter experts who visually verify that NETL is in compliance with all of the standards and requirements.
- Finally, the preparation of this Annual Site Environmental Report requires a complete review of compliance with all of the 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 and requirements on the Focused Standards List.

## 2.3 Discussion of Sites within the Document

Four principal sites and one satellite office comprise NETL. Each office is located in a different state, is subject to different state and local laws, and focuses on different activities. Because most members of the public are interested in learning about only one site – the site located nearest them – this document splits the detailed discussion among the sites. The Albany, Morgantown, and Pittsburgh sites are laboratories that have a broad array of environmental concerns, so a detailed discussion is provided for each in this report. Tulsa and the Alaska satellite offices perform only administrative functions, and as a result, there is less discussion of their environmental impacts and any regulatory compliance issues.

## 2.4 Accomplishments

NETL's efforts are focused on resolving the environmental, supply, and reliability constraints of producing and using America's fossil fuel resources. To accomplish this mission, NETL draws on approximately 1,100 federal and support-contractor employees to implement and manage a broad spectrum of research programs. The laboratory has five sites that span the United States. NETL sites in Pittsburgh, Pennsylvania, and Morgantown, West Virginia, conduct a broad range of research to increase the supply of traditional energy resources, improve the efficiency and environmental performance of power generation plants, and help end users to conserve energy. Researchers at NETL's site in Albany, Oregon, focus on developing advanced materials for use in the energy industry. Sites in Tulsa, Oklahoma, and Fairbanks, Alaska, address challenges unique to those energy-rich regions. All five locations share the same goal: to advance science and technology for a clean, secure energy future.



One measure of NETL's success is the two R&D 100 Awards that NETL and NETL-supported technologies earned in 2008. These prestigious awards, which the Chicago Tribune dubbed "the Oscars of Invention," are given annually to the 100 most technologically significant new products to hit the market in a given year. According to R&D Magazine, which selects the winning technologies, the goal of the award is "to spotlight major breakthroughs – products and processes with the capacity to improve the standard of living for many people."

The first award recognized NETL's suite of palladium sorbents designed to capture mercury, arsenic, selenium, and phosphorus from high-temperature fuel gas. NETL has licensed the sorbent to Johnson Matthey for application in the IGCC process. The second award recognized the Advanced Process Engineering Co-Simulator (APECS)/ANSYS® Engineering Knowledge Manager™ (EKM). APECS/EKM

decreases the time, cost, and technical risks associated with developing technologies for future high-efficiency, near-zero emission plants. NETL developed APECS/EKM in partnership with ANSYS, ALSTOM Power, Aspen Technology, and Carnegie Mellon University.

The Federal Laboratory Consortium presented three 2008 Excellence in Technology Transfer Awards to NETL for successfully making available new commercially relevant technologies to the marketplace. At the national level, NETL received an award for licensing its patented high-temperature, palladium-based catalyst formulations to Johnson Matthey. The catalysts will be used to capture mercury, arsenic, and selenium at various stages in the integrated gasification combined cycle (IGCC) process. NETL won a second award at the national level in recognition of the Laboratory's sharing of patent-pending chemical engineering software—the Coal Chemistry Model—for modeling gasification processes. The module is available through the commercial software FLUENT. It was most recently used for gasifier design in collaboration with Southern Company and Kellogg Brown & Root. The patented Thief Process, which won the award at the mid-Atlantic regional level, has been licensed to Nalco-Mobotec for commercial development. The Thief Process extracts partially combusted coal from the furnace of a coal-fired power boiler for re-injection downstream into flue gas ductwork. Pilot-scale tests have shown that the technology's sorbent capacities are comparable to those of commercially available activated carbons, but because they are significantly less expensive, the novel sorbents promise to reduce the cost of mercury removal from flue gas.

Some singular accomplishments performed in 2008 are described below:

- NETL scientists have devised a way to estimate the CO<sub>2</sub> storage capacity of the Oriskany brine formation of central NY and northern PA. Employing geographic information system data, they have created two sets of mathematical equations: one to define the capacity of the formation's deep brine reservoirs to contain dissolved CO<sub>2</sub> and the other to calculate its capacity for holding pure, compressed CO<sub>2</sub>. The first set of calculations, experimentally validated, show that the brine can store approximately 360 million metric tons of dissolved CO<sub>2</sub>. When the CO<sub>2</sub> is in a supercritical form, the second set of calculations theorize that as much as 8.8 billion metric tons of pure CO<sub>2</sub> may be sequestered. A paper describing the study appears in the American Chemical Society publication, *Environmental Science and Technology*, February 9, 2008, issue.
- Coal powder samples can be useful in estimating the CO<sub>2</sub>-sorption capacity of shallow coal seams under low-pressure conditions. However, at the supercritical pressures found in deep coal seams, estimates vary widely among measurement techniques. NETL researchers have found that if the texture of coal after grinding is not exactly the same as before grinding, the high-pressure sorption capacity estimates based on the powder tests are likely to be misleading. NETL has also established a method for making more accurate predictions by keeping samples in equilibrium for longer periods. Results of a 9



month-long sorption-desorption study comparing the CO<sub>2</sub> storage capacity of dry Upper Freeport coal samples in powder and lump forms are reported in the American Chemical Society journal, *Energy & Fuels*, in the February 13, 2008, issue.

- As part of a cooperative agreement between NETL and Southwest Research Institute, the second phase of a conceptual design effort was initiated on July 1, 2008. The project aims to reduce the power required to compress CO<sub>2</sub> produced from an IGCC power plant. The project team at Southwest will test a liquid CO<sub>2</sub> pumping loop and a closed-loop CO<sub>2</sub> compressor with internal cooling to validate the thermodynamic predictions generated in Phase I of the effort. Phase II also seeks to quantify actual power savings. Modeling results show that combined power savings of 25 percent for CO<sub>2</sub> compression and 30 percent for pumping CO<sub>2</sub> are possible. These savings would reduce the associated power penalty at a 700-megawatt power plant by over 12 megawatts. More efficient and less costly carbon capture technologies will benefit the Office of Fossil Energy's Innovations for Existing Plants and Advanced Turbines programs being implemented by NETL.
- The XLamp®, based on a technology developed by Cree, Inc., in cooperation with NETL, was chosen to light two prominent buildings at the 2008 Olympics in Beijing, China. The National Aquatic Center, nicknamed the Water Cube, was illuminated by approximately 496,000 XLamp light-emitting diodes (LEDs) in red, green, and blue. A computer controlled the lighting and coloring so that the lighted "bubbles" on the building dramatically changed in an infinite variety of shades and patterns every evening. The bubbles even formed words and created moving images. In addition, the exterior of the Bird's Nest, China's National Stadium, was lit by approximately 258,000 Cree LEDs in white, amber, and red. XLamps also illuminated the video screen behind the main stage and were incorporated into the huge scroll that formed one of the largest LED screens in the world. The Cree research team continues to work with NETL to achieve the DOE goal of producing LED devices that achieve a power efficiency of 160 lumens per watt for cost-effective, market-ready systems by 2015.
- NETL researchers have discovered a new class of gas separation membranes that are selective for CO<sub>2</sub> and require no aqueous transport phase. Developed under a Cooperative Research and Development Agreement with the University of Notre Dame, the NETL membrane consists of a high-temperature polymer support and an ionic liquid with the capability to form chemical complexes with CO<sub>2</sub>. Because evaporation typically causes aqueous-phase membranes to fail at high temperatures, this design represents a major step forward in high-temperature CO<sub>2</sub>-selective membrane development. A paper appearing in Elsevier's *Journal of Membrane Science*, September 1, 2008, details development of the membrane.

- Researchers at NETL in collaboration with the University of Pittsburgh have determined that the solid water structure, or lattice, in methane hydrates plays a more important role than expected in lowering the compound's thermal conductivity value as compared to normal ice. Thermal conductivity of methane hydrates has been the subject of experimental and theoretical investigations for more than two decades. Still, the mechanisms behind this phenomenon have not been clearly understood. Improved understanding of this parameter will lead to better predictive models for controlling the breakdown of methane hydrates in methane production and in understanding how methane hydrates may impact climate change. The study appears in *The Journal of Physical Chemistry B* in the August 21, 2008, issue.
- NETL researchers have developed theoretical calculations to explain the stability and electronic properties of different layers within the tin oxide materials important in catalysis and high-temperature sensor technologies. The analysis represents a first step toward an understanding of the properties of these materials and their surfaces at the atomic level, with direct implications for further development of high-temperature gas sensors. The achievement was presented by NETL in the January 30, 2008, issue of *Physical Review B*.
- As part of the Laboratory's Institute for Advanced Energy Studies, a collaboration of researchers from NETL, the University of Pittsburgh, and West Virginia University has yielded a Raman spectrometer configuration that simultaneously measures the major constituents—nitrogen, oxygen, and hydrogen—of natural gas and synthetic fuel gases. The process enhances the signal power several hundred times over what would otherwise be obtainable. A description of the work appears in the August 10, 2008, issue of *Applied Optics* published by the Optical Society of America.

This is only a sampling of the accomplishments made by NETL in 2008. For a more complete description of NETL's accomplishments, please see [NETL 2008 Accomplishments](#) located on the NETL internet website.

### **3 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)**

#### **3.1 Introduction to the NETL ES&HMS**

The Pittsburgh and Morgantown sites received certification to the ISO 14001 standard, Environmental Management Systems, on August 31, 2003, and the Albany site received certification to ISO 14001 on June 9, 2005. All three sites have maintained those certifications through 2008, following surveillance and recertification audits. Tulsa and Fairbanks are not required to have an EMS because these operations are not considered facilities as defined by E.O. 13148; their activities are limited to desktop operations that do not impact environmental programs.

The Morgantown and Pittsburgh sites were recertified as a single entity in 2007 by Orion Registrars, Inc. Two ISO/OHSAS Surveillance Audits were conducted in 2008, one April 1-2, 2008, and the other November 12-13, 2008. In addition, Albany was also recertified by Orion Registrars, Inc. In order to maintain certification, surveillance audits are conducted every six months at Morgantown and Pittsburgh, and every 12 months at Albany. These audits measure continual improvement to the ES&HMS and conformance to the ISO 14001 and OHSAS 18001 standards. By maintaining ISO 14001 and OHSAS 18001 certifications, NETL demonstrates to its workforce, the surrounding community, DOE, and other stakeholders that it is committed to responsible environmental stewardship.



NETL's ES&HMS at the Morgantown and Pittsburgh sites assures consideration of environmental impacts of day-to-day activities and minimizes these impacts, as much as possible, consistent with the mission of fossil energy research and development (R&D). The Environmental, Safety, and Health Management System (ES&HMS), as described in NETL Order 450.1, Environmental, Safety and Health 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.

The scope of the EMS 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 the small Navy facility at Morgantown.

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/OHSAS 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 onsite and offsite, during the conduct of operations over which NETL has control.

### 3.2 ES&H (Environmental, Safety, and Health) Policy

Senior management created an ES&H policy which is the basis for NETL's ES&H program. NETL strives to reduce injuries to the workforce and to minimize hazards to the public and the environment. NETL requires consideration of potential environment, safety, and health impacts when planning and executing work at all

levels. 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 incorporate safety and health concerns. The policy has not been modified since August 9, 2006.

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

NETL uses the acronym PRISM to illustrate its policy (see Figure 3.2). PRISM demonstrates the successful incorporation of Integrated Safety Management (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 3.2 Illustration of NETL Environmental Policy**

### 3.3 Identification of Environmental Aspects

Environmental aspects are elements of an organization's activities that can interact with the environment, and are those over which NETL has 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 scores are reviewed by the ES&HMS Crosscutting Team, a group of ES&H professionals and administrators consisting of both DOE and contractor staff, and are used to determine the most significant aspects of NETL activities. The team recommends to the ES&HMS representative those aspects which are considered significant. The ES&HMS representative approves the list of significant environmental aspects.

The 2008 registry (see [Table 3.3](#)) provides a listing of the significant environmental aspects. In 2008, a new aspect for water usage was added to the registry to address requirements established by Executive Order 13423 for controlling water consumption.

Aspects at the Albany site are updated on an on-going basis, rather than annually because of their separate certification from Morgantown and Pittsburgh. When there are changes noted in the nature or amount of any given activity, the significance of the environmental aspects associated with that activity is reevaluated. This increases the responsiveness and flexibility of the system, enabling more rapid adjustments in controls and resources as appropriate.

### 3.4 Environmental Objectives and Targets

Following an annual update and ranking of the significant environmental aspects, the environmental objectives and targets are revised. These revised objectives and targets are then presented to the Management Review Team for approval.

Environmental objectives are goals that an organization attempts to achieve. Environmental targets are specific measurable or quantifiable criteria which support the objective. Performance measures are compared to targets to determine the degree of success in reaching an associated objective. 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.

The ES&HMS representative assigns responsibility for the objectives and targets to various individuals with expertise in the respective subject area. These individuals develop ES&H management plans (EMPs) that specify how NETL will meet the objectives. As with the aspects, the objectives and targets for 2008 include safety and health objectives and targets as well. The approved objectives and targets, and the actual performance data, for the 2008 aspects are presented in [Table 3.4.1](#) for Morgantown, Pittsburgh. (Aspects 8 and 9 of Table 3.4.1 also include Albany).

Albany has also developed EMPs for its objectives and targets. These include the Alternative Fuels for Lift Trucks Program; the Beryllium Identification and Remediation Program; the Energy Efficiency Program; the Lead-Based Paint Abatement Program; the Groundwater Program; and the Particulate Emissions Reduction Program. The approved objectives and targets, as well as the actual performance data, for the 2008 aspects for Albany are presented in [Table 3.4.2](#).

### 3.5 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. Other activities that represent a concentrated effort are managed through environmental management plans as described in [section 3.4](#).

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 that are documented in directives (orders, operating plans, and procedures). These documents are written to describe how routine actions are undertaken to achieve the safety and environmental goals of NETL. Managerial responsibilities are attached to EMS/ES&H function titles. NETL directives are used to establish the foundation and control mechanisms of the EMS. The directives process is described in NETL Procedure 251.1-1, Directives Management System.

ES&H Management Plans (EMPs). Some activities that can impact the environment can be addressed through a concentrated effort that directly affect objectives and targets associated with the significant aspects. 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 responsible person(s) for the action, quantifiable targets, and how performance should be measured against the targets. Quarterly status reports are collected for EMPs to show progress on the activities documented in the plans.

### 3.6 Implementation and Operational Controls

The EMS is implemented through an organizational structure shown in Figure 3.6.1. Senior level positions include the director, who serves as the ultimate authority for the EMS; 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 Management Review Team; the director of the Office of Institutional and Business Operations, who is the environmental steward and champion; and the division director for ES&H, who functions as the program administrator and the EMS representative. Mid-level titles and responsibilities are defined in several NETL directives that specify key components of the EMS. The

ES&H division director assigns employees to the function titles and responsibilities.

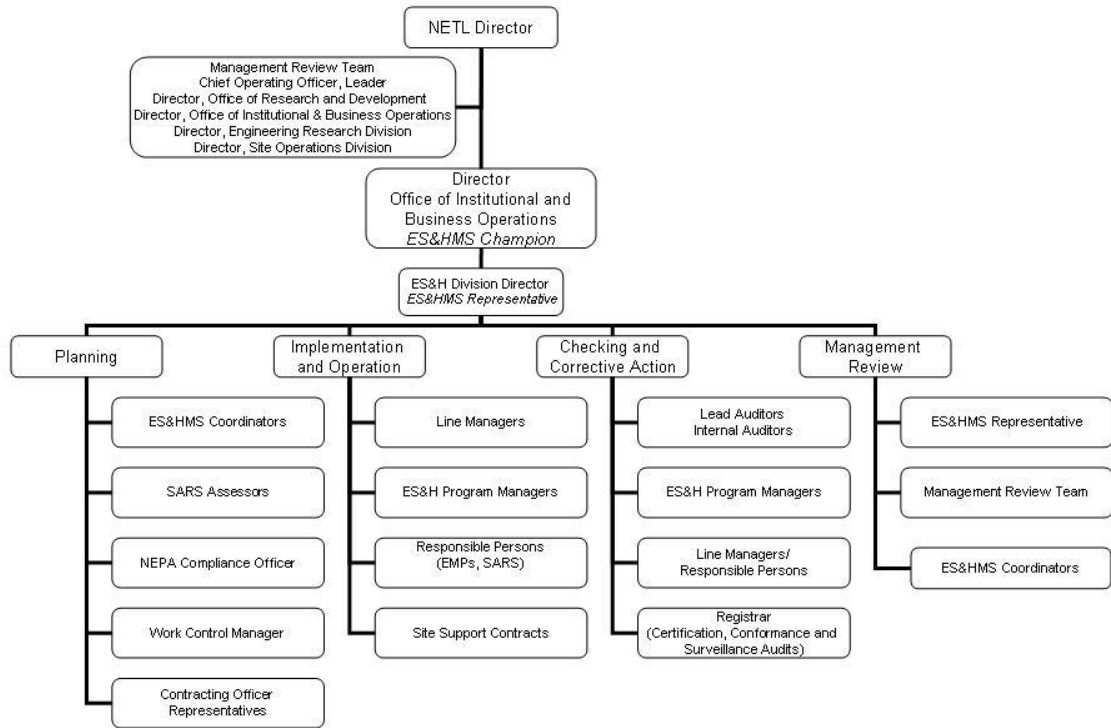


Figure 3.6.1. – NETL EMS Organization

Albany continues to implement NETL procedures and directives wherever possible. This includes aligning Albany with NETL procedures for safety, industrial hygiene, hazardous material handling, and waste disposal. Extensive internal communication is necessary to successfully implement any program. The NETL system of line management responsibility requires that line managers communicate effectively with the people working for them. Line managers are the primary means that NETL uses for achieving operational control.

EMS communication also occurs through the NETL Intranet, which is a secure internal website containing current versions of all NETL directives, as well as general reference information, forms, and programmatic information. On the EMS webpage there is an EMS roadmap that provides an overview of available information about the NETL EMS.

Another example of internal communication at NETL is the biweekly regulatory review, which promotes awareness of regulatory changes and new programs. Every two or three weeks, an employee reviews federal and state agency websites while searching for announcements of changes in environmental laws, regulations, guidance documents, compliance information, and regulatory agency programs. The search also includes a DOE Headquarters website to check for new DOE requirements and

guidance. These reviews are circulated to the ES&H staff and posted on the NETL Intranet homepage.

NETL communicates the EMS to its employees through the Intranet, training, staff meetings, e-mail, and posters. The training program includes general EMS training designed to make employees aware of the EMS by providing them with information about the significant environmental aspects and the potential impacts of their work, employee roles and responsibilities, and the potential consequences of a departure from operating procedures. In addition to the general training, program- and job-specific training is required for all staff based on their job duties. The computer-based training (CBT) system includes a job hazard survey that asks the user about their work assignments to obtain information about which training modules or types of training 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 work on an assignment.

For purposes of communication with external parties, NETL maintains an internet site, [www.netl.doe.gov](http://www.netl.doe.gov) that has EMS information available to the public, such as the ES&H policy and the significant aspects.

NETL conducts public participation activities under the requirements of the National Environmental Policy Act (NEPA). For projects conducted offsite, 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, analyzed, and will be mitigated to the extent practicable prior to committing to the project.

To effectively and efficiently implement the EMS, NETL has to maintain operational control of its onsite R&D projects, facilities, and operations. At Albany, Morgantown, and Pittsburgh, this is accomplished through the Safety Analysis and Review System (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 is repeated. Other processes for operational control include the following:



- Environmental Programs. Baseline programs have been established for both defined media (air, surface water, and groundwater) and likely pollution routes (spills, hazardous waste, non-hazardous waste). Generally speaking, 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 emergency response exercises annually and participates in emergency preparedness training.

NETL-Pittsburgh received a no-notice exercise from NNSA in 2008. The scenario for the exercise was limited to on-scene response and concentrated on the emergency operations center response and the emergency public affairs team response. The NETL ERO passed all elements of the exercise objectives, and earned the praise of a “noteworthy item” mention in the after-action report for the development of a “Joint Information Center (JIC)-in-a-Box”. The NETL public information officer was invited to the annual DOE meeting of emergency managers to present the “JIC-in-a-Box” to a wider audience of agency emergency preparedness experts. The scenario was based on a workplace violence security event.



This year’s scenario for the Morgantown site involved severe weather that brought high winds, heavy rain, and tornado warnings for Monongalia County. The NETL ERO addressed how employees are notified of severe weather and the subsequent protective action orders given. Accountability was conducted of site employees, visitors, and off-site contractors. Decisions were made where to shelter employees normally working in vulnerable facilities, as well as the child care facility which is located in a trailer. An employee reported that she injured her ankle at the height of the storm and required medical assistance. Two employees were injured in Building 27 and were only discovered missing through the accountability process. A technical high angle rescue was required with only on-site assets due to off-site responders being occupied with numerous community response calls.

At the Albany site, the exercise scenario began when the receptionist received a phone threat from an off-site location stating that a bomb had been placed on the



NETL site. She contacted the security office. Security notified an incident commander who, upon forming an Incident Evaluation Team (IET), verified

the existence and location of the device and notified the Albany Fire Department, Albany Police Department, and Oregon State Police. Evacuation routes were searched for suspicious devices prior to initiating building evacuations. After evacuations occurred, it was determined that an employee was missing from Building 17. Upon arrival of the Oregon State Police bomb squad a secondary search by canine of the site uncovered the existence of a secondary device located under the Building 24 propane tank.

In addition to the no-notice exercise, the Pittsburgh ERO also conducted an annual site-wide exercise. The exercise kicked off at 0800 hrs on April 23, 2008, when two R&D technicians were looking for a cylinder of sulfur dioxide gas that was delivered by the gas supply company onto the building 65 receiving dock. A violent explosion within an adjacent propane gas storage area caused the entire building 65 loading dock, office area, and lean-to structures to collapse onto the two R&D technicians. The technicians were pinned under building 65 debris, including cement rubble, sharp sheet metal, and heavy I-beams and they sustained significant lacerations and contusions. The explosion also compromised the integrity of the cylinder of sulfur dioxide gas that was located on the loading dock. Its contents were released into the atmosphere. Nearby Chemical Handling Facility personnel heard the explosion, evacuated the area, and reported the incident to Security by 2-way radio. Security immediately activated the PGH ERO Incident Evaluation Team. A pungent odor of sulfur gas was detected offsite by residents along the lower McElheny Road area of South Park Township.

The exercises were evaluated by contractors independent of DOE emergency management. An analysis of opportunities for improvement was used to develop corrective actions that are tracked until completion in NETL's AIIS database.

- 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 offsite 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.

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. It is ensured that the current versions are readily available, and obsolete documents are promptly disposed of.

Core EMS documentation is embodied primarily within the NETL ES&H directives. According to procedure, 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

to be official versions. Official copies of ancillary tables, lists, and forms are also maintained on the Intranet and are reviewed and updated as required.

### 3.7 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. Responsibility and authority for handling and investigating non-conformances and for initiating and completing corrective and preventive actions has been clearly defined by NETL as part of its processes. Several practices are employed, including internal audits, reviews, and inspections; independent assessments; and reporting through the Assessment Information Input System (AIIS).

NETL conducts both internal and external audits of its EMS as required by the ISO 14001 standard. This process is defined in NETL Procedure 450.4-14, Internal Auditing. To maintain the ISO 14001 certification, an annual schedule is prepared that ensures that the entire standard is audited against NETL's EMS. There were four EMS audits performed in 2008, including two surveillance audits by the ISO/OHSAS registrar, and two internal audits.

Management's commitment to ES&H is evidenced by encouragement and management review of ES&H assessments. DOE and contractor ES&H specialists participate in regular site audits and inspections, which cover all NETL facilities on an annual basis. These audits and inspections focus on ES&H observable conditions of facilities (e.g., compliance with OSHA regulations, National Fire Protection Association (NFPA) codes, the National Electric Code (NEC)), and other environmental requirements). Findings are entered into the NETL corrective action tracking systems, and the status of corrective actions resulting from the audits and inspections is provided semiannually to the management review team.

Annual SARS assessments are performed on new or modified R&D projects, facilities, and support operations. In addition, annual assessments are performed to ensure continued ES&H compliance. A full discussion of the SARS assessment process can be found in [Section 3.8, 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 Groundwater Program). These reviews are informal and may vary in scope and detail. During each review, 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 manager must decide whether to remove a specific requirement from the directive or to enforce the requirement. 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 action.

Site support contractor employees inspect various high-risk items periodically, 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. Likewise, semi-annual surface water monitoring reports are compiled and reviewed. All of this information provides the program managers with an opportunity to assess the effectiveness of their programs.

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

- A biweekly regulatory review, generated at NETL, provides updates to the program managers that cover the major changes in laws and regulations, as posted on the websites of selected governmental agencies and as posted by the DOE Office of Health, Safety and Security (HS-1).
- Private sector publications are received by program managers, such as “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 also draw on the Pennsylvania Bulletin and the Pennsylvania Code, which are produced by the Commonwealth of Pennsylvania, and the Code of Federal Regulations, published by the National Archives.
- The NETL library subscribes to relevant regulatory documents.
- Program managers purchase updated lists of hazardous or regulated chemicals as needed.
- All 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 for regular review of federal and Oregon state 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, NETL relies on the professionalism, training, competence and personal responsibility of the program managers, who are subject matter experts residing in the ES&H Division, to do whatever is necessary for them to stay abreast of the changing laws and regulations. It is part of the program manager's general job responsibilities to stay abreast of regulatory issues that may affect the NETL EMS and to take appropriate actions to implement these requirements.

- Independent Program Assessments. In addition to internal audits, NETL conducts independent assessments of its ES&H programs through an external contractor. These assessments identify strengths, weaknesses, deficiencies, and recommendations for improvement. They also provide a look at regulatory compliance and assure that non-compliances are discovered and corrected. The contractor reviews internally and externally generated documents associated with the programs 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/dissemination of program information; (5) documentation and reporting; and (6) performance measurement. There were three programs assessed in 2008: the Environmental Noise Monitoring Program; the Non-RCRA Waste Management Program; and the Environmental Control of External Storage Program. The assessments found that these programs were working well and provided NETL with a few recommendations for improvement.
- Workplace Monitoring Program. In general, the systems in place with regard to the workplace monitoring program are effective and contribute to the protection of 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.

It has not been necessary to conduct frequent industrial hygiene monitoring at NETL, since engineering controls reduce personnel exposures 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 with regard to the Facility SARS Program are effective and contribute to the protection of workers and the environment. NETL does an excellent job of employee training that ensures employees know their responsibilities; the applicable regulations; and best practices related to structural engineering, mechanical engineering, and construction safety.

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 use permit, rather than the Facility SARS Program to reduce the administrative burden when a full SARS package would be unnecessary. The determination of whether to obtain a use permit or prepare a SARS package is made by the Office of Institutional and Business Operations director after reviewing information provided by the responsible person (RP) or facility custodian (FC), 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 use permit. After the facility is approved for use, the inspection schedule reverts to an annual review by the ES&H staff to determine if required safety measures are still in place and operational controls are being followed. Deficiencies found during the annual inspection are documented in the corrective action tracking systems (AIIS or TrackWise<sup>®</sup>).

- **Industrial Wastewater Program.** The systems in place with regard to the industrial wastewater program are effective and contribute to the protection of workers and the environment. NETL does an excellent job of employee training that ensures employees know their responsibilities, applicable regulations, and best practices related to management of chemical hazards, including management and disposal of hazardous materials. Additional training is provided when needed for exceptional circumstances.

Nonconformance generated from all of the self-assessment audits mentioned above are documented using the corrective action tracking systems. Corrective action status is measured by data provided by AIIS. All NETL employees have access to either AIIS. Instructions on the use of the systems have been communicated to everyone.

NETL Procedure 450.4-4, ES&H Corrective and Preventive Action Process, outlines how corrective and preventive action items identified in the various assessments performed at NETL are captured, prioritized, assigned, tracked, closed, analyzed for root causes, 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 implemented within their programs, organizations, or facilities and disseminates lessons learned across appropriate organizational elements at NETL.

In brief, 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.

Other processes used for reporting corrective actions include NETL Procedure 151.1-2, Emergency Categorizations, Classifications, and Notifications, which is used to catalog and investigate major non-conformances 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.

Of note in 2008 is that NETL is considering a new corrective action tracking system to replace AIIS at the Morgantown and Pittsburg sites, and TrackWise<sup>®</sup> at the Albany site. The new system will be used by all of NETL and will incorporate a host of improvements based on user feedback. Several commercial and in-house systems have been reviewed and it is anticipated that a new system will be tested in 2009.

### 3.8 Quality Assurance

Please see [Section 4.13](#) for a description of the NETL Quality Assurance (QA) Program, including QA for the EMS.

### 3.9 Management Review Process

Management review of the EMS ensures that the policy and system remain appropriate and effective. The EMS representative conducts semi-annual review meetings with the Management Review Team (MRT) (see [Figure 3.6.1, NETL EMS Organization](#)). During the review meetings, the MRT considers the environmental, safety and health policy, objectives, targets, internal and external audits, and other related issues. Changes are documented and implemented. Management involvement guarantees that the projects are funded and the appropriate priority is placed on the issues identified. Notes from the MRT meetings are posted to the intranet.

The MRT met two times during 2008, on March 12, 2008, and on September 19, 2008. Among the issues discussed were the facility SARS process, changing the composition of the Management Review Team to include directors from the Site Operations and the Engineering Research divisions, finalizing the ES&H training team's recommendations, and creating a plan for moving forward to solve training issues.

## 4 COMPLIANCE SUMMARY

### 4.1 Major Environmental Statutes

NETL was in full compliance with all environmental statutes and regulations in 2008. Throughout the year numerous inspections and audits were performed and documented to ensure that there were no instances of environmental non-compliance. Those statutes included CERCLA, SARA, RCRA, CAA, CWA, AEA, NEPA, and TSCA, and each are described in detail below.

### 4.2 Environmental Executive Orders

NETL was in full compliance with all applicable environmental executive orders in 2008. Throughout the year, numerous inspections and audits were performed and documented to ensure that there were no instances of environmental noncompliance. Those executive orders which apply to NETL include E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, which is described more fully in [Section 4.5.1](#). Other executive orders which apply to NETL, but for which no specific action was required in 2008 included: [E.O. 11514](#), *Protection and Enhancement of Environmental Quality*; [E.O. 11738](#), *Providing For Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans*; [E.O. 11987](#), *Exotic Organisms*; [E.O. 12088](#), *Federal Compliance with Pollution Control Standards*; [E.O. 11988](#), *Floodplain Management*; and [E.O. 11990](#), *Protection of Wetlands*.

### 4.3 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.

### 4.4 Atomic Energy Act of 1954

The Atomic Energy Act (AEA) of 1954 and its amendments require federal control of radiation source materials for the protection of the public and workers. DOE orders, EPA regulations, and Nuclear Regulatory Commission regulations are based on the AEA. To fulfill its obligations, DOE has implemented radiation protection programs at DOE facilities that process, produce, handle, use, or dispose of radiation source materials.

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 Morgantown site also has four phosphorescent exit signs located in the hazardous waste accumulation facility. Radiation safety officers maintain an inventory of these radiation sources, tracking each item, isotope(s), quantity, custodian, location, status, and activity. [Table 4.4.a](#)

lists the 2008 source inventory at Morgantown, [Table 4.4.b](#) lists the 2008 X-ray radiation generating devices for Pittsburgh, and [Table 10.4](#) lists the x-ray radiation generating devices at Albany.

In 2008, 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 includes the presence of ores that are naturally-occurring radioactive materials.

Radiation exposure monitoring at the Albany, Morgantown, and Pittsburgh sites consisted of the use of personal dosimeter badges. In addition, leak testing and analysis was performed on sealed sources at Morgantown by Applied Health Physics, Inc. Operational radiation-generating devices at Albany are leak checked annually by certified personnel employed by Oregon State University.

#### 4.5 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (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 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 it is not clear from the scope of the federal action 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. DOE has determined that certain classes of actions do not individually or cumulatively have a significant effect on the human environment and might, therefore, 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 onsite actions 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 2008:

### **Western Greenbrier Co-Generation Demonstration Project**

The NEPA requirements for this advanced circulating fluidized bed power plant fueled primarily from nearby waste coal, or gob was successfully completed with the publication of the Record of Decision in the *Federal Register* on April 29, 2008. Following multiple time extensions, DOE ended its participation in the project in June 2008. Construction and equipment costs had increased substantially and the industrial participant was unable to secure the necessary financing to move the project forward. The project, selected under Round 1 of the Clean Coal Power Initiative (CCPI), would have been designed, constructed, and operated by Western Greenbrier Co-Generation, LLC, a nonprofit organization owned by the municipalities of Rainelle, Rupert, and Quinwood, WV.

### **Mesaba Energy Project**

Excelsior Energy was selected under CCPI Round 2 to build the Mesaba Energy Project near Hoyt Lakes in the Iron Range of Northeastern Minnesota. The objective is to design, construct, and demonstrate a utility-scale next-generation integrated gasification combined cycle (IGCC) electric power generating facility which uses the ConocoPhillips E-Gas™ carbonaceous solids gasification technology. The planned installed capacity is approximately 600 MWe (net). The final EIS is in preparation and is expected to be available in October 2009.

### **Gilberton Coal-to-Clean Fuels and Power Project**

WMPI PTY, LLC was selected under CCPI Round 1 to design, construct, and operate an integrated coal waste gasification technology and Fischer-Tropsch technology facility in Gilberton, Schuylkill County, Pennsylvania. This demonstration effort will involve using a feedstock of 4,700 tons per day of anthracite coal waste to produce approximately 5,000 barrels per day of clean liquid fuels (diesel fuel and naphtha) and about 41 megawatts of electricity. A draft EIS (DOE/EIS-0357) was issued in November 2005, and after receiving comments, particularly with regard to carbon dioxide (CO<sub>2</sub>) emissions and CO<sub>2</sub>-related cumulative impacts, a supplement to the draft was issued in late December 2006. Comments on the supplement were received through February 2007. Both oral and written comments on the draft EIS and

comments on the supplement were considering in preparing the final EIS. In addition, to complete the final EIS, an appendix was developed comparing the potential impacts of using petroleum coke and anthracite coal as feedstock. The final EIS was issued in October 2007. The Record of Decision has not been finalized.

### **Kemper County IGCC Project**

Southern Company Services, Inc. was selected under CCPI Round 2 to demonstrate advanced power generation systems using Integrated Gasification Combined Cycle (IGCC) technology. In a combined cycle plant two power generators, or cycles, are used in combination to generate electricity in a very efficient manner. Coal is first heated in a special process vessel with air and steam to drive off the gas from the coal. The gas is then cleaned and used to fire a gas turbine to generate electricity. The hot exhaust gas leaving the turbine is then used to heat water to produce steam to power a steam turbine and generate additional electricity. The IGCC demonstration plant, which will use Mississippi lignite coal, will generate approximately 550 megawatts of electricity at a site located in Kemper County, Mississippi. The Notice of Intent to prepare an EIS for the proposed Kemper County IGCC was published in the *Federal Register* on September 22, 2008. A public scoping meeting was held on October 14, 2008 with comments being received through October 23, 2008.

#### 4.5.1 Executive Order 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management

President Bush signed [Executive Order 13423](#) *Strengthening Federal Environmental, Energy, and Transportation Management* on January 24, 2007, revoking a number of previous energy, environmental and transportation executive orders, including E.O. 13101, E.O. 13123, E.O. 13134, E.O. 13148, and E.O. 13149.

Specifically, with the revocation of E.O. 13101, E.O. 13423 reestablished goals for federal agencies that correspond to those originally established in E.O. 13101:

- Acquisition of goods and services that use sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products,
- Use of paper with at least 30 percent post-consumer fiber content,
- Reducing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed,
- Increasing diversion of solid waste as appropriate,



- Maintaining cost effective waste prevention and recycling programs,
- Meeting at least 95 percent of the requirements for an electronic product with an electronic product environmental assessment tool (EPEAT)-registered electronic product, unless there is no EPEAT standard for such product,
- Enabling the Energy Star feature on computers and monitors,
- Establishing and implementing policies to extend the useful life of electronic equipment, and
- Using environmentally sound practices with respect to disposition of electronic equipment that has reached the end of its useful life.

For the past several years, NETL has managed its acquisition of goods and services using its internal Procedure 541.2-1B, *Affirmative Procurement Program*. Employees are required to consider “environmentally preferable” or “green” products when making purchases using a government credit card. However, there are exceptions to the purchase of green products, including unreasonable price, the item cannot be received on time, the item is not available from a reasonable number of sources to ensure a satisfactory level of competition, or the items does not meet the required specifications. To ensure the program is implemented appropriately, training is provided to procurement officials and government credit card holders on the requirements of affirmative purchasing.

Another facet of the program includes tracking purchases made by the NETL warehouse for general office supplies and materials. NETL’s warehouse stocks 205 recycled-content products; with all GSA items containing at least 30% recycled content. The warehouse also stocks 10 biobased products, including cleaners/disinfectants, removers, and sealers.

NETL also provides a list of environmentally preferable, “green” products that are available in its “green cupboard.” The list is maintained on NETL’s internal



website to encourage employees to consider using these alternatives. When an employee needs an item, a check is first made to determine whether it is available as a used or excess item. This is particularly helpful when obtaining office

supplies, furnishings, tools, and chemicals. If the items are not available from the used or excess list, the employee is encouraged to obtain the item from the warehouse, which stocks “green” items. Only when the item is not available on the used or excess list, or in the warehouse, is the employee permitted to purchase the item from an outside source. In such situations, the employee is required to provide justification as to why an affirmative item was not purchased.

To more fully implement the Affirmative Procurement Program, four existing purchasing requirements have been combined energy-efficient, recycled-content, biobased, and environmentally preferable products. In addition, these purchases can include recycled-content products designated in EPA's Comprehensive Procurement Guidelines, Energy Star® products, bio-based products designated by the U.S. Department of Agriculture, and environmentally preferable products and services, including EPEAT-registered electronic products.

For 2008, NETL met the target of 100% for green purchases of storeroom materials and supplies, including paper, construction materials, non-paper supplies, vehicular materials, transportation materials, landscaping materials, park and recreation supplies.

Reducing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed, as part of the ongoing commitment to reduce the risks associated with hazardous chemicals under Title III of the Superfund Amendments and Reauthorization Act (SARA) requirements, NETL established targets to reduce the amount of hazardous chemicals on site. The intent is to avoid the unnecessary accumulation of potentially hazardous chemicals in laboratories, while maintaining sufficient chemical stores to complete mission-related research. NETL was able to reduce the total number of containers of hazardous materials, surpassing its target by 294 containers. The reductions were achieved through laboratory cleanouts and removal of chemicals that were no longer needed. In addition, NETL implemented a chemical inventory system which enables updates to the system in real-time.

To increase diversion of solid wastes from landfills and to maintain cost-effective waste prevention and recycling programs, NETL focused its efforts on its construction programs, with ES&H and Site Operations staff being part of its construction task force. Task force members review construction, renovation, and demolition projects and address ES&H-related issues in the conceptual stages of the project.

A prime example is the exterior cleaning and painting of two 30+ years old metal maintenance buildings (901 and 902 in Pittsburgh) which had debris and rust accumulation. The project involved power washing the roof and sides of one building, as well as the sides of the other. Cleaning was followed by priming and painting of those same surfaces. The task force implemented methods to protect the storm water system during the power washing and limited the amount of volatile organic carbons (VOCs) released during priming/painting. Non-woven polypropylene cloth was lined up next to the buildings to absorb debris and rust from power washing; storm sewers were covered with the same cloth. This prevented possible violations of the NPDES permit for suspended solids, iron, and oil and grease limits. Exterior painting of the buildings using low-VOC emission primer and zero-VOC emission top coat instead of using the originally proposed

acrylic paint resulted in minimal VOC emissions, resulting in lowered worker exposure to VOCs and limited release to the environment. Based on its original project plan, which included two coats (totaling approximately 300 gallons) of (Sher-Cryl High-Performance) paint (0.76 lbs/gal emitted VOC); the painting would be expected to emit approximately 228 lbs of VOCs. Using 100 gallons of low-VOC (Pro-Cryl primer) (0.32lbs/gal emitted VOC, or 32 lbs) and approximately 110 gallons of Zero-VOC paint (0.00 lbs/gal emitted VOC), an estimated 196 lbs of VOC emissions were avoided during the project.

Another example is the exterior renovation to another building (921), which involved removal of galbestos siding, rebricking the building, and replacing the exterior windows. The task force implemented methods to protect the storm sewers and made arrangements with a local recycler, Construction Junction, to take as many as 75 double-paned windows for reuse. Exterior renovations to the building (921), included protecting the storm sewers using mats and booms, which ultimately protected the outfalls from possible contamination, and likely NPDES permit violations. Reuse of the windows resulted in significant waste being diverted from a landfill.

In another renovation project, NETL's Computational Science Computer Room (103, building 94) and exterior building modifications involved relocating the computer laboratory to office space and various landscaping activities. The task force reused as many of the components of the project as possible, including carpeting, light fixtures, and ceiling tile. Recycling of the light fixtures, ceiling tile, and carpeting, approximately 343.2 lbs of light fixtures, 475 lbs of ceiling tile, and 738 lbs of carpeting would be diverted from a landfill. Exterior landscaping activities included reuse of cobblestone collected from reconstructed streets in the Pittsburgh area.

Renovations to another administrative building (920) included diverting light fixtures, ceiling tile, and a steel door to reuse through donation to a non-profit used building material retailer. The task force made arrangements with a local recycler to take the materials for reuse. Diverting waste building materials from landfill disposal and/or recycling results in dramatic environmental benefits. The building 920 renovation diverted 76 lighting fixtures, 250 ceiling tile, and a steel door to reuse through donation to a non-profit used building material retailer.

Finally, NETL completed construction of a new Technology Support Facility (TSF) in Morgantown, WV, in 2008. The TSF was designed and constructed to the U. S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Platinum (exceeding Gold) standard, certification pending. It is one of the most energy efficient and cost effective federal structures built to date.

NETL has been proactive in meeting the requirement of at least 95 percent of electronic products with an electronic product environmental assessment tool

(EPEAT)-registration being purchased, unless there is no EPEAT standard for such product. In addition, NETL is committed to enabling the Energy Star feature on computers and monitors. NETL has established and implemented policies to extend the useful life of electronic equipment, NETL received the award for the following initiative: "Use of NETL's Small Purchasing System to Control Electronic Product Environmental Assessment Tool (EPEAT) Purchases." NETL modified the Standard Accounting and Reporting System (STARS) so that whenever a purchase is attempted that does not meet EPEAT requirements, the purchase is rejected and an alternate EPEAT-certified product is offered in its place. This modification is being adopted into the Strategic Integrated Procurement Enterprise System (STRIPES) currently being used throughout DOE.

As part of efforts to use environmentally sound practices with respect to disposition of electronic equipment that has reached the end of its useful life, NETL joined the Federal Electronics Challenge, a partnership program encouraging federal facilities and agencies to purchase greener electronic products, to reduce impacts of electronic products during use, and to manage obsolete electronics in an environmentally safe way. In addition, NETL participated in the Electronics Reuse and Recycle Campaign which is sponsored by the Office of the Federal Environmental Executive. The campaign challenges federal agencies to donate and recycle excess or surplus electronics through a competition based on the weights of the computers and other electronics.

NETL won a 2008 Fossil Energy Environment, Safety, Security and Health Award for the initiative on "Use of NETL's Small Purchasing System to Control Electronic Product Environmental Assessment Tool (EPEAT) Purchases." For the second year in a row, NETL has been identified as an EnviroStar award winner by the Allegheny County Health Department, Pittsburgh,



Pennsylvania. NETL was one of seven organizations in the Pittsburgh area to receive the award, but the only organization to receive a three-star rating. The rating was based on NETL's efforts under its environmental management system which sets goals for nonhazardous waste reduction, hazardous waste recycling, chemical inventory reduction, and improvements in energy efficiency.

While E.O. 13423 further defined goals for energy intensity, renewable energy, and transportation management, it also mandated changes to NETL's energy management program. In response, NETL has aggressively pursued the most energy efficient management of facilities possible. For example, lighting retrofits are a routine part of all construction and renovation packages. Inefficient fixtures are replaced with more efficient, 277-volt Energy Star-rated, electronic-ballast fluorescent fixtures. Motion sensors have been installed to conserve energy in areas that are not used frequently. NETL consistently incorporates energy

efficient designs, Energy Star-rated equipment, and Federal Energy Management Program (FEMP)-approved equipment into construction packages, renovation packages, and maintenance projects.

E.O. 13423 redefines Public Law 109-58, the Energy Policy Act of 2005 (EPact05) that established updated performance objectives for the federal government. Those performance objectives require a reduction in energy intensity and water consumption intensity, and the incorporation of high-performance sustainable building practices.

E.O. 13423 requires a reduction in energy intensity (energy consumption per square foot of building space) of 3% per year from FY2006 through FY2015, based on a 2003 baseline. This will result in an overall 30% reduction in energy intensity (energy use/gross square feet) by 2015. The EPact05 requirements reestablished by E.O. 13423 include the following electricity procurement requirements: from FY2006 through FY2009, at least 3% of NETL's total electricity supply must be derived from renewable energy; from FY2010 through FY2012 at least 5% of the total electricity supply must be derived from renewable energy; and from FY2013 and beyond, at least 7.5% of the electricity must be derived from renewable energy. E.O. 13423 also requires that 50% of the above-mentioned renewable energy is generated from renewable energy sources that were developed after 1990.

After E.O. 13423 was implemented, then Secretary of Energy, Samuel Bodman, announced his Transformational Energy Action Management (TEAM) Initiative at GovEnergy 2007 in New Orleans, LA, on Aug. 7, 2007. Secretary Bodman's TEAM Initiative challenged the Department to exceed the goals identified in the E.O. 13423 and to become the role model for other government agencies in its endeavor to meet President Bush's challenge. The TEAM Initiative led to the development and implementation of DOE Order 430.2b, "Departmental Energy, Renewable Energy and Transportation Management," which provides guidance on the goals identified in both the E.O. 13423 and the TEAM Initiative. DOE Order 430.2b (approved August 7, 2007), also identified more aggressive goals pertaining to renewable energy. Specifically, the order mandates that DOE-owned facilities install on-site renewable projects that can generate up to 7.5% of the site's electricity usage. If DOE sites are unable to cost effectively install these projects, they are to provide documentation that validates their position.

E.O. 13423 also requires a reduction of water consumption intensity (water use per square foot of building space) through life-cycle cost-effective measures. This reduction must be at least 2% per year from 2008 through 2015, or 16% by the end of FY2015 using FY2007 as the baseline.

In addition, E.O. 13423 requires new DOE building design, construction, and major renovations to comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (HPSB)* set forth in the Federal



*Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006)*. It also requires that 15% of the existing federal capital asset building inventory of NETL at the end of FY2015 incorporate the sustainable practices established in these guiding principles. On October 10, 2008, construction was completed on NETL's proposed Leadership in Energy and Environmental Design (LEED) Platinum-Certified Technology Support Facility, TSF (B-39). The TSF is designed to use 30% less energy than building's designed to American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standard 2004, which is DOE's standard for design. The TSF incorporates all design and construction requirements to meet the LEED Platinum Rating. NETL is preparing the necessary criteria to validate platinum certification by the first or second quarter of FY 2009. If NETL is successful in validating the TSF as a LEED platinum-certified building, it will count towards meeting the goal of 15% of existing buildings. NETL staff has initiated an HPSB survey of its existing buildings and they are confident that with the TSF LEED platinum- certification and the expected validation for the Pittsburgh Daycare Center, NETL will meet the HPSB guidelines. The laboratory is expected to realize an 11.25% achievement towards meeting the HPSB guidelines goal of 15% of existing buildings.

In 2008, NETL initiated numerous actions to meet or exceed each of these goals. 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.

Likewise, NETL's Comprehensive Energy Management Plan was updated in 2008 to include strategies and annual implementation steps to insure compliance with EPact05, E.O. 13423, DOE Order 430.2b, and the Energy Independence and Security Act of 2007 (EISA07). 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 2008, these analyses were used for equipment retrofit and replacement projects, renewable energy projects, lighting retrofit projects, water savings projects, and HVAC control projects. These analyses, coupled with energy efficiency, renewable energy and water efficiency mandates by DOE, will help 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 Plan includes energy efficiency upgrades and water conservation projects in its general plant project (GPP) budget requests.

DOE Order 430.2b also recommends 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 a 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 WV, Pittsburgh PA, and Albany, OR. See the following [Delivery Order-4 \(DO-4\)](#) schedule of the ECMs. The DO-4 schedule identifies each ECM and its associated guaranteed energy, water, and renewable energy savings, cost savings, individual ECM simple payback, and the entire project simple payback.

Once all of the ECMs have been installed, commissioned, and accepted by NETL, the annual energy savings are guaranteed to be 23.8 Btu with an annual guaranteed cost savings of \$757,929.00. The implementation of the BAMF ESPC will provide NETL with an energy savings of 24% from its FY2003 baseline - equivalent to meeting 79% of its 2015 goal. The BAMF ESPC, when fully implemented, using 2007 usage as a baseline, will provide NETL with a 13% water intensity savings, which equates to meeting 79% of its 2015 savings goal. This project does not require any capital equipment cost outlays by NETL. The guaranteed annual energy cost savings provide the funding for Constellation Energy to implement the project.

NETL was able to achieve the 3% reduction in energy consumption per square foot of building use (required by EPact05) in FY2008 using FY2003 as the base year. Energy use at NETL was 231,732 Btu/gross square foot (energy intensity) in FY2003, while energy use was 162,597 Btu/gross square foot during FY2008. This equates to a 29.83% percent reduction in energy intensity. This reduction in energy intensity was achieved in part through the Pittsburgh site's procurement of 100% of its natural gas needs from a local landfill. This source of natural gas is provided through the natural gas utility supplier. The DOE Office of Federal Energy Management Program has identified landfill natural gas as a renewable energy source. The FY2008 through FY2012 contribution from landfill gas use at Pittsburgh will help reduce NETL's energy intensity for both renewable energy sources and long-term renewable sources as identified in [Table 4.6.1](#).

While neither EPact05, nor E.O.13423, define a goal for greenhouse gas reductions, the goal established in E.O. 13123 is generally applicable for greenhouse gas reductions. E.O. 13123, which defined greenhouse gas as carbon dioxide (CO<sub>2</sub>) only,



established a goal of 30% reduction by FY2010 using FY1990 as the base year. NETL received authorization from the DOE Federal Energy Management Program to allow credit for reducing greenhouse gas emissions through the use of landfill gas. This is permitted because landfill gas reduces methane emissions, which are considered to be more environmentally damaging than CO<sub>2</sub> emissions.

In FY2008, NETL greenhouse gas emissions were estimated to be 22,382 metric tons equivalent of CO<sub>2</sub>. Using the FY1990 baseline of 67,849,829 pounds of CO<sub>2</sub> yields a 66.35% reduction for 2008. The success in reducing greenhouse gas emissions has been achieved by the following: reduction in electricity, natural gas, and steam, credit for using landfill gas, and installation of new multi-stage central steam plant boilers at the laboratory's Morgantown site.

NETL has reduced consumption of petroleum products primarily through the use of ethanol (E85) and natural gas in alternative-fueled vehicles. DOE defines petroleum products as oil, gasoline, diesel fuel, liquefied petroleum gas (LPG), and propane. NETL does not typically use petroleum products for heating buildings. Only forklifts, front-end loaders, snow-removal equipment, and lawn care equipment utilize petroleum products. This equipment is generally fueled using gasoline and diesel fuel. Alternate fuel systems have been installed at both Morgantown and Pittsburgh. These alternative fuel systems include a mixture of 85% ethanol-15% gasoline (E-85) and compressed natural gas (CNG) vehicle refueling stations. As of the end of FY2008, E-85 refueling stations are operating at both Morgantown and Pittsburgh. As of the end of FY2008, only the CNG facility at Pittsburgh was operating, while the Morgantown CNG facility remained under construction. The E-85 and CNG facilities are helping NETL meet the alternate-fueled vehicle goals as defined in E.O. 13423, Secretary's Team Initiative of 2008 and DOE O 430.2b.

#### 4.6 Compliance and/or Cleanup Agreements

There were three ongoing compliance activities in the State of Wyoming during 2008. Two sites required ongoing active remediation activities, and one site has been cleaned up and is subject only to vegetation surveillance monitoring. The other two are active sites, in which the groundwater is contaminated with volatile (VOCs) and semi-volatile organic contaminants. Organic contaminants of concern are primarily benzene, toluene, ethyl benzene, and isomeric xylene (BTEX) compounds. Underground coal gasification and oil shale retorting tests resulted in ground water contamination at the two active sites.

The largest cleanup activity during 2008 occurred at the Rock Springs Oil Shale Retort Project Site near Rock Springs, Wyoming. Air sparge/bioremediation activities were conducted at sites 4, 6, 7, 9, and 12. Results indicate that sites 4, 6, 7, and 12 are near the Wyoming Department of Environmental Quality (WDEQ) water quality standard of 5 parts per billion (ppb) for benzene. In addition, site 9 has six monitoring wells that exhibit higher levels of benzene (up to 40 ppb) and will require

continued air sparge/bioremediation activities. WDEQ recommended in December 2008 that an independent evaluation of this project, along with the Hoe Creek project be conducted. The evaluation report is expected to be complete in December 2009.

Remediation activities continued at the Hoe Creek Underground Coal Gasification Project at the Hoe Creek III site in 2008. While periodic air sparge/bioremediation actions were conducted until May 2008, no active remediation has occurred since that time. This was to allow for evaluation of additional contaminants that had leached into the groundwater from source materials. No groundwater monitoring wells have contaminant levels above the WDEQ standard of 5 ppb as of October 2008. No further active remediation will be conducted until results of the independent evaluation are available in December 2009.

The DOE Hanna Underground Coal Gasification Project, near Hanna, Wyoming, is complete except for vegetation evaluation. Vegetation sampling was conducted in 2006-07 and is currently being evaluated by the WDEQ. Release of the reclamation performance bond and permit termination is anticipated in 2009.



#### 4.7 Environmental Violations Cited by Regulators

There were no environmental violations cited by regulators in 2008.

#### 4.8 Notices of Violation, Notices of Deficiency, Notices of Intent to Sue, and Other Enforcement Actions Issued

##### Groundwater

The Albany site began a groundwater monitoring program as a voluntary effort onsite in 2001 and offsite in March 2005. Certain VOCs at levels above the state of Oregon's risk-based standards both in the groundwater at the Albany site and beneath Liberty Elementary School located adjacent to the site were discovered at the times noted above. NETL continues to monitor the groundwater both onsite and offsite, perform applicable site investigations, document applicable risk assessments, and act as a voluntary participant in the Oregon Department of Environmental Quality's (DEQ) Cleanup Program. At no time have students, faculty, or staff of the elementary school received any adverse or harmful exposures. NETL works closely with the Oregon DEQ to investigate the nature and extent of the contamination, as well as to assess appropriate remediation methods. No enforcement action has been initiated by the DEQ against the DOE as of the end of 2008.

NETL closed and decommissioned two contaminated residential water wells, although the source of the contamination remains unknown. 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.

#### Beryllium

In 2005, beryllium surface contamination above the threshold limits for contamination specified in 10 CFR Part 850 was discovered in several buildings at the Albany site. In response, the Albany site, then known as the Albany Research Center (ARC), began a systematic process of identifying all beryllium-contaminated areas and evaluating potential levels of residual beryllium throughout the site. ARC also implemented worker safety measures, including the provisions of 10 CFR Part 850 for establishing a Chronic Beryllium Disease Prevention Program.

In 2007, NETL completed testing the facility for the potential spread of beryllium and characterized the site by performing beryllium inventory sampling. Based on the data collected, NETL compiled a prioritized list of areas to remediate and issued a solicitation for the remediation work. An award was made for the associated remediation work in FY 2008. It is anticipated that all remediation work will be completed by the end of FY 2009.

#### 4.9 Reportable Occurrences

The Morgantown site filed one safety- and health-related occurrence report with the DOE Occurrence Reporting and Processing System (ORPS) in 2008. The occurrence was a construction contractor damaging a 3-inch natural gas line. It was categorized as a failure to follow a prescribed hazardous energy control process.

The Pittsburgh site filed one safety- and health-related occurrence report and four environmental occurrence reports with ORPS in 2008. The first was a building fire that occurred in a site laboratory, while the other four involved the release of turbid water into the storm sewer system from water line breaks and maintenance activities. The first occurrence was categorized as an unplanned fire in a non-nuclear facility, while the other four occurrences were categorized as release of a substance from a DOE facility that must reported to an outside agency.

The Albany site filed three safety- and health-related and environmental occurrence reports with ORPS in 2008. They involved an electrician receiving a mild shock, an unexpected discovery of an hazardous energy source, and friable asbestos discovered in a laboratory hood. The first two were categorized as failure to follow a prescribed hazardous energy control process, while the third was categorized as a facility or operations shutdown directed by management for safety reasons.

#### 4.10 Major Issues, Instances of Non-compliance, and Corrective Actions

There were no major issues, instances of non-compliance, or corrective actions at NETL in 2008. Concerns over potential groundwater contamination with VOCs and surface contamination of beryllium at the Albany site are discussed in [Section 4.9](#).

#### 4.11 Status of Ongoing Third-Party Inspections, Self-Assessments, and/or Environmental Audits

NETL continued to maintain ISO 14001/OHSAS 18001 certification at the Morgantown and Pittsburgh sites in 2008. Two surveillance audits and two internal audits were performed.

The ISO 14001/OHSAS 18001 Surveillance Audit #1 was conducted April 1-2, 2008, and involved the surveillance of NETL's ISO 14001/18001 certification and conformance, respectively. The audit resulted in two minor nonconformances. One minor non-conformance addressed corrective action requests currently past their documented due dates in the AIIS system. The other minor non-conformance involved operational controls for disposal of scrap metals that were not followed. The audit also revealed three strengths and three opportunities for improvement in NETL's ISO 14001 and OHSAS 18001 programs.

Surveillance Audit #2 was conducted November 12-13, 2008. The audit resulted in one major conformance and one minor nonconformance. One previous minor non-conformance had not been completely closed, so it was elevated to a major nonconformance. The minor nonconformance was identified dealing with personal protective equipment signage in the penthouse boiler room. The audit also revealed three strengths and three opportunities for improvement.

The Albany site successfully passed both an ISO 14001 recertification audit and an ISO 9001 certification audit on October 23, 2008. No nonconformities were found against the ISO 14001 standard. Three minor non-conformities were identified against the ISO 9001 standard.

#### 4.11 Summary of Environmental Permits

A summary of environmental permits for the Morgantown site is provided in [Table 4.11.a](#), and a summary of environmental permits for the Pittsburgh site is provided in [Table 4.11.b](#). The Albany site maintains a wastewater discharge permit with the City of Albany.

#### 4.12 Emergency Preparedness

NETL is working toward compliance with the National Incident Command System (NIMS) training requirements for emergency responders and requirements for Mutual Aid Agreement (MAA) content with local community response organizations.

NETL emergency management has identified the community response organizations with which NETL should have MAAs. The MAA content has passed a legal review. Some MAAs have been completed by having been signed by representatives of the community organizations and NETL representatives, while others are reaching the review and negotiation stages.

The NETL Continuity of Operations Plan was approved in 2007 and is undergoing revision to address DOE Order 150.1 Continuity Programs compliance issues identified in gap analyses using the DOE Continuity Technical Assistance Program tool and FEMA continuity plan checklists.

#### 4.13 Quality Assurance

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 Quality Assurance (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, 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.

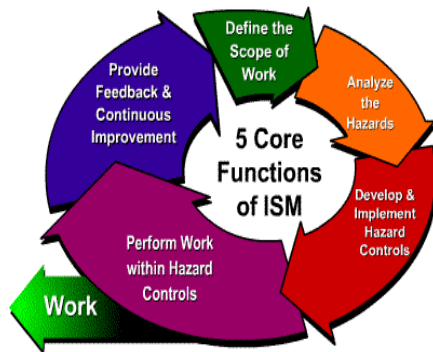
NETL uses a computer-based job hazard survey to identify both general and specific ES&H training courses that employees need. As part of NETL's existing computer based training (CBT) system, employees are fed survey questions that focus on the potential hazards and responsibilities associated with their job/s. The survey then follows up with an e-mail to the employee identifying appropriate training. In addition, training needs are also identified and documented through the SARS process. This analysis defines requirements to demonstrate competency, including appropriate education, training, and experience, as well as an understanding of the importance of NETL's environmental aspects for project design and operation, including support operations. ES&H training records are managed through the CBT system, DOE and contractor human resource departments, and official SARS files.

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, it is important that it work effectively. NETL has three distinct SARS processes: one for R&D, one for facilities, and one for support operations. At Morgantown and Pittsburgh, the R&D SARS procedure, NETL P 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 made up of, at a minimum, the project's responsible person (or designee), an ES&H representative, a project quality assurance engineer (PQAE), 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 and 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 de minimis deficiencies that must be corrected within one year. After assignment, findings are sent to the responsible person for correction using AIIIS. The responsible person's supervisor is copied on the finding.

NETL's Facility SARS Procedure (NETL P 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 up of, at a minimum, the facility's custodian and ES&H staff, including the 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 P 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.

#### 4.14 Performance Measurement

Goal setting is an excellent approach 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 2008, trained ES&H professionals performed extensive crosscutting audits and inspections of the NETL ES&H program to ensure adequate performance. The performance measures used to monitor progress include EMP Objectives and Targets (see Section 3.4) and institutional environmental performance measures. This includes NETL's performance measures established under the Government Performance and Results Act (GPRA) of 1993. These measures are tracked on a fiscal year basis. They cover performance goals and accomplishments for FY 2008. 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 4.14, Surveillance Monitoring.

## 5 MORGANTOWN

### 5.1 Site Description

The Morgantown site resides within Monongalia County, West Virginia, on the northern end of the city of Morgantown. This 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. This work is accomplished through both in-house R&D and contracted research. There are approximately 600 employees at the Morgantown site of whom roughly half are federal employees and half are site support contractors.

As of the 2000 U. S. Census, Morgantown's population consisted of 26,809 people, 10,782 households, and 4,183 families within the city limits. The population density was 1,056.2 people per square kilometer (2,736.0 people/mi<sup>2</sup>). There were 11,721 housing units at an average density of 461.8 units per square kilometer (1,196.2 units/mi<sup>2</sup>). The racial makeup of the city was 89.48% White, 4.15% African American, 4.15% Asian, 0.17% Native American, 0.05% Pacific Islander, 0.51% from other races, and 1.48% from two or more races.

The median income for a household in the city was \$20,649, and the median income for a family was \$44,622. Males had a median income of \$33,268 versus \$24,944 for females. The per capita income for the city was \$14,459. About 15.0% of families and 38.4% of the population were below the poverty line, including 23.3% of those under age 18 and 8.3% of those who are age 65 or over. 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.

## 5.2 Major Site Activities

In 2008, a design package for a pH control facility for the industrial waste water pretreatment system was completed. The unit will utilize a batch process to neutralize the effluent from the primary clarifier prior to discharging to Morgantown's Publically Owned Treatment Works (POTW). When completed, the unit will help to ensure compliance with the permit requirements.

**Facility Repairs Completed.** The construction activities at the Technology Support Facility (TSF) at Morgantown were completed and the building was occupied in 2008. The TSF is a multi-story, 106,000-square foot structure, housing approximately 168 offices. The TSF was designed and constructed to enable NETL to obtain U. S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Gold Certification.



The roof of the TSF comprises two sections. The first section is a plant-filled rooftop garden, which acts as a thermal mass, absorbing and holding

energy from sunlight, then releasing it when the ambient air cools. By functioning as a heat storage battery, the “living” roof reduces the building’s heating and cooling demands. The second section of the roof holds large reservoirs to collect rainwater for use in septic and gardening systems. In addition, the TSF roof is coated with a reflective roofing material for solar protection.



The TSF is expected to be one of the most energy efficient and cost effective federal structures built to date. It was designed and constructed to consume 43% less energy than a building designed and constructed using conventional methods and materials. The Department of Energy and NETL will realize utility and operational cost savings of approximately \$1.5 million dollars annually due to this design.

Another facility repair was the replacement of the roof of Building 4 because of concerns over the health and safety of building occupants. The new roof has improved insulation and ultraviolet sunlight protection to ensure increased energy efficiency.

## 6 COMPLIANCE STATUS

### 6.1 Environmental Restoration and Waste Management

#### 6.1.1 CERCLA

Morgantown had no National Priorities List (NPL) sites in 2008 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 2008. During the past 25 years, there have been several on-site cleanup activities. Some of these activities followed the closure of facilities that had leaked for a number of years. Other cleanup activities followed discrete spills. [Table 6.1.1](#) provides an overview of these events in terms of 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 6.1.2, Properties of Potential Contaminants](#).

#### 6.1.2 SARA Title III

The Emergency Planning and Community Right-To-Know Act (EPCRA) requires facilities that store hazardous materials in quantities exceeding specified threshold amounts to notify the state emergency response commission, to cooperate in local emergency response planning activities, and to submit hazardous material

inventories to the local and state emergency response and planning organizations. It also requires reporting to the EPA and to designated state officials of any annual releases of toxic materials that are used, produced, or processed in quantities exceeding threshold amounts. The inventory requirement is triggered when the facility stores more than 10,000 pounds of a hazardous material (as defined by OSHA) or more than 500 pounds, 55 gallons, or the specific threshold planning quantity of a listed extremely hazardous substance.



To help comply with these regulatory requirements, NETL developed Procedure 440.1-2 (B), *Chemical Inventory and SARA Title III Reporting*, which is implemented by the NETL chemical hygiene officer. The program revolves around a computer-based chemical inventory system that is continually updated as materials are purchased, consumed, and disposed. The database is verified annually by representative samplings of work areas to determine whether observed types and quantities of materials match the database information.

Chemicals arriving on site must be accompanied by an MSDS, or they will be held at the warehouse until the MSDS is obtained. When a prospective buyer wants a particular chemical, they must first check the intranet-based chemical inventory and the waste accumulation list to determine if it is available on site. If not, they may complete a purchase request for the chemical. The purchase request is reviewed by a specialist who assigns an MSDS number to the requested material, if an MSDS is already on file. The specialist also attempts to determine if less hazardous substitutes are available. If the chemical is new to NETL, the Chemical Inventory and MSDS Manager (CIMM) will obtain a copy of the MSDS for review before it is approved to be purchased. Once the purchase request is approved, the purchase can be initiated. When chemicals arrive on site, tracking begins. First, the chemicals are tagged and logged into the database. When the chemicals are moved to a new location, the database must be updated with the new location of the materials. When the empty container is picked up or when the remaining material is sent to the hazardous waste facility for disposal, the item is removed from the database.

Morgantown did not have any extremely hazardous substances above threshold planning quantities (TPQ) in 2008. NETL provides Tier 2 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 remained on site. Hydrogen sulfide was above the TPQ in 2006, but was removed from Tier 2 reporting requirements in 2008 because the 370 pounds daily average (maximum daily 385 pounds) was below the 500-pound TPQ. Hydrogen sulfide is stored as a compressed gas in metal

cylinders. Other materials that are voluntarily reported in the Tier 2 report are carbon dioxide (average daily amount stored is approximately 2,000 pounds) and nitrogen (average daily amount stored is approximately 55,000 pounds). Nitrogen is stored outdoors in an above-ground storage tank and in individual gas cylinders.

Morgantown did not generate a toxic release inventory (TRI) in 2008 because the site did not release any of the listed toxic materials in quantities that exceed the TRI threshold amounts. Similarly, there were no releases that would trigger either EPCRA or CERCLA emergency notification.

### 6.1.3 RCRA Program

The Resource Conservation and Recovery Act (RCRA) designates sites as generators, transporters, or transportation, storage and disposal (TSD) facilities. Morgantown is regulated as a large-quantity generator and is under the jurisdiction of the West Virginia Department of Environmental Protection (WVDEP). Although hazardous waste generation rates are low for most months, occasional lab activities result in the generation of larger quantities that exceed the threshold for large quantity generators. [See Table 6.1.3](#) for summary information on waste generation and management. NETL does not hold a permit as a transporter or TSD facility for hazardous waste, nor does it hold a permit for treatment or disposal of non-hazardous 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. During 2008, hazardous waste materials were transported to the storage and treatment facilities of American Environmental Services (AES), Inc., located in Westover, WV, a town adjacent to Morgantown. At the AES facility, small packages of similar waste are combined and repackaged for more cost-effective shipment to a final disposal facility selected by AES. Non-hazardous waste (normal office wastes that are not recycled and cafeteria waste) is transported by Browning Ferris Industries (BFI), Inc., to the Meadowfill landfill, located near Clarksburg, WV.

NETL complies with the RCRA manifest requirements by initiating documentation when hazardous wastes are shipped from the Morgantown site. The NETL 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 them harmless; however, NETL does recycle some universal wastes as classified under RCRA. During 2008, NETL recycled batteries, fluorescent light bulbs, 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 into labeled containers (drums, buckets, bottles) in their labs. An internal manifest is used for tracking and identification. Laboratories have satellite accumulation areas where the waste awaits transport by technicians to the on-site collection area located in B-33. Technicians who transport the waste on site inspect the waste for proper containment, labels, and completed documentation. They



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 (e.g., toxicity, ignitability, reactivity, and corrosiveness).

According to the procedure, the collection occurs each month or as needed. At the collection area, a technician checks the containers for appropriate internal manifests, and the waste may be repackaged into lab-packs for purposes of transportation. Wastes are held only temporarily in the collection area until the next pickup by the contracted transporter. Storage on site is less than 90 days for non-universal hazardous waste regulated by RCRA. The hazardous waste coordinator assures proper labeling on the waste at the time of pickup by the contracted transporter.

Despite training and the various administrative controls, including the planning that precedes the issuance of a SARS permit, there is always the possibility 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 walkthrough inspections, ES&H staff members visually evaluate garbage cans for evidence of improper disposal practices. To check for improper flushing of chemicals, ES&H staff sample wastewater discharges monthly for metals, various organic compounds, pH, biological oxygen demand (BOD), total suspended solids, and total oxygen content (TOC). A full suite of chemical analyses are conducted on wastewater annually. If anomalous readings are obtained during the monitoring of the dedicated laboratory wastewater sewer system, troubleshooting begins. If necessary, ES&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. Floor drains are connected to the onsite pretreatment facility, where NETL staff may be able to detain and neutralize any spilled chemicals before release offsite.

Morgantown stores its waste indoors within a specially designated area that requires a key for entry. Extra spill protection is provided by an epoxy coating on the concrete floor, which drains to sump pumps connected to catch containers.

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 class of waste is stored in separate rooms to minimize the chance that a leaked material could come into contact with an incompatible substance and cause a reaction. An employee is assigned to perform daily inspections and keep records of the inspections. RCRA-required worker training is mandatory for all technicians who collect and handle hazardous waste. The initial training is supplemented periodically with refresher courses. All NETL employees take general awareness training. Those persons who generate hazardous waste in the labs take additional, lecture-based training.

There are no hazardous waste ponds or underground storage tanks for any materials at the Morgantown site. These items were phased out in the past, and most contaminated soils associated with these items were removed. Currently, there are aboveground storage tanks holding 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. At the Morgantown site, there are additional aboveground storage tanks designed to hold acids and bases as lab feeds. The tanks designed for sodium hydroxide storage were never utilized and have been empty since installation. In 2005, the tanks designated to hold acids were thoroughly cleaned and prepared for decommissioning. The sump water (which consists of rainwater) collected in the secondary containment area associated with these tanks is being discharged to the storm water drains.

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, lab-specific operating procedures specify how to control and shut down various lab activities in the event of an emergency.

During 2008, hazardous waste management inspections continued to focus on proper control of hazardous materials within lab spaces. Any deficiencies were entered into the AIIS tracking system, and appropriate actions were taken to correct these findings. The WV DEP Division of Water & Waste Management conducted an inspection during 2008.

## 6.2 Toxic Substances Control Act (TSCA)

There were no unplanned releases of air pollutants covered by CERCLA or TRI regulations during 2008. 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 more than thirty years ago. No samples taken this year contained fiber concentrations in excess of EPA and State of West Virginia clearance levels (0.01 fibers/cc). Occasionally, fiber concentrations do exceed that limit, but second level analysis has always verified that the excess was caused by non-asbestos fibers. The observed concentrations of asbestos fibers have always been below the clearance level.

### 6.3 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

There were no restricted-use pesticides, herbicides, or defoliant kept on site during 2008. 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. Herbicides are not used for weed control except for extremely limited cases. No defoliant are used. The ES&H Division is not aware of any spills or releases of FIFRA-regulated substances (e.g., pesticides, herbicides, or defoliant).

### 6.4 Radiation Protection Program

NETL does not have an extensive program for protection of the public and the environment from radiation hazards, because its sources are all small, sealed instrumentation sources with low rem levels. The Morgantown site does not generate radioactive materials, and does not transport process, treat, store, or provide onsite disposal of radioactive waste. Sources are returned to the instrument manufacturers for disposal. 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 4.4](#) (Atomic Energy Act of 1954), and [Section 4.3](#) (DOE Order 435.1, Radioactive Waste Management). Non-applicable radiological program requirements for NETL in 2007 include the following:

- Price-Anderson Amendments Act of 1988, as amended in 1992
- USC, Title 10, Part 71, Packaging & Transportation of Radioactive Material
- 10 CFR 834 (draft), Environmental Radiological Protection Program
- 40 CFR 61, Subpart H, National Emission Standards for Emissions of Radionuclide Other than Radon from Department of Energy Facilities
- DOE Order 5400.5, Radiation Protection of the Public and the Environment
- DOE Order 435.1, Radioactive Waste Management.



## 6.5 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 NETL 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 EMPs have been created which focus attention on a few of the emissions categories or sources where NETL can make the most improvement. To maintain quality control in our program, NETL selects and subcontracts analytical work only to EPA-certified laboratories. These laboratories must submit their QA/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. Where possible, air emissions monitoring systems onsite are checked or calibrated.

There are two EMPs that direct continuous improvement efforts in air-quality protection. One will eliminate use of Class I refrigerants by year 2010, to the extent economically practicable, and to the extent that safer alternatives are available. The second EMP is designed to reduce greenhouse gas emissions attributed to facility use through life-cycle cost effective measures by 30% by 2010, using 1990 as a baseline (67.4 million lbs.). Additionally, two EMP's geared at reducing vehicular consumption of petroleum products and the emissions of air pollutants are in place.

WVDEP generally evaluates air quality on a 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 Morgantown 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.

During 2008, there were no new source reviews (i.e., Clean Air Act pre-construction reviews) for any Morgantown facility, nor were there any Morgantown facilities with the potential to emit more than 100 tons/year of any designated air pollutant. Prior to 2006, the Morgantown site held one permit for a facility called the Gas Process Development Unit (GPDU). The permit for this one facility was allowed to expire in June 2006. See [Table 6.5](#) for additional information on the expired permit.

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.

## 6.6 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 storm water 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 that are found in the Storm Water Pollution Prevention Plan, which documents the various potential sources of pollution and the prescribed methods for managing the various types of sources. Under the plan, designated storm water outfalls are sampled twice per year and tested for basic pollutants of concern that might

indicate contamination from site applications of fertilizer or leaking sewer lines: see [Table 6.6.1a NPDES Storm Water Monitoring Requirements](#). The results of that testing are presented in [Table 6.6.1.b, NPDES Storm Water Analysis Results](#). 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, there are four drainage areas that have rainwater runoff collection systems and regulated outfalls to the nearby surface streams.

- Outfall 002 drains an area that holds the majority of the facilities for material handling and is approximately 509,652 square feet in area.
- 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.
- 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.
- Outfall 010 drains parking areas, offices, and a large section of undeveloped land. It drains an area of 3,197,304 square feet.

The outfalls at the Morgantown site are monitored according to General Permit Registration #WVG610042 under 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). There are six aboveground storage tanks that contain petroleum products (diesel fuel and gasoline) and one that contains ethanol, for a total capacity of 2,900 gallons. Three of the aboveground storage tanks are located inside the area drained by Outfall 002. There are two additional aboveground storage tanks 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 PCBs. There are no buried or partially buried storage tanks at the Morgantown site.



An oil-water separator is installed inside the runoff collection system of the new parking garage, but there are no other treatment systems 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. The State of West Virginia has recently launched a program to categorize streams by water quality and to establish minimum water quality criteria for each category. It is anticipated that both West Run and Burroughs Run would be categorized as impaired streams that require the establishment of total maximum daily loading (TMDL) limits and further regulation. 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).



Although storm water runoff is handled by storm water sewer systems, a completely separate and dedicated sewer system handles the industrial wastewater. A third separate and dedicated sewer system on site handles the domestic sewage. Industrial wastewater quality on site 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 located on site, where the wastewater is sampled monthly. From the clarifier the industrial wastewater enters the on-site domestic sewage lines that empty into the municipal sewers owned and operated by the Morgantown Utility Board (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 2008 are provided in [Table 6.6.1.c](#), NETL-*Morgantown 2008 Wastewater Effluent Analysis*.

The NETL monitoring activities help to 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 the 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 SWQM. 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 the NETL emergency

response activities. There have been no reportable spills of toxic or hazardous materials within the notification period (November 1996 to the present) of the current general storm water permit.

Aboveground storage tanks 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. To the extent practicable, contaminated soil and rainwater are collected and 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 underneath the drums, and spill kits are kept nearby. The Hazardous Waste Accumulation Facility (Building 33) is designed and constructed to be compatible with the materials stored there and with the conditions of storage. Leaks within this facility will drain to sump areas that have 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.

Emergency containment actions would consist of placing absorbent materials at the source of the spill, at any potentially-affected drains, and at the entrances and exits of culverts. 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 committed and 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 there is a change in effluent composition, 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 6.6.1.c](#). 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.

## 6.7 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 every year for general water quality parameters and for selected chemicals or metals that might indicate contamination from known leaks and spills. 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 EPA-certified laboratories. QA/QC samples are submitted at least annually to further verify the quality of the analytical results.



The primary strategy for groundwater protection is one of spill and leak prevention. Together, a Spill Prevention, Control, and Countermeasures (SPCC) Plan 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 feed-stocks 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 6.7.1](#)). These wells monitor two shallow aquifers within the unconsolidated Lake Monongahela sediments and one bedrock aquifer, the Morgantown Sandstone. None of these aquifers are used as a source of water in the immediate area. [Figure 6.7.2](#) shows a generalized cross-section through the site and the relationship between the aquifers.

No groundwater contaminants have ever been consistently detected at higher than regulatory levels at the site. Groundwater monitoring at the Morgantown site is focused primarily on past spills and leaks and the effectiveness of the cleanup actions undertaken. The section on CERCLA (Section 6.1.1) lists the past events and the current status of these spill sites.

An informal agreement exists between NETL and WVDEP concerning the Pond 005 site located north of Building 7. The pond collected waste from an experimental fixed-bed gasifier. That site is now a parking lot. When the pond was closed and the area was converted into a parking lot during 1985, the closure was not consistent with the state-approved closure plan. Sampling indicated that low concentrations of semi-volatile organic compounds remained in the soil after removal of the pond liner. The plan called for removal of all the contaminated soil. But after removing many truckloads of soil, NETL decided to forego further removal despite the fact that some contaminated soil remained. NETL then constructed a parking lot on the site. The informal agreement subsequently reached with WVDEP requires groundwater monitoring around the parking lot perimeter. NETL continues to comply with this requirement. Five wells (I, J, L, M, and N) associated with the now-closed Pond 005 and completed in the Lake Monongahela sediments are sampled semiannually for benzene, toluene, ethyl benzene, xylenes, phenolics, cadmium, sulfates, and chlorides. Three wells associated with closed Pond 005 (K, L, and N) have detected cadmium at levels above background. However, these have never consistently exceeded the West Virginia limit of 0.005 µg/l in groundwater, (see [Figure 6.7.3](#)).



During the construction of B-19, coal combustion ash was used as fill beneath the concrete floor slab. After completion of the building, leachate appeared which had the characteristics of acid mine drainage. Installation of collector drains at the footer of the building to collect the leachate and to convey it to a treatment facility that first raises the pH of the leachate into the alkaline range, filters the resulting precipitates

from the leachate, and then adjusts the pH to the normal range was the mitigation method employed.

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 (see [Table 6.7.1](#), [Table 6.7.2](#), and [Table 6.7.3](#).)

This impact on groundwater is a problem that is 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.



After more than 10 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 there are now few large projects that 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, sampling will continue for one up-gradient well and three down-gradient wells. The original list of measurements and compounds analyzed, 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 groundwater monitoring conducted during 2008 are presented in the Appendix as [Table 6.7.1](#), [Table 6.7.2](#), and [Table 6.7.3](#).

## 7 PITTSBURGH

### 7.1 Site Description

The Pittsburgh site resides within Allegheny County, Pennsylvania, at a location locally known as the Bruceton Research Center. It is approximately 13 miles south of Pittsburgh, PA, in South Park Township. It is approximately 60 miles north of Morgantown, WV. 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.

With the decline of the steel industry and other manufacturing, the Pittsburgh area has shifted to retail trade and, more recently, to the service industry. The area is widely known for its hospitals and universities. However, Pittsburgh is still home to a number of large companies, such as the H.J. Heinz Corporation, PPG Industries, Bayer Corporation, Alcoa, and U.S. Steel. DOE employs about 510 people at the Pittsburgh site. NIOSH and MSHA employ an additional 502 people, so the entire workforce of the Bruceton Research Center is over 1000. The laboratory is a major employer for the surrounding townships.

### 7.2 Major Site Activities

**Facility Repairs Completed.** The Pittsburgh site has been experiencing problems with the iron pipe water lines that supply the potable and fire water for R&D plateau

operations. The 50-year old system has experienced unpredictable pipe ruptures and inoperable shutoff valves. On several occasions, line ruptures caused turbid water to be released into nearby Lick Run, creating an environmental incident. In addition, disruption of the water supply has impeded the effective performance of site activities. In 2008, additional water lines were replaced and new isolation valves installed so that future environmental releases from broken water lines are reduced.

A comprehensive renovation of the third floor of the laboratories in Building 83 was completed in 2008. This included relocation of existing functions and upgrading of utility functions. A plan was developed to relocate the extensive library holdings in Building 83 to the first floor of Building 84 while minimizing the impact to patrons. The electrical wiring for the third floor was upgraded and a state-of-the-art, high efficiency, HVAC system was installed with connections to the BMS (?). Two large lab work tops were also installed. The renovations will also help ensure the safety and health of employees.

The offices on the first floor of the Building 920 were renovated to remove asbestos-containing floor tiles and mastic. New interior walls were installed with energy-efficient insulation to provide increased energy savings to the building.

Likewise, a renovation of the fourth floor of the laboratories in Building 94 was completed. The renovation focused on energy efficiency HVAC, laboratory hood system, lighting, and boilers. Additionally, asbestos was removed, and a high-efficiency hot water heating system was installed to provide energy efficient heating to the building. An energy efficient air conditioning system was also installed, complete with variable frequency drives on the connected air handlers. This ensures superior cooling to the building. All exterior windows and doors were replaced with highly energy efficient windows and doors.

The exterior renovation of Building 921 was also completed. This project included the removal of the Lucite siding, the installation of insulation and brickwork, and the replacement of windows and doors. Additionally, the HVAC system was updated and rebalanced. The modifications ensure the health and safety of the employees, while increasing the energy efficiency of the building.

In Buildings 64 and 92, which constitute the site's chemical handling and dispensing facilities, exhaust fans were replaced to conform to the electrical classification class of the area. This replacement was performed to ensure that hazardous waste workers are protected from potential explosion hazards.

In addition, exterior power washing and painting of metal maintenance buildings, Buildings 901 and 902 was conducted in an environmentally preferred manner. During the power washing activities, non-woven polypropylene cloth was placed next to buildings to absorb debris and rust. Use of the cloth prevented the



possible environmental release of suspended solids, iron, and oil and grease into the local environment. In addition, exterior painting of the buildings was performed using low-VOC emission primer and zero-VOC emission top coat, in place of the traditional, high VOC acrylic paint.

Finally, the roof on Building 141 was replaced following concerns over the health and safety of building occupants. The new roof provides improved insulation and protection from ultraviolet sunlight, and ensures increased energy efficiency.

## 8 COMPLIANCE STATUS

### 8.1 Environmental Restoration and Waste Management

#### 8.1.1 CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act (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 Priorities 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 that are 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. The site was not listed as an NPL site during 2008 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. Each year, including 2008, NETL provides a status report to the U.S. EPA through the DOE Environment, Safety, and Health Program Office. The status report states the following:

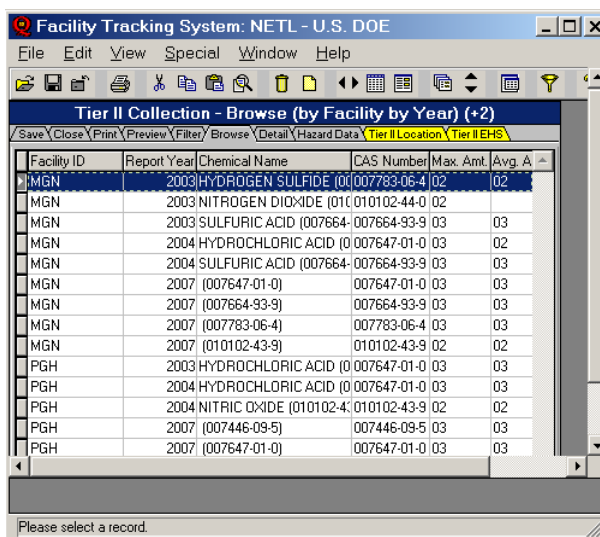
*The site sampling and analysis program has been completed. Remediation for areas of concern was completed during FY 1997. Based on the sampling and analysis, no further significant soil remediation is planned. The human health and ecological risk assessment is in the process of being updated. The current conclusion is that exposure to media at the facility is not*

*expected to generate adverse health effects in onsite 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”].*

### 8.1.2 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 gases 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 8.1.2](#) lists those chemicals reported by the Pittsburgh site for 2008, commonly known as the Tier II Chemical Inventory Reporting List. NETL maintains an active inventory of all hazardous and extremely hazardous chemicals on site, along with an MSDS for each of these substances.



Facility ID	Report Year	Chemical Name	CAS Number	Max. Amt.	Avg. A.
MGN	2003	HYDROGEN SULFIDE	00007783-06-4	02	02
MGN	2003	NITROGEN DIOXIDE	01010102-44-0	02	
MGN	2003	SULFURIC ACID	007664-007664-93-9	03	03
MGN	2004	HYDROCHLORIC ACID	0007647-01-0	03	02
MGN	2004	SULFURIC ACID	007664-007664-93-9	03	03
MGN	2007	(007647-01-0)	007647-01-0	03	03
MGN	2007	(007664-93-9)	007664-93-9	03	03
MGN	2007	(007783-06-4)	007783-06-4	03	03
MGN	2007	(010102-43-9)	010102-43-9	02	02
PGH	2003	HYDROCHLORIC ACID	0007647-01-0	03	03
PGH	2004	HYDROCHLORIC ACID	0007647-01-0	03	03
PGH	2004	NITRIC OXIDE	01010102-44-0	02	02
PGH	2007	(007446-09-5)	007446-09-5	03	03
PGH	2007	(007647-01-0)	007647-01-0	03	03

The Pittsburgh site does not prepare a toxic release inventory (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. During 2008, there were no releases that would trigger emergency notification as required by either Emergency Planning and Community Right-To-Know Act (EPCRA) or CERCLA.

Section 312 of SARA Title III requires NETL to provide an MSDS to the Pennsylvania Department of Labor and Industry, 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 on the Pittsburgh site.

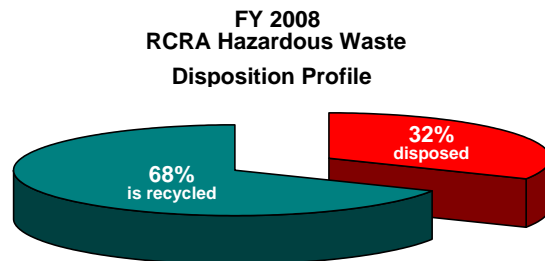
As part of the on-going commitment to improve emergency planning under the SARA Title III Program, NETL has established targets for reducing the accumulation of hazardous chemicals on site. The intent of these targets is to avoid the unnecessary accumulation of potentially hazardous chemicals in the laboratories while maintaining sufficient chemical stores to complete mission-related research. Year 2002 inventories provided a baseline for the target to reduce the number of containers of hazardous chemicals. The number of containers of hazardous materials in 2002 was 6,600. The objective for this target is to reduce the number of containers 20% by 2008, and 30% by 2010.

NETL achieved a reduction in number of containers by 294 over the target of 1,614 containers, for a total reduction to 1,320 containers (24.5%). This demonstrates the commitment made to reduce the risk posed by such chemicals. The targeted reduction was surpassed because laboratory personnel were encouraged to clean out their laboratories and remove chemicals that were no longer needed. This accomplishment was assisted by an improvement to the program which involved the implementation of a real-time chemical inventory system that enables NETL to submit chemical inventory reports in a timely manner, thus avoiding a time lag in removing chemicals from the inventory list.

8.1.3 RCRA Program

Hazardous waste operations at the Pittsburgh site complied with all applicable federal, state, and local regulations that apply to the handling, storage, and disposal of hazardous waste during 2008. 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, 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.

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, attend the hazardous waste operations training annually, and attend the hazardous materials transportation training every three years.

Pittsburgh is a large quantity 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, occasional lab 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 containing combinations of several different compatible chemicals within a single container.

The Pittsburgh site is not authorized to transport, and therefore does not transport, hazardous waste. All hazardous waste removed during 2008 was transported by American Environmental Services (AES), Inc., to their 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) are transported to a local landfill using commercial waste disposal services.



The amount of hazardous materials and waste removed from the site remained relatively the same as in previous years. Pittsburgh generated 7,295 pounds of hazardous waste during 2008. The small increase in waste generated can be attributed to clean out of several laboratories that are being remodeled or turned into other operations.

Pittsburgh also continues an aggressive program to reduce the chemical footprint. The latter was done by contacting various researchers to verify that all chemical materials are still needed. Any items that were deemed unusable were disposed. See Section 3.4, Environmental Objectives and Targets, for an explanation of how this quantity was

established. This reduction was accomplished using a multitude 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 there underground storage tanks in Pittsburgh for

petroleum or hazardous waste. There are no aboveground storage tanks for hazardous waste. No leaks were reported from storage tanks during 2008. Liquid acids and bases are collected monthly at satellite accumulation areas and are analyzed for acidity.

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, Inc., 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, with copies sent to the ES&H Records Center.

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. The waste handling personnel are not allowed 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.



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 and Waste Minimization Reports to the Commonwealth of Pennsylvania. The hazardous waste manager also audits hazardous waste management operations, hazardous waste generators, and TSD facility subcontractors. The 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 that they may properly perform their duties and responsibilities. This includes instruction on the proper handling techniques and disposal methods for chemical waste.

## 8.2 Toxic Substances Control Act (TSCA)

Pittsburgh uses more than 100 different materials containing TSCA-regulated substances. Nearly all of these substances are present in very small amounts, either as preservatives for stock chemicals or as chemical reagents used in the laboratories. None of these TSCA-regulated substances are manufactured by NETL, and consequently, Pittsburgh is not subject to TSCA reporting requirements. No PCBs are kept on site for lab use or as a dielectric fluid inside electrical transformers. Oil-filled equipment is occasionally discovered on site. Since it cannot be ascertained whether it was manufactured after July 2, 1979, it is presumed to contain PCBs at a concentration greater than 50 parts per million. NETL disposed of 154 pounds of such presumed waste in 2008, consisting of capacitors and lighting ballasts (transformers) from construction and maintenance activities. [Table 8.2.1](#) lists the TSCA-regulated chemicals held at Pittsburgh in quantities greater than 10 pounds.

Asbestos is perhaps the most abundant TSCA-regulated substance on site. NETL has never manufactured asbestos, but used it extensively in building materials purchased and installed in prior years. Most is contained within floor tile and floor tile mastic installed on the floors of several lab buildings (e. g., Buildings 94, 141, and 903). The remainder is contained in roofs and in laboratory furniture (Buildings 83, 86, 94, and 921). In 2008, asbestos in Building 74 was removed and the building given



clearance from asbestos from the Allegheny County Health Department. Asbestos remaining inside buildings is well encapsulated by the matrix material (e.g., floor tiles). Air monitoring has revealed no shedding of asbestos fibers. Asbestos is also found on site in some gaskets and inside some lab devices, such as muffle and tube furnaces.

### 8.3 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

There were no restricted-use pesticides, herbicides, or defoliants kept or used on site during 2008. Only general use herbicides were kept and used for routine vegetation control along fence lines, guard rails, and flower beds. This included Prosecutor Pro<sup>®</sup>. A commercial pest control company provided integrated pest management services in the cafeteria, in and around the daycare center, and around Buildings 95 and 903. Talstar<sup>®</sup> crystals are spread on the grass to control insects. Demand<sup>®</sup> 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. Additionally, diluted chlorine bleach is poured into all sinks and floor drains in the daycare center and cafeteria to act as a larvicide.

### 8.4 Radiation Protection Program

Use of radioactive materials at NETL is limited to research instrumentation that contains sealed radioactive sources (see [Table 8.4.1](#)) and radiation-generating devices (see [Table 8.4.2](#)). NETL does not generate, process, or treat any radioactive material, and it does not have on site any temporary or permanent facility for radioactive waste disposal. An inventory of radiation sources is actively maintained and monitored by the radiation safety officer. Information is retained about the item, isotope, quantity, custodian, location, status, and sealed source activity. Title 10 CFR 835.901(e), DOE Policy 441.1, and NETL Procedure 440.1-17 are the applicable regulations and requirements. In addition, best management practices include DOE implementation guides, EPA information, NRC information, and Commonwealth of Pennsylvania recommendations and requirements. 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. In total for the site, there are nine radiation-generating devices in four radiological control areas at Pittsburgh. The five devices described above use radioactive source materials, and the other four are instruments that produce X-rays. These instruments include a scanning electron microscope, an

electron spectroscopy chemical analyzer, an X-ray diffraction instrument, and an X-ray scanner in the mailroom.

Radiation monitoring performed at Pittsburgh consisted of body thermoluminescent dosimeters (TLD) and finger rings for the employees in the mail facility. In addition, there are specific radiological control areas which have dosimeter badges continually displayed. Leak testing was not required and was not performed in 2008 on any sealed sources because they have all been removed from service. NRC requirements do not include required testing for sealed sources that are not in service. There were not any radiation leakage or exposure problems during 2008.

## 8.5 Air Quality and Protection Activities

The NETL Ambient Air Quality Management Program is concerned with protection of outdoor air quality. This includes the applications for air emissions 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 Clean Air Act 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. One permit (#7032056-000-00500) is for a 4,500,000-Btu/hr Cleaver Brooks natural gas-fired boiler located inside Building 922. The second permit (#7032056-000-00501) is for three RayPak finned copper tube boilers located inside Building 922, each having a 1,630,000-Btu/hr input rating. The third permit (#7023056-000-00800) is for the 500-lb/hr gas- and coal-fired research unit located inside Building 86.

The site was designated as an administratively synthetic minor source by the Allegheny County Health Department (ACHD), and this designation continued through 2008. A synthetic minor source is a source that accepts an emissions limit that allows it to remain outside of the federal permit program. It is any source that has its emissions administratively limited below certain thresholds by means of a federally enforceable order, rule, or permit condition. A synthetic minor source site pays a fee for the work involved in establishing the order, rule, or permit condition. After the synthetic minor source determination is complete, the source then becomes a registered source with the agency. An administratively acceptable synthetic minor source must have a completed application form; a written certification signed by a responsible official; a fee deposit sufficient to cover the estimated costs to the Division of Air Quality to review, evaluate, and act on the application; and submittal of sufficient information to ACHD. The designation provides interim permitting under Title V, pending final approval of the permit by ACHD.

This designation provides full compliance with Title V of the Clean Air Act. For the Pittsburgh site, three R&D combustion units follow operating requirements as outlined in the Title V application submitted to Allegheny County. Although not yet

permitted under Title V, Allegheny County requires NETL to follow the limitations submitted in their application. NETL has never exceeded these operating limits, and, in 2008, none of the three combustion units were operated.

The model used by the ACHD, Bureau of Environmental Quality, Division of Air Quality to calculate air emissions is based on fuel usage and provides a worst-case potential to emit emissions. This model takes into account the type, quantity, and total burn time of the fuel to determine the estimated emission level. The results of this modeling are summarized in [Table 8.5.1](#). Several of the largest combustion units at the Pittsburgh site are now in the planning process for decommissioning and demolition. These units are the 500-lb/hr Combustion Unit and the Combustion and Environmental Research Facility (CERF). The third large unit is the flexible Modular CO<sub>2</sub> Capture Facility (MCCF), which is now in a mothballed/inactive state. Due to the size of the MCCF's combustion capabilities, the Pittsburgh campus remained a Title V synthetic minor source throughout 2008.

In years past, the three large units contributed the vast majority of site emissions. Other operations that still contribute site emissions include: the Raypak boilers in Buildings 58, 84, 900, 920, 921, and 922; three Kewanee boilers in Building 84; two Weil McLain boilers in Building 74; three Patterson Kelley boilers in Building 94; unpaved roads (a source of particulates); and paved roads.

NETL is not required to perform continuous air monitoring to determine emission levels and is in compliance with all permit requirements for the 500-lb/hr Combustion Unit and for the boiler air emissions permits. There were no NOV's and no unplanned air emissions during 2008.

NETL actively participates in a program for a reduction in the use of Class I ODSs. 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 ODSs is being phased out for the HVAC equipment. For example, water fountains that contained Class I ODSs in their chiller units continued to be replaced across the site during 2008. Systems and appliances with environmentally friendly substitutes are being used to replace the Class I ODS-containing systems and appliances.

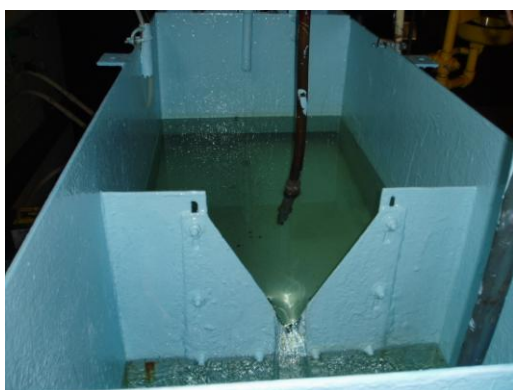


The site maintains three 30-foot meteorological towers that monitor temperature, relative humidity, precipitation, wind speed, and wind direction. The towers are not used for emissions monitoring. Data are collected twice per week for use by the site's HVAC programs, for providing critical meteorological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

## 8.6 Water Quality and Protection Activities

The topography of the Pittsburgh site is comprised of rolling hills that separate the natural flow of water on the site. Consequently, 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 located south of Wallace Road. The northern area houses all of the laboratory and process facilities for the DOE portion of the site, and the southern area primarily houses administrative, project management, and contractor maintenance operations.

The site is staffed by ES&H professionals who review activities to ensure that the site does not contaminate storm water, industrial wastewater, or sanitary wastewater discharges. All on-site research projects and support activities are reviewed by ES&H staff as part of the SARS process for possible impacts on air, surface water, groundwater, and soil. Applicable federal, state, and local regulations potentially affecting these activities are reviewed, and compliance is ensured before approval to operate is given by the ES&H staff.



Laboratory wastewater from the northern area is routed to the wastewater treatment facility (WWTF) located in Building 74. All 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 by adding caustic soda or ferric chloride. Metals and particulates are removed by agglomeration in the flocculation tank, coupled with solids separation in the plate separator, and final removal of the metals and particulates occurs in the filter press. An activated clay/activated carbon filtration system provides additional removal of organics and metals from the treated wastewater prior to discharge into the sanitary sewer. The effluent can be recirculated from within the effluent monitoring tank immediately prior to discharge to the sanitary sewer. This recirculation is pH-driven. If the pH is outside the allowable range (between 6 and 9), a diverter valve automatically opens, which allows the off-specification treated effluent to be recirculated within the system for additional treatment until the pH has been brought back to within requirements. Final effluent pH adjustment occurs in a chamber inside the effluent monitoring tank prior to discharge into the sanitary sewer system. Treated industrial wastewater effluent from the site's WWTF is then routed to, and given final treatment in, the Pleasant Hills Sewage Treatment Plant.

The Pleasant Hills Authority (PHA) issued the current Industrial Sewer Use Permit to NETL on December 28, 2001. Conditions placed on NETL by the permit limit the quantity and quality of effluent constituents (free cyanide, phenolics, mercury, copper, chloroform, and pH) that may be discharged into the wastewater. The permit

requires NETL to submit all wastewater analysis data for the treated wastewater effluent discharged through the WWTF to PHA's consulting engineering firm, Gannett Fleming, Inc., on a semi-annual basis. [Table 8.6.1](#) contains the results of the 2008 monitoring. During this semi-annual sampling, PHA conducts sampling and analysis independently. NETL also provides the PHA with the monthly sampling analysis at their request, although these data are not required by the permit.

In addition, NETL is required to prepare an annual wastewater report that contains no analytical data, but rather summarizes information about the site's industrial waste water discharge, including the volume of wastewater discharged, the number of site employees, the type of waste discharged, and the type of pretreatment performed.

[Table 8.6.2](#) provides the industrial wastewater treatment facility effluent sampling results taken at the WWTF during 2008. The permit limits were exceeded for chloroform in June 2008 and free cyanide in December 2008. However, no NOV's were received.

The southern area of the site does not have and does not need an industrial wastewater sewer system separate from the sanitary sewer system that drains to the Clairton Municipal Sewage Treatment Plant, because there are no laboratory operations on the southern area of the site.

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.

In addition to the sampling and analysis performed by NETL and CDC/NIOSH, 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 a NOV.

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 that is 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.

All NETL sanitary sewage from the southern area is routed to, and treated in, the Clairton Municipal Sewage Treatment Plant.

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 are regulated by an NPDES storm water discharge 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. There were four reportable releases into this permitted system during the year that required NETL to notify PADEP. Two reportable releases involved a potable water supply line break on June 12, 2008 and September 11, 2008, and two reportable releases involved a maintenance activity on July 2, 2008 and July 8, 2008, that released turbid water into Lick Run.

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 site storm water discharge outfalls on a quarterly basis, although there are no discharge limits established for this discharge.



An NPDES storm water discharge permit issued to the Bruceton Research Center lists three outfalls: North Outfall (001), South Outfall (002), and North Outfall Extension (101). The North Outfall Extension discharges directly into the North Outfall. The North Outfall receives storm water from NETL, NIOSH, and MSHA. The South Outfall receives storm water from NETL and NIOSH. 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 8.6.3](#) 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. [Table 8.6.3](#) also provides the storm water South Outfall monitoring results for flow, suspended solids, aluminum, iron, manganese, lead, pH, and ammonia.

## 8.7 Groundwater and Soil Quality Protection Activities

The Pittsburgh site (see [Figure 8.7.1](#)) 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 8.7.2](#)).

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 on site. The Pittsburgh Coal, however, has

been heavily mined and very little remains. The resultant mine voids and their possible effect on groundwater 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 Pittsburgh geologic quadrangle, there 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. There are a total of 19 wells screened in shallow weathered bedrock; 7 are located in the R&D Plateau area and 12 are in the Valley Fill area. [Figure 8.7.3](#) and [Figure 8.7.4](#) 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. There are a total of 4 wells 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 (2 at the Main Plateau and 2 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. There was, however, at least one groundwater well listed for domestic usage within a one-mile radius of the site. This well, situated near central Bruceton, was 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, it was possible that this well, was in fact, 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. There has been a report of a domestic water well 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.

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.

There are two groundwater flow patterns at the Pittsburgh site. 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. 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 commingles 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 20<sup>th</sup> 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 have 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 in order to provide data on water quality and contaminant migration.

Another goal of the monitoring program is to identify and characterize groundwater 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 2008 groundwater monitoring was performed according to the NETL-PGH 2008 Groundwater Detection Monitoring Plan. NETL-PGH monitoring well locations are identified in Attachment A of this plan. To fulfill a PADEP storage tank closure request, eight wells were monitored for total petroleum hydrocarbons, diesel range organics, in 2008. The results of the NETL-PGH Groundwater Detection Monitoring Program are presented in [Table 8.7.5](#). The results were compared against federal and state standards for groundwater. No standards were exceeded.

Statistical analysis was conducted on two indicators of groundwater contamination (pH and specific conductance) for eight of the NETL-PGH Valley Filled Groundwater Monitoring Wells in the 2008 monitoring data. The analysis compared the up gradient wells to the down gradient wells. The up gradient wells are VFW-2 and VFW-10. The results of the statistical analysis for pH showed that, for the tolerance interval two-tailed method, no wells were outside the background tolerance intervals. The results of the statistical analysis for specific conductance showed that, for the tolerance interval two-tailed method, only well VFW-14 was outside the background tolerance limit.

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 groundwater flow patterns described previously.



An element of the Groundwater Protection Program is the surface water - groundwater interaction. A piezometer was monitored monthly in 2008 along Lick Run upstream of the site, and a piezometer was monitored weekly along Lick Run adjacent to the site to determine if Lick Run is a gaining or losing stream. 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 eight out of the twelve months, while Lick Run adjacent to the site is always a gaining stream.

## 9 ALBANY

### 9.1 Site Description



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

Geographically, the facility is located in the Willamette Lowland, structural and erosional lowland between the uplifted marine rocks of the Coast Range and the volcanic rocks of the Cascade Range. The Albany site covers approximately 42 acres and approximately 220,000 square feet of working area. The site is relatively flat, located on a higher section of town, away from any flood plains. The Calapoonia 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. The research addresses 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.

As of the 2000 census, there were 40,852 people, 16,108 households, and 10,808 families residing in the city. The population density was 2,571.8/sq mi. There were 17,374 housing units at an average density of 1,093.8/sq mi. The racial makeup of the city was 91.68% White, 6.09% Hispanic or Latino of any race, 1.22% Native American, 1.14% Asian, 0.53% African American, 0.21% Pacific Islander, 2.65% from other races, and 2.56% from two or more races.

The median income for a household in the city was \$39,409, and the median income for a family was \$46,094. Males had a median income of \$36,457 versus \$24,480 for females. The per capita income for the city was \$18,570. About 9.3% of families and 11.6% of the population were below the poverty line; including 14.1% of those under age 18, and 7.5% of those age 65 or over. The major employers in Albany are

Samaritan Health Services; Allvac-Oremet-Wah Chang Metals; Linn Benton Community College; Greater Albany Public Schools; Linn County; and Weyerhaeuser Company.

## 9.2 Major Site Activities

**Facility Repairs Completed.** The roofs on Buildings 29, 30, 31 and 34 were replaced in 2008 in response to concerns expressed by the building occupants regarding their overall health and safety. The new roofs provide improved ultraviolet sunlight protection and insulation, ensuring increased energy efficiency in the buildings.

Asbestos abatement was completed in a number of critical areas in Buildings 1, 13, 17, 24, 28, 30 and 35. In addition, mold abatement was completed in several areas in Buildings 13, 24, 28 and 39. Both were performed to ensure that employees are not exposed to asbestos or mold.

Various electrical projects were completed in 2008. These included lighting upgrades in Buildings 17, 19 and 28; electrical infrastructure and panel upgrades in critical support areas in Buildings 1, 8, 17, 21, 23, 28, 29 and 33; and egress lighting and signage replacements and upgrades in Building 31. The projects were performed to meet facilities needs and to increase energy efficiency.

Finally, fume hood air-velocity monitors were installed in Buildings 17, 23 and 24 to provide alarms for low-hood air flow. The main exhaust and ventilation blower were replaced in Building 35 to provide acceptable ventilation levels for the chemical storage. This work was performed to ensure that laboratory and chemical handling workers are working in an atmosphere that is properly ventilated and that they are protected from chemical exposure.

## 10 COMPLIANCE STATUS

### 10.1 Environmental Restoration and Waste Management

#### 10.1.1 CERCLA

The Albany site had no off-site remediation activities that were ongoing during 2008, and there were no National Priorities List (NPL) sites for which they had liability under CERCLA/SARA.

#### 10.1.2 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. 313) is not necessary. However, emergency response

planning has been implemented at the site. A chemical inventory and MSDS database are maintained to aid in the efficient use and storage of chemicals and for worker safety and knowledge.

There were no on-site CERCLA/SARA cleanups at the Albany site in 2008. There were 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.

### 10.1.3 RCRA Program

In 2008, there were no spills or leaks from facilities, operations, or other activities that would lead to RCRA cleanups. There were also no cleanups or surveillance activities for leaks or spills that occurred in prior years.

## 10.2 National Environmental Policy Act (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 2008, all funded projects at the Albany site were determined to be categorically excluded.

## 10.3 Toxic Substances Control Act (TSCA)

Albany did not have any spills or releases of TSCA-regulated substances (e.g., pesticides, PCBs, formaldehyde, methylene chloride, asbestos) in 2008.

## 10.4 Radiation Protection Program

### 10.4.1 Ionizing Radiation Program

There are only x-ray generating devices used for analytical applications at the Albany site. These include scanning and transmission electron microscopes, x-ray diffraction and fluorescence instruments, and a particle size analyzer. [Table 10.4](#) lists the x-ray radiation generating devices at Albany. All are examined annually for leaks and safety controls to insure employee safety. A dosimetry program has been in place since the 1950's 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 an area identified as a hot cell while awaiting disposal.



#### 10.4.2 Laser Program

The Albany office 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 devices that protect the consumer through engineering design. Staff members may also have laser pointers that are either Class II or Class III that are commonly used by speakers during lectures and presentations. Based on lasers currently used at the Albany site, a nominal laser safety program has been implemented at the site that adequately protects personnel.

#### 10.5 Air Quality and Protection

Albany has no emissions that require monitoring, reporting, or permitting. In 2008 there were no New Source (Pre-Construction) Reviews for any facilities or projects owned or managed by the Albany site. Operation of the Albany site does not contribute significantly to any emissions under the National Ambient Air Quality Standards (NAAQS). There are no Albany office facilities or projects that are regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAPS) Program. Albany 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.

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.

#### 10.6 Water Quality and Protection Activities

Albany holds a wastewater discharge permit with the City of Albany, which was last renewed in 2006 as part of a four-year cycle. In addition, Albany has also filed a slug discharge control plan with the city; it must be renewed every two years. No storm water permit is held by Albany, since regulation is augmented by the city through the wastewater permit. Albany site activities in 2008 resulted in no unplanned releases, leaks, or spills that would require reporting to governmental agencies.



In 2008, there were no tests of the potable water supplies on site to verify compliance with the Safe Drinking Water Act standards, since all potable water is supplied via a bottled water contract. This water is provided due to the aging water delivery pipes in most buildings at the site. The water supply for Albany comes from the municipal water distribution network and is used for all applications except drinking.

## 10.7 Executive Orders (EO) and DOE Orders

### [10.7.1 EO 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management](#)

This EO ensures that the federal government exercises leadership in the reduction of petroleum consumption through improvements in fleet fuel efficiency and the use of alternative fuels in alternative fuel vehicles. The Albany office has four vehicles that are leased from GSA, including three passenger vehicles and one stake-bed truck. Of the three passenger vehicles, two are alternate fuel compatible, with a passenger van being bi-fuel, using ethanol-85 (E-85) or gasoline, and a pickup truck being bi-fuel, using compressed natural gas (CNG) or gasoline. The third vehicle is a gasoline-fueled vehicle. E85 fuel supplies are becoming more available regionally, while the Albany site has its own slow-fill CNG station. The stake-bed truck is diesel-fueled and is biodiesel-fuel compatible. These vehicles are included in the NETL statistics that are reported to DOE.

This EO requires Albany to ensure that all necessary actions are taken to integrate environmental 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 achieves this requirement through its development and implementation of an environmental management system, called the Albany Management System (AMS). Through the AMS, Albany ensures that strategies are established to support environmental leadership programs, policies, and procedures, and that senior level managers explicitly and actively endorse these strategies.

Albany was certified to the ISO 14001:1996 standard on November 30, 2005, and has continued to maintain that certification throughout 2008. On March 13, 2006, the Albany site was recertified to the ISO 14001:2004 standard.

This EO also mandates a comprehensive effort to reduce energy consumption by federal facilities. For example, it aims to reduce greenhouse gas emissions attributed to federal facility energy use by 30% by 2010, compared to emission levels in 1990.

For Albany, electricity costs are included in overall utility costs. In the main administrative building (Building 1) at Albany, HVAC systems are governed by a building energy management system that uses timers which are on between 6:00 am and 6:00 pm, and sets back temperatures at night, on weekends, and on holidays. Energy efficient lighting has replaced conventional bulbs in the majority of areas on center as part of a Bonneville

Power Administration (BPA)-sponsored upgrade program, and the staff buys Energy Star® products when the opportunity arises.

EO 13423 establishes a general approach and goals for affirmative procurement and recycling activities by federal agencies. The Albany site has established a recycling program, including plastics, office paper, newsprint, glass, cans, and bottles. Receptacles are provided for the collection of waste office paper and aluminum cans throughout the facility. Various scrap materials from building maintenance are also sent to recycling.

The Albany office purchases refilled toner cartridges and office paper made with recycled materials.

Albany utilizes the NETL small purchasing system, SPS, or the newer DOE Strategic Integrated Procurement Enterprise System, STRIPES, to buy supplies. This system further encourages affirmative procurement. Individuals who regularly purchase items are instructed to give preference to the purchase of items with recycled content.

#### 10.7.2 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 above in Section 10.4 Radiation Protection.

### 10.8 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 Oregon Department of Environmental Quality (DEQ) Independent Cleanup Program, with regulatory input from them. Albany installed 14 monitoring wells on site in July 2002, and sampled the wells for a broad range of contaminants, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, nitrates, and polychlorinated biphenyls (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 groundwater samples be performed using U.S. EPA low-stress protocols. This resulted in the discovery of metal and radiological contaminant levels in groundwater 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 on site and off site 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 10.8](#) for well locations).

Oregon DEQ 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 wells that were used for drinking water (10) have been connected to City of Albany potable water supplies by NETL, and NETL has already properly closed any wells that residents requested to be abandoned.

Albany is continuing its site investigation activities, periodic monitoring, and remedial actions in accordance with Oregon DEQ requirements and will pursue actions to protect human health and the environment by eliminating risk and minimizing potential exposures.

## 10.9 Other Major Environmental Issues and Actions

Compliance with 10 CFR 850. Albany has developed a program based on 10 CFR 850 to comply with the objectives of a chronic beryllium disease prevention program (CBDPP). The program plan was issued in October 2005 and is being updated based on current beryllium area designations. A site inventory of the beryllium contaminations at the Albany site was completed in 2007, which showed



several areas across the site to have residual beryllium concentrations above background levels (attributable to soils and building materials), as described in [Section 4.7](#). Remedial actions, as well as protective health measures have been instituted at the Albany site, with remedial activities starting in September 2008. Planned completion of remedial activities is currently scheduled for September 2009. Once the remedial activities are completed, the Albany site will be 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.

In addition, in July 2007 the Albany site instituted a Safety Analysis and Review System (SARS) stand-down to fully implement the NETL SARS program. Every research project, as well as facilities and support activities, were required to implement appropriate SARS documentation and inspection prior to resuming operations. The majority of projects were operational by the end of 2008, with the remainder of the projects working towards becoming operational as soon as practicable.

Finally, the Albany site instituted a quality assurance program under its AMS in 2008 to meet the standards of ISO 9001. After an internal review, the Albany site achieved external certification via Orion Registrar in October 2008.

## 11 TULSA

### 11.1 Site Description

The Tulsa office, having 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 Tulsa office itself has to comply with few ES&H regulations. Therefore, the Tulsa office does not undertake in house audits, external audits, or subject matter reviews, and 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.

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 calls 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 Tulsa does not impose recycling requirements that would apply directly to office space lessees. Nevertheless, building management has arranged for various recycling activities throughout the office building complex.

There were no citations for violations of ES&H laws, regulations, or ordinances in 2008.

## 11.2 Major Site Activities

All facilities of the NETL office in Tulsa are located in The Williams Center, a downtown office building complex. The offices are leased by NETL from the Southwestern Power Administration (SWPA). In 2008, the Tulsa office undertook no actions to alter facilities or operations in a manner that could change the current impacts on the environment around the offices.

## 12 COMPLIANCE STATUS

### 12.1 Environmental Restoration and Waste Management

The Tulsa office had no offsite remediation activities, no onsite CERCLA/SARA cleanups, and no spills or leaks from facilities or operations that were ongoing during 2008. There were no National Priorities List (NPL) sites for which NETL-Tulsa had liability under CERCLA/SARA. There were no cleanups or surveillance activities for leaks or spills that occurred in prior years or other activities that would lead to RCRA cleanups.

Tulsa does not have a program to deal with hazardous waste; however, building management does recycle some RCRA universal (semi-hazardous) waste materials. They also provide pickup and handling services for the disposal or recycling of dry-cell batteries, fluorescent light bulbs, and light ballasts.

### 12.2 National Environmental Policy Act (NEPA)

Tulsa does not conduct NEPA reviews for proposed offsite federal actions. These actions relate to contract awards or grants to other governmental organizations, educational institutions, and private industry were completed by NEPA staff in Morgantown, WV. Project managers complete questionnaires regarding the potential for environmental impacts associated with project proposals that are under consideration for funding or financial support. The completed forms are evaluated by the NEPA compliance officer at Morgantown site for a determination of the appropriate level of NEPA review (i.e., EIS, EA, or categorical exclusion). In 2008, all funded projects were determined to be categorical exclusions.

### 12.3 Toxic Substances Control Act (TSCA) and Federal Insecticide, Fungicide, Rodenticide Act (FIFRA)

Tulsa housed no TSCA-regulated substances, and no restricted-use pesticides, herbicides, or defoliants were kept within the offices in 2008 or any other years. The landlord and building management organization provide pest control services and grounds keeping services.

## 12.4 Radiation Protection

### 12.4.1 Ionizing Radiation Program.

There are no ionizing radiation sources at Tulsa.

### 12.4.2 Laser Program

Tulsa 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 Tulsa site and is currently viewed as unnecessary due to the absence of more dangerous, higher class lasers on site.

## 12.5 Air Quality and Protection Activities

Because it is strictly a project management office implementing oil and gas programs, Tulsa has no air quality protection program and no emissions that require monitoring, reporting, or permits. In 2008, there were no New Source (Pre-Construction) Reviews for any facilities or projects owned or managed by the Tulsa office. Operation of the Tulsa office does not contribute significantly to any violations of National Ambient Air Quality Standards (NAAQS). There are no Tulsa office facilities or projects that are regulated under the National Emission Standards for Hazardous Air Pollutants (NESHAPS) program. Tulsa 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. There are no plans or activities related to the phase out of ozone depleting substances at Tulsa.

## 12.6 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. It is assumed that the level of impact on surface water has been about the same as for other office complexes in the region. Tulsa office activities in 2008 resulted in no unplanned releases, leaks, or spills that would require reporting to governmental agencies.

In 2008, there were no tests of the potable water supplies on site to verify compliance with the Safe Drinking Water Act standards. Tulsa's water supply comes from the municipal water distribution network.

## 12.7 Executive Orders

### [12.7.1 EO 13423 -- Strengthening Federal Environmental, Energy, and Transportation Management](#)

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

Tulsa'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 am and 6:00 pm 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 buys Energy Star<sup>®</sup> products when the opportunity arises. Although there is no formal energy efficiency training in place for the Tulsa staff, they receive informal education through the use of posters throughout the office, and there are containers for recyclables in their offices.

Tulsa participates in a recycling program established by the landlord and the building management contractor, Metropolitan, Inc. Receptacles are provided for the collection of waste office paper and aluminum cans. Building management sends the items that can be marketed to local recyclers. All recycling efforts are led by the building management organization. Various scrap materials from building maintenance are also sent to recycling. Tulsa purchases office paper made with recycled materials and uses refilled toner cartridges. There are no statistics on the amount of materials recycled on behalf of Tulsa. Tulsa uses the NETL small purchase system to buy supplies. This system further encourages affirmative procurement. 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.

## 12.8 Groundwater and Soil Quality Protection Activities

There are no groundwater or soil quality protection activities at Tulsa.

## 12.9 Other Major Environmental Issues and Actions

Tulsa is not aware of any ongoing or pending lawsuits, notices of violation of regulations, public accusations of regulatory violations, environmental occurrences, or any non-routine releases of pollutants. There were no violations of any compliance agreements or cleanup agreements or any unresolved compliance issues. There were no audits conducted in 2008 under the sponsorship of DOE Headquarters.

## 13 FAIRBANKS

### 13.1 Site Description

Fairbanks 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 45 minutes from Anchorage and 3.5 hours from Seattle. It lies 358 road miles (576 km) or a 6-hour drive north from Anchorage.



As of the census of 2000, there were 30,224 people, 11,075 households, and 7,187 families residing in the city. The population density was 948.7 people per square mile (366.3/km<sup>2</sup>). There were 12,357 housing units at an average density of 387.9/sq mi (149.8/km<sup>2</sup>). The racial makeup of the city was 66.67% White, 11.15% Black or African American, 9.91% Native American, 2.72% Asian, 0.54% Pacific Islander, 2.45% from other races, and 6.57% from two or more races. 6.13% of the population was Hispanic or Latino of any race.

The median income for a household in the city was \$40,577, and the median income for a family was \$46,785. Males had a median income of \$30,539 versus \$26,577 for females. The per capita income for the city was \$19,814. About 7.4% of families and 10.5% of the population were below the poverty line, including 11.6% of those under age 18 and 7.0% of those age 65 or over.

The scope of NETL's Arctic Energy Office includes promoting research that will lead to more efficient and economical electrical power generation in rural villages, and 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, examining alternatives for electric power generation and transmission for some villages, and facilitating communications with key stakeholders.

Alaska produced 14 percent of total domestic oil production, about 720,000 barrels per day, in 2008. Over 15.7 billion barrels of oil have been produced in Alaska, primarily from the North Slope's Prudhoe Bay Field, about 72% of the estimated technically recoverable oil from the currently developed fields. The remaining technically recoverable oil from these fields is about 6.1 billion barrels. Those barrels represent 20 percent of domestic conventional oil reserves.

It is Alaska's potential that is remarkable. The US Geological Survey (USGS) and the Minerals Management Service (MMS) estimate that more than 50 billion barrels of conventional oil remains undiscovered but technically recoverable in the onshore and offshore areas of Alaska. If discovered this would nearly double US reserves. These estimates place about 10 billion of these barrels in each of northern Alaska's two important onshore areas, the National Petroleum Reserve (NPR) on the western North Slope and the Alaska National Wildlife Refuge (ANWR) on the eastern North Slope. Additionally, large amounts of shallow viscous oil remain to be developed.

Natural gas in the Arctic, until recently, has been largely overlooked. The considerable natural gas reserves known to exist in the Arctic are in fact a byproduct of oil production. Consequently, little is known about the breadth of the Arctic storehouse from a purely natural gas perspective. What is known from the two oil producing areas is that the Arctic potential for natural gas is significant. In the Alaskan North Slope area alone, about 36 trillion cubic feet (Tcf) awaits construction of a pipeline to the Lower 48 states, and it is estimated that there is another 137 Tcf of technically recoverable natural gas to be discovered. While this amounts to a little less than 10% of the Nation's supply, it is significant in that much of the Arctic is still unexplored.

Alaska's identified coal resource is an estimated 170 billion metric tons, roughly half of the U.S. total. However, this resource undeveloped as a result of the challenges imposed by the Arctic's protected status, remoteness, higher exploration and development cost, and its general lower quality. The majority of the Alaskan coal is lignite, sub-bituminous and bituminous due to their relatively young age of 30 million to 130 million years. The USGS estimates that as much as 5 trillion metric tons of coal could remain undiscovered in Alaska, 70 percent of which lies in Alaska's North Slope Region. Alaskan coal has a low sulfur content compared to coal in the contiguous United States.

On a more regional level, over forty communities are sited near potential coal resources for electrical power generation and space heating. Given that Alaskans use 1112 MBtu/capita versus the United States average of 333 MBtu/capita, producing the Arctic's energy resources is a challenge and a priority. Research is required to meet the existing and future challenges of finding, producing, and transporting these Arctic resources.

The Fairbanks office is in space rented by GSA on behalf of NETL. The Small Business Administration and Army Corps of Engineers are located in the same

building, and the space is inspected annually by GSA to ensure the building complies with all government requirements, including local codes. In 2008, Fairbanks undertook no actions to alter facilities or operations in a manner that could change the current impacts on the environment around the office. Any significant new environmental impacts would be associated with offsite projects supported or funded through the Fairbanks office. As further noted in section 14.4 each project is reviewed independently by NETL for its potential environmental impact before the project is undertaken.

### 13.2 Environmental Compliance

The Fairbanks office currently houses a single federal employee. Because of 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. The staff practices affirmative procurement whenever possible in Fairbanks (i.e., the procurement of goods containing recycled content or having less life-cycle impact on the environment). There is no formal recycling program within the Fairbanks community. However, the staff does contribute to the local recycling efforts when they are available. The Fairbanks North-Star Borough used to sponsor a paper recycling program that converted waste paper into pellets. The pellets were then used as a substitute fuel for coal in a power plant at the Eielson Air Force Base. Unfortunately, on January 18, 2007, the pelletizer that was used to shred paper and form it into pellets caught fire and was destroyed. As a consequence, paper recycling in the community was suspended and it is unclear if such recycling efforts will be revived because of the cost associated with the program.

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 spent toner cartridges for local recycling. The Arctic Energy Office has joined in this program and provides its spent cartridges to the same organization.

### 13.3 National Environmental Policy Act (NEPA)

NETL-Fairbanks requires NEPA reviews for proposed off-site 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 categorical exclusion). In 2008, all Fairbanks-funded projects were determined to fall within the level of categorical exclusions.

#### 13.4 EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management

NETL-Fairbanks engages in minimal ES&H activities. The office consists of approximately 2,000 square feet of leased space inside a commercial office building. On-site ES&H primarily focuses on the NEPA process and affirmative procurement of office supplies and miscellaneous items. The office does not maintain an EMS and is not covered by NETL's EMS system that is in effect at the Pittsburgh and Morgantown sites. Inclusion of Fairbanks into the NETL EMS may be considered at some time in the future if an increase in staff warrants it.



#### 13.5 Other Major Environmental Issues and Actions

Fairbanks staff members are not aware of any ongoing or pending lawsuits, notices of violation of regulations, public accusations of regulatory violations, environmental occurrences, or any non-routine releases of pollutants. There were no violations of compliance agreements or cleanup agreements, nor were there any unresolved compliance issues. There were no audits conducted in 2008 under the sponsorship of DOE Headquarters, independent regulators, or other independent third parties. GSA conducted an annual inspection of the facility to ensure that safety equipment, bathroom facilities, ventilation, and elevators are maintained in a safe working condition and to verify that no hazardous materials were stored inappropriately anywhere in the building.

# **APPENDIX**

ACHD	Allegheny County Health Department
AEO	Arctic Energy Office (Fairbanks)
AFV	Alternative Fuel Vehicle(s)
AIIS	Assessment Information Input System
ASER	Annual Site Environmental Report
B-	Building
BMS	Building Management System
CBT	Computer-Based Training
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	U.S. Code of Federal Regulations
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ES&H	Environment, Safety, and Health
FE	Office of Fossil Energy
FEMP	Federal Emergency Management Program
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GPDU	Gas Process Development Unit
GSA	U.S. General Services Administration
HVAC	Heating, Ventilation, and Air Conditioning
ISM	Integrated Safety Management
ISO	International Organization for Standardization
LEED	Leadership in Energy and Environmental Design
MGN	Morgantown, West Virginia
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NOV	Notice of Violation
NPL	National Priorities List
ODEQ	Oregon Department of Environmental Quality
ODS	Ozone-depleting Substance
P2	Pollution Prevention
PADEP	Pennsylvania Department of Environmental Protection
PC	Personal Computer

PCBs	polychlorinated biphenyls
PGH	Pittsburgh, Pennsylvania
PHA	Pleasant Hills Authority
PPOA	Pollution Prevention Opportunity Assessment
PQAE	Project Quality Assurance Engineer
QA/QC	Quality Assurance/Quality Control
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act
REC	Renewable Energy Credits
SARA	Superfund Amendments and Reauthorization Act
SARS	Safety Analysis and Review System
SPS	Small Purchase System
sq. ft.	Square Feet
SWPA	Southwestern Power Administration
TMDL	Total Maximum Daily Loading
TPH	Total Petroleum Hydrocarbons
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal
VOC	Volatile Organic Compound
WVDEP	West Virginia Department of Environmental Protection
WWTF	Wastewater Treatment Facility

**Table 1.1 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
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
Records Program
ES&H Training Program
Facility and Area Custodian Program
Facility Work Authorization Program (SOD)
Facility Safety Committee Program
Directives Program
Workers' Compensation 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

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 y Program  
R&D Projects Program  
Radiation Safety 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  
Worker Protection Program

**Table 3.3 NETL Significant Environmental Aspects**

- Aspect 1: Waste Generation, Management, and Disposal Practices
- Aspect 2: Energy and Fuel Use
- Aspect 3: Hazardous Materials Procurement, Consumption, Storage, and Release
- Aspect 4: Industrial Wastewater Treatment Facility Operations and Discharges
- Aspect 5: Air Emissions
- Aspect 6: Raw Materials Usage (Increasing Green Purchasing)
- Aspect 7: Non-Industrial Land Use
- Aspect 8: Accident/Incident Rates
- Aspect 9: Corrective Action Management
- Aspect 10: Water Usage

**Table 3.4.1 CY 2008 Environmental Management Plan Metrics  
Pittsburgh and Morgantown**

ES&H Management Plan	Objective/Target	Baseline	Target
			Actual
<b>Aspect 1 – Waste Generation, Management, and Disposal</b>			
1.1 Nonhazardous Waste Generation	Reduce the amount of nonhazardous waste generated by 75% by 2010 based on 1993 baseline (641 metric tons) (EO 13423, Sec 2.e)	641 metric tons	179 (72%) 157 (76% reduction)
1.2 Hazardous Waste Generation	Reduce routine hazardous wastes generated by 90% reduction by 2010, using the 1993 baseline (18.46 metric tons) (EO 13423, Sec 2.e)	18.46 metric tons	2.58 (86%) 1.23 (93% reduction)
1.3 Recycling	Increase recycling of sanitary waste streams to 50% by 2010 based on the 2002 baseline (31%) (EO 13423, Sec 2.e)	31%	47% 53%
<b>Aspect 2 – Energy and Fuel Use</b>			
2.1 Energy Use	Reduce energy usage/square foot by 3% percent annually through the end of fiscal year 2015 based on the 2003 baseline. (EO 13423, Sec. 2.a)	193,568 Btu/sq ft	187,761 (3.0%) 171,123 (12%)
2.2 Renewable Energy	Ensure the use of statutorily required renewable energy consumed is 50% or greater (EO 13423, Sec 2.b)		50% 0%
2.3 Petroleum Fuels	Reduce the vehicle fleet's total consumption of petroleum products by 2% annually through the end of fiscal year 2015 based on FY2005 baseline (EO 13423, Sec. 2.g)	22,942 gallons	21,566 (6.0%) 19,214

2.4 Alternative Fuels	Increase the total fuel consumption that is non-petroleum-based by 10% annually based on FY2005 baseline. (EO 13423, Sec 2.g)	12,547 gallons	16,311 (30.0%) 27,172
<b>Aspect 3 – Hazardous Materials Procurement, Consumption, and Storage</b>			
3.1 Chemical Inventory	Reduce the quantity of toxic and hazardous chemicals and materials, acquired, used and disposed of. (EO13423, Sec. 2.e)	Determine the baseline	
<b>Aspect 4 – Industrial Wastewater Treatment Plant Operations</b>			
4.1 Notices of Violation (NOVs)	Maintain the number of NOV's issued to the WWTF at zero through 2010. (NETL - NOVs from Pleasant Hills)	0	0 0
<b>Aspect 5 – Air Emissions</b>			
5.1 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	70 76
5.2 Greenhouse Gases	Reduce greenhouse gas emissions attributed to facility use through life-cycle cost effective measures by 30% by 2010, using 1990 as a baseline (67.4 million lbs)	67,400,000 lbs.	49,202,000 lbs. (27%) 81,651,280 (121%)
<b>Aspect 6 – Green Purchasing</b>			
6.1 Purchase of Electronic Products	Increase the purchase of electronic products to that meet 95 percent of Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic product, unless there is no EPEAT standard for such product (EO 13432, Sec. 2.h)	Determine the baseline	Establish process
<b>Aspect 7 – Non-Industrial Land Use</b>			
7.1 Wildlife Management	Reduce the deer population at the PGH and MGN sites in 2007 and implement a Wildlife Management Program in 2008. (NETL - Deer Population Problem)	PGH: <50 MGN: <5	PGH: <50 MGN: <5 PGH: 23 MGN: 12
<b>Aspect 8 - Accidents/Incident Rates</b>			
8.1 Recordable Case Rate	Reduce recordable case rates to a level of 1.5 in 2007. (FE ESS&H Commitment to ESS&H)		1.5 1.09
8.2 Lost Workday Case Rate	Reduce the lost workday case rate to a level of 0.6 in 2007. (FE ESS&H Commitment to ESS&H)		0.6 0.44
8.3 Safety and Health Cost Index	Reduce the safety and health cost index to a level of 3. (FE ESS&H Commitment to ESS&H)		3 11.56



8.4 Construction Safety	Reduce the accident and incident rate of all off-site construction contractors working at the NETL sites. (NETL - Management Concern)		0 3
<b>Aspect 9 - Corrective Action Management</b>			
9.1 Management of Urgent Corrective Actions	Increase the number of urgent corrective actions completed on time to 100%. (NETL - Management Concern)		100% 100%
9.2 Management of Serious Corrective Actions	Increase the number of serious corrective actions completed on time to 75%. (NETL - Management Concern)		75% 80%
<b>Aspect 10 – Water Usage</b>			
10.1 Water Usage	Reduce water consumption intensity, relative to the baseline of the agency’s water consumption in fiscal year 2008, through life-cycle cost-effective measures by 2 percent annually through the end of fiscal year 2015 or 16 percent by the end of yea	29,400,000 gallons	28,800,000 gallons 28,800,000 gallons

-  Objective/Target Was Met in 2008
-  Objective/Target Was Not Met in 2008
-  Objective/Target Narrowly Missed

<u>Table 3.4.2 CY 2008 Environmental Management Plan Metrics</u> <u>Albany</u>			
ES&H Management Plan	Objective/Target	Baseline	Target
			Actual
<b>Aspect 1 – Energy and Fuel Use</b>			
Alternative Fuels	Convert or replace 50% of all propane internal combustion powered materials handling equipment to electric by the end of FY 2006 and 100 % by the end of FY 2006.	0%	100 % 100% (closed)
Energy Use	Reduce energy consumption to meet DOE Order Number 430.2A (04/15/2002) and conform to Executive Order 13123. The requirement is to reduce energy consumption per square foot by 25% by 2010.	77,343 Btu/GSF	58,007 Btu/GSF 56,267 Btu/GSF
<b>Aspect 2 – Legacy Contamination</b>			
Beryllium	Identify and Remediate Beryllium Contamination by the end of fiscal year 2009.		All Be has been identified and remediation efforts have begun.

Groundwater	Identify sources of potential groundwater contamination and remediate groundwater to meet the satisfaction of the Oregon Department of Environmental Quality (DEQ) by 2016.		Work is ongoing characterizing groundwater
Lead	Complete Center-wide abatement of Exterior building surfaces' lead based paints by end of FY 2004.		All surfaces Level 2 surfaces only done
<b>Aspect 3 – Atmospheric Emissions and Particulates</b>			
Particulate Emissions	Install new or upgraded particulate control devices to operations having the potential for producing significant particulate emissions.	28	28
			28 (100%)



Objective/Target Was Met in 2008



Objective/Target Was Not Met in 2008

**Table 4.4.a Radioactive Materials Inventory – Morgantown**

Isotope	Activity/Date Determined	Source	Location
Kr-85	2 mCi 3/30/81	Model #3077, Serial #700T, Thermo-Systems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 1/02/79	Model #3012, Serial #467T, Thermo-Systems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 5/19/80	Model #3012, Serial #626T, Thermo-Systems Inc.	B-16, Radioactive Material Storage Cabinet
Kr-85	2 mCi 5/78	Model #3077, Serial #373T, Thermo-Systems Inc.	B-25, Room 212
Kr-85	2 mCi 3/30/81	Model #3077, Serial #697T, Thermo-Systems 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 7/01/90	University of Missouri	B-16, Radioactive Material Storage Cabinet
Sc-46	0.046 mCi 2/12/91	University of Missouri	B-16, Radioactive Material Cabinet
Ra-226	9 uCi 1/56	Model #B-5, Serial #11205, Mettler Corp.	B-25, Room 206
Ra-226	21 uCi 1/56	Model #M-5, Serial #17032, Mettler Corp.	B-25, Room 112
Ra-226	9 uCi 1/56	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 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

Table 4.4.a Radioactive Materials Inventory – Morgantown

<b>Isotope</b>	<b>Activity/Date Determined</b>	<b>Source</b>	<b>Location</b>
Po-210	5mCi 09/06	P-2042 cell serial #A2FH133 NRD, Inc.	B13 diesel test cell

Table 4.4.b X-Ray Radiation Generating Devices – Pittsburgh

<b>Device</b>	<b>Quantity</b>	<b>Location</b>
X-Ray Tube	1	B-922 Mail Sorting Facility
X-Ray Diffraction Instrument	1	B-94 X-Ray Diffraction Laboratory
Scanning Election Microscope	1	B-94 SEM Laboratory
Electron Spectroscopy for Chemical Analysis	2 X-Ray Tubes	B-94 Electron Spectroscopy for Chemical Analysis Laboratory

**Table 4.5.1 Delivery Order Schedule D-4**

Tech No.	ECM No.	ECM Energy Baseline (MBtu/yr)	Electric Energy Savings (KWh/yr)	Electric Energy Savings (\$/yr)	Electric Demand Savings (kW/yr)	Electric Demand Savings (\$/yr)	Natural Gas Savings (MBtu/yr)	Natural Gas Savings (\$/yr)	Other Savings (MBtu/yr)	Other Savings (\$/yr)	Total Energy Savings (MBtu/yr)	Total Energy Cost Savings (\$/yr)	Other Energy Related & O&M Cost Savings (\$/yr)	Water Savings (kgal/yr)	Water Savings (\$/yr)	Sewage Savings (kgal/yr)	Sewage Savings (\$/yr)	Estimated Annual Cost Savings (\$/yr)	Implementation price	Simple Payback (yrs)
q.	Proposal Development Energy Surveys																		\$392,032	
r.	ECM 1 – NIOSH Steam Biogas Conversion	28,952	(32,000)	(\$1,490)	0	\$0	(15,056)	(\$207,483)	28,952	\$768,600	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)	(\$879)	1,350	\$18,506	0	\$0	1,332	\$17,488	\$0	0	\$0	0	\$0	\$17,488	\$327,982	18.8
m.	ECM 3 – Water Savings ECMs - Pittsburgh	146	0	\$0	0	\$0	34	\$473	0	\$0	34	\$473	\$0	1,008	\$6,250	1,008	\$7,293	\$14,016	\$183,637	13.1
m.	ECM 4 – Water Savings ECMs - Albany	8	1,282	\$43	0	\$0	0	\$0	0	\$0	4	\$43	\$0	2,334	\$7,121	2,334	\$15,176	\$22,340	\$171,854	7.7
k.	ECM 5 – Renewable Energy Systems - Pittsburgh	6,928	569	\$26	0	\$0	0	\$0	0	\$0	2	\$26	\$0	0	\$0	0	\$0	\$26	\$121,383	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
e.	ECM 7 – Lighting Improvements- Pittsburgh	6,310	735,036	\$34,228	2,498	\$14,712	0	\$0	0	\$0	2,509	\$48,940	\$0	0	\$0	0	\$0	\$48,940	\$501,584	10.2
e.	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 Measures	7,121	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
a.	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
a.	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	829	\$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	\$768,600	23,862	\$721,041	\$0	3,420	\$13,855	3,420	\$23,033	\$757,929	\$6,370,493	8.4

<b>Table 4.6.1 EPA05 Mandated Energy Intensity Reductions &amp; Renewable Electric Procurement</b>						
Fiscal Year	NETL's Energy Reduction Goal	EPA05 Goals	DOE O 430.2b 3.0 % Per year	Federal Goals for Procurement of Renewable Electric Energy	NETL's EPA05 Goal Status for Renewable Electric Procurement	DOE O 430.2B Goal Generate 7.5% of Total Electric Energy Consumed through Renewable Energy Projects By 2010
2003	Base Year	N/A	NA	N/A	N/A	N/A
2007	34.0%	4.0%	6.0%	3.0%	8.9%	0%
2008	29.83%*	6.0%	9.0%	3.0%	8.9%	0%
2009		8.0%	12.0%	3.0%	8.9%	
2010		10.0%		5.0%	8.9%	
2011		12.0%		5.0%	8.9%	
2012		14.0%		5.0%	8.9%	
2013		16.0%		7.5%	8.9%	
2014		18.0%		7.5%	8.9%	
2015		20.0%		7.5%	8.9%	

\*Note: The lower energy reduction/gsf in 2008 versus 2007 is due to a recalculation of renewable energy usage as a renewable energy credit which limits the energy intensity reduction of renewable energy usage to 7.2% of the FY2008 reduction of 9%.

<b>Table 4.11.a Summary of Permits – Morgantown</b>			
<b>Permit Number and Name</b>	<b>Issue Date Exp. Date</b>	<b>Regulatory Agency</b>	<b>Description</b>
MUB 012 Industrial Wastewater Discharge Permit	07/01/2005 to 06/30/2010	MUB	This permit allows for the operation of wastewater pretreatment facilities and discharge into the 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.

Table 4.11.a Summary of Permits – Morgantown

<b>Permit Number and Name</b>	<b>Issue Date Exp. Date</b>	<b>Regulatory Agency</b>	<b>Description</b>
WV0111457 General WV/National Pollutant Discharge Elimination System (NPDES) Storm Water Permit	04/01/2004 to 03/31/2009	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	12/07/2004 to 03/31/2009	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.

Table 4.11.b Summary of Permits – Pittsburgh

Permit No. Expiration Date	Permit Type	Regulatory Agency	Description
7032056-000-00500  A Title V permit was administratively accepted but not formally issued. No expiration date has been established for this permit	Air	ACHD	4,500,000-Btu/hr Cleaver Brooks natural gas boiler located in B-922.
7032056-000-00501 A Title V permit was administratively accepted but not formally issued. No expiration date has been established for this permit.	Air	ACHD	Three 1,630,000-Btu/hr RayPak finned copper tube boilers located in B-922
7023056-000-00800. A Title V permit was administratively accepted but not formally issued. No expiration date has been established for this permit	Air	ACHD	500-lb/hr gas-and coal-fired research combustion unit in B-86.
GF 31062.008 12/28/2002. Waiting for PHA to issue a new permit.	Industrial Sewer Use	PHA	Establishes the permissible waste water effluent discharge of certain process/laboratory/ waste-water constituents.
PA0025844 07/11/2001. A renewal application was submitted on 01/11/2001, but a new permit has not yet been issued.	Storm water Discharge	PADEP	National Pollutant Discharge Elimination System (NPDES) permit for the discharge of site storm water into the public waterways of Pennsylvania.
PA0297201 Not applicable	Industrial Settling Weir	PADEP	Permit for an industrial settling weir owned by the U.S. National Institute of Occupational Safety and Health.
02-81183008A 10/04/2008	Aboveground Storage Tank Registration	PADEP	Permit for tank containing ferric chloride.
02-81183009A 10/04/2008	Aboveground Storage Tank Registration	PADEP	Permit for tank containing caustic soda.
S-343	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	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	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	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.

**Table 4.11.b Summary of Permits – Pittsburgh**

Permit No. Expiration Date	Permit Type	Regulatory Agency	Description
S-1102	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	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-080548	Asbestos	ACHD	Asbestos Abatement Permit for B-94, 4 <sup>th</sup> floor.

**Table 4.14 Surveillance Monitoring – Pittsburgh and Morgantown**

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 inspection (MGN)	EG&G	Visual assessment of oil-filled transformer	Regulatory compliance	Daily	Site-wide
Transformer inspection (PGH)	SAIC	Visual assessment of oil-filled transformer	Regulatory compliance	Weekly	Site-wide
Storage tank inspection (MGN)	EG&G	Visual assessment of oil-filled storage tanks	Regulatory compliance	Weekly	Site-wide
Interstitial storage tank monitoring (MGN)	EG&G	Interstitial monitoring of dual-wall tanks	SPCC plan compliance, regulatory compliance	Quarterly	B29, B36, Navy facility fuel storage tanks
Storage tank inspection (PGH)	SAIC	Visual assessment of oil-filled storage tanks	Regulatory compliance	Weekly	Site-wide
Radiation gauge survey	Parsons	Leak test of radiation sources	Regulatory compliance	Semi-annual	At radiation sources, B-84
Safety observer inspection (PGH)	EG&G	Visual inspections of work-sites	Contractor ISM observance, operational control	Semi-annual	Site-wide
Water usage (PGH)	Site Operations Division	Document water usage	Operational	Daily	B-83, 84, 93, 94, chillers, boiler house
Backup generators (PGH)	SAIC	Backup generator inspection	Operational	Weekly	Site-wide
Chemical handling facility (PGH)	EG&G	CHF operations inspection checklist	Operational	Daily	B-64, B-91, B-92



<b>Table 6.1.1 Potential Contamination Sources and Cleanup Actions - Morgantown</b>		
<b>Potential Source</b>	<b>Potential Contamination</b>	<b>Current Status</b>
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 was 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 (i.e., storm, sanitary, or contaminated).

**Table 6.1.2 Properties of Potential Contaminants**

<b>Contaminant Suite</b>	<b>Potential Contaminant</b>	<b>Density (g/ml)</b>	<b>Physical State</b>	<b>Water Solubility</b>	<b>Sorption Coefficient</b>	<b>Carcinogenic</b>
			@ approx. 20 deg C		log KOC	
Coal Tar	Acenaphthalene	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	0.0015-0.006mg/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	

Table 6.1.2 Properties of Potential Contaminants

Contaminant Suite	Potential Contaminant	Density (g/ml)	Physical State	Water Solubility	Sorption Coefficient	Carcinogenic
	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	1780 mg/l	1.69-2.00	+
	Ethyl benzene	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 6.1.3 Hazardous Waste Generation -- Morgantown

Waste Stream	Quantity Generated (lbs)	Quantity Shipped (lbs)
Poison (Toxic solids & Liquids)	34.1	34.1
Mercury/Mercury Compounds	1.3	1.3
Waste Corrosive Liquids	18.6	18.6
Waste Solvents/Flammable Liquids	37	37
Waste Oxidizers	1	1
Flammable Solids	13	13
Activated Carbon	70	70
Other RCRA Compounds	78	78
Fluorescent Light Tubes (Universal Waste)	308	308
Batteries (Universal Waste)	1,979	1,979
<b>TOTAL</b>	<b>2,540</b>	<b>2,540</b>

<b>Table 6.5 Air Emission Permits – Morgantown</b>							
<b>Permits</b>	<b>Status</b>	<b>Exceedance</b>	<b>NOVs</b>	<b>Sources</b>	<b>Pollutants</b>	<b>Emissions</b>	<b>Criteria</b>
R13-1768 and 061- 00064	Expired	None	None	Minor emission sources, GPDU	None	None	1440 hours operation per year when permit was active.

<u>Table 6.6.1.a NPDES Permit Storm Water Monitoring Requirements -- Morgantown</u>			
<b>Outfall</b>	<b>Pollutants of Concern</b>	<b>Low Concentration Cutoff Waiver</b>	<b>Frequency</b>
002	Nitrite and nitrate	0.68 mg/l	6 month
	Fecal coli form	Report only	6 month
005	Total suspended solids	100 mg/l	6 month
	Fecal coli form	Report only	6 month
010	BOD	30 mg/l	6 month
	Total suspended solids	100 mg/l	6 month
	Ammonia	4 mg/l	6 month
	Fecal coli form	Report only	6 month
	pH	9 s.u.	6 month
	COD	120 mg/l	6 month
	Oil and grease	15 mg/l	6 month

<u>Table 6.6.1.b NPDES Storm Water Analysis Results -- Morgantown</u>							
<b>Constituents</b>	<b>Low Conc. Cutoff Waiver</b>	<b>Outfall 002</b>		<b>Outfall 005</b>		<b>Outfall 010</b>	
		<b>5/8/08</b>	<b>8/27/08</b>	<b>5/8/08</b>	<b>8/27/08</b>	<b>5/8/08</b>	<b>8/27/08</b>
Nitrate + Nitrite (Grab)	0.68 mg/L	0.78 mg/l	0.51 mg/L	NS	NS	NS	NS
Ammonia (Grab)	4 mg/L	NS	NS	NS	NS	ND	0.6 mg/l
Fecal Coli form (Grab)	---	450 col/100mL	5,100 col/100mL	5,400 col/100mL	>6,000 col/100mL	142 col/100mL	9,500 col/100mL
Total Suspended Solids (Grab)	100 mg/L	NS	NS	11 mg/L	9.2 mg/L	11 mg/l	272 mg/l
BOD	30 mg/l	NS	NS	NS	NS	7.4 mg/l	2.6 mg/l
pH	9 s.u.	NS	NS	NS	NS	7.9 s.u.	7.6 s.u.
COD	120 mg/l	NS	NS	NS	NS	ND	22.7 mg/l
Oil & Grease	15 mg/l	NS	NS	NS	NS	ND	ND

NS = Not Sampled; ND = Not Detected

**Table 6.6.1.c Wastewater Effluent Analysis (lb/d); Pretreatment Permit, Outfall 001, One sample/month -- Morgantown**

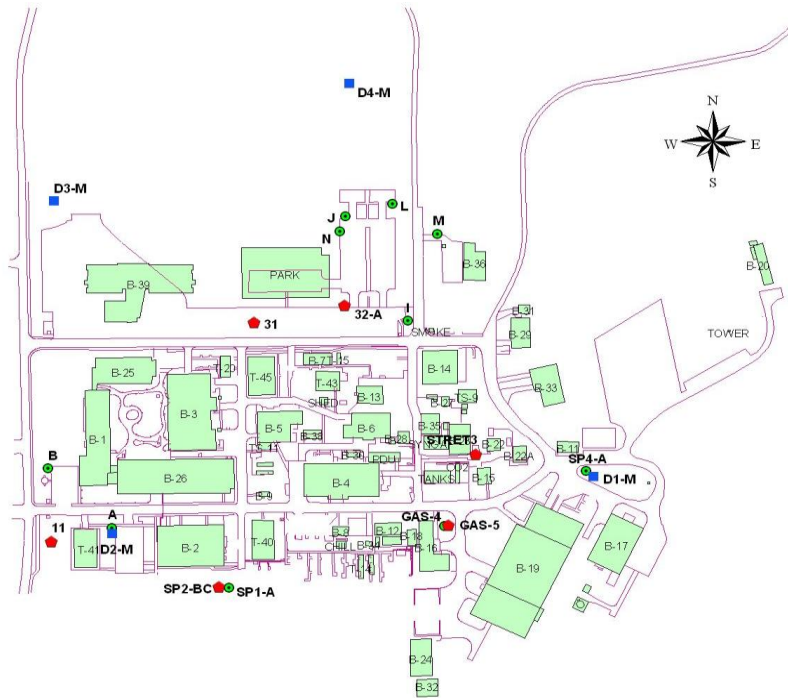
Parameter	Limit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow (MGD)													
Monthly Avg	0.09	0.01	0.02	0.02	0.02	0.01	0.01	0.03	0.02	0.01	0.01	0.03	0.01
Daily Max	0.15	0.03	0.05	0.04	0.04	0.02	0.06	0.06	0.05	0.04	0.05	0.06	0.04
BOD5													
Monthly Avg	None	ND	0.5	ND	ND	0.2	ND	0.6	ND	0.3	0.2	1.4	ND
Daily Max	None	ND	1.3	ND	ND	1.4	ND	1.3	ND	1.1	0.8	2.8	ND
TSS													
Monthly Avg	None	ND	ND	ND	ND	ND	0.8	1.7	0.7	1.1	0.3	1.2	ND
Daily Max	None	ND	ND	ND	ND	ND	5.0	3.4	1.8	4.5	1.7	2.4	ND
Arsenic													
Monthly Avg	0.005	ND	ND	ND	ND	ND	ND	0.0005	ND	0.0002	0.0001	0.0005	0.0001
Daily Max	0.008	ND	ND	ND	ND	ND	ND	0.001	ND	0.0007	0.0004	0.001	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	0.007	ND	ND	ND	ND	ND	ND	0.0008	0.0005	0.0005	0.0001	ND	ND
Daily Max	0.011	ND	ND	ND	ND	ND	ND	0.002	0.001	0.002	0.0004	ND	ND
Copper													
Monthly Avg	0.04	0.001	0.002	0.002	0.002	0.001	0.001	0.02	0.002	0.002	0.002	0.010	0.002
Daily Max	0.06	0.003	0.004	0.003	0.003	0.002	0.005	0.04	0.004	0.007	0.008	0.020	0.007
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	0.00008	0.0005	ND	ND	ND	0.0001	0.0003	ND	0.0002	0.0001	ND	0.0005
Daily Max	0.038	0.0003	0.001	ND	ND	ND	0.0005	0.0005	ND	0.0007	0.0004	ND	0.002
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
Nickel													
Monthly Avg	0.01	ND	ND	ND	ND	ND	0.0003	0.0008	0.0005	0.0003	0.0002	0.001	0.0002
Daily Max	0.015	ND	ND	ND	ND	ND	0.002	0.002	0.001	0.001	0.001	0.003	0.001
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	0.004	0.008	0.02	0.007	0.004	0.01	0.02	0.01	0.007	0.01	0.02	0.005
Daily Max	0.3	0.01	0.02	0.03	0.01	0.008	0.07	0.03	0.03	0.03	0.02	0.04	0.02
Iron													
Monthly Avg	None	0.02	0.06	0.06	0.06	0.04	0.09	0.23	ND	0.09	0.02	0.05	0.09
Daily Max	None	0.07	0.15	0.11	0.12	0.08	0.52	0.47	ND	0.37	0.09	0.09	0.37
Manganese													
Monthly Avg	None	0.02	0.03	0.03	0.04	0.02	ND	0.003	0.01	0.01	0.01	0.06	0.008
Daily Max	None	0.05	0.07	0.06	0.08	0.04	ND	0.006	0.03	0.05	0.03	0.11	0.03
Phenolics													
Monthly Avg	None	0.0009	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND
Daily Max	None	0.003	ND	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Organic Halogens													
Monthly Avg	None	ND	ND	0.012	0.005	0.003	0.003	0.013	0.010	0.012	0.005	0.010	0.020
Daily Max	None	ND	ND	0.024	0.010	0.006	0.020	0.025	0.025	0.049	0.025	0.020	0.080
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

Table 6.6.1.c 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
pH (s.u.)													
Minimum	6.0	7.6	7.3	7.0	6.4	6.7	7.3	7.4	7.6	7.6	7.7	6.7	6.4
Maximum	9.0	8.7	8.9	8.0	7.7	7.6	8.4	7.9	8.0	8.1	8.3	8.0	8.4

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

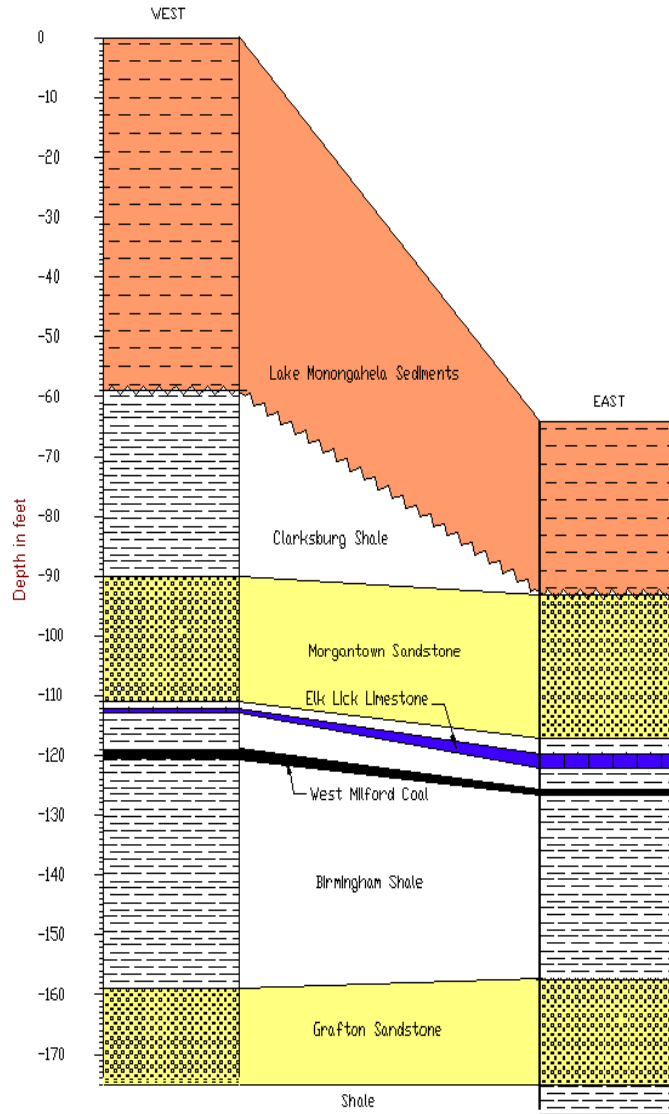
Figure 6.7.1 Active Monitoring Wells at the Morgantown Site



NETL Morgantown Site  
Active Groundwater Monitoring Wells  
January 2009

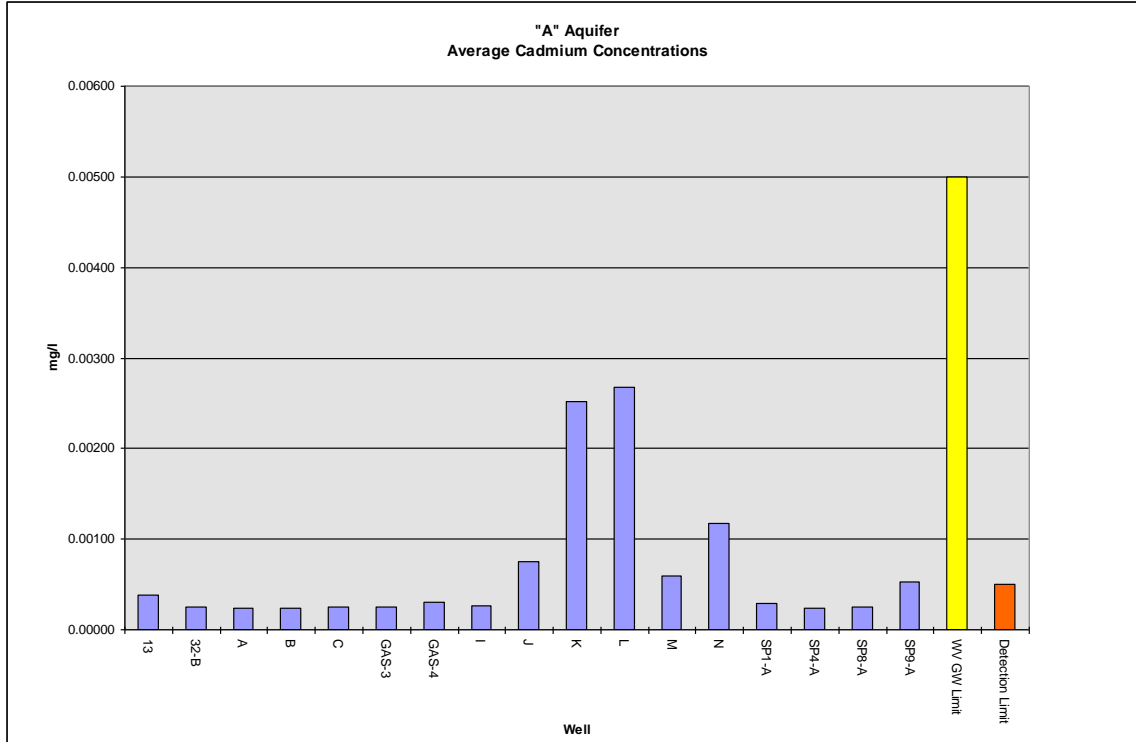
- Morgantown Sandstone well
- ◆ B-C Aquifer well
- A Aquifer well





**Figure 6.7.2 Generalized cross-section of aquifer units at the Morgantown site.**





[Figure 6.7.3 Average cadmium concentrations in wells, “A” Aquifer, Lake Monongahela unconsolidated sediments -- Morgantown.](#)

Table 6.7.1 November 2008 Groundwater Data for "A" Aquifer -- Morgantown

PARAMETER	Sample Location														
	MDL	UNITS	A	B	SP1-A	SP4-A	SP8-A	SP9-A	I	J	K	L	M	N	GAS-4
Benzene	0.99	ug/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Toluene	0.85	ug/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Ethyl benzene	0.62	ug/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Total Xylenes	2	ug/L	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Benzo(a)pyrene	0.12	ug/l	ND	ND	ND	0.44	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Arsenic	0.002	mg/l	0.0045	0.0055	ND	ND	P&A	P&A	0.0063	ND	P&A	ND	ND	ND	ND
Cadmium	0.00021	mg/l	ND	ND	ND	0.00023	P&A	P&A	ND	0.0011	P&A	0.001	0.0009	0.0022	0.00021
Chloride	0.053	mg/l	0.53	0.79	6.4	41	P&A	P&A	22.9	213	P&A	274	97.2	280	52.8
Chromium	0.0011	mg/l	0.0032	0.0024	ND	ND	P&A	P&A	ND	0.0014	P&A	0.0106	0.0012	ND	0.0024
Copper	0.0046	mg/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	0.0094	ND	ND	ND
Cyanide	0.0017	mg/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	0.0024	ND	ND
Fluoride	0.0039	mg/L	0.043	0.033	ND	0.057	P&A	P&A	0.039	ND	P&A	0.085	0.13	0.065	ND
Iron	0.0084	mg/l	31.5	43.4	2.26	1.08	P&A	P&A	28.2	0.251	P&A	6.66	1.51	0.549	2.52
Lead	0.0017	mg/l	0.0018	ND	ND	ND	P&A	P&A	ND	ND	P&A	0.0047	0.002	ND	ND
Manganese	0.00057	mg/l	1.01	1.42	1.6	0.486	P&A	P&A	0.623	0.218	P&A	0.347	4.11	0.677	4.66
Mercury	0.0002	mg/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Nickel	0.00078	mg/l	0.0025	0.0038	0.0015	0.0024	P&A	P&A	ND	0.0733	P&A	0.0589	0.0344	0.119	0.0375
Nitrate Nitrogen	0.0077	mg/L	ND	ND	0.11		P&A	P&A	ND	0.6	P&A	0.22	0.6	0.64	0.072
Silver	0.00054	mg/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	0.00097	ND	0.001
Sulfate	0.031	mg/l	16.5	22.3	33.8	17.3	P&A	P&A	13.4	49.8	P&A	91.3	30	66.7	4.1
Total Organic Halogen	0.015	mg/l	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	0.0231	0.0228	0.0951	0.0154
Total Recoverable Phenolics	0.01	mg/L	ND	ND	ND	ND	P&A	P&A	ND	ND	P&A	ND	ND	ND	ND
Zinc	0.0031	mg/l	0.011	0.0119	0.0087	0.0062	P&A	P&A	0.0058	0.0921	P&A	0.076	0.0882	0.2	0.0083

ND = not detected; S.U. = standard units; NT = not tested; P&A = well plugged

Table 6.7.2 November 2008 Groundwater Data for “B-C” Aquifer -- Morgantown

PARAMETER	Sample Location							
	MDL	UNITS	11	SP2-BC	32-A	31	GAS-5	STRET-3
Benzene	0.99	ug/l	ND	ND	ND	ND	ND	ND
Toluene	0.85	ug/l	ND	ND	ND	ND	ND	ND
Ethyl benzene	0.62	ug/L	ND	ND	ND	ND	ND	ND
Total Xylenes	2	ug/L	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	0.12	ug/l	ND	0.38	ND	ND	ND	0.61
Arsenic	0.002	mg/l	ND	ND	ND	0.0126	0.0042	ND
Cadmium	0.00021	mg/l	ND	ND	0.0014	ND	ND	ND
Chloride	0.053	mg/l	9.8	6.4	562	142	85.1	5.6
Chromium	0.0011	mg/l	ND	ND	ND	0.0829	ND	ND
Copper	0.0046	mg/l	0.0047	ND	ND	0.041	ND	ND
Cyanide	0.0017	mg/l	ND	ND	ND	ND	0.014	ND
Fluoride	0.0039	mg/L	0.033	0.11	0.055	ND	0.16	ND
Iron	0.0084	mg/l	29.3	0.211	ND	77.3	7.3	0.339
Lead	0.0017	mg/l	ND	ND	ND	0.0286	ND	ND
Manganese	0.00057	mg/l	1.11	0.162	1.09	2.56	0.308	1.51
Mercury	0.0002	mg/l	ND	ND	ND	ND	ND	ND
Nickel	0.00078	mg/l	0.00086	0.0012	0.0397	0.084	0.002	0.0034
Nitrate Nitrogen	0.0077	mg/L	0.079	0.053	0.81	0.54	0.5	0.046
Silver	0.00054	mg/l	ND	ND	ND	ND	ND	0.00068
Sulfate	0.031	mg/l	11.3	16.2	92.9	37.7	83.1	3.6
Total Organic Halogen	0.015	mg/l	0.0185	0.0175	0.138	0.0151	ND	ND
Total Recoverable Phenolics	0.01	mg/L	ND	ND	ND	ND	ND	ND
Zinc	0.0031	mg/l	0.0124	0.008	0.06	0.19	0.0157	0.0329

ND = not detected; S.U. = standard units; NT = not tested; P&A = well plugged

Table 6.7.3 November 2008 Groundwater Data for Morgantown Aquifer

PARAMETER	Sample Location					
	MDL	UNITS	D2-M	D1-M	D3-M	D4-M
Benzene	0.99	ug/l	ND	ND	NT	NT
Toluene	0.85	ug/l	ND	ND	NT	NT
Ethyl benzene	0.62	ug/L	ND	ND	NT	NT
Total Xylenes	2	ug/L	ND	ND	NT	NT
Benzo(a)pyrene	0.12	ug/l	ND	ND	NT	NT
Arsenic	0.002	mg/l	ND	0.0087	NT	NT
Cadmium	0.00021	mg/l	ND	ND	NT	NT
Chloride	0.053	mg/l	0.78	17.6	NT	NT
Chromium	0.0011	mg/l	0.0011	ND	NT	NT
Copper	0.0046	mg/l	ND	ND	NT	NT
Cyanide	0.0017	mg/l	ND	ND	NT	NT
Fluoride	0.0039	mg/L	0.39	0.048	NT	NT
Iron	0.0084	mg/l	0.718	15.1	NT	NT
Lead	0.0017	mg/l	ND	ND	NT	NT
Manganese	0.00057	mg/l	0.0315	1.62	NT	NT
Mercury	0.0002	mg/l	ND	ND	NT	NT
Nickel	0.00078	mg/l	0.0017	0.0022	NT	NT
Nitrate Nitrogen	0.0077	mg/L	0.24	ND	NT	NT
Silver	0.00054	mg/l	ND	ND	NT	NT
Sulfate	0.031	mg/l	ND	ND	NT	NT
Total Organic Halogen	0.015	mg/l	ND	ND	NT	NT
Total Recoverable Phenolics	0.01	mg/L	ND	ND	NT	NT
Zinc	0.0031	mg/l	0.0104	0.016	NT	NT

ND = not detected; S.U. = standard units; NT = not tested; P&A = well plugged

Table 8.1.2 Tier II Chemical Inventory Reporting List -- Pittsburgh

Chemical Name	CAS #	Average and Maximum Daily Amount (lbs)	TPQ (lbs)
Nitrogen, liquid	7727-37-9	182,115	10,000
Nitric oxide	10102-43-9	672	100
Sulfur dioxide	7446-09-5	2,678	500

<u>Table 8.2.1 TSCA Chemicals Held Onsite In Excess Of 10 Lbs. -- Pittsburgh</u>	
Common Name	CAS
Naphthalene, 1,2,3,4-tetrahydro-	000119-64-2
Carbon Tetrachloride	000056-23-5
Boric Acid	010043-35-3
Nitric Acid	007697-37-2
Hydrochloric Acid	007647-01-0
N-Hexane	000110-54-3
Sodium Acetate	000127-09-3
Carbon Dioxide	000124-38-9
Ethyl Acetate	000141-78-6
Ferric Chloride	007705-08-0
Methanol	000067-56-1

<u>Table 8.4.1 2008 Radioactive Material (RM) -- Pittsburgh</u>				
Isotope	Qty	Activity	Supplier/Source	NRC License
Ni-63	2	15 mCi	Gas Chromatograph Electron Capture Device – <b>Out of Service</b>	Held by Hewlett Packard
Cs-137	3	40 mCi (2); 20 mCi (1)	Ronan Engineering Company, Model 137; Level Density Gauge – <b>Out of Service</b>	Held by Parsons
Assorted	80	Consumer Product	Smoke Detectors	Not Required

<u>Table 8.4.2 2008 Other Radiation Generating Devices: X-ray Devices -- Pittsburgh</u>		
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	1	B-94 Laboratory
Electron Spectroscopy for Chemical Analysis	2 X-Ray Tubes	B-94 Electron Spectroscopy for Chemical Analysis Laboratory

<u>Table 8.5.1 Air Emissions Based on Fuel Usage -- Pittsburgh</u>					
Estimated Emissions (Tons/Year)					
Pollutant	MCCF	Combined Boilers	Unpaved Roads	Paved Roads	Total Site
Carbon Monoxide	0.0	0.091832	0.00532	0.1008	0.197952
Lead	0.0	0.0	0.0	0.0	0.0
Nitrogen Dioxide	0.0	0.10935	0.00038	0.0072	0.116930
Particular Matter	0.0	0.004937	0.1102	0.432	0.547137

<b>Table 8.5.1 Air Emissions Based on Fuel Usage -- Pittsburgh</b>					
<b>Estimated Emissions (Tons/Year)</b>					
<b>Pollutant</b>	<b>MCCF</b>	<b>Combined Boilers</b>	<b>Unpaved Roads</b>	<b>Paved Roads</b>	<b>Total Site</b>
<10 micron					
Particular Matter Total	0.0	0.003657	0.38114	2.232	2.616797
Sulfur Dioxide	0.0	0.000656	0.0	0	0.000656
VOCs	0.0	0.02964	0.000361	0.00648	0.036481

<b>Table 8.6.1 Industrial Sewer Use Permit (Building 74) Monitoring Analysis -- Pittsburgh</b>						
<b>Constituent</b>	<b>Free Cyanide</b>	<b>Phenol</b>	<b>Copper</b>	<b>Mercury</b>	<b>Chloroform</b>	<b>pH</b>
<b>Permit Limit</b>	< 0.005 mg/L	0.025 mg/L	0.08 mg/L	< 0.0002 mg/L	< 5 µg/L	6.0 - 9.0 s.u.
April 09, 2008 Sampling Date						
<b>Building 74 Effluent</b>						
Composite	ND (< 0.0016	ND (< 0.0092	0.0013 mg/l	ND (< 0.000051	1.6 µg/l	N/A
Grab #1	N/A	N/A	N/A	N/A	N/A	6.15 s.u.
Grab #2	N/A	N/A	N/A	N/A	N/A	6.38 s.u.
Grab #3	N/A	N/A	N/A	N/A	N/A	6.99 s.u.
Grab #4	N/A	N/A	N/A	N/A	N/A	6.32 s.u.
October 22, 2008 Sample Date						
<b>Building 74 Effluent</b>						
Composite	ND (< 0.0016 mg/l)	0.013 mg/l	ND (< .00066 mg/l)	0.000046 mg/l	1.6 µg/l	N/A
Grab #1	N/A	N/A	N/A	N/A	N/A	7.68 s.u.
Grab #2	N/A	N/A	N/A	N/A	N/A	7.58 s.u.
Grab #3	N/A	N/A	N/A	N/A	N/A	7.53 s.u.
Grab #4	N/A	N/A	N/A	N/A	N/A	7.32 s.u.

ND = not detected; s.u. = standard units; mg/L = milligrams per liter; µg/L = micrograms per liter;

Table 8.6.2 Building 74 2008 Monthly Monitoring results (mg/l) -- Pittsburgh

Constituent	Permit Limit	01/09	02/06	03/05	04/09	05/07	06/04	07/09	08/06	09/03	10/22	11/05	12/03
		Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America	Test America
Aluminum	None	0.848	0.222	0.526	0.293	0.472	0.791	0.281	0.484	0.181	0.065	0.0883	0.0431
Cadmium	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	None	0.0011	ND	0.0021	0.00086	0.00092	0.00099	0.0011	ND	ND	ND	ND	ND
Cooper	0.08	0.0048	ND	ND	0.0019	ND	0.00090	0.00096	0.00220	ND	ND	ND	0.0025
Cyanide (free)	<0.005	ND	ND	0.0017	ND	ND	ND	ND	ND	ND	0.0025	ND	0.0054
TOX	None	0.0193	ND	0.0839	0.0186	ND	0.180	0.0214	0.025	0.0303	ND	0.0239	0.0826
Iron	None	0.261	0.0475	0.202	0.138	0.0611	0.189	0.347	0.337	0.180	0.283	0.145	0.207
Lead	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	<0.0002	0.000069	ND	ND	0.000059	ND	0.000069	ND	ND	ND	0.000039	ND	ND
Nickel	None	0.0021	ND	ND	ND	0.0012	ND	0.0021	ND	ND	ND	ND	ND
Oil & Grease	None	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH (s.u.)	6.0 – 9.0	7.3	7.3	6.7	6.4	8.0	7.7	6.6	6.9	6.9	7.6	7.7	6.7
Phenolics	0.025	ND	ND	ND	ND	ND	ND	ND	0.015	ND	ND	ND	0.015
TSS	None	ND	ND	ND	ND	ND	8.4	ND	ND	ND	ND	ND	ND
Tin	None	ND	ND	0.0033	0.0027	0.0021	ND	ND	ND	0.0038	0.0024	0.0022	ND
Trichloromethane	<0.005	ND	ND	ND	ND	ND	0.0053	ND	ND	ND	ND	ND	ND
Zinc	None	ND	0.0058	ND	0.0058	ND	0.0277	ND	ND	ND	0.0058	0.005	0.0105

ND = not detected; s.u. = standard units; mg/L = milligrams per liter;

Table 8.6.3 National Pollutant Discharge Elimination System Storm Water Analysis Results -- Pittsburgh

Constituent	Sample Date			
	03/14/08	06/13/08	09/30/08	12/15/08
<b>North Outfall – PGH</b>				
Flow	0.304 MGD	2.814 MGD	0.076 MGD	0.362 MGD
Suspended Solids	ND (< 4.0 mg/L)	208 mg/L	ND (< 2.0 mg/L)	28.0 mg/L
CBOD5	ND (< 0.30 mg/L)	9.1 mg/L	ND (< 2.0 mg/L)	2.7 mg/L
Oil and Grease	ND (< 0.47 mg/L)	ND (< 0.49 mg/L)	ND (< 0.47 mg/L)	ND (< 0.46 mg/L)
Aluminum	0.076 mg/L	2.350 mg/L	0.0674 mg/L	0.507 mg/L
Iron	0.109 mg/L	4.670 mg/L	0.0623 mg/L	1.290 mg/L
Manganese	0.175 mg/L	0.455 mg/L	0.0917 mg/L	0.365 mg/L
Lead	ND (< 2.4 µg/L)	10.3 µg/L	ND (< 2.4 µg/L)	ND (< 2.4 µg/L)
Mercury	ND (< 0.051 µg/L)	0.42 µg/L	ND (< 0.051 µg/L)	0.048 µg/L
pH	7.62 s.u.	7.33 s.u.	8.23 s.u.	7.98 s.u.
Ammonia	0.26 mg/L	0.40 mg/L	0.20 mg/L	0.13 mg/L
<b>South Outfall – PGH</b>				
Flow	0.344 MGD	12.362 MGD	0.289 MGD	0.350 MGD
Suspended Solids	71.2 mg/L	823 mg/L	14.0 mg/L	23.2 mg/L
Aluminum	17.200 mg/L	11.100 mg/L	2.840 mg/L	2.640 mg/L
Iron	2.070 mg/L	17.300 mg/L	0.687 mg/L	0.541 mg/L
Manganese	1.380 mg/L	1.780 mg/L	0.347 mg/L	0.375 mg/L
Lead	ND (< 2.4 µg/L)	36.2 µg/L	ND (< 2.4 µg/L)	ND (< 2.4 µg/L)
pH	6.48 s.u.	8.38 s.u.	8.01 s.u.	7.78 s.u.
Ammonia	0.77 mg/L	0.58 mg/L	0.23 mg/L	0.45 mg/L



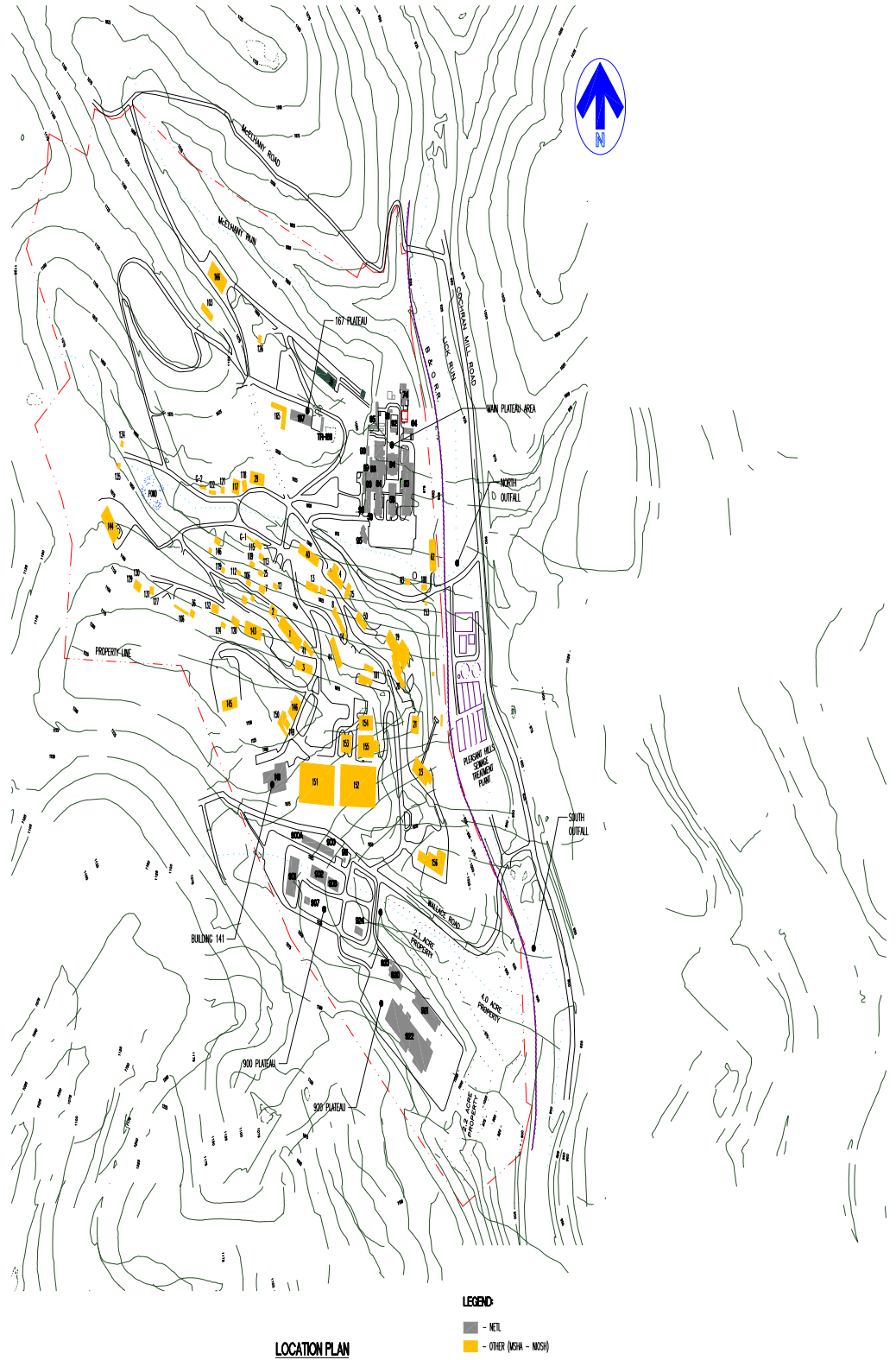


Figure 8.7.1 Topographic Site Map of Pittsburgh

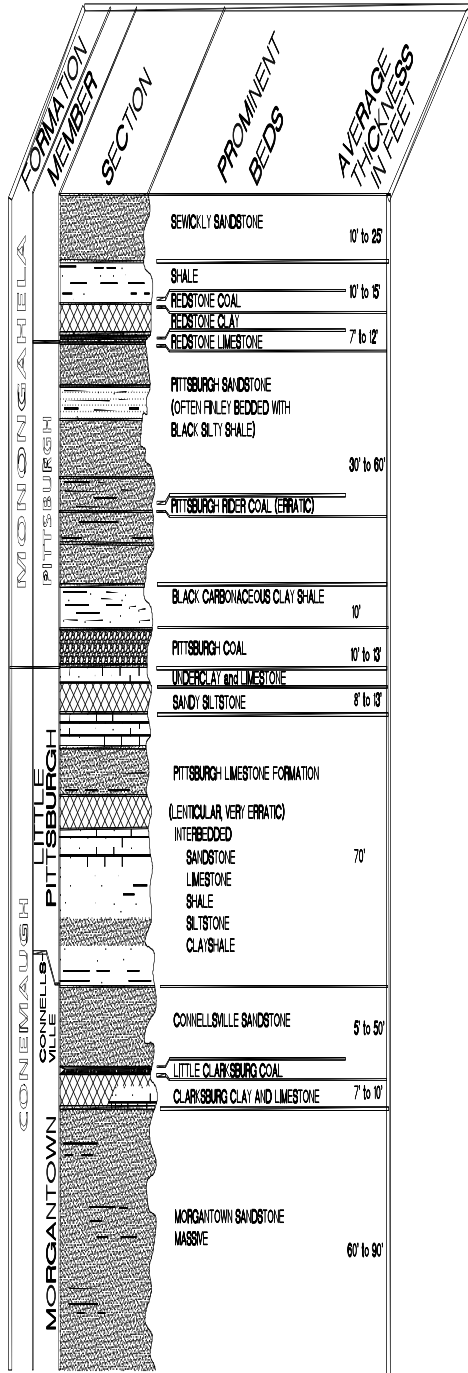
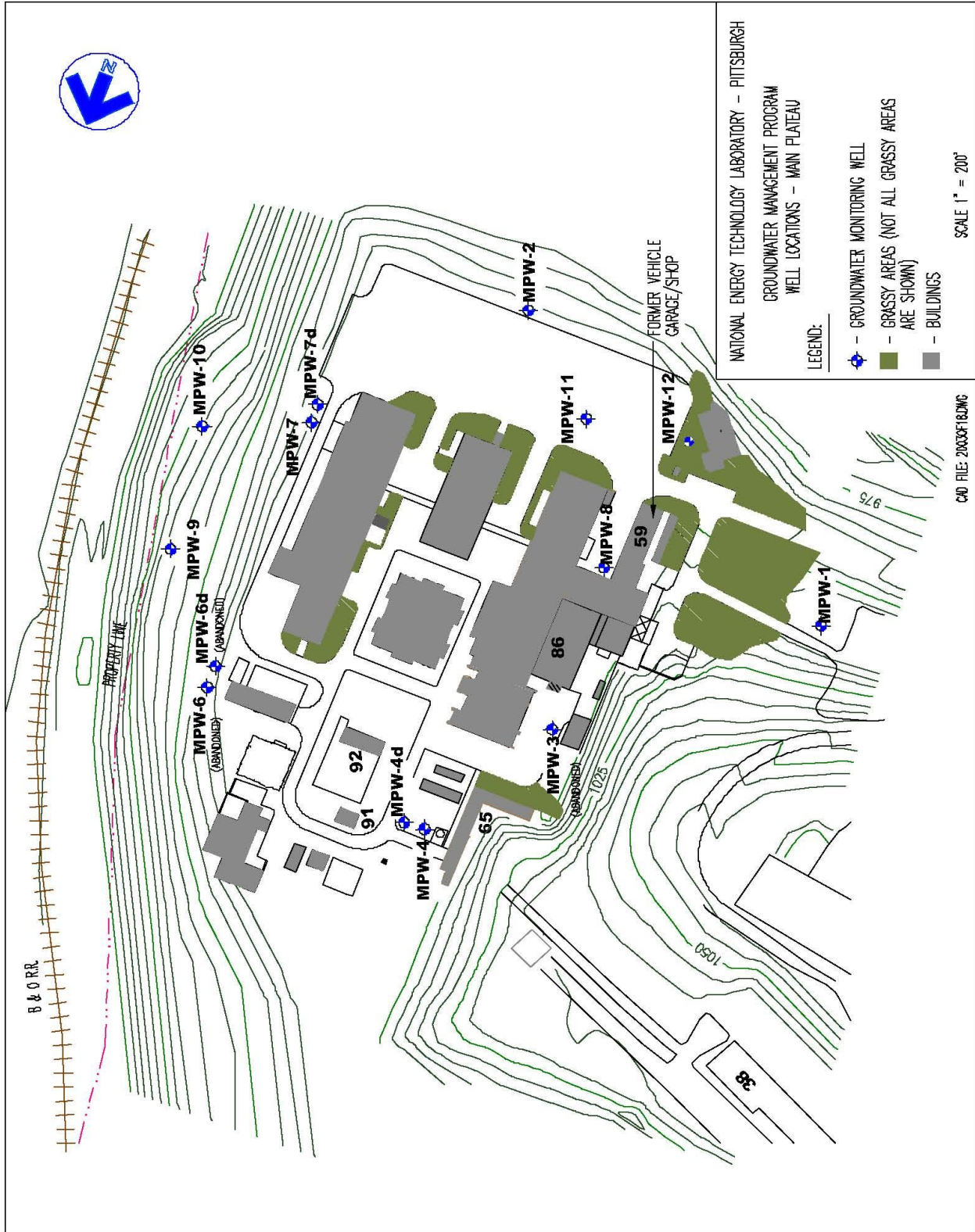
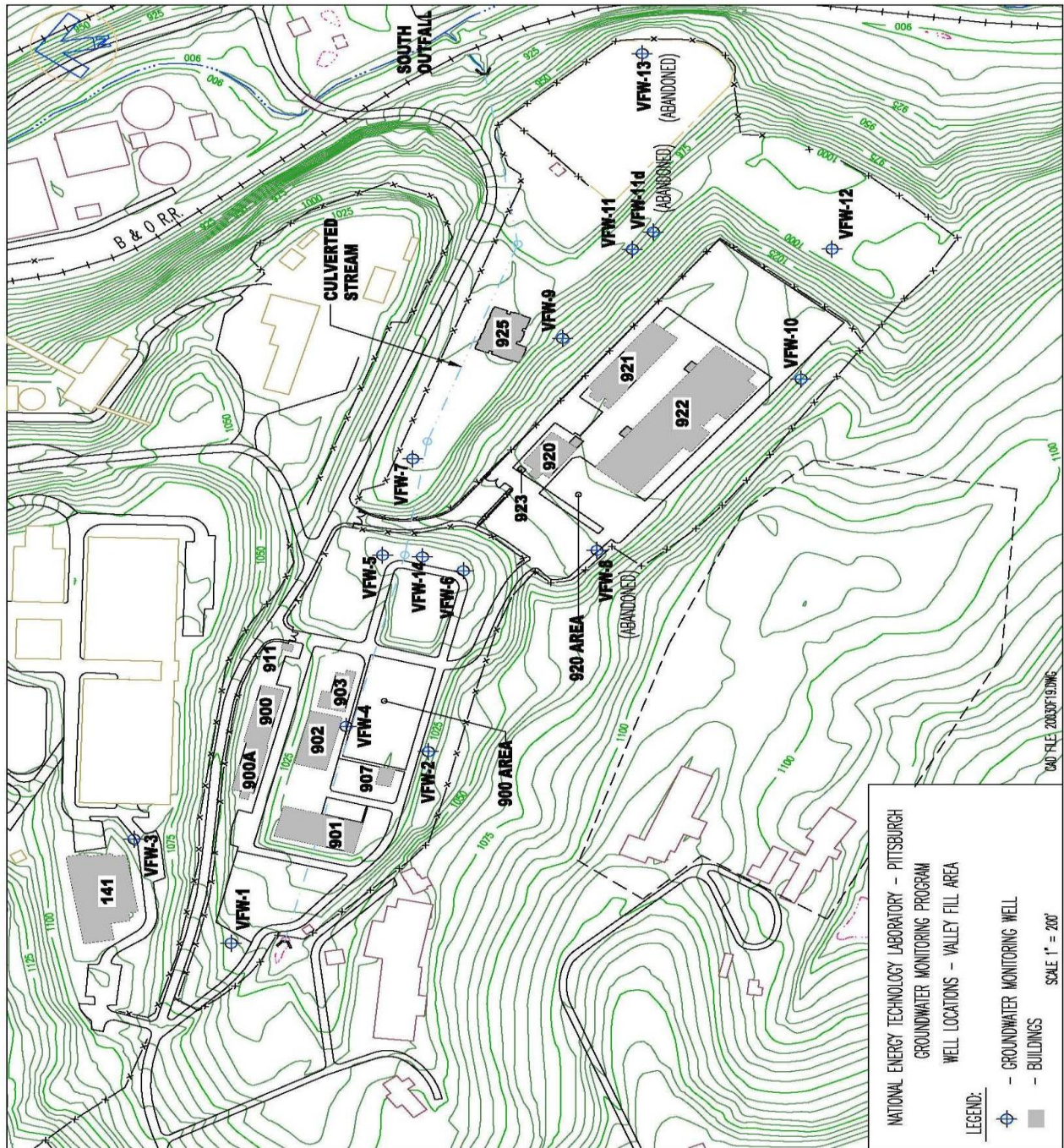


Figure 8.7.2 General Geologic Column -- Pittsburgh



[Figure 8.7.3 Groundwater Management Program Main Plateau Well Locations – Pittsburgh](#)



[Figure 8.7.4 Groundwater Management Program Valley Fill Well Locations -- Pittsburgh](#)

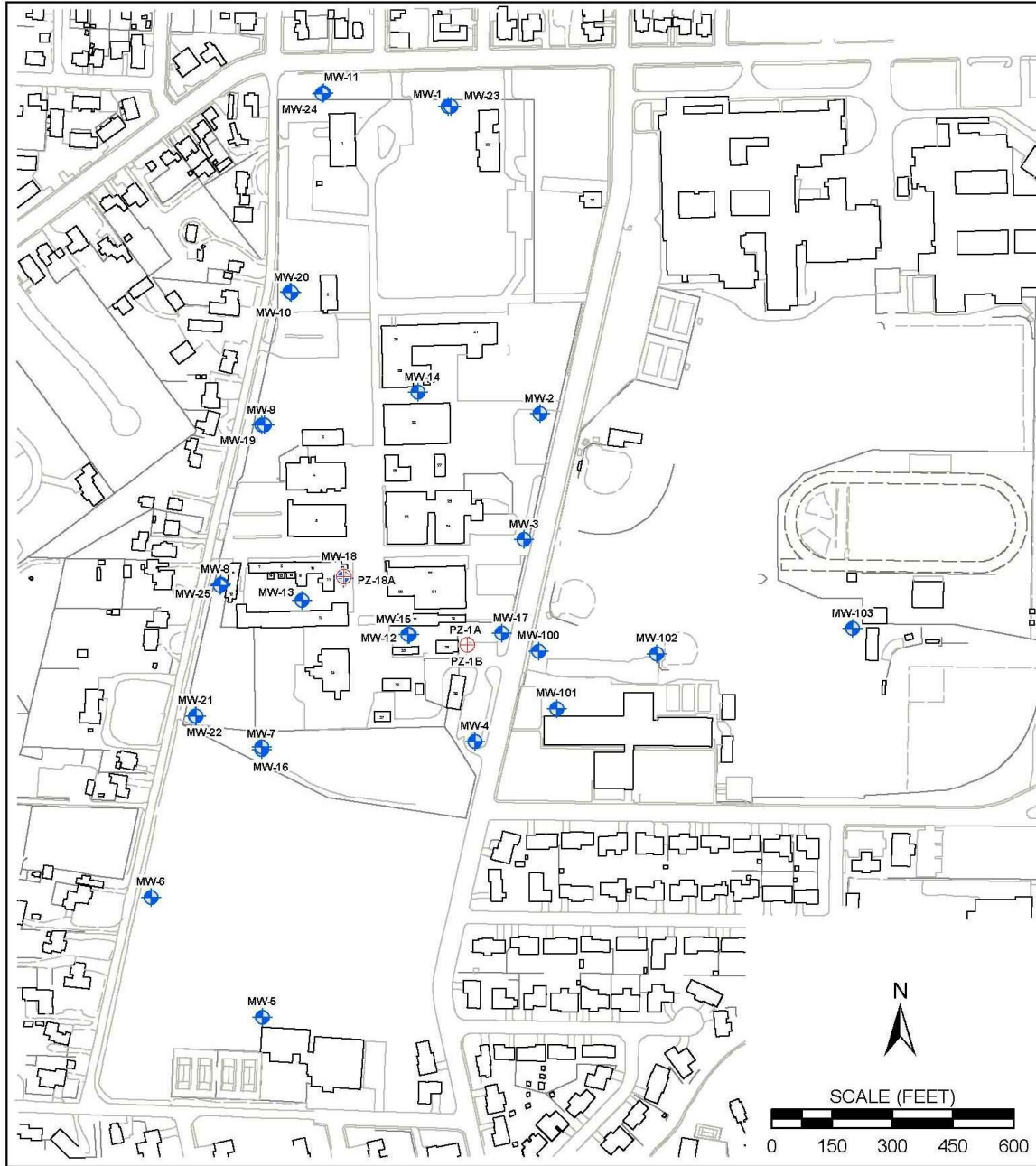
**Table 8.7.5 Groundwater Detection Monitoring Program – Results of Analysis -- Pittsburgh**

Well	Sample Date							
	05/08/08				10/08/08			
Constituents	pH	Specific Conductance	Temperature	TPH-DRO	pH	Specific Conductance	Temperature	TPH-DRO
VFW-2	7.18	3913	11.9	ND	7.12	2920	14.8	0.060
VFW-4	6.97	2882	15.3	ND	6.95	2720	14.8	0.056
VFW-7	7.12	3492	13.8	ND	7.14	3620	13.1	0.052
VFW-9	7.29	1240	10.9	ND	6.83	448	13.4	0.085
VFW-10	7.22	2532	12.5	ND	7.16	2700	14.4	0.033
VFW-11	7.39	1763	11.9	ND	7.34	1568	12.6	0.042
VFW-12	7.18	2922	11.9	ND	7.08	2890	14.1	0.120
VFW-14	6.98	3382	12.8	ND	6.64	8380	13.8	0.053

pH unit: standard unit; Specific conductance unit: umhos/cm @ 25 °C; Temperature unit: degree centigrade  
 TPH-DRO: Total Petroleum Hydrocarbons – Diesel Range Organics; TPH-DRO unit: mg/l; ND: Non Detect; NS: Not Sampled

**Table 10.4 Albany 2008 X-Ray Radiation Generating Devices**

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



[Figure 10.8 Monitoring Well Locations at the Albany Site](#)