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Annual Site Environmental Report

Period: January 1994 to June 1995

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U.S. Department of Energy
Office of Fossil Energy
Morgantown Energy Technology Center
Morgantown, West Virginia

MASTER

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1.0 EXECUTIVE SUMMARY

This report covers the period from January 1, 1994, to June 1, 1995.

The environmental management program at the U.S. Department of Energy (DOE), Morgantown Energy Technology Center (METC), addresses all areas of environmental concern, including surface water and groundwater quality, air quality, and solid and hazardous waste disposal. The program focuses primarily on the treatment and disposal of industrial, contaminated, and sanitary wastewaters; the disposal of solid and hazardous wastes; minimizing air pollutant emissions; the monitoring of surface water, groundwater, and air quality on the METC site and in the surrounding area; the decommissioning, decontamination, and disposal of on-site research facilities no longer in use; and the identification, characterization, and cleanup of off-site property where METC sponsored research and development activities. The environmental management program is conducted to meet the requirements of all applicable Federal, state, and local laws and regulations.

METC is owned and operated by the DOE as a research and development (R&D) center. During 1992 and 1993, METC was DOE's lead center for coal gasification, fluidized-bed combustion, unconventional gas recovery, gas stream cleanup, heat engines, fuel cells, underground coal gasification, oil shale retorting, combined-cycle component integration, and instrumentation and control technologies. This work is accomplished through contracts managed by the center and through on-site research. DOE Order 5400.1, General Environmental Protection Program, of November 9, 1988, defines the environmental standards and program requirements that apply to all DOE facilities. This order essentially invokes EPA Federal regulations at DOE-controlled sites and adds some DOE-specific requirements as well. One requirement of this order is an annual site environmental report. This report has been prepared to satisfy this DOE requirement. It provides an overview of environmental activities at the METC site and at sites for which METC has responsibility for 1992 and 1993.

METC is located on a 145-acre tract in Morgantown, West Virginia. Morgantown is in Monongalia County in northern West Virginia, approximately 80 miles southwest of Pittsburgh, Pennsylvania. The city and surrounding area have a population of approximately 60,000 people. Principal employers in the area include West Virginia University and the coal industry. METC is situated within the city limits northwest of the commercial district at the edge of a residential section. Figure 1 shows the location of METC within Morgantown and the surrounding area.

Monongalia County is located in the deeply dissected Allegheny Plateau Province, west of the Appalachian Mountains. Topographic relief in this area is moderate to strong, ranging from 61 to 91 meters (200 to 300 feet) in some sections to 305 to 914 meters

(1,000 to 3,000 feet) in mountainous areas (Fenneman 1938). The Morgantown area is hilly, with peaks of 366 to 396 meters (1,200 to 1,300 feet). Soils in the county are Pennsylvanian or Permian in age and consist of cyclic sequences of sandstone, red beds, shale, limestone, and coal (Erwin 1969).

The climate in this region is temperate, with temperatures ranging from an average of 0.6 °C (33 °F) in January to an average of 23 °C (74 °F) in July (U.S. Army Corps of Engineers 1975). Precipitation averages from 102 to 137 centimeters (40 to 54 inches) per year. Winds are most frequently from the southwest to west, and stronger winds occur during the winter months. In the deep, protected valleys typical of this region, wind speeds are reduced and temperature inversions are frequent. Stagnation conditions lasting for 4 days or more occur about once or twice a year. Once every 6 years, a 7-day stagnation occurs (West Virginia Air Pollution Control Commission 1976).

The Monongahela River is the largest body of water in Morgantown and forms the northern border of METC. All surface drainage in the county eventually flows into this river. West Fork Run and its Burroughs Run tributary form the eastern and southern boundaries of METC and flow into the Monongahela River.

Most of Monongalia County is underlain by rocks of low permeability, which consequently yield water at low rates. Wells nearest the METC facility typically have yields of 6 liters per minute (1.6 gallons per minute [gpm]) or less. The principal aquifers are the Conemaugh series and the Pottsville series. The Conemaugh series outcrops at the METC site and provides most of the domestic water supplies near the area under water-table (unconfined) conditions. The Pottsville series, which is quite deep but is regarded as the most important aquifer in the county, yields up to 946 liters per minute (250 gpm) under artisan pressure but averages about 170 liters per minute (45 gpm). The Pottsville aquifer is separated from the Conemaugh aquifer by several hundred meters of bedrock. It is assumed that there is no communication between these aquifers.

2.0 COMPLIANCE SUMMARY

2.1 Background and Overview

The West Virginia Office of Air Quality agrees that air emissions from METC research projects are insignificant and no permits are needed.

No contamination has been detected in groundwater from samples taken from monitoring wells.

One hundred forty nine (149) soil samples were negative for metals, cyanide, BETX, SVOC's, and radiological compounds, and no further remediation is needed.

Fifty five (54 CX, 1 FONSI) NEPA documents were approved for on-site activities and 168 documents were prepared for METC's off-site activities.

Asbestos abatement activities were completed in 7 buildings.

Thirty four (34) radon samples were taken. All results are negative and no further action is required.

Ninety five (95) percent of the 1991 Tiger Team Corrective Actions are complete.

Two computer-based environmental training courses were given to all Federal employees on site.

One CERCLA incident occurred. Approximately 200 gallons of Dowtherm leaked from a HVAC chiller unit.

2.2 Compliance Status

2.2.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA is designed to provide for Federal response and compensation for unpermitted releases of hazardous substances and oil to the environment and for funding the cleanup of abandoned waste disposal sites. EPA's regulations implementing CERCLA are codified in Title 40, Chapter I, Subchapter J, Parts 300, 302, 303, 310, 350, 355, 370, 372, and 373.

An important CERCLA-related action under way at METC involves responding to the EPA Region III Hazardous Ranking System (HRS) Data Deficiency Checklist. The U.S. Army Corps of Engineers (USACE) and their subcontractor, Woodward-Clyde, Inc., performed a Site Assessment for METC in response to METC being placed on the Federal Agency Hazardous Waste Compliance Docket. However, EPA Region III has required additional information prior to calculating the final HRS score.

The METC 42-inch gasifier pad and the Stretford desulfurization pad were removed in May and June of 1994. An investigation and characterization of the gasifier and Stretford pads in 1993 indicated that coal gasification products (such as coal tars) probably leaked through several concrete pad expansion joints over the nearly 20-year period of gasifier operations. Analyses of soil samples extracted from boreholes drilled through the approximately 2-foot thick pads and about 10 feet into the soils beneath revealed the presence of primarily coal-derived organic substances, including polyaromatic hydrocarbons. Both the WVDEP and METC agreed that although no environmental statutes were at issue, a proactive approach for dealing with the contamination was most desirable. METC has (1) drilled additional wells to determine if groundwater in the area is being contaminated from the pads and (2) removed the pads and the underlying soils which

were contaminated. Over 1400 tons of concrete and 3500 tons of soil were removed and disposed of in a permitted landfill. This site is now scheduled to be used as the location of a new process development unit.

METC Pond 005 (industrial slurry pond) was removed in 1985, back-filled, paved, and converted to a parking lot. However, a limited quantity of contaminated soil was not removed, and this soil remains beneath the pavement. Following the requirements of the pond closure plan, quarterly groundwater sampling was conducted during 1985-91. As part of the METC subsurface exploration program, in October 1992 five temporary groundwater monitoring wells were installed around Pond 005, and soil and groundwater samples have been extracted and analyzed for chemical species related to coal gasification. Results from this soil and groundwater sampling and analysis have not indicated any contamination of the groundwater around the parking lot area. Groundwater monitoring has continued through 1994 and no groundwater contamination has been observed. In October of 1994, METC submitted a revision of the closure plan which requests that the State of West Virginia approve the final closure of the site. METC is currently awaiting the State's response.

METC is also conducting relatively small-to-moderate scale CERCLA-related activities in Wyoming on three sites which include (1) the Rock Springs Oil Shale Retort site located near Rock Springs, Wyoming; (2) the Hoe Creek Underground Coal Gasification site located near Gillette, Wyoming; and (3) the Wyoming Research Institute's (WRI) North Site Facility, which is located about 1 mile north of Laramie, Wyoming. The latter site, which is a formerly owned DOE site, was acquired by the University of Wyoming Research Corporation from the Union Pacific Railroad after the de-federalization of the Laramie Energy Technology Center in 1983. A DOE-METC Fossil Energy Site Cleanup Agreement with the State of Wyoming, WDEQ, was executed effective August 1993. The State is requiring that the sites be cleaned up in accordance with State statutes and State ARARs (Applicable or Relevant and Appropriate Requirements). During the fall of 1992, DOE-METC awarded a grant to the WDEQ to enable the State to provide guidance and oversight of the cleanup of the sites. In the summer of 1993, METC awarded a task to TVA and, in the fall of 1993, to the Omaha District of the COE to obtain support in the clean up of the Rock Springs and Hoe Creek sites. Characterization of the sites continued during FY 94 and is detailed below.

The Rock Springs Oil Shale Retort site consists of 13 locations where in situ oil shale retorting research was conducted. As a result of research activities, groundwater was contaminated with organic compounds and must be cleaned up to background levels or groundwater quality kept within class of use through the use of a remedial best practicable technology. Although the site was not listed on the Federal Agency Hazardous Waste Compliance Docket, METC proactively conducted a Preliminary Assessment (PA) of the site in accordance with CERCLA to determine if the site should be

placed on the National Priority List (NPL). After reviewing the PA, EPA Region VIII classified the site as Site Evaluation Accomplished (SEA) under the Federal Superfund Program and notified METC that the site would not be evaluated further for inclusion on the NPL. As a result, the DOE must satisfy State of Wyoming requirements as defined by the Wyoming Environmental Quality Act.

During 1994, the Army Corps of Engineers continued a site characterization effort with primary emphasis on groundwater monitoring. Nineteen (19) monitoring wells have been installed at locations selected by the Land Quality Division of the WDEQ, and samples have been extracted for analysis. The USACE and their contractor (Dames and Moore) have been tasked to provide the DOE with remedial alternatives for site remediation. Additionally, two groundwater monitoring well locations have been determined for installing wells into the Wasatch aquifer to ascertain if contaminants from oil shale research activities are present.

The Hoe Creek Underground Coal Gasification site consists of three locations where coal was gasified in situ. As a result of the field tests, coal tars were left underground in two coal seams and in the channel sand overburden. Water flowing through the coal and the channel sand is leaching organics into the groundwater, and the contaminant levels have exceeded State regulatory limits. The site was listed on the Federal Agency Hazardous Waste Compliance Docket on June 1, 1991. Annual pump and treat operations have been conducted during the summer months as an interim measure to minimize any contaminated groundwater movement out of the boundaries of the R&D License Area onto private lands. It was subsequently learned that a contaminated groundwater plume has migrated about 50 m (165 ft) onto one private landowner's property located to the east of the permit area. During 1994, approximately 13.1 million liters (3.5 million gallons) of water were pumped, treated, and applied to the ground surface through atomizing nozzles. A Preliminary Assessment of the Hoe Creek site was conducted in accordance with CERCLA to determine if the site should be placed on the NPL. The EPA Region VIII office classified the site as SEA under the Federal Superfund Program and notified METC that the site would not be evaluated further for inclusion on the NPL. As a result, requirements imposed by the Wyoming Environmental Quality Act must be met. The Corps of Engineers continued site characterization efforts in FY 94 with primary emphasis on groundwater monitoring. Thirty-three (33) monitoring wells (4 wells on the adjacent landowner's property) have been installed at locations selected by the Land Quality Division of the WDEQ, and samples have been extracted for analysis. Cores were extracted from locations adjacent to the walls of the three gasification cavities and from other locations within the license (permit) area to determine the distribution of contaminants in the subsurface soils and the groundwater. Remediation alternatives are being evaluated and discussed with the WDEQ for implementation in late 1995. The Corps will continue to assist METC in determining the preferred remediation methodology/best practicable technology

for site remediation, conducting any remedial action required, and achieving final closure of the site.

The Western Research Institute's North Site Facility has undergone several site assessments including two PA's performed by EPA - Region VIII, the first in 1983 at the time of the privatization of the facility and a second in 1988. These assessments showed the site did not meet the requirement to be placed on the NPL listing. The site, however, did store both product and waste streams from Government research and Government-sponsored research. WRI was awarded five phase tasks during the fall of 1993 to bring the facility in compliance with EPA's requirement. These tasks include (1) define feed materials, product streams, and by-products (waste) streams, group and analyze the streams/materials; (2) dispose of hazardous materials; (3) dispose of non-hazardous materials; (4) sample the soil, identify any buried materials, characterize, and dispose; and (5) remove non-functional equipment.

Tasks 1 and 4 are complete; Tasks 2 and 3 are complete except for the final report. Task 5 was expanded to address concerns of EPA Region VIII. The modification was to install two monitoring wells, one up dip and one down dip of the site and to monitor for 2 years. The wells have been installed; the ASTM wellhead pads were installed in the spring of 1995. It should be noted that no soil contamination was detected; however, buried material was encountered, removed, and disposed of in compliance with EPA requirements. The wells obtained water from artisan aquifers and operate with a wellhead pressure of 40 psig at the surface. It was estimated that the aquifer pressure was about 500 psig which would not allow contamination to enter the aquifer. Even with the additional costs of METC's directed analytical tests, the problems of PCB contamination and the addition of two wells to the project, the project is still within budget. This was achieved by finding beneficial uses for most of the materials at no cost to the project.

2.2.2 Resource Conservation and Recovery Act (RCRA)

Hazardous wastes are regulated under RCRA (42 United States Code [USC] 6901 et seq.). EPA's hazardous waste regulations are codified in 40 Code of Federal Regulations (CFR), Part 260-271. West Virginia is authorized to administer RCRA regulations. West Virginia's hazardous waste regulations are found in the West Virginia Code, Title 47, DNR, Series 35 - Hazardous/Waste Management.

METC is recognized by EPA as a hazardous waste generator with a status of "large quantity generator." Hazardous waste disposal is conducted by the Site Support Contractor (EG&G Technical Services of West Virginia). Hazardous wastes are generated from a variety of laboratory, pilot plant, site operation, and maintenance activities. Since METC is not permitted as a hazardous/waste treatment, storage, and disposal facility, all hazardous

wastes are stored and removed from the site in accordance with allowable accumulation times (e.g., no more than 90 days) specified in the RCRA regulation (40 CFR 262.34). Hazardous waste streams are identified, stored, and ultimately disposed of by the Céres Environmental Group. Hazardous and potentially hazardous wastes are ultimately disposed of in EPA-approved secure landfills or, if possible, sent to licensed hazardous waste incinerators for destruction.

2.2.3 National Environmental Policy Act (NEPA)

NEPA declares a general commitment to "use all practicable means" to conduct Federal activities in a way that will promote "the general welfare where man and nature can exist in productive harmony." Thus, before undertaking a proposed Federal action, an assessment of potential environmental impacts is prepared as early as possible during the planning stages of the project. The analysis of potential impacts to the environment is conducted and verified by completing at least one of the following classes of documents:

- a. Environmental Impact Statement (EIS) -- An EIS describes and analyzes the potential effects of the action being considered and potential alternatives to the proposed action. This document is required of Federal agencies for major projects or legislative proposals that have the potential to significantly affect the environment. A Record of Decision (ROD) is prepared and released to inform the public of the agency's decision, the alternative selected and approved by that Federal agency.
- b. Environmental Assessment (EA) -- EAs are analytical documents that assess the potential environmental effects of a proposed Federal action. An EA would either support a conclusion that the proposed Federal action could potentially have a significant effect on the environment, and thus require more complete analysis (with development of an EIS). A Notice of Intent (NOI) to prepare an EIS would then be prepared. If the analysis in the EA supported a Finding of No Significant Impact (FONSI), no additional documentation would be required. The decision document (either a NOI or a FONSI) would be developed to inform the public of the Federal agency's decision.
- c. Categorical Exclusion (CX) -- CXs are prepared for the class of actions which neither individually nor cumulatively would have a significant effect on the human environment. CXs do not require preparation of an EA or an EIS.

A METC site-wide EA was deemed unnecessary based on discussions between J. Wachter, METC ES&H Program Support Division Director, and C. Borgstrom, Director of NEPA Oversight (EH-25). METC does, however, assess the potential environmental impact of each new proposed action prior to on-site implementation of that project,

and prepare the appropriate level of NEPA documentation. During calendar year 1994 a total of 41 NEPA documents were approved for on-site activities. One of these was an EA resulting in a FONSI for the Fundamental Fluid Research Project, and the remaining 40 documents prepared for on-site activities during 1994 were CXs. During the first 6 months of 1995, an additional 14 CXs were approved for METC on-site activities. As with previous years, the CXs approved during calendar year 1994 and the first 6 months of 1995 have generally covered actions related to site monitoring, maintenance, and minor construction.

2.2.4 Clean Air Act (CAA)

Air pollutant emissions are regulated under the CAA as amended (42 USC 7401 through 7642). EPA's regulations are contained in 40 CFR 50 through 87. West Virginia regulates ambient air quality through the West Virginia Division of Environmental Protection (WV DEP), Office of Air Quality (OAQ), Air Pollution Control Regulations Title 45 - WV Code, Series 1-7a, 10, 11, 13-15, and 17-26. An air emissions inventory was completed for the period January 1, 1994, through December 31, 1994. The inventory supported the conclusion by the WV DEP OAQ that METC is currently a small and insignificant source of air emissions.

- Construction Air Permit Obtained for Process Development Unit (PDU) -- On May 1, 1995, METC received air permit number R13-1768 from the West Virginia Office of Air Quality (OAQ) to construct an Experimental Syngas Generator/Hot Gas Desulfurization Process Development Unit (PDU) at the METC site. When the PDU becomes operational, in 2 years, it will be used to develop gas cleanup technologies for advanced integrated coal gasification combined-cycle power generation systems. METC personnel assisted the successful air permitting process by conducting air dispersion modeling studies to prove compliance with air quality regulations and by participating in a recent public meeting held by the OAQ.
- METC is NOT a Title V Source -- On May 16, 1995, Joe Morgan, WV DEP OAQ, documented in writing that "METC is not considered, by this office (WV DEP OAQ), to be a Title V source." Joe Morgan continued by stating that "this office has received and reviewed your Certified Emissions Statement (CES) and agrees with the information which indicates no Title V triggers are met." Thus, no Title V operating permits are required for METC projects.
- Annual Site Air Emissions Inventory -- An air emissions inventory was completed for calendar year 1994 (CY 94). The report covered stationary sources. As per DOE Order 5400, the projected annual emissions rates were documented for sulfur dioxide, nitrous oxides, carbon monoxide, particulate matter, volatile organic compounds, ozone, non-methane hydrocarbon, hydrogen sulfide, and the 189 Hazardous Air Pollutants (HAPS).

The inventory for stationary sources was compiled based upon emission data provided by principal investigators (PIs). These emissions were obtained by the PIs primarily through material balance calculations, reference to building environmental documents (BEDs), or a best educated guess. No actual stack samples were taken for analysis. The inventory supported the conclusion by the WV DEP OAQ that METC projects (excluding the Syngas Generator/PDU) are currently a small and insignificant source of air emissions, and thus do not need to be permitted.

The METC air emissions inventory for CY 94 was provided to Mr. Robert Weser, Assistant Chief of the Enforcement and Permits Section, at WV DEP OAQ, in a letter from Marie Mallin dated April 19, 1995. The METC air emissions inventory for CY 94 was also documented with Mr. William Morrelles, Engineer III, WV DEP OAQ, on April 19, 1995.

Mr. Weser said in a letter dated June 24, 1992, that WV DEP OAQ considers METC to be a small and insignificant source of air pollutant emissions based upon these current emissions. Since that time, further communications with Mr. Weser lead to a second letter written by Mr. Robert Weser to Marie Mallin (METC) dated April 13, 1993, stating again that WV DEP OAQ considers METC to be a small and insignificant source of air pollutant emissions based upon our emission data. Mr. Weser said that no permit is needed for those projects that have been and are currently operating at METC. However, for future projects planned, WV DEP OAQ will work with METC, on a case-by-case basis, to determine if a permit is needed under the State and Federal Clean Air Act regulations.

- Meteorological Monitoring -- The construction of the 150-foot free-standing meteorological tower at METC was completed, including installation of meteorological instruments. The meteorological data will be quality checked periodically by a certified Ph.D. meteorologist. The meteorological data obtained from the tower is needed as input into air dispersion models in order to complete the air surveillance monitoring program for METC (as per Department of Energy orders), and to verify METC's compliance with the Clean Air Act. In addition, this data will be made available to (1) the METC Emergency Operations Center for accidental and non-routine releases, as well as (2) used in evaluating indoor air quality problems such as stack exhaust re-entry into buildings.
- Indoor Air Quality Program -- The METC indoor air quality program started the fourth week of January 1993, and is continuing, working in conjunction with the METC Site Development and Management Division. A baseline for indoor air quality will be developed for each building on site, and remediation will be carried out, as necessary. This work goes above and beyond DOE Order 5400 as EPA has not yet outlined specific requirements on indoor air quality.

It is imperative to recognize that Quality Assurance/Quality Control (QA/QC) is an integral part of air sampling, for both indoor air as well as outdoor air. To this end, a request was made for the following EPA Quality Assurance Handbooks for Air Pollution Measurement Systems:

- Volume I: Principles
- Volume II: Ambient-Air Specific Methods
- Volume III: Stationary Source Specific Methods
- Volume IV: Meteorological Measurements
- Volume V: Manual for Precipitation Measurement Systems

These will be used to ensure a top notch air program with the QA/QC built right in from the start.

Asbestos Abatement Program -- Asbestos is regulated under EPA Regulation 40 CFR 61, Subpart M, as well as the Occupational Safety and Health Administration (OSHA) Regulation 29 CFR 1910, Parts 1001, 1101, and 1926.58, and West Virginia State regulations. METC Procedure 5400.3-2, Asbestos Management, details the responsibilities and procedures to which METC will adhere for site management of asbestos. A full asbestos survey of all METC facilities was completed during 1992. No current plan exists to totally remove asbestos containing materials from METC. Facility construction and modification plans are reviewed during the planning stages for potential asbestos disturbance. An asbestos abatement plan is being developed for specific projects at this time on an as-needed basis.

Asbestos abatement activities completed between January 1, 1994, and May 16, 1995, include:

1. Encapsulation of asbestos wallboard in Building 7 and Building 9.
2. Removal of 800 square feet of floor tile from Building 20.
3. Removal of under 30 square feet of asbestos wallboard in Building 9.
4. Repair and encapsulation of under 10 square feet of damaged asbestos wallboard in Building 4.
5. Removal of under 30 square feet of HVAC insulation from Building 13.
6. Numerous penetrations cut through asbestos containing outer and inner walls in Building 1, Building 3, and Building 7.
7. Attached building identification signs to asbestos wallboard in Building 3, Building 4, Building 5, Building 7, and Building 9.

No asbestos abatement activities are planned for the remainder of FY 95.

2.2.5 Clean Water Act (CWA)

Wastewater discharges are regulated under the CWA (33 USC 1251 et seq.) and EPA Regulations 40 CFR, Parts 121, 122, 125, 136, 405, and 405-471. West Virginia is an authorized National Pollutant Discharge Elimination System (NPDES) state and has regulations under Title 46 - WV Codes 1 and 2.

On March 9, 1993, METC received authorization from the WVDEP to operate under General WV/NPDES Water Pollution Control Permit No. WV0111457. METC was assigned General Permit Registration No. WVG610042. Under the terms of this permit, METC is required to submit an annual discharge monitoring report (DMR) to the WVDEP. METC is also required to develop a complete Storm Water Pollution Prevention Plan, and this plan will be completed by August 1995. METC's NPDES permit expires on June 7, 1997.

METC's sanitary and industrial wastewater is discharged to the City of Morgantown's municipal sewer system/POTW under Permit No. 012 issued by the MUB. Industrial wastewater is pretreated in a spiroflow clarifier at METC, which removes coal fines prior to discharge. The effluent from the clarifier is monitored to ensure compliance with Permit No. 012. Sanitary wastewater is discharged directly to the municipal sewer system with no prior monitoring. All monitored parameters were within permit limitations during 1994 except for October, when the pH limit was exceeded.

The 1991 regular session of the West Virginia legislature enacted a new law entitled the Groundwater Protection Act (Chapter 20, Article 5M of the West Virginia Code). The Groundwater Protection Act required the Division of Natural Resources to promulgate the Groundwater Protection Act Fee Schedule (Title 47, Series 55, Legislative rules of the Division of Environmental Protection). This regulation, which became effective on June 19, 1992, establishes Groundwater Protection and Remediation fees applicable to owners or operators of facilities or activities that have the potential to impact groundwater quality. METC submitted the required Groundwater Protection and Remediation annual fees to the WVDEP in 1992 and 1993.

2.2.6 Safe Drinking Water Act (SDWA)

Drinking water is regulated under the SDWA (42 USC 300f through 330j - 11). Regulations promulgated pursuant to the SDWA are codified in 40 CFR, Parts 141 through 143.

METC receives its potable water supply from the City of Morgantown. Under METC's Safe Drinking Water procedure, testing of the site's potable water is required three times per year. Water samples are tested and compared against the SDWA primary and

secondary regulatory standards. SDWA standards were exceeded at isolated drinking water sources. The METC procedure requires that a sign be posted to warn employees of the unacceptable water until the problem has been eliminated.

2.2.7 Toxic Substances Control Act (TSCA)

Polychlorinated biphenyls (PCBs) and asbestos are regulated under the TSCA (15 USC 2601 to 2654). EPA regulations addressing PCBs and asbestos in conjunction with the TSCA are codified in 40 CFR 761 and 763, respectively. Asbestos is also regulated under the CAA (40 CFR 61, Subpart M); the Occupational Safety and Health Act (29 CFR 1910, 1001, 1101, and 1926.58); and West Virginia State Regulations.

METC disposes of all abated asbestos and asbestos-containing materials in asbestos-approved landfills. Additional information regarding asbestos can be found in this section under the CAA. All PCB transformers were removed from METC during previous years.

2.2.8 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Pesticides are regulated under the FIFRA (USC 136 through 136 [y]). EPA pesticide regulations are codified in 40 CFR, Parts 162, 166, and 171.

No material of this type is stored at METC. The use of pesticides at METC is limited to materials that are not classified by the EPA for restricted use. Compliance was verified by comparing the Material Safety Data Sheet (MSDS), which must accompany the material on site, with the applicable standard. Pesticides are applied by qualified contractors using certified personnel. Pest control for buildings is performed monthly or as-needed and normally entails the spraying of interior baseboards and corners.

Policy and procedures regarding the use of insecticides, fungicides, and rodenticides at METC are contained in METC Order 5400.1, General Environmental Protection Program, of June 3, 1993.

2.2.9 Endangered Species Act (ESA)

To ensure that Federal actions are not likely to jeopardize the continued existence of endangered or threatened species, regulatory protection is provided under Section 7 of the ESA of 1973 (10 USC 1536).

The following agencies were contacted for information regarding threatened and endangered species on, and adjacent to, the METC site:

- Natural Heritage Program of the DNR.

- U.S. Fish and Wildlife Service.
- West Virginia University.
- Marshall University School of Biological Sciences.

Information obtained from these sources indicated that there is no documentation of rare, threatened, and endangered species in the vicinity of the METC site in Morgantown, West Virginia. No threatened or endangered species were encountered during the course of an Environmental Baseline Characterization of the METC site by the USACE. Therefore, no compliance action was required during this period.

2.2.10 National Historic Preservation Act (NHPA)

The following is a list of laws, one EO, and a Presidential Memorandum that provides guidance for the protection of archeological and historic resources:

- Antiquities Act of 1906 (Public Law [P.L.] 59-209).
- Historic Sites, Buildings, and Antiquities Act of 1935, P.L. 74-292, as amended by P.L. 89-249, P.L. 96-625.
- Archeological Recovery Act of 1960, P.L. 86-523, as amended by P.L. 93-291 (The Archaeological and Historic Preservation Act of 1974), P.L. 95-625, P.L. 96-205, and P.L. 96-515.
- NHPA of 1966, P.L. 89-665, as amended by P.L. 92-243, P.L. 93-54, P.L. 94-422, P.L. 94-458, P.L. 96-199, P.L. 96-244 and 96-616, P.L. 98-483, and P.L. 101-70.
- EO 11593 (1971).
- President's Memorandum on Environmental Quality and Water Resources Management (1978).
- Archaeological Resources Protection Act of 1979, P.L. 96-95, as amended by P.L. 100-555 and P.L. 100-588.

A cultural resources survey was performed as part of an environmental baseline study of the METC site. A small number of artifacts were discovered and were identified as potential cultural resources. Further evaluatory testing will be conducted in the future. However, in the near term, METC has isolated the identified sites to comply with the NHPA.

Additionally, a comprehensive architectural reconnaissance survey of the METC site was also undertaken as part of the METC baseline characterization study. That survey identified no structures that were potentially eligible to be listed on the National Register of Historic Places. Therefore, no compliance action was required for this area.

2.2.11 Floodplain/Wetlands Assessments

Two Executive Orders (EO 11988, Floodplain Management, and EO 11990, Protection of Wetlands) require Federal agencies to consider the effects of proposed actions on floodplains and wetlands.

Five wetland systems were identified and delineated on the site in accordance with the Corps of Engineers Wetlands Delineation Manual (1987).

The National Flood Insurance Program, Flood Insurance Rate Maps document 100-year and 500-year floodplains along Burroughs Run and West Run adjacent to the METC facility.

In order to remain in compliance with EO 11988, Floodplain Management, and EO 11990, Protection of Wetlands, METC has completed the following actions:

In association with METC's site baseline characterization, an Environmental Constraints Map (ECM) has been developed. The ECM's function is to identify the areas located on site where no future development should occur. METC's identified wetlands and floodplains are delineated on this map to fulfill METC's obligation to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and wetlands and to avoid direct or indirect support of floodplain and wetlands development whenever there is a practicable alternative.

METC has implemented a SWMP under METC Order 5400.1, "General Environmental Protection Program," a Chemical Hygiene Plan, and an Emergency Response Plan. These actions will ensure that METC will provide the leadership and will take action to minimize the destruction, loss, or degradation of floodplain/wetlands, and to preserve and enhance the natural and beneficial values of floodplains/wetlands in carrying out its responsibilities.

2.3 Current Issues and Actions

METC has several concerns on issues that could affect current and future operations both on site and off site. A summary of the concerns are as follows:

- The site-wide soil surveillance project, conducted in 1994, showed that at one location on the METC property the surface soil had low-level contamination from past research activities. METC will now use the information gathered in 1994 and conduct a risk assessment to determine if any actions need to be taken to protect human health and the environment.
- In 1994 METC submitted a Pond 005 closure revision to the State of West Virginia. The revision states that the pond

should be closed with no further action since the ground-water monitoring has shown no degradation to the water quality. When the State replies to the suggested closure revision, METC will take whatever actions are necessary to close the site.

- The underdrain of one of METC's buildings has been contaminated by the fly ash used for the foundation of the building. The leachate is acidic and contains metals. In 1994, METC completed a study to determine the most appropriate treatment method to neutralize the water. In the near future, METC will put the treatment system in place.
- The METC site assessment has identified the storm water sewer lines as a potential source of contamination due to the historical use of the lines as industrial waste lines. Current and future efforts include the characterization of the sediment in the lines and soils immediately surrounding the lines. The results of the characterization will be used in a risk assessment to determine what actions, if any, are required to protect human health and the environment.

2.4 Summary of Permits

- MUB Permit No. 012, issued by the MUB for the discharge of sanitary and pretreated industrial wastewater to the City of Morgantown's municipal sewer system/POTW.

Issued: July 1, 1990. Expires: June 30, 1995

- WV/NPDES Permit No. WV0111457, General Permit Registration No. WVG610042, issued by the West Virginia Department of Commerce, Labor and Environmental Resources Division of Environmental Protection for the discharge of storm water to Burroughs Run and West Run.

Issued: March 9, 1993. Expires: June 7, 1997

- Air Permit No. R13-1768, issued by West Virginia Office of Air Quality (OAQ) to construct the Experimental Syngas Generator/Hot Gas Desulfurization Process Development Unit at the METC site.

Issued: May 1, 1995. Expires: None.

3.0 ENVIRONMENTAL PROGRAM OVERVIEW

3.1 Radiological Monitoring Program Summary

The Atomic Energy Act (AEA) of 1954 and its amendments are the Federal law that mandates that DOE control radioactive materials to protect public safety and health. DOE Orders and EPA and Nuclear Regulatory Commission (NRC) regulations are based on the

AEA. Under the AEA, as amended, DOE is responsible for establishing and maintaining an environmental health and safety protection program. Furthermore, although DOE facilities are generally exempt from NRC regulations, the facilities are to meet the intent of these regulations.

3.2 Nonradiological Monitoring Program Summary

The nonradiological monitoring program at METC is designed to meet permit requirements and assess the effectiveness of ongoing waste minimization and pollution prevention programs. The monitoring program focuses on industrial wastewater, storm water, groundwater, and soil. METC currently does not monitor any point source air emissions.

The primary objective of the industrial wastewater monitoring program is to comply with MUB's POTW pretreatment requirements.

The primary objectives of the storm water discharge monitoring program are to comply with the NPDES permit and to determine whether and when present on-site storm water and underdrain discharges contain contaminants that could cause potential surface water and sediment contamination of Burroughs Run and West Run.

The primary objective of the groundwater monitoring program is to determine whether or when contamination of the groundwater occurred.

The primary objective of the soil monitoring program is to determine if any METC activities have had an impact on the soil quality.

3.3 Permits

METC has a current requirement for only two permits. These permits include:

- MUB Permit No. 012, issued by the MUB for the discharge of sanitary and pretreated industrial wastewater to the City of Morgantown's municipal sewer system/POTW.

Issued: July 1, 1990. Expiration Date: June 30, 1995.

Compliance Status: All monitored parameters were within permit limitations in 1994 except pH in the month of October. Data for 1994 are attached in Table 5. A notice of violation for the pH exceedance was issued to METC by the Morgantown Utility Board. The elevated pH level was directly attributable to high pH blowdown from the boilers. Although elevated pH levels have occurred during past years, this is the first year that they have exceeded the permit limitation. This could be the result of many complex factors including, but not limited to, higher blowdown rates, lower overall industrial wastewater flows, the addition of

new chemicals into the industrial discharge such as those from the process water treatment system, a decrease in the buffering capacity of the discharge, etc. After the boiler operating parameters and conditions stabilized, the amount of blowdown decreased. Subsequently, pH levels in the industrial discharge decreased and leveled off. METC is currently developing a method to control the pH level of the boiler blowdown to ensure that the permit limitation is not exceeded in the future.

- WV/NPDES Permit No. WV0111457, General Permit Registration No. WVG610042, issued by the West Virginia Department of Commerce, Labor and Environmental Resources Division of Environmental Protection for the discharge of storm water to Burroughs Run and West Run.

Issued: March 9, 1993. Expiration Date: June 7, 1997.

Compliance Status: As stated in the WV/NPDES permit approval letter, METC is required under the terms and conditions of this permit to:

1. Monitor and report annually to the State of West Virginia the level of oil and grease, pH, BOD, COD, nitrate, nitrite, and TSS of storm water from outfalls 002, 005, and 010. These data are to be submitted in the form of a DMR each March 9th. Data for 1994 are attached as Table 8a.
2. Monitor and report monthly to the State of West Virginia the level of fecal coliform in storm water from outfalls 002, 005, and 010. These data are to be submitted in the form of a DMR on or before the ninth of each month. Data for 1994 are attached as Table 8b. These outfalls are to be monitored until sample results show that the source of fecal coliform has been found and eliminated. METC may then petition the State for relief of these monitoring and reporting requirements. Dye tests have been performed to track the source of any cross-connections; however, at this time none have been found.
3. Develop a storm water pollution prevention plan. This plan is to be retained on site and made available for review by the State at their request.

Air Permit No: R13-1768. \

Issued: May 1, 1995.

Issued By: West Virginia Office of Air Quality,
Charleston, WV.

Expiration Date: None.

On May 1, 1995, METC received an air permit from the West Virginia Office of Air Quality (OAQ) to construct an Experimental Syngas Generator/Hot Gas Desulfurization Process Development Unit (PDU) at the METC site. The WV OAQ issued the construction permit number R13-1768 pursuant to Subsection 4.5 of 45CSR13.

Syngas generator/PDU construction will begin immediately. When the PDU becomes operational in 2 years, it will be used to develop gas cleanup technologies for advanced integrated coal gasification combined-cycle power generation systems. METC personnel assisted the successful air permitting process by conducting air dispersion modeling studies to prove compliance with air quality regulations and by participating in a recent public meeting held by the OAQ.

3.4 NEPA EIS/EAs Performed

METC must prepare NEPA documents in support of both proposed on-site actions and off-site Federal actions that are undertaken in cooperation with Federal, State, or local government; educational institutions; or private industry. During calendar year 1994 and the first half of 1995, a total of 223 NEPA documents were produced by METC. Fifty-five (55) of these documents were for METC on-site work and the balance supported proposed METC off-site actions.

As noted above, during calendar year 1994 a total of 41 NEPA documents were prepared to support on-site activities. One of these was an Environmental Assessment resulting in a Finding of No Significant Impact for the Fundamental Fluid Research Project and the remaining 40 documents prepared for on-site activities during 1994 were CXs. During the first 6 months of 1995, an additional 14 CXs were approved for METC on-site activities. As with previous years, the CXs approved during calendar year 1994 and the first 6 months of 1995 have generally covered actions related to site monitoring, maintenance, and minor construction.

During calendar year 1994 and the first half of 1995, a total of 168 additional NEPA documents were prepared to support METC's off-site activities. Most of the NEPA documents prepared (217) were CXs, however, 2 EAs with FONSI and 3 EISs with RODs were also completed in support of off-site work.

During this past year significant upgrades to the computer-aided, standardized NEPA formats program and to the NEPA document tracking system have been made. The NEPA formats program and the NEPA tracking system are available to site personnel. These two computer-based systems allow METC to conduct the NEPA process efficiently and track all NEPA actions easily and accurately.

3.5 Solid and Hazardous Waste

METC is recognized by the EPA as a hazardous waste generator (EPA Identification No. WV7890331886). METC's hazardous waste generator status for 1994 was "large quantity generator." A total of 10,217 kg (25,801 lb) of solid waste was generated at METC during 1994. Approximately 1,732 kg of this were hazardous waste, 48 kg were medical waste, and 8,437 kg were non-hazardous solid waste. Table 1 in the Appendix summarizes the types of solid and hazardous wastes generated at METC during 1994 and their likely sources.

METC's hazardous waste management subcontractor during 1994 was McCutcheon Enterprises, Inc., of Apollo, Pennsylvania. The following treatment storage and disposal facilities (TSDFs) were utilized for the management and disposal of solid and hazardous wastes generated at METC during 1994: (1) Rollins Environmental Services (NJ), Inc., Bridgeport, NJ, hazardous waste incineration; (2) Rollins Environmental Services (TX), Inc., Deer Park, TX, hazardous waste incineration; (3) Chemtron Corporation, Avon, OH, fuel blending; (4) Lancaster Oil Company, Lancaster, PA, residual landfill; (5) Hawker Energy Products, Warrensburg, MO; and (6) P.J. Greco & Sons, Inc., Pittsburgh, PA, contaminated scrap metal for recycle.

Recycling, reclamation, and recovery and reuse were used to the maximum extent possible for METC's waste streams. Incinerable materials having little or no potential to be recycled, reclaimed, or recovered and reused were sent to licensed hazardous waste incinerators for destruction, thereby reducing the quantity of material sent to landfills. Non-hazardous solid wastes were disposed of in sanitary or industrial waste-permitted landfills. No wastes were disposed of on the METC site during 1994. General office wastes were collected from the various areas around the facility and loaded into on-site dumpsters. These dumpsters were removed by approved contractors, and the contents were disposed of in a local sanitary landfill.

Since METC is not permitted as a hazardous waste storage facility, all hazardous wastes are stored in accordance with the allowable accumulation times specified under RCRA regulations (40 CFR 262.34) and then removed from the site. METC retains these wastes on site for no more than 90 days before disposal to off site, fully licensed, treatment, storage, or disposal facilities. No hazardous waste is treated, stored in excess of 90 days, or disposed of at METC or at any of the western sites.

3.6 Audits and Self Assessments

METC undertook several activities this year that provided information concerning our health of environment, safety, and health program. In emergency response, METC conducted three small-scale functional training drills and one large-scale exercise. The large exercise included participation from off-site response

agencies such as the Morgantown Fire Department, local hospitals, ambulance companies, and the Monongalia County Office of Emergency Services. The exercise determined that METC's emergency response program is still maturing and is capable of responding to credible emergency threats posed at the site.

METC also was the recipient of a state RCRA inspection of our Hazardous Waste Facility. This surprise inspection resulted in an excellent rating and the inspector was impressed with the construction of the new Hazardous Waste Facility. The inspector also reviewed emergency response plans, permits, and hazardous waste manifests. No notices of violations were received from this inspection.

METC also was a participant in the DOE's Chemical Vulnerability Assessment and answered the questionnaire that was sent to screen out those sites that had small amounts of chemicals and did not pose a serious threat to the public. METC fell under the threshold for a full site evaluation; however, METC felt that a full assessment was warranted to better understand our chemical vulnerabilities. Therefore, METC is presently undertaking a full site assessment using the same criteria that DOE is using at other sites. No significant findings have been identified other than minor programmatic deficiencies.

METC continues to complete corrective actions from the 1991 Tiger Team and over 95 percent of these corrective actions are now completed. The METC Corrective Action Tracking System (MCATS) developed for this assessment is still being used to tracking findings to completion.

3.7 Waste Minimization

In 1994, the METC Recycling Program collected paper and cardboard, aluminum, film canisters, spiral plastic binders, styrofoam peanuts, and three-ring notebook binders. The program started in early 1992 at the employee grass roots level and now has management support with the imposition of Executive Order 12873. Including 8.4 tons of confidential shredded paper, computer paper, white office paper, and mixed office paper amounted to 37.2 tons in 1994. Cardboard collection totaled 7.7 tons even after a 3-month suspension of cardboard collection. The total amount of paper and cardboard collection of 44.9 tons represents a 20 percent increase over the amount recycled in 1993. This increase assured that METC met the DOE goals to reduce waste and was visibly demonstrated by taking 20 percent of the dumpster capacity out of service. Further waste reduction efforts will take place to meet a 5 percent reduction in each year until 2000.

On-site aluminum can collection amounted to 0.54 tons. Two thousand (2,000) photographic film canisters were returned to Kodak this past year for recycling.

Employees are encouraged to reuse three-ring notebook binders and return plastic spiral binders to the Duplicating Department. Styrofoam peanuts are returned to the Shipping Department for reuse.

Used batteries are collected as part of the hazardous waste collection program.

3.8 Environmental Training

Two computer-based training courses were given to all Federal employees on site in 1995. Waste Minimization training included recycling and hazardous waste (RCRA) document control. The Hazcom I training included MSDS documents relating to hazardous chemicals used on site.

4.0 RADIOLOGICAL PROGRAM

The Atomic Energy Act (AEA) of 1954 and its amendments are the Federal law that mandates that DOE control radioactive materials to protect public safety and health. DOE Orders and EPA and Nuclear Regulatory Commission (NRC) regulations are based on the AEA. Under the AEA, as amended, DOE is responsible for establishing and maintaining an environmental health and safety protection program. Furthermore, although DOE facilities are generally exempt from NRC regulations, the facilities are to meet the intent of these regulations.

Currently, METC does not generate, transport, process, treat, or have on-site permanent disposal of any radioactive waste. However, METC does use, in the conduct of research, instrumentation that contains radioactive sources. An inventory of radiation sources is maintained by the Radiation Safety Officer, indicating the item, isotope, quantity, custodian, location, status, and activity. The December 1994 source inventory is provided as Table 2 in the Appendix. METC does not release any radionuclide into the environment as all of its sources are sealed and are used in instrumentation.

The radiation monitoring currently performed at METC consists of a limited number (less than 20) of personal dosimeter badges and rings supplied under a contract with Siemens Gammasonics, Inc. Additionally, leak testing is conducted on all applicable sealed sources with analysis also performed by Siemens Gammasonics, Inc.

In addition to baseline radiological monitoring, indoor radon sampling at METC was performed during 1994 to screen all facilities on site in order to determine the indoor radon concentrations and if there existed a need for additional follow-up testing.

The risk of lung cancer resulting from exposure to radon and its decay products has been documented by both State and Federal health officials. According to the U.S. Environmental Protection

Agency (U.S. EPA), there has recently been increased evidence that indoor radon concentrations may present a significant health threat. EPA also reports there are areas in the country where indoor radon concentrations are such that significant health risks exist even from short-term exposure.

During radon sampling at METC, the measurement device was located in a place inside each building where it was least likely to be tampered with and labeled with a "Do Not Disturb" sign. Additionally, the measurement device was not placed where air or wind drafts were detectable. As recommended by the U.S. EPA and the monitor manufacturer, measurements were not performed in kitchens, laundry rooms, closets, or bathrooms, as these locations require exhaust fans and frequent air exchanges. Lastly, the radon measurement device was placed according to the EPA-recommended sampling protocol listed in Table 1.

During indoor radon sampling, closed building conditions were followed 12 hours prior to and during the sampling period. Normal entrance and exit traffic was excluded from this condition. Internal-external air exchangers (e.g., high-volume attic fans, window fans, etc.) were shut down 12 hours prior to and during the radon measurement period. Normal HVAC operation continued since shutdown of these systems would be impractical for the occupants of the various buildings at METC. In addition, radon measurements were not performed when severe storms with high winds and/or rapidly changing barometric pressure were predicted due to the possibility of their effects on the sampling results.

Documentation concerning each measurement period was recorded and kept on file. The documentation developed on each measurement sequence is detailed in Table 2.

Radon measurements were performed for at least 48 hours in each building in order to ensure two complete 24-hour cycles. An average radon concentration was recorded and documented every 4 hours during the 48-hour period.

The purpose of the radon screening measurements conducted at METC was to determine if there were (1) radon concentrations high enough to warrant health risks to building occupants and (2) radon concentrations high enough to necessitate follow-up measurements and actions. According to U.S. EPA (1986), radon concentrations below 4 pCi/L present a relatively low probability of significant health risk. At concentrations below 4 pCi/L, there is no follow-up sampling recommended. None of the buildings or trailers sampled at METC were found to contain radon concentrations exceeding 4 pCi/L, thus no follow-up sampling or action is required.

A program of Quality Assurance/Quality Control (QA/QC) was followed during all radon measurements performed at METC. The radon measurement device was recalibrated at least once every

12 months. The particular device utilized for the radon measurements at METC was last calibrated on March 24, 1994, by Sun Nuclear Corporation, Melbourne, Florida. Precision checks were also made on the radon measurement device roughly every tenth 48-hour measurement period. These precision checks were performed in a Sun Nuclear Corporation Model 1080 Radon Constancy Chamber located in the radiation storage room in Building B-16 at METC. The radon constancy chamber contains a phosphorus rock that is a naturally occurring 15 pCi/L radon-222 constant source that emits in a confined, air-tight chamber during precision checks.

The sampler utilized during the measurement of indoor radon concentrations of the buildings located at METC operated within the specifications listed in Table 3.

The radon screening conducted at METC covered all buildings and trailers located on site that were occupied or had the potential to be occupied by personnel. Table 4 contains a list of all the buildings and trailers screened. The results of the radon monitoring are presented in Table 5. As stated previously, none of the buildings at METC had radon levels above the EPA action level of 4 pCi/L. Thus, no follow-up measurements nor corrective actions are needed.

5.0 NONRADIOLOGICAL PROGRAM

5.1 Monitoring Program

The nonradiological monitoring program at METC is designed to meet permit requirements and to assess the effectiveness of ongoing waste minimization and pollution prevention programs. The 1994 monitoring program focuses on industrial wastewater, storm water, groundwater, and soil.

5.2 Effluent Data Summary - Water

METC's effluent water consists of an industrial wastewater component and a sanitary wastewater component.

The primary objective of the industrial wastewater monitoring program is to comply with MUB's POTW pretreatment requirements.

The primary objectives of the storm water discharge monitoring program are to comply with the NPDES permit and to determine whether and when present on-site storm water and underdrain discharges contain contaminants that could cause potential surface water and sediment contamination of Burroughs Run and West Run.

The primary objective of the groundwater monitoring program is to determine whether or when contamination of the groundwater occurred.

The primary objective of the soil surveillance program is to determine if any METC activities have had an impact on the soil quality.

5.2.1 Contaminated and Industrial Wastewater

Industrial wastewaters are generated in varying amounts and strengths throughout the Morgantown facility. The primary sources of industrial wastewater generated during 1994 were as follows:

- Analytical laboratories produced low-strength wastewater, generated primarily from cleaning laboratory equipment and cooling instrumentation. (Laboratory chemical waste is not treated by METC but is shipped off site to a waste disposal contractor.)
- Runoff from process and coal storage areas generated wastewater, variable in both strength and volume, depending on the amount of precipitation.
- Steam plant, air conditioning, and compressor operations produced noncontact cooling water and waste condensate, which overflowed into the industrial wastewater system from the site process water system. Blowdown from the boilers also flowed into the industrial wastewater system.

The primary sources of industrial wastewater generation at METC consist of various bench-scale research projects, PDUs, and pilot plants. This industrial wastewater consists of low-strength and high-strength components. Minimal quantities of high-strength industrial wastewater were generated during 1994. All high-strength industrial wastewater generated at METC is currently shipped off site to a hazardous waste disposal contractor (Ceres Environmental Group, Inc.) for appropriate treatment, storage, and ultimate disposal.

Since September 1990, METC has been connected into the City of Morgantown's municipal sewer system and POTW. As a result of this connection, minimal quantities of low-strength industrial wastewater are currently discharged to Morgantown's POTW after being pretreated in a 16-foot spiroflow clarifier. The clarifier, which is utilized to remove coal fines before discharge to the city's POTW, was installed as part of the tie-in to the city's sewer system.

Clarifier Effluent Monitoring. METC is currently permitted by MUB for connection to the city's POTW and is required by that permit to conduct monthly monitoring of the clarifier effluent. Clarifier effluent monitoring parameters and the sampling results presented in Table 6 are the monthly analyses of the clarifier effluent during its use in 1994. Discharge limits imposed by MUB are included also in Table 6.

5.2.2 Sanitary Wastewater

Sanitary wastes were generated by approximately 650 METC employees during 1994. With the tie-in to the city completed in September 1990, all of METC's sanitary wastes are now discharged directly to the City of Morgantown's municipal sewer system/POTW with no prior treatment nor monitoring occurring at METC.

5.2.3 Storm Water

Storm water is collected from approximately 75,000 square meters (18.5 acres) of nonindustrialized area, such as from sidewalks, roadways, and roof drains. The storm water system discharges at eight main outfalls (see Figure 2).

On March 9, 1993, METC received authorization from the State of West Virginia to operate under a General West Virginia/NPDES Water Pollution Control Permit. Under the terms and conditions of this permit, METC is required to:

1. Monitor and report annually to the State of West Virginia the level of oil and grease, pH, BOD, nitrate, and TSS of storm water from outfalls 002, 005, and 010. (These three outfalls drain the largest areas of the METC site are, therefore, considered characteristic of METC storm water.) These data are to be submitted in the form of a DMR each March 9th. This data is shown on Table 7.
2. Monitor and report monthly to the State of West Virginia the level of fecal coliform in the storm water from outfalls 002, 005, and 010. These data are to be submitted in the form of a DMR on or before the 9th of each month. This data is shown on Table 8. These outfalls are to be monitored until sample results show that the source of fecal coliform has been found and eliminated. METC may then petition the State for relief of these monitoring and reporting requirements.
3. Develop a Storm Water Pollution Prevention Plan. This plan is to be retained on site and made available for review by the State at their request.

METC has been monitoring outfalls 002, 005, and 010 monthly for fecal coliform as required by the State since May 1993 (Tables 7 and 8). Fecal coliform levels have been extremely irregular throughout the course of the monitoring program. Levels of fecal coliform could possibly be caused by cross connections between the storm water system and the sanitary system; however, currently, there is no additional data to support this conclusion. Elevated fecal coliform counts could also be the result of fecal contamination from animal life. Various efforts, including the use of dyes, were conducted in an attempt to determine if the two systems are cross connected. The results of these efforts indicate the two systems are not directly cross-connected.

Further efforts are being made to identify and eliminate the source of fecal coliform in the storm water discharge.

5.3 Water Surveillance

5.3.1 Potable Water

As per METC Order 5400.1, Section 1.3.1, "Safe Drinking Water Requirements Procedure," drinking water at METC must be tested to determine compliance with primary and secondary drinking water standards. Drinking water at METC is tested three times per year. Once per year the drinking water is tested for primary and secondary drinking water standards and twice per year for lead, copper, and corrosivity. SDWA standards were exceeded at isolated drinking water sources. The METC procedure requires that a sign be posted to warn employees of the unacceptable water until the problem has been eliminated.

5.3.2 Boiler Cooling Water

As per METC Order 5400.1, Section 7.7.1, "Legionella Monitoring Procedure," water from the boiler cooling tower at METC must be tested quarterly for legionella bacteria. If any legionella bacteria are found, a second round of samples are taken within two weeks. If the bacteria still exist, a biocide is to be applied to the cooling water. The biocide method of treating the cooling water was approved by MUB. Due to repeated detection of legionella bacteria colonies in the cooling water, the biocide treatment has been implemented on a continuing basis. No colonies have been found during the August 1994 or the January 1995 sampling events.

5.4 Reported Releases Under CERCLA or RECRA

METC experienced one reporting incident in 1994..

Ethylene glycol was discharged from METC to the Morgantown Utility Board's (MUB) Publicly Owned Treatment Works (POTW) on May 2-3, 1994.

On Monday, May 2, 1994, a pink discoloration was observed in the clarifier which discharges from METC into the municipal sanitary sewer system. The source was a leaking coil in a HVAC chiller unit. A review of the Material Safety Data Sheet (MSDS) for the substance that leaked revealed that the agent responsible for the discoloration in the clarifier was the heat transfer fluid (DOWTHERM [R] SR-1 Heat Transfer Fluid) utilized in the HVAC chiller system. This fluid contains greater than 90 percent ethylene glycol. Analytical results of water samples confirmed the presence of ethylene glycol in the influent to the clarifier. The estimated quantity of heat transfer fluid released is 200 gallons. This represents approximately 800 pounds of ethylene glycol. This material was discharged through METC's primary spiral flow clarifier to the local POTW. The MUB/POTW

was notified of the release in accordance with Morgantown's Industrial Waste Ordinance and METC's pretreatment permit.

Ethylene glycol is listed as a hazardous air pollutant in Section 112 of the Clean Air Act, as amended in November of 1990. The term "hazardous substance" as defined in Section 101(14) of CERCLA includes any hazardous air pollutant listed under Section 112 of the Clean Air Act (CAA). Designation as a CERCLA hazardous substance means that a release of this substance requires an immediate report to the National Response Center when the amount released is equal to or greater than the reportable quantity (RQ) listed in 40 CFR 302.

Section 102(b) of CERCLA establishes statutory RQs for releases of CERCLA hazardous substances at 1 pound unless a substance has a different RQ established under Section 311(b)(4) of the Clean Water Act (CWA). Section 102(a) of CERCLA authorizes EPA to adjust these RQs by regulation. Ethylene glycol does not have a different RQ established under the Clean Water Act (CWA); however, EPA is currently proposing to adjust the 1-pound RQ established under CERCLA. The proposed adjusted RQ for ethylene glycol is 5,000 pounds. However, since the proposed rule is not yet final, the RQ for ethylene glycol is 1 pound. Therefore, the release on May 2, 1994, was reportable as a release under CERCLA.

Although the material was discharged to the local POTW rather than directly to the environment, the release was reportable unless the POTW has an approved program or is specifically permitted to accept the material in question. Since there is no formal program or specific permit condition addressing the acceptance of ethylene glycol for treatment, the release is not a federally permitted discharge and is, therefore, reportable under CERCLA.

The release was reported to the National Response Center in Washington, D.C., on May 19, 1994. The report number is 240089. METC was later informed by the Hazardous Waste Management section of the United States EPA Region III that as of July 13, 1994, the case is closed since the quantities released were not of sufficient quantity to warrant a response.

5.5 Chemical Inventory Summary

In conjunction with the ongoing MSDS upgrade, the current site-wide chemical inventory is being revised and validated. Each research laboratory is responsible for providing to the ES&H group their chemical inventory. A master chemical inventory has been compiled. Under the Superfund Amendments and Reauthorization Act (SARA), Title III (Community Right to Know), METC files with the Morgantown Emergency Planning Commission a list of hazardous materials stored on site in quantities above the reportable limits.

5.6 Soil Surveillance

The U.S. Army Corps of Engineers (USACE) Baltimore District and its contractor, Roy F. Weston, Inc., were contracted to perform a site-wide soil surveillance project. The objectives of this investigation were to provide information concerning soil baseline conditions at the facility and to determine and confirm the nature and areal/vertical extent of contamination of specific sites at the METC facility due to past activities. A total of 66 samples from soil borings and 83 surfacial samples were collected. The analyte parameters included metals, cyanide, BETX, SVOCs (PAHs), and, in some locations, radiological compounds. The field work for this project was conducted in October and November 1994.

Except the scrap metal storage area, the analytical results for all soil samples indicate that none of the areas exhibit concentrations of analytes exceeding available EPA or West Virginia Department of Environmental Protection (WVDEP) criteria. No further remediation action will be needed for these areas. In the scrap metal storage area, five SVOCs and lead were detected above EPA and WVDEP criteria. Risk analysis will be performed for this area based on the data available. Future action for this area (additional sampling and/or remediation/removal) will be determined based on the results of this risk analysis.

6.0 GROUNDWATER PROTECTION

6.1 Monitoring Program

Figure 3 shows a current METC site plan and the locations of all of the METC groundwater monitoring wells. Tables 10, 11, and 12 list all of the existing METC groundwater monitoring wells. These tables also list the dates of installation, the name and depth of the aquifer being monitored, and the reason for installation.

To date, no significant contamination has been detected in samples collected from any of the groundwater monitoring wells. A detailed site hydrogeologic report will be prepared after aquifer response tests are completed. This report will include updated potentiometric maps, cross-sections, and analytical data.

6.2 Site Hydrogeology

Most of Monongalia County is underlain by rocks of low permeability, which consequently yield water at low rates. Wells nearest the METC facility typically have yields of 0.1 L/s (1.6 gallons per minute, gpm) or less. The principal aquifers are found in the Pennsylvanian-aged Conemaugh Group and the Pottsville Group. Aquifers of the Conemaugh Group outcrop at the METC site and are the source of most of the domestic water supplies near the area under water-table (unconfined) conditions. Aquifers of the Pottsville Group, which are quite deep but are regarded as the most important aquifers in the county, yield up

to 250 gpm under artesian pressure but average about 45 gpm. The Pottsville Group aquifers are separated from the Conemaugh Group aquifers by several hundred feet of bedrock. There is no apparent communication between these aquifers. Two of the aquifers of the Conemaugh Group are sampled for possible contamination by monitoring wells at METC, the Morgantown and Grafton sandstones. The recharge area for these two aquifers is east of Morgantown in the area of Chestnut Ridge, and both discharge regionally into the Monongahela River west of METC. The Morgantown sandstone outcrops around the perimeter of the METC property along Burroughs Run, West Run, and the Monongahela River. There are small springs in a number of places along these creeks and the Monongahela River where water flows from fractures in the Morgantown sandstone. Although the Grafton sandstone outcrops along West Run below its confluence with Burroughs Run, no springs or seeps have been observed there. Most of the discharge from the Grafton aquifer is probably into the bottom of the Monongahela River.

Unconformably overlying the Pennsylvanian rocks at METC is up to 70 feet of Pleistocene-aged unconsolidated Lake Monongahela sediments. These consist of a basal clayey sand which ranges from 10 to 20 feet in thickness, informally named the "A" aquifer, overlying interbedded clays and clayey sands, informally named the "B-C" aquifer, and a predominately sand unit, the "D," which occurs at the surface on the southwest corner of the site. These sediments were deposited in stream and lacustrine environments as a result of the glacial Lake Monongahela. The "A" and "B-C" units are water bearing under the developed part of the site and both are monitored for possible groundwater contamination at METC. Both units extend off the site, and recharge is probably mostly from off site, as the near-surface sediments are dominated by very low permeability clays in the developed area of METC. Both aquifers outcrop north of the developed area on METC property and form springs and small creeks which drain into West Run. There are probably springs and seeps along the Monongahela River from this unit as well.

7.0 QUALITY ASSURANCE

The reliability and validity of all chemical and physical analyses performed by the analytical laboratory services subcontractor (CT&E Environmental Services, Inc., Charleston, West Virginia) are guaranteed by the subcontractor under an established and formally documented QA/QC program in accordance with the terms and conditions of the subcontract. The program is consistent with DOE Order 5700.6B, "Quality Assurance," and METC Order 5700.6, "Quality Assurance," and addresses all aspects of the services provided including, but not limited to, sampling (i.e., sample collection, preservation, and storage), sample management, analysis/testing, data management, and data reporting. The program is based on the statistics and information suggested in the most recent edition of the following references: Standard Methods for the Examination of Water and Wastewater; EPA Handbook

for Analytical Quality Control in Water and Wastewater Laboratories (EPA-600/4-79-019); EPA Handbook for Sampling and Sample Preservation of Water and Wastewater (EPA-600/4-76-049); Standard Methods, the American Society for Testing and Materials (ASTM) *Manual on Quality Control of Materials, Special Technical Publication*; EPA National Pollutant Discharge Elimination System (NPDES) Compliance Sampling Manual; Test Methods for the Evaluation of Solid Waste - Physical/Chemical Methods (SW-846); and Samples and Sampling Procedures for Hazardous Waste Streams (EPA-600/2-80-018. The most recent revision of the subcontractor's QA/QC Manual is maintained on site at all times by the site support contractor for review and reference.

The subcontractor's QA/QC program addresses the entire analytical process from preparation for sampling through data management and reporting to ensure reliable and valid analytical data. The subcontractor is responsible for ensuring the integrity of all samples from the sampling point to the point of analysis. All labels, containers, and packaging materials required are provided by the subcontractor, and a chain-of-custody system is utilized for all samples to ensure proper sample management. QA/QC data and information is obtained and documented for every analytical result generated to ensure accurate, precise, and defensible measurements and data. The subcontractor utilizes sample blanks, spiked samples, split samples, duplicate samples, and quality control samples to ensure accurate and reliable data. In addition, the site support contractor periodically submits known quality control samples to the subcontractor on a random basis to verify the validity of the subcontractor's QA/QC program. The identity of these quality control samples may or may not be known to the subcontractor. The site support contractor also periodically inspects and audits the subcontractor's facilities, equipment, and operations to further evaluate the subcontractor's performance including their QA/QC program. Analytical results that do not fall within acceptable standards or norms based on valid QA/QC objectives are identified by the subcontractor, and the analytical process is repeated until acceptable results are obtained or the issue is otherwise resolved.

Pertinent QA/QC information and data is reported by the subcontractor along with the written results of every analysis and summary reports of all applicable QA/QC information and data is reported to the site support contractor on a monthly basis.

The proper management and disposal of all solid and hazardous wastes are ensured through thorough investigations of all waste management and disposal subcontractors before contracting for services. All required licenses, permits, certifications, and insurances are obtained and verified. In addition, Certificates of Disposal are obtained for all disposals prior to payment for the services. Selected hazardous waste management and disposal facilities are inspected for compliance with all applicable Federal, state, and local laws and regulations on a rotating periodic basis.

TABLE 1

Sampling Protocol Utilized for Radon Monitor Placement¹

Object	Distance Between Object and Radon Monitor
Windows to Exterior of Building	3 Feet or More
Exterior Walls	1 Foot or More
Floors	3 Feet or More
All Other Objects in Building	4 Inches or More

¹ Protocol from U.S. EPA (1992) and Honeywell manual.

TABLE 2

Documentation Recorded During Radon Measurement

Documentation
Building Number
Building Area
Building Classification (e.g., Office, Mechanical, etc.)
Sampler Location Within Building (i.e., Description)
Start and Stop Dates and Times
Overall Average Radon Measurement (pCi/L)
Average Radon Measurement Over Final 12 Hours of Sampling (pCi/L)
Sampler Type, Model Number, and Serial Number of Radon Sampler Utilized During Measurement Period
Any Additional Comments Pertaining to the Sampling That May Require Further Explanation

TABLE 3

Radon Sampler Specifications

Parameter	Specification
Model Number	Honeywell 05-418 Professional Radon Monitor
Radiation Detected	Alpha Particle Emission From Radon/ Radon Progeny Atomic Decay
Detection Method	Silicon Detector
Measurement Range	0.1 to 999 pCi/L
Accuracy	+/- 25% or 1 pCi/L, Whichever is Greater
Nominal Sensitivity	2.5 Alpha Decays Per Hour/pCi/L
Operating Range: Temperature Relative Humidity	40°F to 90°F (5°C to 32°C) 25% to 85%

TABLE 4

Buildings and Trailers Screened for
Radon at METC

Buildings	Trailers
B-1	T-8
B-2	T-10
B-3	T-12
B-4	T-13
B-5	T-14
B-6	T-20
B-7	T-25
B-12	T-27
B-13	T-28
B-15	T-29
B-16	T-35/36
B-17	T-40
B-19	T-41
B-25	T-42
B-26	T-43
B-29	T-44
	T-45
	T-46

TABLE 5

Summary of Results from Radon Monitoring

METC Location	Average Radon Conc. (pCi/L)
B-1	0.3
B-2	0.1
B-3	0.5
B-4	0.3
B-5	0.3
B-6	0.3
B-7	0.4
B-12	0.3
B-13	0.4
B-15	1.6
B-16	1.3
B-17	0.3
B-19	0.5
B-25	0.3
B-26	0.6
B-29	0.4
T-8	0.3
T-10	0.4
T-12	0.3
T-13	0.2
T-14	0.1
T-20	0.4
T-25	0.4
T-27	0.3
T-28	0.2
T-29	0.2

TABLE 5

Summary of Results from Radon Monitoring
(Continued)

METC Location	Average Radon Conc. (pCi/L)
T-35/36	0.2
T-40	0.3
T-41	0.2
T-42	0.1
T-43	0.1
T-44	0.3
T-45	0.7
T-46	0.3

TABLE 6
1994 Monthly Clarifier Effluents

	MUB Limitation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
pH minimum	6.0	7.3	8.5	7.1	7.1	7.9	7.1	6.9	6.6	6.8	7.4	7.9	7.2
maximum (s.u.)	9.0	8.8	9.0	7.9	8.3	8.9	8.4	7.8	8.1	8.1	10.2	8.9	8.3
BOD (mg/L)	300	2	6	3	9	73	ND	3	ND	4	2	6	11
Total Phenolics (mg/L)	-- ^a	ND ^b	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (mg/L)	300	ND	ND	11	88	13	ND	12	18	ND	9	7	5
TOH (mg/L)	--	0.13	0.82	0.095	0.088	0.058	0.034	0.048	0.055	0.042	0.06	0.068	0.061
Cyanide (mg/L)	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND
Arsenic (mg/L)	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium (mg/L)	--	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (mg/L)	--	ND	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (mg/L)	--	0.003	0.002	0.002	ND	0.002	ND	ND	0.002	0.002	0.008	ND	0.005
Silver (mg/L)	--	0.003	0.002	ND	ND	0.005	ND	ND	ND	ND	ND	0.001	0.002
Copper (mg/L)	--	ND	0.016	0.032	0.024	0.02	0.008	0.008	0.008	0.008	0.034	0.013	0.024
Nickel (mg/L)	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.014
Zinc (mg/L)	--	ND	0.12	0.06	0.26	0.14	0.14	0.12	0.17	0.11	0.08	0.07	0.19
Iron (mg/L)	--	0.36	0.76	0.75	1.26	0.34	0.29	0.51	0.95	0.15	2.1	0.4	1.0
Manganese (mg/L)	--	0.07	0.28	0.22	0.38	0.097	0.18	0.05	0.07	0.08	ND	ND	0.08
Mercury (mg/L)	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Not defined.

Not detected.

TABLE 7

1994 Storm Water Monitoring Data

Sample Source	Date	BOD (mg/L)	COD (mg/L)	Oil and Grease (mg/L)	pH (s.u.)	Nitrate, Nitrite (mg/L)	TSS (mg/L)
002	2/8/94	8	23	ND	6.93	2.1	33
005	2/8/94	10	34	ND	7.21	1.7	50
010	2/8/94	2	ND	ND	7.79	1.5	50

TABLE 8

1994 Storm Water Monitoring Data - Fecal Coliform
(Colonies per 100 ml)

	Permitted Outfall		
	002	005	010
January	8700	7300	8700
February	3000	7300	2000
March	220	48000	300
April	N/A	N/A	N/A
May	8000	8000	600
June	60000	60000	60000
July	12000	18000	13000
August	26000	32000	15000
September	700	98000	8300
October	3000	21000	4000
November	20000	7000	7000
December	3000	200	60

TABLE 9

METC Radioactive Materials Inventory
December 1, 1994

Isotope/ Custodian	Activity/ Date Determined	Source	Location
Kr-85 P. Yue	2 mCi 03/30/81	Model No. 3077 Serial No. 700T Thermo-Systems, Inc.	B-24
Kr-85 P. Yue	2 mCi 01/02/79	Model No. 3012 Serial No. 467T Thermo-Systems, Inc.	B-24
Kr-85 W. Chisholm	2 mCi 05/19/80	Model No. 3012 Serial No. 626T Thermo-Systems, Inc.	B-24
Kr-85 P. Yue	2 mCi 05/78	Model No. 3077 Serial No. 373T Thermo-Systems, Inc.	B-25, Room 212
Kr-85 P. Yue	2 mCi 03/30/81	Model No. 3077 Serial No. 697T Thermo-Systems, Inc.	B-25, Room 212
Ni-63 R. Barnes	15 mCi 03/01/89	Model No. 19233 Serial No. L5470 Hewlett Packard	B-25, Room 115
Ni-63 R. Barnes	15 mCi 06/01/84	Model No. 6000204 Serial No. 533 Perkin-Elmer Corp.	B-25, Room 112
Sc-46 E. Boyle	0.065 mCi 07/01/90	University of Missouri*	B-24
Sc-46 E. Boyle	0.046 mCi 02/12/91	University of Missouri*	B-24
Ra-226 S. Lamey	9 uCi 01/56	Model No. B-5 Serial No. 11205 Mettler Corp.	B-25, Room 206
Ra-226 S. Lamey	21 uCi 01/56	Model No. M-5 Serial No. 17032 Mettler Corp.	B-25, Room 212
Ra-226 L. Gasper-Galvin	9 uCi 01/56	Model No. B-5 GD Serial No. 13805 Mettler Corp.	B-3, Area 150
Phosphate Rock J. Buterbaugh	Consumer Product	Model No. 1080 San Nuclear Corp.	B-24

* Source encapsulated by a nylon bead.

TABLE 9

METC Radioactive Materials Inventory
December 1, 1994
(Continued)

Isotope/ Custodian	Activity/ Date Determined	Source	Location
Th-nat T. McMahon	Consumer Product	Thoriated Heating Elements (12 Units)	B-24
Kr-85 D. Paton	Consumer Product	Type No. OGP44216 Serial No. 9435-001 EG&G, Inc.	B-1, Room 185
Ni-63 D. Paton	Consumer Product	Model No. KN2 Serial No. 107-002-20 EG&G, Inc.	B-1, Room 180

TABLE 10

1994 Groundwater Data for "BC" Sand

Parameter	Sample Location								
	10	11	13	32A	GAS-1	GAS-2	GAS-5	SP2	SP6
Date	03/94	03/94	03/94	03/94	03/94	03/94	03/94	03/94	03/94
	05/94	05/94	05/94	05/94	05/94	05/94	05/94	05/94	05/94
	08/94	08/94	08/94	08/94	08/94	08/94	08/94	08/94	08/94
		11/94	11/94		11/94		11/94		
pH (s.u.)	7.49	6.87	7.02	4.98	6.38	6.54	6.17	7.05	5.86
	6.99	6.88	7.00	5.15	6.86	6.73	6.85	6.99	4.91
	6.11	6.07	6.82	5.17	6.87	6.59	6.45	6.52	4.82
		6.76	6.81		7.05		6.39		
Specific Conductance (uMhos)	289	208	1218	705	342	393	802	489	531
	188	198	397	1091	376	418	975	572	652
	186	176	426	1225	406	383	955	557	525
		183	394		498		1033		
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Barium	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		

TABLE 10
1994 Groundwater Data for "BC" Sand
(Continued)

Parameter	Sample Location								
	10	11	13	32A	GAS-1	GAS-2	GAS-5	SP2	SP6
Iron	110	32	39	0.49	2.6	11	59	6.4	2.4
	19	55	33	0.22	0.64	1.2	70	1.9	0.80
	33	26	25	ND	0.12	0.57	55	0.49	0.059
		24	28		0.38		63		
Manganese	0.92	0.93	0.41	1.6	0.22	1.0	12	2.6	0.34
	0.99	1.1	0.43	2.2	0.29	0.28	13	0.41	0.25
	1.3	0.81	0.26	1.7	0.23	0.18	10	0.16	0.14
		1.1	0.43		0.37		15		
Sodium	6.4	ND	47	81	8.8	8.4	69	5.5	32
	5.2	5.3	16	97	9.5	8.8	76	ND	42
	ND	ND	7.0	110	6.8	6.9	57	ND	22
		3.9	14		9.8		67		
Vanadium	ND	ND	ND	ND	ND	0.012	ND	ND	ND
	ND	0.018	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	0.002	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	0.001	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Xylenes	ND	ND	ND	0.002	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Total Organic Halides	ND	ND	ND	ND	0.039	0.025	0.021	ND	ND
	0.041	ND	0.027	ND	ND	ND	0.029	ND	ND
	ND	ND	0.032	0.033	ND	0.024	ND	ND	0.033
		ND	ND		ND		0.042		
Chloride	6	8	69	180	42	45	210	3	81
	9	8	13	260	43	43	210	4	150
	9	9	10	320	45	42	190	4	110
		9	15		60		210		
Sulfate	8	26	41	150	18	36	65	34	30
	15	350	36	170	23	52	81	27	69
	ND	10	17	70	14	22	41	16	37
		20	25		20		50		

TABLE 10

1994 Groundwater Data for "BC" Sand
(Continued)

Parameter	Sample Location								
	10	11	13	32A	GAS-1	GAS-2	GAS-5	SP2	SP6
Fluoride	0.07	0.06	0.06	0.16	0.05	0.06	0.05	0.16	0.10
	0.09	0.05	0.06	0.19	0.06	0.06	0.05	0.10	0.21
	0.06	0.06	ND	0.21	0.07	0.05	0.06	0.12	0.12
		0.06	0.05		0.05		0.05		
Nitrate Nitrogen	ND	ND	ND	0.61	0.07	ND	ND	0.12	0.58
	ND	ND	0.07	0.81	0.06	ND	ND	ND	2.5
	ND	ND	0.05	0.91	0.05	ND	ND	0.08	1.40
		ND	0.10		ND		ND		
Phenolics	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Total Organic Carbon	11	5.8	16	9.5	6.3	8.6	13	15	3.5
	2.7	2.9	2.7	2.8	3.8	4.2	8.2	3.8	4.3
	2.6	2.0	3.4	3.9	2.2	2.8	4.6	10.2	2.4
		3	7		5		8		
Naphthalene	ND	ND	ND	0.032	ND	ND	ND	ND	ND
	ND	ND	ND	0.041	ND	ND	ND	ND	ND
	ND	ND	ND	0.023	ND	ND	ND	ND	ND
		ND	ND		ND		ND		
Semivolatiles	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND	ND
		ND	ND		ND		ND		

TABLE 11
1994 Groundwater Data for "A" Sand

Parameter	Sample Location							
	32B	A	B	C	I	J	K	L
Date	03/94	03/94	03/94	03/94	03/94	03/94	03/94	03/94
	05/94	05/94	05/94	05/94	05/94	05/94	05/94	05/94
	08/94	08/94	08/94	08/94	08/94	08/94	08/94	08/94
pH (s.u.)	6.15	6.85	7.62	7.16	6.36	5.57	4.94	5.09
	6.13	6.85	6.90	6.75	6.79	5.34	5.37	5.47
	6.02	6.31	6.39	6.25	6.52	5.48	5.11	5.51
Specific Conductance (uMhos)	401	309	278	383	350	404	548	425
	411	293	258	194	414	441	740	615
	443	267	253	167	365	465	613	495
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Barium	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	0.064	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Iron	5.7	77	69	28	19	6.5	5.8	6.8
	0.46	24	29	45	13	2.1	0.69	1.8
	0.072	34	46	38	4.1	0.90	0.038	0.18
Manganese	0.053	3.3	2.9	1.0	0.37	0.30	0.86	0.37
	0.009	1.3	1.1	1.5	0.21	0.14	1.1	0.53
	0.005	1.4	1.0	1.7	0.093	0.069	0.54	0.32
Sodium	16	7.4	ND	ND	13	23	49	32
	19	5.5	ND	5.3	16	24	58	41
	24	ND	ND	ND	ND	22	31	30
Vanadium	0.017	0.031	0.034	ND	ND	ND	ND	ND
	ND	ND	ND	0.023	ND	ND	ND	ND
	ND	ND	ND	0.013	ND	ND	ND	ND

TABLE 11

1994 Groundwater Data for "A" Sand
(Continued)

Parameter	Sample Location							
	32B	A	B	C	I	J	K	L
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Total	ND	0.033	ND	ND	ND	ND	0.034	ND
Organic	0.025	0.025	0.031	0.033	ND	ND	0.026	ND
Halides	0.022	ND	0.030	0.028	ND	ND	ND	0.033
Chloride	61	ND	1	10	36	90	150	93
	61	ND	ND	12	42	93	170	100
	64	ND	ND	11	30	92	140	93
Sulfate	66	41	26	41	57	57	61	68
	90	33	140	52	140	81	68	120
	43	19	13	15	33	39	45	51
Fluoride	ND	0.07	0.07	0.06	0.16	0.05	0.2	0.18
	0.05	0.07	0.07	0.07	0.05	0.05	0.22	0.20
	ND	0.07	0.07	0.07	0.06	ND	0.18	0.17
Nitrate	0.18	ND	ND	ND	ND	0.72	0.70	1.0
Nitrogen	0.14	0.17	ND	ND	0.20	0.94	1.2	2.9
	0.12	ND	ND	ND	ND	0.55	1.07	1.49
Phenolics	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	0.09	ND	0.03	ND	0.04	ND	ND
Total	8.2	11	15	5.5	8.4	7.7	6.3	10
Organic	5.5	3.0	3.4	2.7	3.0	2.9	4.4	3.1
Carbon	2.5	3.0	2.8	5.2	2.6	1.5	2.8	4.1
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatiles	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 12
1994 Groundwater Data for Regional Aquifers

Parameter	Sample Location							
	D1M	D2M	D3M	D4M	D1G	D2G	D3G	D4G
Date	3/94	3/94	3/94	3/94	3/94	3/94	3/94	3/94
	5/94	5/94	5/94	5/94	5/94	5/94	5/94	5/94
	8/94	8/94	8/94	8/94	8/94	8/94	8/94	8/94
pH (s.u.)	6.76	--	8.52	7.66	8.53	--	9.32	9.00
	6.95	9.29	8.21	8.17	6.85	8.15	8.94	9.20
	6.93	8.76	7.61	7.99	8.54	8.58	8.38	9.19
Specific Conductance (uMhos)	353	--	834	360	1008	--	1300	1169
	350	582	508	408	399	878	1278	1183
	370	570	510	409	973	891	1338	998
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Barium	ND	1.4	ND	ND	ND	1.1	1.0	ND
	ND	1.1	ND	ND	ND	ND	1.6	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	0.12	ND	ND	ND	0.14	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	0.072	ND	0.070
	ND	ND	ND	ND	ND	ND	0.055	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Iron	13	81	1.2	0.34	0.86	150	6.2	0.41
	13	76	0.42	0.40	1.3	1.9	45	48
	42	5.5	4.7	ND	1.6	15	0.90	4.1
Manganese	1.2	1.6	0.096	0.15	0.010	2.4	1.5	0.011
	0.88	3.6	0.051	0.041	0.68	0.23	4.9	1.1
	1.5	0.49	0.27	ND	0.061	0.44	0.95	0.061
Sodium	5.6	130	32	23	190	180	230	210
	5.2	97	31	23	7.7	170	290	280
	11	110	42	20	190	160	280	250

TABLE 12
1994 Groundwater Data for Regional Aquifers
(Continued)

Parameter	Sample Location							
	D1M	D2M	D3M	D4M	D1G	D2G	D3G	D4G
Vanadium	ND	0.11	ND	ND	ND	0.17	ND	ND
	ND	0.065	ND	ND	ND	ND	0.028	0.029
	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	0.001	ND	ND	ND
	ND	ND	ND	ND	0.001	ND	ND	ND
Toluene	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	0.001	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Total Organic Halides	0.030	0.038	0.023	0.021	--	0.047	ND	0.026
	ND	0.035	ND	0.029	ND	0.039	0.032	0.047
	ND	0.036	ND	0.033	0.022	ND	ND	ND
Chloride	13	2	1	ND	ND	3	6	ND
	13	2	1	6	28	8	4	6
	3	ND	ND	7	2	1	ND	4
Sulfate	27	570	25	14	12	540	23	31
	39	180	29	17	83	230	480	100
	42	11	20	11	ND	16	ND	18
Fluoride	0.15	0.71	0.17	0.19	5.5	1.7	4.9	6.0
	0.08	0.57	2.0	0.21	0.11	1.8	6.2	5.6
	0.12	0.52	0.22	0.21	4.6	2.5	6.3	5.5
Nitrate	ND	0.06	ND	1.5	1.1	ND	0.32	ND
Nitrogen	ND	0.12	0.08	2.1	1.7	0.19	0.74	0.29
	ND	ND	0.23	2.22	4.3	0.11	2.90	0.67
Phenolics	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	0.03	ND	ND	ND	0.03	ND	ND
Total Organic Carbon	3.6	1.1	9.3	3.0	--	3.7	23	2.3
	2.7	3.1	2.0	3.2	4.0	5.3	5.2	12
	5.8	3.3	7.0	1.7	12	5.6	22	12

TABLE 12

1994 Groundwater Data for Regional Aquifers
(Continued)

Parameter	Sample Location							
	D1M	D2M	D3M	D4M	D1G	D2G	D3G	D4G
Naphthalene	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatiles	ND	ND	ND	ND	--	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 13

Well Name	Other Name	Aquifer	Depth ft.	Status	Date	Contractor	Reason Installed
1-A	NEW 1-A		11.54		1985		Pond 005
13	88B26-13	A	47.90		9/12/88	Mid-Eastern	Contaminated Sewer
32-B		A	39.19		6/13/90	Mid-Eastern	Pond 005
A		A	59.50		11/1/92	Mid-Eastern	Perimeter Monitoring
B		A	66.00		10/16/92	Mid-Eastern	Perimeter Monitoring
C		A	64.00		10/23/92	Mid-Eastern	Perimeter Monitoring
I		A	46.00		10/26/92	Mid-Eastern	Pond 005
J		A	34.00		10/14/92	Mid-Eastern	Pond 005
K		A	21.00		10/27/92	Mid-Eastern	Pond 005
L		A	29.50		10/28/92	Mid-Eastern	Pond 005
M		A	24.00		10/29/92	Mid-Eastern	Pond 005
N		A	39.00		11/2/92	Mid-Eastern	Pond 005
UST-1		A	39.63			Mid-Eastern	UST's
UST-2		A	40.88		10/31/88	Mid-Eastern	UST's
GAS-3		A	46.79		6/10/93	GeoEnvironmental	Gasifier Closeout
GAS-4		A	40.88		6/8/93	GeoEnvironmental	Gasifier Closeout
SP1-A		A	48		9/21/93	GeoEnvironmental	Perimeter Monitoring
SP4-A		A	30		9/17/93	GeoEnvironmental	Perimeter Monitoring
SP8-A		A	56.15		6/29/94	GeoEnvironmental	Perimeter Monitoring
SP9-A		A	51		6/30/94	GeoEnvironmental	Perimeter Monitoring
6	88B26-6	B-C	38.42		9/13/88	Mid-Eastern	Contaminated Sewer
10	88B26-10	B-C	37.96		9/9/88	Mid-Eastern	Contaminated Sewer
11	88B26-11	B-C	47.89		9/14/88	Mid-Eastern	Contaminated Sewer
12	88B26-12	B-C	21.42		9/12/88	Mid-Eastern	Contaminated Sewer
31		B-C	25.33		6/14/90	Mid-Eastern	Pond 005

TABLE 13
(Continued)

Well Name	Other Name	Aquifer	Depth ft.	Status	Date	Contractor	Reason Installed
32-A		B-C	20.96		6/13/90	Mid-Eastern	Pond 005
STRET3		B-C	30.31		11/7/88	Mid-Eastern	Stretford Pad
GAS-1		B-C	25.64		6/8/93	GeoEnvironmental	Gasifier Closeout
GAS-2		B-C	24.80		6/9/93	GeoEnvironmental	Gasifier Closeout
GAS-5		B-C	23.11		6/9/93	GeoEnvironmental	Gasifier Closeout
SP2-BC		B-C	32.11		9/22/93	GeoEnvironmental	Perimeter Monitoring
SP5-BC		A	16.5		9/29/93	GeoEnvironmental	Perimeter Monitoring
SP6-BC		B-C	25.5		9/27/93	GeoEnvironmental	Perimeter Monitoring
D1-M		Morgantown	64		8/25/93	GeoEnvironmental	Perimeter Monitoring
D2-M		Morgantown	130		9/29/93	GeoEnvironmental	Perimeter Monitoring
D3-M		Morgantown	128		9/2/93	GeoEnvironmental	Perimeter Monitoring
D4-M		Morgantown	57		8/26/93	GeoEnvironmental	Perimeter Monitoring
D1-G		Grafton	117		8/31/93	GeoEnvironmental	Perimeter Monitoring
D3-G		Grafton	185		9/13/93	GeoEnvironmental	Perimeter Monitoring
D4-G		Grafton	113		8/27/93	GeoEnvironmental	Perimeter Monitoring
D5-G		Grafton	184		9/23/94	GeoEnvironmental	Perimeter Monitoring

Figure 1. Directions to METC

Directions to the Morgantown Energy Technology Center

From I-68, exit onto the Pierpont Rd. (Exit 7). Follow Rt. 857 to U.S. 119 South and turn onto Rt. 705 West. Follow 705 to the University and Pattenon Drive intersection. Turn right and follow University Ave. onto Collins Ferry Rd.

From I-79, exit at the Star City Interchange (Exit 155). Bear right onto Rt. 7 and turn left onto Pattenon Drive. (WVU Coliseum will be on your right) Go to University Ave. & Pattenon Dr. intersection, turn left and follow University Ave. onto Collins Ferry Rd.

M96000281E

Figure 2. METC Site Plan: Storm Water Outfall and Stream Sediment Sample Locations

M96000275W

Figure 3. METC Site Plan: Location of Ground-Water Monitoring Wells