

ENVIRONMENTAL MANAGEMENT SYSTEM

Integrated Safety Management System (ISMS) Implementation

In accordance with the United States (U.S.) Department of Energy (DOE) Policy 450.4, "Safety Management System Policy," a plan to integrate environmental, safety, and health (ES&H) management programs at the West Valley Demonstration Project (WVDP or Project) was developed and initiated in 1998. Implementation of an ISMS at the WVDP was verified by the DOE in November 1998. Environmental subject matter experts routinely participate in a site-wide work review group to review work plans, identify ES&H concerns, and specify practices that ensure work is performed safely. For the purposes of this policy, the term "safety" includes environmental, radiological, industrial/chemical, and nuclear safety and health and encompasses the public, workers, and the environment.

Environmental Management System (EMS)

During the ISMS development, the EMS was identified as an integral part of the ISMS. The WVDP EMS has been established to implement sound stewardship practices that are protective of the air, water, land, and other natural and cultural resources potentially impacted by DOE operations and by which DOE cost effectively meets or exceeds compliance with applicable environmental, public health, and resource protection requirements. The EMS objectives implement sustainable practices for enhancing environmental, energy, and transportation management performance, as stipulated in Executive Order (E.O.) 13423, "Strengthening Federal Environmental, Energy, and Transportation Management."

The key elements of the WVDP EMS are designed to:

- Reflect the EMS elements and framework found in International Organization for Standardization (ISO) 14001:2004 or equivalent, including policies, procedures, and training to identify operations and activities with significant environmental impacts; to manage, control, and mitigate the impacts of these operations and activities; and to assess performance, implement corrective actions where needed, and ensure continual improvement;

- Include environmental, energy, and transportation objectives and measurable targets that are reviewed annually, updated as appropriate, and contribute to achieving the DOE sustainable environmental stewardship goals in DOE Order 450.1A, "Environmental Protection Program," and the energy and transportation goals in DOE Order 430.2B, "Departmental Energy, Renewable Energy and Transportation Management;"
- Address tenant activities wherever such activities affect environmental, energy, and transportation management; and
- Contain the elements of an Environmental Compliance Management Plan pursuant to the Federal Council on Environmental Quality's instructions for implementing E.O. 13423, including:
 - a clear statement by senior leadership committing to achieve and maintain compliance with applicable environmental protection requirements;
 - clearly articulated roles and responsibilities related to environmental performance at all appropriate levels to ensure accountability for less-than-desired environmental performance;
 - an environmental compliance audit and review program that identifies compliance deficiencies and root causes of noncompliance; and
 - integration of compliance management information and resource allocation procedures to ensure that audit findings and root causes of noncompliance are tracked and addressed, including allocation of funding.

The environmental monitoring program is an important component of the EMS, ensuring accomplishment of its mission.

The elements of the WVDP EMS are summarized in Table 1-1. The elements for which activities or achievements were accomplished in calendar year (CY) 2010 are presented in the sections that follow.

**TABLE 1-1
Elements of the Environmental Management System (EMS) -
West Valley Demonstration Project (WVDP) Implementation**

Environmental Policy	
<p>It is the policy at the WVDP to conduct all activities, including design, construction, testing, startup, commissioning, operation, maintenance, and decontamination and decommissioning in a manner appropriate to the nature, scale, and environmental impacts of these activities. West Valley Environmental Services LLC (WVES) is committed to full compliance with applicable federal and New York State laws and regulations for protection of the environment, continual improvement, the prevention and/or minimization of pollution, and public outreach, including stakeholder involvement. The policy establishes the WVDP EMS, which provides the framework for environmental protection at the WVDP.</p>	
Planning	
Environmental Aspects	<p>Since the WVDP is currently in the deactivation, decontamination, and demolition phase, there are significant environmental aspects related to those activities. The environmental aspects are addressed in Work Instruction Packages with the assistance of Hazard Control Specialists, and all building demolitions require the completion of a Demolition Readiness Checklist. The environmental aspects that have been determined to have the potential to affect the environment are:</p> <ul style="list-style-type: none"> • Waste generation, management, and decontamination activities; • Radiological and/or chemical atmospheric emissions and liquid effluent discharges; • Energy usage and materials consumed and/or recycled; • Natural resource preservation, restoration, and impact; and • Accidental releases or spills, and their subsequent mitigation and future prevention.
Legal and Other Requirements	<p>Established policies and procedures at the WVDP identify legal and other requirements to which WVES subscribes, and which are applicable to the environmental aspects of site activities. These policies and procedures provide identification and access, which range from formal review and implementing requirements from the United States (U.S.) Department of Energy (DOE) Orders, Guides, Manuals, and Technical Standards through Federal and New York State laws and regulations. Environmental Affairs regularly assesses proposed and recently issued regulatory requirements for impact to site activities.</p>
Objectives and Targets	<p>DOE Order 450.1A requires that goals be established to integrate sustainable environmental stewardship into the site's operations as a cost-effective business practice. The Order established five performance-based sustainable environmental stewardship goals to (1) prevent pollution, (2) reduce environmental hazards, (3) protect the public and the environment, (4) minimize pollution control and waste disposal costs, and (5) improve operational capability. DOE Order 430.2B requires that each contractor establish leadership goals to reduce energy intensity needs, strive to purchase renewable energy where economically feasible, operate alternate fuel vehicles, reduce potable water consumption, and to achieve U.S. Green Building Council's Leadership in Environmental Design certifications for new construction. At the WVDP, objectives and measurable targets are developed to meet these goals, which are discussed in Table 1-2.</p>
Environmental Management Program	<p>A key element to successful implementation of an EMS, is an environmental management program that describes aspects of environmental policy implementation applicable to the organization, and may be subdivided to address specific elements of the organization's operations. WVES accomplishes this through policies and procedures, project schedules, milestone tracking, and commitment tracking.</p>

TABLE 1-1 (continued)
Elements of the Environmental Management System (EMS) -
West Valley Demonstration Project (WVDP) Implementation

Implementation and Operation	
Structure and Responsibility	Site procedures define roles and responsibilities, and management provides resources essential to the implementation and control of the EMS. Specific WVES management representatives have the defined role, responsibility and authority for ensuring that EMS requirements are established, implemented and maintained in accordance with the policy, and for reporting on the performance to staff management. This reporting and review provide the basis for improvement of the EMS.
Training, Awareness, and Competence	Employees are informed of the importance of conformance with the environmental policy and with implementing EMS procedures; the actual or potential significant environmental impacts of their work activities; the environmental benefits of improved personal performance; their roles and responsibilities in achieving conformance with the environmental policy and EMS procedures (including emergency preparedness); and the potential consequences of departure from specified operating procedures.
Communication	WVES provides for internal communication between the various levels and functions of the company and for receiving, documenting, and responding to relevant communication from external interested parties. Key external parties include the regulatory agencies and local emergency responders. Communications with the local stakeholders include monthly meetings with the Citizen Task Force and quarterly meetings with the general public. Project information, including this entire Annual Site Environmental Report (ASER), is available on the internet at http://www.wv.doe.gov .
EMS Documentation	Comprehensive, up-to-date environmental policies are written to describe the core elements of the EMS and their interaction, and to reference related implementing documentation.
Document Control	EMS documentation is maintained via controls that require the availability of documents at locations where operations essential to the effective functioning of the EMS are performed; provide for periodic review and revision; require that obsolete documents be promptly removed from all points of issue and points of use; and, require that any obsolete documents retained for legal use and/or record preservation purposes be suitably identified. Records pertaining to the EMS are classified, inventoried, indexed, retained, and disposed of in accordance with established procedures.
Operational Control	WVES ensures operational control through adherence to all site procedures. WVES has identified those operations and activities that are associated with the identified significant environmental aspects in line with the EMS policy, as well as resultant objectives and targets. Procedures for these operations and activities provide specific conditions and criteria that must be satisfied to ensure compliance and ensure meeting the objectives and targets.
Emergency Preparedness and Response	An emergency preparedness and response program with specialized staff provides timely response to emergency situations, and the prevention and mitigation of the environmental impacts that may be associated with them. Emergency preparedness and response procedures are reviewed and revised routinely and after the occurrence of accidents or emergency situations, when appropriate. Drills and exercises are conducted to assess the effectiveness of the emergency management programs.

TABLE 1-1 (concluded)
Elements of the Environmental Management System (EMS) -
West Valley Demonstration Project (WVDP) Implementation

Checking and Corrective Action	
Monitoring and Measurement	The EMS is monitored and measured for effectiveness, as well as key characteristics of site operations and activities that can have a significant environmental impact. Liquid effluent and air-emission monitoring helps ensure the effectiveness of controls, adherence to regulatory requirements, and timely identification and implementation of corrective measures. A comprehensive, sitewide environmental monitoring program is in place at the WVDP. Data are reported to regulatory agencies and summarized in this ASER. In addition, monitoring data are assessed for adverse trends to determine site performance, impacts from site conditions, and the need for preventative or corrective measures.
Evaluation of Compliance	WVES has established, implemented, and maintained a process for periodically evaluating compliance with applicable legal requirements. This activity is included under the "Legal and Other Requirements" EMS element.
Nonconformance and Corrective and Preventive Action	WVES has defined responsibilities and authorities for handling and investigating nonconformances, taking action to mitigate any associated impacts, and for initiating and completing corrective and preventative actions.
Records	Environmental records are identified, maintained, and dispositioned in accordance with regulatory requirements for record maintenance. These include training records and the results of audits and other reviews. Environmental records must be legible, identifiable, and traceable to the activity or service involved. Records are maintained in such a way that they are retrievable and protected against damage or loss.
EMS Audit (Assessments)	EMS assessments are performed to determine whether or not the EMS conforms to the requirements of the policy; that the EMS has been properly implemented and maintained; and to provide information to management on the assessment results. They are based on the environmental importance of the site activities and consider the results of previous reviews.
Management Review	
Senior management reviews site environmental performance to ensure the continuing suitability, adequacy and effectiveness of the EMS. The review addresses opportunity for improvement, the need for change, including environmental policy, and environmental objectives and targets.	
EMS Validation	
<p>The WVDP EMS is considered to be fully implemented because:</p> <ol style="list-style-type: none"> 1 - During July 26–29, 2010, the WVDP EMS was the subject of a formal audit performed by a joint review team of external DOE, DOE-WVDP, and WVES assessors. 2 - The findings of the above audit have been addressed by the Environmental Safety, Health, and Quality (ESH&Q) manager and the DOE-WVDP director. 3 - The ESH&Q manager and the DOE-WVDP director have declared conformance of the EMS to the requirements of DOE Order 450.1A. 	

Environmental Policy

Activities at the WVDP during 2010 were conducted in full compliance with applicable environmental statutes, DOE directives, executive orders, and state laws and regulations. Refer to Table ECS-1, "Compliance Status Summary for the WVDP in CY 2010," for details.

Environmental Aspects

The environmental aspects of site activities have been identified within the elements of the WVDP EMS. Activities that have regulatory implications or those that could have significant environmental impacts are identified as significant aspects. Site activities related to hazardous and radiological waste management, pollution prevention, air and water emissions, energy and materials use, and recycling are presented in the "Environmental Compliance Summary" (Tables ECS-3 through ECS-11).

The WVDP site is currently in the decontaminating and decommissioning (D&D) phase of operations, therefore, current work scope encompasses waste disposition, decontamination, deactivation, facility disposition, and infrastructure reduction. For each facility or structure that is considered for demolition, the base environmental aspects are identified. These aspects are addressed during work planning with the assistance of hazard control specialists. In addition, before a building may be demolished, a "Demolition Readiness Checklist" that captures many of these environmental aspects must be completed.

Legal and Other Requirements

Requirements contained in DOE orders and directives are incorporated into the WVDP contract with West Valley Environmental Services LLC (WVES) as specific terms and conditions. Regulatory Affairs conducts environmental regulatory reviews to identify, evaluate, and document changes to applicable environmental regulations. Items that have an effect upon compliance activities at the WVDP are communicated to other appropriate Project personnel.

Objectives and Targets

DOE Order 450.1A requires that goals be established to integrate sustainable environmental stewardship into the site's operations as a cost-effective business practice. Goals are intended to prevent pollution, reduce environmental hazards, protect the public and the environment, reduce waste disposal

costs, and improve operational capability. The Order also established five performance-based sustainable environmental stewardship goals that are to be achieved at each DOE site.

The goals and objectives, established specifically for the WVDP, have been evaluated using a graded approach that takes into consideration that all buildings and infrastructure will be demolished in the coming years.

The WVDP's "Waste Minimization and Pollution Prevention Awareness Plan" established the strategic framework for integrating waste minimization and pollution prevention into waste generating and reducing activities, procuring recycled products, reusing existing products, and using methods that conserve energy. The program is a comprehensive and continual effort to prevent or minimize pollution, with the overall objective of reducing health and safety risks, and protecting the environment. The WVDP objectives and targets that were established to meet the EMS goals are presented in Table 1-2. Also refer to the Environmental Compliance Summary Table ECS-6, "Pollution Prevention Progress for Fiscal Year (FY) 2010," and Table ECS-7, "Affirmative Procurement Accomplishments for FY 2010."

Environmental Management Program

An environmental management program is a key element to successfully implementing an EMS. At the WVDP, the program is implemented by the "WVDP Environmental Management System" policy. The policy describes how the objectives and targets are achieved and clearly defines responsibilities and timeframes, and provides for modifications to ensure that environmental management will apply to new developments and new or modified activities. This is accomplished through routine review and update of policies and procedures, as well as through project schedules, milestone tracking, and commitment tracking.

Structure and Responsibility

All project personnel are responsible for adherence to the site's EMS policies. In addition, specific management representatives have defined responsibility and authority for ensuring that EMS requirements are implemented in accordance with the policy, and for reporting to staff management. During 2010, the annual review of the WVES EMS was performed and reported to the DOE in accordance with DOE Order 450.1A, and audits were performed both by internal and external agencies to identify areas for improve-

**TABLE 1-2
WVDP EMS Objectives and Targets**

Goal	Objective	Target	Responsibility	Target Date	Status	Driver
Goal 1	(United States [U.S.] Department Of Energy [DOE] Order 450.1A) Reduce or eliminate the generation and/or toxicity of waste and other pollutants at the source through pollution prevention					
1.1	Reduce usage of laundry detergent.	Implement the use of N-45 laundry detergent because it was determined that the amount of detergent could be reduced from 3 pounds to 0.26 pounds per day.	Engineering	2/22/10	Implemented 2/22/10.	Executive Order (E.O.) 13423
1.2	Reduce or eliminate the need for demineralized water.	Eliminate the demineralized water production which requires using approximately 30 gallons of sulfuric acid and 40 gallons of caustic annually.	Engineering	3/31/10	Implemented 3/31/10.	E.O. 13423
Goal 2	(DOE Order 450.1A) Reduce or eliminate the acquisition, use, and release of toxic and hazardous chemicals and materials					
2.1	Research and evaluate an environmentally friendly alternative to replace Handi-Foam used for filling voids in waste packages.	Determine an acceptable substitute (preferably bio-based).	Waste Planning & Disposition/ Environmental Affairs	Prior to Ordering Foam	Researched. Foaming is only used for low-level radioactive waste. Current waste packaging efforts primarily involve transuranic waste; therefore, foam use was limited. Current stock was used first.	E.O. 13423
2.2	Reduce usage of caustic for wastewater treatment.	Eliminate the need for the cooling tower which requires 1,375 gallons of caustic per year for neutralization. See related goal 7.2 and 6.10.	Engineering	8/31/10	Complete 9/12/10. The K9 water-cooled compressor is installed and operational.	E.O. 13423
Goal 3	(DOE Order 450.1A) Maximize the acquisition and use of environmentally preferable products in the conduct of operations.					
3.1	Maximize the purchase of U.S. Environmental Protection Agency (EPA)-designated items and bio-based products.	Provide training to procurement personnel and P-Card holders on the resources available to assist in locating alternative items that meet EPA designated items and bio-based product requirements.	Environmental Affairs	3/31/10	Training briefing TR1367B, "Green Purchasing Training," was developed and presented to procurement personnel and P-Card holders on 3/11/10.	E.O. 13423
Goal 4	(DOE Order 450.1A) Reduce or eliminate the environmental impacts of electronics assets					
4.1	Participate in the electronics reuse and recycling challenge (ERRC).	Register on the ERRC website when program is launched for fiscal year (FY) 2010.	Environmental Affairs	When registration is launched	The Federal ERRC was discontinued. However, WVES voluntarily continued to implement recycling and reuse opportunities. Recycled one ton of electronics, and four tons was sold or donated for reuse.	E.O. 13423

TABLE 1-2 (continued)
WVDP EMS Objectives and Targets

Goal	Objective	Target	Responsibility	Target Date	Status	Driver
Goal 5	(DOE Order 450.1A) Reduce degradation and depletion of environmental resources through post-consumer material recycling					
5.1	Eliminate the purchase of water in plastic bottles.	Purchase reusable water bottles for all site employees.	Safety	6/17/10	Complete. Reusable bottles were distributed at the 2010 WVDP Safety Fair held on 6/17/10.	E.O. 13423
Goal 6	(DOE Order 430.2B and E.O. 13423) Energy Efficiency					
6.1	Reduce energy intensity.	Reduction of at least 30% by FY 2015 from the FY 2003 baseline. Baseline: Electricity - 20,650,000 KWhr Natural Gas - 920,000 ccf Goal: Electricity - 14,455,000 KWhr Natural Gas - 644,000 ccf	Infrastructure	9/30/15	Goal exceeded, results for FY 2010: Electricity - 12,483,517 KWhr - 39.5% reduction. Natural Gas - 283,190 ccf - 69.2% reduction.	DOE Order 430.2B and E.O. 13423
6.2	Update the DOE Order 430.2B Executable Plan for calendar year (CY) 2010.	Update the 430.2B Executable Plan and issue to the DOE.	Engineering	12/15/10	Replaced with the Site Sustainability Plan (SSP). Completed by DOE-WVDP	E.O. 13423
6.3	Obtain DOE approval for the DOE Order 430.2B Executable Plan	Obtain DOE approval for the West Valley Demonstration Project (WVDP) DOE Order 430.2B Executable Plan for CY 2010.	Engineering	2/28/11	Replaced with the SSP. Completed by DOE-WVDP	E.O. 13423
6.4	Reduce energy requirements of air compressors in the vitrification facility.	Replace the obsolete compressor with a new compressor with variable frequency drives.	Engineering	2/28/10	Installation completed in March, 2010.	E.O. 13423
6.5	Reduce energy requirements of the laundry.	Replace existing laundry with a modular facility with a high efficiency washer with an integrated on-demand water heater. The modular design will reduce heating, cooling, ventilation and water demand, therefore reduce energy demand.	Engineering	On hold due to project baseline changes.	Plans to relocate the laundry were put on hold.	E.O. 13423
6.6	Reduce the energy requirements of site office space.	Office space was relocated from the main plant process building (MPPB) and administration building to modular units, allowing conversion of old inefficient boiler systems to use low-pressure steam. Compact fluorescent lighting (CFL) was used. This modular design significantly reduced heating, cooling, and ventilation make-up air demands, resulting in reduced energy demands.	Engineering	4/30/10	Complete, with 47 units installed. One hundred fifty five personnel have been moved into 40 units, and seven units are used for materials and equipment.	E.O. 13423

TABLE 1-2 (continued)
WVDP EMS Objectives and Targets

Goal	Objective	Target	Responsibility	Target Date	Status	Driver
6.7	Reduce the energy requirements of the environmental laboratory (ELAB) facility.	The ELAB space will be relocated to modular units with CFLs for lighting. Modular design will significantly reduce heating and cooling demands due to less building cubic	Engineering	On hold due to project baseline changes.	Plans to relocate the ELAB were put on hold.	E.O. 13423
6.8	Reduce energy requirements of the MPPB compressed air system.	Eliminate the use of compressed air to sparge the lagoons.	Engineering/ Maintenance	12/31/10	Complete. Blowers were relocated, tested, and are operational.	E.O. 13423
6.9	Reduce energy requirements of the Ventilation Exhaust Cell blower system.	Install variable frequency drives.	Engineering	6/30/10	Installation was completed on 7/17/10.	E.O. 13423
6.10	Reduce energy requirements of utility room air compressors.	Install chiller units and replace compressor K3 with a new air cooled unit K9 to eliminate the need for the cooling tower. See related goals 2.2 and 7.2.	Engineering	8/31/10	Completed on 9/12/10. The chiller units are installed and operational and installation of K9 compressor is complete.	E.O. 13423
6.11	Reduce energy requirements of the laundry facility.	Purchase and install a more efficient respirator washer in the existing facility.	Engineering	7/31/10	New washer was installed on 7/15/10.	E.O. 13423
6.12	Reduce energy requirements of the ELAB facility.	Replace the chiller in the ELAB from a 50-ton unit to a previously used 30-ton unit that was taken from storage. Reduce air infiltration by installation of sealant.	Engineering	7/31/10	Complete. The unit was installed and the building was sealed on 7/20/10.	E.O. 13423
6.13	Reduce the vehicle fleet petroleum use.	Acquire 3 electric Taylor/Dunn carts from another DOE facility.	Site Operations	11/30/10	Three carts acquired, refurbished, and in use at the site.	E.O. 13423 DOE Order 430.2B.
6.14	Reduce energy usage of the remote-handled waste facility (RHWF) air compressors.	Interconnect MPPB air compressors to RHWF. The MPPB variable frequency drives are more energy efficient.	Site Operations	2/28/11	Complete by mid-February 2011.	E.O. 13423 DOE Order 430.2B.
Goal 7	Other					
7.1	Provide environmental management system (EMS) overview training to new hire American Reinvestment Recovery Act employees.	Prepare and present a PowerPoint training presentation on the WVDP EMS program and expectations of employees.	Environmental Affairs	1/31/10	Complete 1/11/10. 68 ARRA new personnel were trained.	WV-980

TABLE 1-2 (concluded)
WVDP EMS Objectives and Targets

<i>Goal</i>	<i>Objective</i>	<i>Target</i>	<i>Responsibility</i>	<i>Target Date</i>	<i>Status</i>	<i>Driver</i>
7.2	Reduce water usage.	Eliminate the need for the cooling tower which utilizes 500,000 gallons of water per year. This will also eliminate the annual usage of 600 pounds of pesticides and 350 pounds of a corrosion inhibitor. See related goal 2.2.	Engineering	8/31/10	Complete 9/12/10. The chiller units are installed and operational and installation of K9 compressor is complete.	E.O. 13423

ment and assess compliance to the EMS principles. For further discussion of audits, refer to “EMS Audits and Other Audits and Assessments” later in this chapter.

Training, Awareness, and Competence

Human performance/behavior-based safety (HP/BBS) training is conducted across the site. Project personnel are trained to HP/BBS concepts and practices, and HP/BBS observer technique training is provided for safety department and safety observers. Self-assessment activities are also stressed as a mechanism for evaluating, improving, and maintaining worker safety. WVES operated the WVDP throughout 2010 in a safe manner that was protective of its workers, the public, and the environment.

The radiological and hazardous work environment at the WVDP warrants strict adherence to safety procedures. During 2010, the WVDP employees were recognized by numerous safety milestones that occurred during the year:

- The workforce achieved 3.5 million consecutive work hours without a lost time work injury, which translated to 1,347 days without a lost time work injury;
- The site was requalified as a STAR site under the DOE’s voluntary protection program for its safety performance; and
- The site was awarded the 2009 URS Safe Project of the Year.

These CY 2010 achievements continued to rank the WVDP among the safest of the DOE’s Office of Environmental Management programs.

To accelerate cleanup projects at the site (funded under the American Recovery and Reinvestment Act

[ARRA]), 68 employees received training and were introduced to the WVDP’s strong safety culture, including the EMS program. The training department developed a systematic approach to assessing individual qualifications and tailoring training requirements to the individuals. The new personnel brought a wealth of field expertise, including hazardous materials management, welding, asbestos-handling certifications, and heavy equipment operation. The ARRA work continued throughout 2010.

10 Code of Federal Regulations (CFR) 851, “Worker Safety and Health Program.” 10 CFR 851 became effective in February 2007, with full implementation at the WVDP by May, 2007. The legislation superseded DOE Order 440.1A, “Worker Protection Management for DOE Federal and Contractor Employees,” which directed compliance with specific Occupational Safety and Health Administration (OSHA) requirements.

Similar to the OSHA requirements, the rule established the framework for an effective worker health and safety program to provide DOE contractor workers with a safe and healthy workplace in which hazards are abated, controlled or otherwise mitigated in a manner that provides reasonable assurance that workers are adequately protected from identified hazards.

The “WVDP Worker Safety and Health Plan” described how the WVDP complied with 10 CFR 851. The plan was reviewed by WVES in 2010 and no modifications were necessary.

Any person working at the WVDP who has a personal photo badge allowing unescorted access to administrative areas of the site receives general employee training (GET) that covers health and safety, emergency response, and environmental compliance issues. All visitors to the WVDP receive a site-specific briefing on safety and emergency procedures.

Safety-Trained Supervisor Program. WVES maintains a certification program whereby employees complete extensive training to become safety-certified. Standards are established by the Council on Certification of Health, Environmental, and Safety Technologists, and the certification is offered by the Board of Certified Safety Professionals. Certified personnel helped ensure that the workforce stayed current with safety knowledge and practices that are applicable to managers, supervisors, and lead personnel. This is especially important in the hazardous work environment that exists at the WVDP, where every worker is expected to be responsible for safety. In 2010, the WVDP had 70 certified personnel who recertified every five years by completing or conducting 30 hours of safety, health, or environmental training.

Communication

Ongoing communication between regulatory agencies, stakeholders, and other interested parties led to two important agreements in 2010. The Record of Decision for the Phase 1 Environmental Impact Statement for Site Decommissioning and/or Long-Term Stewardship at the WVDP and Western New York Nuclear Service Center (WNYNSC) was issued in April 2010, laying the groundwork for future work at the WVDP. This document underwent a public and regulatory review period from December 2008 through September 2009. Additionally, on August 17, 2010, the DOE and New York State Energy Research and Development Authority (NYSERDA) reached an agreement and signed a Consent Decree that formally defined the cost sharing for cleanup of the WVDP and the WNYNSC.

EMS Documentation, Document Control, and Records

All EMS documentation is maintained, updated, and controlled in accordance with the WVDP records inventory and disposition system, or in accordance with specific regulatory requirements for records maintenance (e.g., National Emission Standards for Hazardous Air Pollutants [NESHAP]). During 2010, WVES prepared and submitted to the DOE, quarterly status/progress reports describing accomplishments related to EMS targets, goals, and objectives. On November 23, 2010, the WVDP FY 2010 EMS Annual Report was submitted via the online Federal Facilities Environmental Stewardship and Compliance Assistance Center website. The Office of the Federal Environmental Executive tracks the progress of EMS implementation by using an Environmental Steward-

ship Scorecard that includes metrics to measure site-level progress toward EMS implementation. The metrics (red, yellow, or green) are provided to allow facilities that have implemented an EMS to plan for effective reporting of progress, performance, and successes. As in previous years, the WVDP scored "green" based on the rating criteria.

Operational Control

U.S. Nuclear Regulatory Commission-Licensed Disposal Area (NDA) Interceptor Trench and Pretreatment System. Radioactively contaminated n-dodecane, in combination with tributyl phosphate (TBP), was discovered in groundwater at the NDA's northern boundary in 1983, shortly after the DOE assumed control of the WVDP. Investigations during 1983 and 1984 determined the source and location of the kerosene-contaminated water to be from eight 1,000-gallon tanks buried in the NDA. In 1985, the eight tanks were exhumed and the contaminated absorbent and tanks were treated and packaged for disposal. To mitigate subsurface migration of potential remaining organic mixture, an interceptor trench and liquid pre-treatment system (LPS) were installed in 1990. In 2008, a slurry wall was installed upgradient of the NDA and a geomembrane cover was installed over the NDA footprint.

Operations personnel maintain the water levels in the NDA trench and environmental monitoring personnel monitor for any releases from the NDA. As in previous years, n-dodecane/TBP was not detected in the trench water; therefore, no water was treated by the LPS in 2010. Approximately 63,000 gallons (240,000 liters) of radiologically contaminated water were pumped and transferred from the interceptor trench to the low-level waste treatment facility (LLW2) during CY 2010. Refer to the "Environmental Compliance Summary" for additional discussion. Refer also to Chapter 4, "Groundwater Protection Program," under "Groundwater Sampling Observations on the South Plateau: Weathered Lavery Till and the NDA" for a discussion of results of surface and groundwater monitoring in the vicinity of the NDA.

North Plateau Full-Scale Permeable Treatment Wall (PTW). A plume of groundwater contaminated with strontium-90, migrating to the north-northeast, has been monitored on the north plateau for nearly two decades. The contamination source has been determined to have been from a piping leak, during pre-project operations, that entered the ground below the southwest corner of the main plant process building (MPPB). In 1995, a

pump-and-treat system was installed to reduce the plume's migration rate. This system continued to operate throughout 2010. In October and November 2010, an 860-foot-long zeolite-filled full-scale PTW was installed along the existing roadway south of the construction and demolition debris landfill (CDDL). The PTW allows groundwater to pass through the wall, while adsorbing the radioactive strontium-90 in place. The zeolite, chosen for the PTW, is a natural mineral with a porous structure that adsorbs positively charged ions, such as strontium. Sixty-six groundwater monitoring wells were installed to monitor the wall's performance. The work for this project was completed using ARRA funding. Refer to Chapter 4, "Groundwater Protection Program," under "Strontium-90 Plume Remediation-Related Activities" for further discussion.

Emergency Preparedness and Response

The emergency response organization (ERO) activates the emergency operations center (EOC) and the technical support center (TSC) in accordance with site emergency response procedures in the event of health, safety, or environmental emergencies.

Emergency management personnel, ERO personnel, and operations personnel participated in 29 drills and/or exercises throughout 2010. On June 23, 2010, the "Sitewide Integrated Emergency Response Exercise - Fire in the FRS with Contaminated/Injured Personnel," was conducted. This exercise included off-site responders from the West Valley Volunteer Hose Company, Inc., and observers from the DOE and Seneca Nation of Indians emergency response personnel. The exercise ended with an actual emergency (minor earthquake) that precipitated an evacuation of the MPPB and the Ashford Office Complex (AOC). The response teams responded appropriately and there were no adverse environmental impacts or releases from the minor earthquake. The exercise was designed to evaluate activation of WVDP emergency response organizations, as well as the interface of these organizations with off-site emergency responders. The objectives and criteria for the exercise were focused on an evaluation of security, plant systems operations shift supervisor, incident command, radiation safety, and the emergency medical response team. Overall, the actions of all organizations evaluated in this exercise demonstrated proper training and knowledge of emergency response processes and procedures.

On September 28, 2010, ERO members responded to a DOE No Notice exercise. The after-action report was

submitted to the emergency management program manager and, although several areas for improvement were noted, there were no concerns, findings, or observations.

In 2010, the ERO refresher training was updated and was completed by 100 individuals. The emergency management sections of GET and the WVES annual mandatory briefing were also updated to reflect changes in the program and the WVDP assembly areas. Six new members of the ERO were trained for positions in the EOC, the TSC, and the radiation safety response team. A total of 19 engineers, radiation safety personnel, and subcontracted personnel completed the emergency management overview training and AOC emergency management training.

Environmental Monitoring and Measurement

Since the WNYNSC is not an active nuclear fuel reprocessing facility, the environmental monitoring program at the WVDP focuses on measuring radiological and chemical constituents associated with the aged residual by-products of former Nuclear Fuel Services Inc. operations, the Project's former high-level radioactive waste (HLW) treatment operations, and the current operations for management of HLW, transuranic waste (TRU), and low-level radioactive waste (LLW).

Exposure to radioactivity from site activities could occur through the air, water, and food pathways. Therefore, these three potential pathways are monitored at the WVDP. Air and surface water pathways are the two primary means by which radioactive material could move off site.

The on-site and off-site monitoring program at the WVDP includes measuring the concentration of alpha and beta radioactivity, conventionally referred to as "gross alpha" and "gross beta," in air and water effluents. Measuring the total alpha and beta radioactivity from key locations produces a comprehensive picture of on-site and off-site radioactivity levels from all sources. Frequent updating and tracking of the gross radioactivity in effluents is required to maintain acceptable operations.

More-detailed measurements are also made for specific radionuclides. The radionuclides monitored at the Project are those that might produce relatively higher doses or that are most abundant in air and water effluents. Because man-made sources of radiation at the Project have been decaying for more

than 40 years, the monitoring program does not routinely include short-lived radionuclides, that is, isotopes with a half-life of less than two years, which would currently be present at less than 1/100,000 of their original radioactivity levels.

The WVDP monitoring program includes sanitary wastewater discharges and storm water for nonradiological water quality and chemical constituents. See Appendix A for the schedule of sample locations and analytical requirements, and Chapter 2 for a discussion of radiological and nonradiological program information.

Environmental Management of Wastewater. Water containing radioactive material from site process operations is collected in the site’s interceptors, then transferred to the LLW2 and treated. The LLW2 includes the LLW treatment building and associated holding lagoons.

Lagoon 3 water is held, sampled, and analyzed before its release through a New York State Pollutant Discharge Elimination System (SPDES)-permitted outfall. (The SPDES permit is identified in Table ECS-3.) In 2010, about 10.3 million gallons (39.1 million liters) of water were discharged through outfall 001, the lagoon 3 weir. Table 1-3 summarizes the estimated radioactivity releases in the 2010 discharge waters, as compared to

the previous 10-year average. (Also, see Table 2-1 in Chapter 2.) Note that releases of tritium activity through outfall 001 were below the 10-year average; however, releases of gross alpha and beta activity were slightly above the 10-year average. (See “Predicted Dose From Waterborne Releases” in Chapter 3.)

Effective operation of the site wastewater treatment facilities is indicated by compliance with the applicable discharge limits regulated by the SPDES permit. Approximately 60 chemical and water quality constituents are monitored regularly. The analytical results are reported to the New York State Department of Environmental Conservation (NYSDEC) via monthly Discharge Monitoring Reports, required under the SPDES program. There were no SPDES effluent limit exceptions for chemical constituents for 2010. Historical limit exceptions are discussed in previous Annual Site Environmental Reports. Although the goal of the LLW2 and sanitary and utility wastewater treatment facility operations is to maintain effluent water quality consistently within the permit requirements, if SPDES permit limit exceptions occur, the exceptions are evaluated to determine their cause and to identify corrective measures. (See “SPDES Permit” discussion in the Environmental Compliance Summary.)

The north plateau groundwater recovery system (NPGRS) operated throughout 2010, recovering groundwater from an area within the western lobe of the strontium-90 plume on the north plateau. During 2010, approximately 3.0 million gallons (11.4 million liters) were recovered and treated by ion exchange to remove strontium-90. The water was transferred to the lagoon system and ultimately discharged through the lagoon 3 weir. For a more-detailed discussion of the plume and the NPGRS, see "Strontium-90 Plume Remediation-Related Activities in 2010" in Chapter 4.

Environmental Management of Airborne Emissions. During operations, ventilated air from various WVDP facilities is continuously sampled for radioactivity in gases and particulate matter. Ventilated air is monitored and an alarm is activated if particulate matter radioactivity increases above preset levels. Samples are analyzed in the laboratory for the specific radionuclides that are present in the radioactive materials being handled in the facilities. (See "Radiological Air Emissions" in Chapter 2.)

Ventilation air through facilities undergoing radioactive material cleanup passes through high-efficiency filters before being released to the atmosphere. The filters are generally more effective for particulate matter

**TABLE 1-3
2010 Radioactivity Releases Versus 10-Year Averages^a**

<i>Radionuclide</i>	<i>10-Year Average Curies</i>	<i>2010 Curies</i>	<i>% of 10-Year Average</i>
Aqueous Discharge LLW2			
Tritium	0.095	0.028	30%
Gross Alpha and Beta	0.017	0.018	106%
Airborne Discharge ANSTACK			
<i>Gaseous</i>			
Tritium	0.012	0.0028	23%
Iodine-129	0.00024	0.000020	8%
<i>Particulate</i>			
Gross Alpha and Beta	0.00016	0.000093	57%

^a All numbers were rounded to two significant digits after calculations were complete. Percentages based on the above total curie values may not exactly match those in the table.

than for gaseous radioactivity. Therefore, facility air treatment tends to remove a lesser percentage of gaseous radioactivity (e.g., tritium and iodine-129) than radioactivity associated with particulate matter (e.g., strontium-90 and cesium-137). However, gaseous radionuclide emissions still remain so far below the most restrictive regulatory limits for public safety that additional treatment technologies beyond those already provided are typically not necessary.

Table 1-3 shows the gaseous and particulate matter radioactivity emissions from the MPPB (location ANSTACK) in 2010 compared to averages from the previous 10-year period. These 2010 values are low in comparison with the 10-year averages that include years when the vitrification system was operating.

Environmental Performance Measures

Performance measures can be used to evaluate effectiveness, quality, timeliness, safety, or other areas that reflect achievements related to organization or process goals, and can be used as tools to identify the need to institute changes.

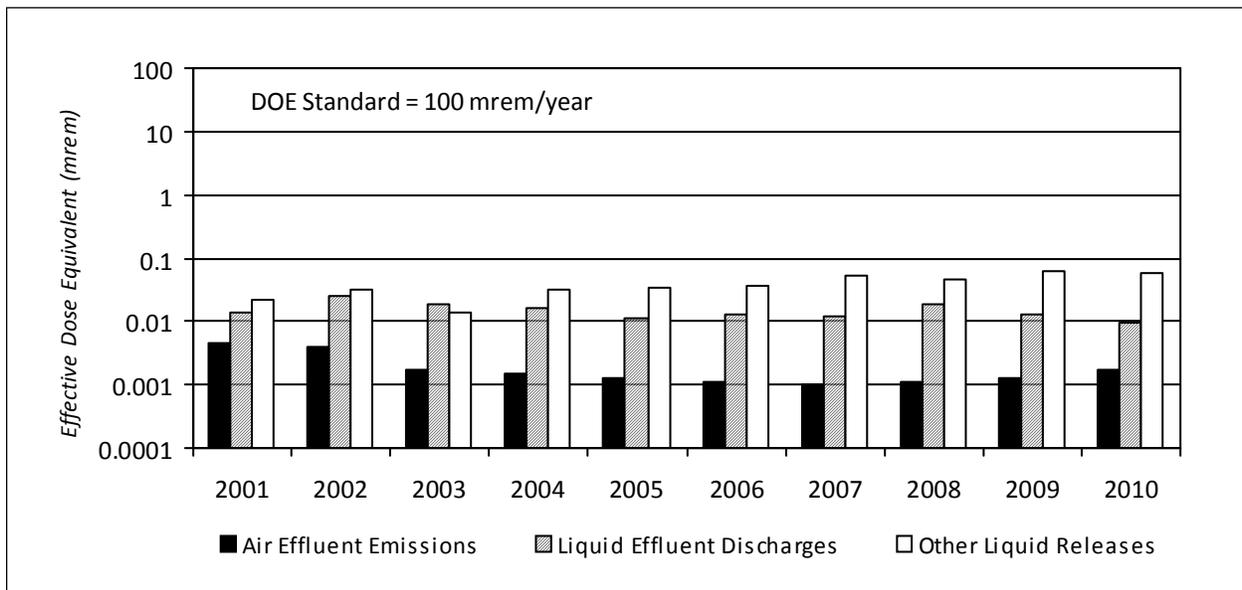
Dose Assessment. As an overall assessment of Project activities and the effectiveness of the as-low-as-reasonably-achievable policy, the low potential radiological dose to the maximally exposed off-site individual is an indicator of well-managed radiological operations.

The relative dose equivalents for radiological air emissions, liquid effluent discharges, and other liquid releases (including drainage from the WNSWAMP ditch) from 2001 through 2010 are graphed on Figure 1-1. Note that, when summed, the total dose is well below the DOE standard of 100 millirem per year. The consistently low effluent concentrations indicate that radiological activities at the site are well-controlled. (See also Table 3-2 in Chapter 3, "Dose Assessment.")

Groundwater Monitoring. The groundwater program is implemented at the WVDP according to DOE Order 450.1A and Resource Conservation and Recovery Act §3008(h) Administrative Order on Consent requirements, as approved by NYSDEC and the U.S. Environmental Protection Agency (EPA). Monitoring continued during 2010. Refer to Chapter 4, "Groundwater Protection Program," for details.

Environmental Management of Radiation Exposure. Ambient environmental radiation is measured with thermoluminescent dosimeters (TLDs) at on-site and off-site locations. (See Figures A-10 through A-12.) Consistent with historical data, results from three of the eight TLDs located near on-site waste storage facilities on the north plateau in 2010 were generally higher than background. Results from perimeter TLDs that would be more representative of exposure to the public were statistically indistinguishable from background concentrations. (See "Environmental Radiation" in Chapter 2.)

FIGURE 1-1
Annual Effective Dose Equivalent to the Maximally Exposed Off-Site Individual



Nonconformance and Corrective and Preventative Action

Throughout CY 2010, comprehensive evaluations, reviews, audits, and assessments were performed evaluating the implementation of EMS elements at the WVDP. During CY 2010, there were no notices of noncompliance, and no regulatory inspection findings. Results from the various assessments indicate that WVES has maintained an effective EMS. Performance against metrics is outstanding and there were few environmental performance issues, none which indicate regulatory noncompliance.

When a deficiency or issue is noted during an audit or assessment, corrective actions are initiated in a timely manner. In addition, WVES has a robust and well-managed Operating Experience Program (Lessons Learned). During CY 2010, over 1,600 items (both internal and external) were screened for Lessons Learned applicability, resulting in 46 Lessons Learned being issued. Refer later in this chapter to "EMS Audits and Other Audits and Assessments" for further discussion.

Quality Assurance (QA) Program

The QA program at the WVDP provides for and documents consistency, precision, and accuracy in collecting and analyzing environmental samples and in interpreting and reporting environmental monitoring data. Under contract with the DOE, WVES implemented the QA program at the WVDP. Subcontractor laboratories providing analytical services for the environmental monitoring program are contractually required to maintain a QA program consistent with WVDP requirements.

10 CFR Part 830, Subpart A, "Quality Assurance Requirements," Section 830.122, "Quality Assurance Criteria," and DOE Order 414.1C, "Quality Assurance" (DOE, 2005), document the QA program policies and requirements applicable to activities at the WVDP. The WVDP QA program serves to implement the DOE Order 450.1A requirement to provide "assurance that analytical work for environmental and effluent monitoring supports data quality objectives, using a documented approach for collecting, assessing, and reporting environmental data." The integrated QA program also incorporates the requirements from the consensus standard "Quality Assurance Program Requirements for Nuclear Facilities" (American Society of Mechanical Engineers NQA-1, 1989). Controlled documents specific to the WVDP are used to implement the integrated QA program.

General areas addressed by the QA program are presented below.

Responsibility. Responsibilities for overseeing, managing, and conducting an activity must be clearly defined. Personnel who verify that an activity has been completed correctly must be independent of those who performed it. Managers of programs, projects, and tasks at the WVDP are responsible for ensuring that QA requirements applicable to activities under their cognizance are implemented.

Planning. Work activities must be planned beforehand, the plan followed, and activities documented. Purchases of quality-affecting equipment or items must be planned, precisely specified, and verified for correctness upon receipt.

Training. Anyone performing an activity in support of the WVDP environmental monitoring program must be trained in the appropriate procedures and qualified accordingly before carrying out the activity.

Control of Design, Procedures, Items, and Documents. Any activity, equipment, or construction must be clearly described or defined and tested. Changes in the design must be tested and documented. Procedures must clearly state how activities will be conducted. Procedures are reviewed periodically, updated when necessary, and controlled so that only approved and current procedures are used.

Equipment or particular items affecting environmental data quality must be identified, inspected, calibrated, and tested before use. Calibration status must be clearly indicated. Items that do not conform to requirements must be identified as nonconforming and segregated to prevent inadvertent use.

Corrective Action. Conditions adverse to quality must be promptly identified, a corrective action planned, responsibility assigned, and the problem remedied.

Documentation. Records of all activities must be kept to verify what was done and by whom. Records must be clearly traceable to an item or activity. Records such as field data sheets, chain-of-custody forms, requests for analysis, sample shipping documents, sample logs, data packages, training records, and weather measurements, in addition to other records in both paper and electronic form, are maintained as documentation for the environmental monitoring program.

Quality Control (QC)

The QC practices, an integral part of the WVDP QA program, are used to ensure that samples are collected and analyzed in a consistent and repeatable manner. QC methods are applied both in the field and in the laboratory.

Field QC. Procedures are defined for collecting each type of sample, such as surface water, groundwater, soil, and air. Trained Environmental Laboratory (ELAB) field personnel collect the samples. Field sampling locations are clearly marked to ensure that routine samples are continually collected in the same location. Collection equipment that remains in the field is routinely inspected, calibrated, and maintained, and automated sampling stations are kept locked to prevent tampering. Samples are collected into certified, pre-cleaned containers of an appropriate material and capacity. Containers are labeled with information about the sample, such as date and time of collection, sample collection personnel, and special field conditions. Collection information is documented and kept as part of the sample record.

Chain-of-custody documentation is maintained to trace sample possession from time of collection through analysis. Samples are stored in a locked, secure location before analysis or shipping. Samples sent off site for analysis are accompanied by an additional chain-of-custody form. Subcontract laboratories are required by contract to maintain internal chain-of-custody records and to store the samples under secure conditions.

Special field QC samples are collected and analyzed to assess the sampling process. Duplicate field samples are used to assess sample homogeneity and sampling precision. Field and trip blanks (laboratory-deionized water in sample containers) are used to detect contamination potentially introduced during sampling or shipping. Environmental background samples (samples of air, water, vegetation, venison, and milk taken from locations remote from the WVDP) are collected and analyzed to provide baseline information for comparison with on-site or near-site samples so that site influences can be evaluated.

Laboratory QC. In 2010, samples were collected by personnel from the URS ELAB. On-site analyses were performed at the ELAB or the Wastewater Treatment Facility Laboratory. Off-site analyses were performed by GEL Laboratories LLC (Charleston, South Carolina), TestAmerica Laboratories, Inc. (Buffalo, New York),

and AREVA NP Inc. (Westborough, Massachusetts). As samples were collected, shipped, and analyzed, chain-of-custody documentation was maintained to track sample possession from time of collection through analysis and data reporting. All laboratories are required to maintain relevant certifications, to participate in applicable crosscheck programs, and to maintain a level of QC as defined in their contracts.

To analyze environmental samples originating from the state of New York, both on-site and subcontract analytical laboratories are required to maintain the relevant New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certification.

Laboratory QC practices specific to each analytical method are described in approved references or procedures. QC practices include proper training of analysts, maintaining and calibrating measuring equipment and instrumentation, and routinely processing laboratory QC samples such as standards and spikes (to assess method accuracy), duplicates and replicates (to assess precision), and blanks (to assess the possibility of contamination). Standard reference materials (materials with known quantities or concentrations of constituents of interest) traceable to the National Institute of Standards and Technology are used to calibrate counting and test instruments and to monitor their performance.

Crosschecks. Crosscheck samples (performance evaluation samples) contain a concentration of a constituent of interest known to the agency conducting the crosscheck, but unknown to the participating laboratory. Crosscheck programs provide an additional means of testing accuracy of environmental measurements. Subcontract laboratories are required to perform satisfactorily on crosschecks, defined as having at least 80% of reported results falling within control limits. Crosscheck results that fall outside of control limits are addressed by formal corrective actions to determine any conditions that could adversely affect sample data and to ensure that actual sample results are reliable.

The WVDP participates in formal crosscheck programs for both radiological and nonradiological analyses.

- Radiological Crosschecks

Organizations performing radiological analyses as part of effluent or environmental monitoring

are encouraged by the DOE to participate in formal crosscheck programs to test the quality of environmental measurements being reported to the DOE by its contractors. Crosscheck samples for radiological constituents are analyzed on site by the ELAB and off site by GEL. In 2010, the WVDP participated in the DOE Radiological Environmental Sciences Laboratory Mixed Analyte Performance Evaluation Program (MAPEP). Results are listed in Appendix G⁶⁹.

The radiological crosscheck results reported by GEL for the March 2010 MAPEP study for air filter radiological analyses were flagged as “not acceptable” by the DOE MAPEP proficiency laboratory. The reported results for the air filter crosscheck (americium-241, cesium-137, cobalt-60, plutonium-238, plutonium-239/240, strontium-90, uranium-233/234, and uranium-238) presented a bias of greater than 100% of the actual reference value. A corrective action investigation for the nonconformance was initiated by GEL to determine the root cause. It was determined that human error, combining two filters for digestion and analysis instead of one, resulted in the elevated reported results. Inattention to detail was attributable to the error, which has since been corrected.

- Nonradiological Crosschecks

As a SPDES Permittee, the WVDP is required to participate in the EPA Discharge Monitoring Report (DMR) - QA performance evaluation studies (2010 DMR QA Study #30) for the National Pollutant Discharge Elimination System. Samples from this program are analyzed both on site and by subcontract laboratories. In addition, subcontract laboratories performing nonradiological sample analyses that contain radiological contamination participate in the DOE MAPEP program. This mixed analyte program provides performance evaluation samples for both radiological and nonradiological constituents.

In 2010, nonradiological crosschecks were analyzed by the WVDP Wastewater Treatment Facility Laboratory, the ELAB, GEL, and TestAmerica. Results are summarized in Appendix G⁶⁹.

Results for 2010 from all laboratories that analyzed samples from the WVDP monitoring program are summarized in Table 1-4. As presented, 96.4% of the crosschecks performed in 2010 were acceptable.

TABLE 1-4
Summary of Crosschecks Completed in 2010

Type	Number Reported	Number Within Acceptance Limits	Percent Within QC Limits
Radiological	92	82	89.1%
Non-radiological	213	212	99.5%
All types	305	294	96.4%

Data Management

The Environmental Laboratory Information Management System (ELIMS) is a database system used at the WVDP for establishing sample identification number, maintaining the sample data log, tracking samples, managing field and analytical data, and recording status and results of data validation. The ELIMS is used as a controlled-source database for generating reports and statistical evaluations of data sets to support environmental surveillance activities. Subcontract laboratories are requested to provide data in electronic format for direct entry into the ELIMS by WVDP personnel.

All software packages used to generate data are verified and validated before use. All analytical data produced in the ELAB at the bench level are reviewed and signed off by a qualified person other than the one who performed the analysis. A similar in-house review is contractually required from subcontractor laboratories.

Data Verification and Validation

Data validation is the process by which analytical data from both on-site and off-site laboratories are reviewed to verify proper documentation of sample processing and data reporting, and to determine the quality and usability of the data. A graded approach is applied that, based upon data quality objectives, dictates the rigor of review of the documentation associated with sample collection and/or sample analysis. In the WVDP environmental program, each data point is validated per approved standard procedures before it is assigned approval status and made ready for data assessment.

Data Assessment and Reporting

Validated analytical data, field information, and historical project data are integrated and evaluated to determine whether the constituents of interest are

actually present and, if so, at what concentrations. Data problems identified at this level are investigated and appropriately resolved.

Data from the environmental monitoring program are then evaluated to assess the effect, if any, of the site operations and activities on the environment and the public. Data from each sampling location are compared with historical results from the same location, with comparable background measurements, and (if applicable) with regulatory limits or guidance standards. Standard statistical methods are used to evaluate the data.

EMS Audits and Other Audits and Assessments

Audits, assessments, and surveillances are an important part of the improvement of the safety program at the WVDP. WVES established an Integrated Assessment Council, made up of representatives from different departments, to develop an annual Integrated Assessment Schedule-based on past performance and the risk and hazards of upcoming work. Internal assessments, audits, and self-assessments are performed throughout the year to continuously improve safety programs. Issues discovered through the Integrated Assessment Program are tracked in a centralized database, statused weekly with senior management, and trended via a quarterly performance analysis program.

Audits and assessments are conducted to verify compliance with, and effectiveness of, all aspects of the QA program, and to verify programmatic and functional compliance with site procedures, applicable local, state, and federal environmental regulations, and applicable DOE Directives. The WVDP environmental monitoring program is audited by external agencies and evaluated using internal self-assessments and audits.

Terminology. An audit or assessment provides for objective and independent review of site functions to determine if they are operating within regulatory, programmatic, and procedural parameters. The focus and/or topics of an audit or assessment are selected from specific criteria taken from the protocol, procedure, or regulation against which the function is to be evaluated.

During an audit or assessment, a "finding" is a non-compliance with a program element or a requirement of a specification, procedure, or commitment. Findings that may be considered immediately dan-

gerous or involve any direct violation of a regulation, WVDP policy or procedure, DOE Order, or conduct of operations requirement must be brought to the immediate attention of the cognizant site manager. Such conditions require corrective action and are to be fixed immediately and documented within the assessment. An "observation" is a condition that, if left uncorrected, could lead to a "finding." It may indicate the potential for violating regulations or requirements or an opportunity to improve an existing compliant condition or procedure. Such conditions also require corrective action. If a finding or an observation cannot be fixed before the issuance of the assessment report, an Issue Report (IR) is initiated to document the condition that needs to be addressed, the required corrective action, and the timeline for completing the corrective action. IRs are tracked to closure in the WVDP open items tracking system. A "recommended action" may be identified to improve a program. "Good practices" (noteworthy practices) are identified when actions are above and beyond those required by procedural compliance.

WVES External Audit of GEL Laboratories. An external QA audit was conducted at GEL Laboratories from August 31 to September 1, 2010. The purpose of the audit was to satisfy a DOE Laboratory Accreditation Program requirement to annually evaluate the laboratory contracted by WVES. The audit considered the technical scope of work and quality program requirement of the WVES contract. In addition, continued implementation of resolutions to previously identified issues was verified.

The auditors specifically evaluated the preparation of bioassay samples and standard operating procedures (SOPs) followed when analyzing for strontium-90 in urine. The elements that were evaluated included; organization and management, instructions and procedures, personnel training, document control, equipment and facilities, data integrity, test control, control of measuring and test equipment, corrective action, control of nonconforming items, and indirect radiobioassay criteria. There were no findings identified during the audit; however, one observation and one commendable practice were noted. The observation was noted in the area of document control relating to minor inconsistencies between language in GEL SOPs and actual practice. It was acknowledged that clarification was warranted and review and potential revision of the affected documents will follow. The commendable practice was noted in the area of development of a barcode reader/scanner in the bioassay count room.

ISMS and QA Program Effectiveness Review. During July 26–29, 2010, WVES and DOE-WVDP jointly conducted a comprehensive evaluation and annual ISMS and QA effectiveness review. The audit included a review of self-assessments, WVES and external oversight reviews, corporate reviews, performance against established performance objectives, measures, and commitments, operating experience programs, as well as other feedback, field observations, document reviews, and personnel interviews. The EMS was included in this review. WVES and DOE-WVDP concluded that the ISMS, EMS, and QA programs remain well documented, and are functioning effectively.

This review was performed to support the annual ISMS and QA declaration, which is transmitted to the DOE-Headquarters.

DOE-WVDP Audit of the WVES Environmental Programs. From November 2–17, 2010, the DOE-WVDP performed an audit of the WVES Environmental Programs. The audit focused on elements of compliance with applicable requirements of DOE Order 450.1A, DOE Order 5400.5, the EPA, and the state of New York relative to air emissions, waste minimization, pollution prevention, spill prevention, and reporting, and hazardous and toxic chemical reporting.

There were four findings as a result of the audit. One was procedural and two were related to ineffective or incomplete corrective actions from the previous CY 2009 audit, and the fourth was related to delays in spill reporting. The procedural finding (finding one) was based on inaccurate modifications that were made to the SPDES and Storm Water Pollution Prevention Plan (SWPPP). This plan has since been corrected. The two incomplete/ineffective findings (findings two and three) were based on failure to maintain procedures that were current administratively. Personnel involved with updates to these procedures are now assigned required reading and informed of the controlled document and periodic review process. The fourth finding was in regard to plant systems operator failure to report and notify EA of three spills, including one reportable petroleum spill, within one hour, as required by procedure. All shift supervisors were provided instructions to reiterate the necessity to contact EA directly for spill reporting at all times, including during nonroutine work hours.

All other areas and activities evaluated during this audit were found to be overall effective and in compliance with applicable federal and state regulations and DOE and WVES program requirements.

QA Audit of the URS ELAB and the ELAP Program. An audit of the URS ELAB QA program was conducted on December 15, 2010 as an external audit of contracted off-site and on-site activities performed by URS laboratories. The audit focused on elements of the NYSDOH ELAP program, quality management, training and indoctrination, document control, inspection, test control, and measuring and test and calibrated equipment control. Within the scope of the audit, one commendable practice was recognized relating to an effectively implemented training matrix. Two observations were identified which were both related to a requirement for review of calibration records by an independent reviewer, or management designee. Staff were briefed and the observations were addressed immediately to the satisfaction of the audit team. The audit team concluded that the URS ELAB effectively implements a mature and well-administered system.

Environmental Assessments

During 2010, EA also conducted self-assessments to verify programmatic effectiveness and functional compliance with site procedures and applicable regulations.

- On March 25, 2010 an evaluation of dam safety requirements was performed. As a result of the August 2009 storm event, an agreement with NYSDC initiated implementation of an enhanced inspection process. The surveillance verified that marker flags were placed at the vertical and lateral extent of the eroded areas, the tall grass and scrub brush had been removed from the dam faces and emergency spillway, and weekly enhanced inspections of the lake dams and emergency spillway had been initiated. There were no findings identified during the assessment. One recommendation was to improve the quality of the documented conditions and notes associated with the inspections.
- From March 16–24, 2010, an assessment was performed to review the records and requirements for Superfund Amendments and Reauthorization Act Title III, Section 311, 312, and 313 reporting. The assessment reviewed the process to track all purchases of chemicals and chemical containing items, and inventories from each user department. Quarterly and annual reports were submitted to the DOE as required. There were no findings observed during this assessment.

- During June 2010, an assessment was conducted to verify that all state and/or federal regulatory requirements for petroleum storage tanks were met. There were no findings observed during the assessment; however, there were three minor observations. Two observations were related to improper location of tank labels, which were immediately attached properly. The third observation noted that hinges on the lid to a fill port catch basin of one of the tanks was broken. The replacement part was ordered. This was not a regulatory non-compliance issue.
- During December 2010, EA performed a SPDES-integrated assessment for storm water associated with construction activities at the north plateau PTW. The north plateau PTW installation/construction project was performed under the SPDES general permit for storm water associated with construction activities (GP 0-10-001) and the SWPPP. Requirements associated with GP 0-10-001 were found to have been satisfactorily performed. There was one finding because one weekly inspection was not performed on December 20, 2010. Due to winter weather conditions in the fall delaying activities, the "notice of termination" was submitted to NYSDEC in August 2011, after the remaining areas of disturbed surface soils were stabilized to the permit requirements.
- During December 2010, a self-assessment was performed to verify that certain implementing requirements associated with National Environmental Policy Act environmental checklists were achieved. The assessment evaluated environmental checklists for the tank and vault drying system and the north plateau PTW. The assessed performance requirements included evaluations of the potential for SPDES or NESHAP permit modifications, evaluating storm water management controls, management and containment of contaminated north plateau soil and water, and airborne radiological-NESHAP evaluations. It was determined that all implementing requirements were met.
- On December 16, 2010, an environmental facility walkdown was performed to observe for environmental issues such as, but not limited to, impacts to storm water quality, general facility housekeeping, waste management concerns, spills or releases, or other issues that could potentially impact the environment, health or safety. There were no findings associated with this assessment. A noteworthy practice for general good housekeeping was noted in the hazardous waste management areas of the RHWF and the lag storage LLW,

TRU, and mixed waste storage areas. A few observations were noted regarding labels and status tags on universal waste management containers. Corrective actions for all observations were initiated and completed within the shift they were observed.

QA Assessment of WVES Environmental Protection Program and EMS. From August 11–16, 2010, WVES QA conducted an assessment to evaluate implementation of WVES contract Directive DOE Order 450.1A, "Environmental Protection Program," and ISO 14001:2004, "Environmental Management Systems." The evaluation focused on activities conducted under the ARRA work force scope. Personnel training, the WVDP safety culture, and emergency preparedness were areas of consideration. The assessment concluded that the requirements of the directives have been adequately addressed in WVES implementing documents.

DOE-WVDP Assessment of the WVES NESHAP Program. During January 24–26, 2011, the DOE-WVDP conducted an assessment of the NESHAP program at the WVDP, through interviews with personnel and organizations, observation of work activities, and review of pertinent documents. Among the elements evaluated were compliance with 40 CFR Part 61, and EPA requirements relative to air emissions and reporting.

Although four findings were identified as a result of the assessment, the overall adequacy and implementation of the WVDP NESHAP program is considered effective. The four findings were identified as follows:

- The "Memorandum of Understanding (MOU) between the EPA and the DOE concerning Clean Air Act Emission Standards for Radionuclides 40 CFR 61 Including Subparts H, I, Q, & T" states that the methodologies for assessing diffuse sources will be provided to the EPA. The finding noted that contrary to the requirement, the methodologies have not been submitted. WVES prepared a current document and has submitted it with the CY 2010 NESHAP report to the DOE-WVDP for transmittal to the EPA.
- The second finding noted that WVES had not received EPA approval to discontinue stack inspections. Through 2007, stack inspection requirements of 40 CFR 61, Appendix B, Method 114 were satisfied for sampling systems in use for major emission points at the WVDP. Sampling systems for the main stack, the STS/PVS, the vitrification heating, ventilation, and air-conditioning system, the con-

tact size-reduction facility (CSRF), and OVEs/PVUs were inspected. After notification was made to EPA in the NESHAP Annual Report, inspections were discontinued in CY 2008. Discontinuing inspections was based upon multiple years of documented lack of continuing visible deposits, no evidence of other sample train degradation, and the continuing need to enhance worker safety. Ventilated facilities have been maintained, and inspections for all major point sources were resumed in CY 2011.

- The third finding was procedural, and related to two site procedures containing outdated references to various documents and regulations. The procedures were updated with current references in June 2011.
- The fourth finding related to lack of inclusion of detailed meteorological data in the NESHAP report. In the report, WVES routinely includes the source of meteorological data, but does not include the detailed user-supplied meteorological data. Additional meteorological data were included in the annual NESHAP report documenting 2010 conditions, including those generated by the CAP88-PC computer program output and wind rose information.

Environmental Surveillances

Several surveillances of activities that potentially could impact environmental health or safety were conducted in 2010.

DOE-WVDP Surveillance of Erosion Monitoring of Dams, Emergency Spillway, and Creeks. The surveillance was conducted as a review of WVES's effort to monitor erosion on the reservoir dams, emergency spillway, and creeks. DOE-WVDP performed walkdowns of Erdman Brook, Buttermilk Creek, the emergency spillway, and Dam #1 and Dam #2 on July 26, 2010, August 4, 2010, and September 29, 2010. The initial walkdown was performed after a July 24–25 storm that yielded 2.46 inches of precipitation. No findings or concerns were identified during the surveillance, and there were two comments, discussed below.

- WVES should continue to monitor, document the length, width, and depth or height of identified eroded areas of concern or knick points on the WVDP, and take measures to prevent further erosion as necessary. In accordance with SOPs, WVES performed biennial inspections of the areas that directly affect the WVDP operations, including La-

goon 3 toe area and Erdman Brook knick points that may eventually have impact on the NDA. In addition, an inspection would be performed in the event of a 24-hour storm event of greater than one inch.

- The second comment noted erosion on a gravel roadway used by NYSERDA during a recently completed erosion mitigation project on Erdman Brook. The pathway is currently used as an access to an environmental sampling point located within Erdman Brook. The access previously existed as a dirt pathway, and motor vehicle traffic is not routinely anticipated. Should the observed erosion (rilling) worsen or prevent safe access to the sampling point, necessary repairs would be performed to make it safe for use.

North Plateau PTW Surveillances. On February 23, 2010, a surveillance was performed of the drilling and sampling operations along the north plateau PTW alignment in preparation of the wall installation. Oversight activities included review of work permits, ground disturbance permit notification, instrument calibration checks, sample container and documentation protocols, and record keeping. The results of the surveillance were satisfactory.

On June 1, 2010, storm water sampling was observed at outfall S09 during a rain event. ELAB personnel were witnessed performing field collection activities, field measurements, documentation on sample containers, field logs, and chain of custodies, and preparation of a flow-weighted composite. Information gathered or generated as a result of the storm water program is subsequently reported to NYSDEC. The results of the surveillance were satisfactory.

Multiple surveillances were performed from September through December 2010 relative to activities associated with the installation of the north plateau PTW. The objectives of these surveillances included, but were not limited to the following:

- verification of the construction of the spoils containment structure;
- observation of pump station installation and hydrostatic testing;
- observation of the geosynthetic clay liner, geotextile cover, and base rock cover installation on top of the PTW trench;

- verification that the smart ditch was properly installed and anchored; and
- verification of design modification for the containment structure concrete walls and rebar positioning.

The results of the surveillances conducted during the PTW installation were all satisfactory.

EMS Management Review

As discussed earlier in this chapter ("ISMS and QA Effectiveness Review"), the FY 2010 annual review was conducted by a joint review team of external DOE, DOE-WVDP, and WVES assessors. The EMS and environmental protection is an integral component of the ISMS. The team concluded that the WVDP ISMS mechanisms continue to be implemented in an effective manner and is adequately integrated with other WVDP management systems.

EMS Experiences

EMS Challenges. A major challenge for the WVDP was to minimize waste generation when the work consists of D&D of radiologically contaminated facilities. Overcoming this challenge was accomplished by detailed work planning that considered methods to minimize each of the environmental aspects of the work and drawing upon the lessons learned from other projects. Future challenges will be met by establishing clear goals with a renewed focus on EMS.

EMS Best Practices/Lessons Learned. During the last three years, WVES worked an ambitious plan to prepare for transport and eventual off-site disposal all of the legacy transuranic (TRU) radioactive waste stored at the site (approximately 80,000 ft³ [1,476 containers]). Thus far, utilizing several waste processing and characterization methodologies, the amount of legacy TRU waste on site has been reduced by approximately 75%. Through non-intrusive techniques, 40% of the waste was reclassified as low-level radioactive waste (LLW). Targeted invasive techniques were used to segregate and remove higher activity materials, allowing the remainder to be reclassified as LLW. TRU waste reduction is critical due to the increased hazards associated with handling TRU waste, more stringent disposal requirements (and subsequent cost increases), and the lack of a current pathway for disposal of this waste stream. TRU waste will be safely stored at the WVDP until a disposal facility is available.

WVES also minimized waste generation by deploying the robotically controlled Nitrocision® technology using a high-pressure liquid nitrogen system to decontaminate larger pieces. The technology has been highly successful in removing high-activity fixed contamination from cell surfaces and large pieces of equipment.

In March 2011, WVES received Honorable Mention for an Environmental Sustainability (E-Star) Award from DOE-Headquarters for these radioactive waste processing and reduction techniques. Many of the tools and techniques used for the processing of TRU waste are developed specifically for individual waste streams and often utilize specialized tooling. WVES continued to assess requirements and opportunities to increase efficiencies in waste processing. See Table ECS-6, "Pollution Prevention Progress for Fiscal Year 2011."

WVES increased its sustainable acquisitions by training purchasing personnel to investigate and find "green" bio-based alternatives to products.

EMS Benefits to Agency Mission. The benefits of implementing an EMS at the WVDP include:

- minimizing the environmental impacts of D&D activities;
- reusing excess materials by transfer to other DOE facilities, Federal and State agencies, various DOE-sponsored programs, donation programs, auctions, and sales; and
- safe removal of asbestos from highly radiologically contaminated areas.

Summary

Although areas for improvement were identified in the course of audits and assessments, nothing was found that would compromise the quality of the data in this report or the environmental monitoring program in general. During 2010, there were no notices of noncompliance, and there were no unpermitted or permit-exceeding releases to the environment.

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