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Annual Waste Minimization Summary Report

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Vision • Service • Partnership

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ACRONYMS AND ABBREVIATIONS

CY	calendar year
DOE	U.S. Department of Energy
EPA	Environmental Protection Agency
EMS	Environmental Management System
m^3	cubic meter
mton	metric ton
NNSA/NSO	National Nuclear Security Administration Nevada Site Office
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
P2	Pollution Prevention
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
SAM	Software Asset Management
TRU	Transuranic
TSCA	*Toxic Substance Control Act*

Introduction

This report summarizes the waste minimization efforts undertaken by National Security Technologies, LLC (NSTec), for the U. S. Department of Energy (DOE), National Nuclear Security Administration Nevada Site Office (NNSA/NSO), during calendar year (CY) 2009. This report was developed in accordance with the requirements of the Nevada Test Site (NTS) *Resource Conservation and Recovery Act* (RCRA) Permit (No. NEV HW0021), and as clarified in a letter dated April 21, 1995, from Paul Liebendorfer of the Nevada Division of Environmental Protection (EPA) to Donald Elle of the U.S. Department of Energy, Nevada Operations Office.

The NNSA/NSO Pollution Prevention (P2) Program establishes a process to reduce the volume and toxicity of waste generated by NNSA/NSO activities and ensures that proposed methods of treatment, storage, and/or disposal of waste minimize potential threats to human health and the environment. The following information provides an overview of the P2 Program, major P2 accomplishments during the reporting year, a comparison of the current year waste generation to prior years, and a description of efforts undertaken during the year to reduce the volume and toxicity of waste generated by NNSA/NSO.

Pollution Prevention Program

It is the priority of NNSA/NSO to minimize the generation, release, and/or disposal of pollutants to the environment by implementing cost-effective P2 technologies, practices, and policies. A commitment to P2 minimizes the impact on the environment, improves the safety of operations, improves energy efficiency, and promotes the sustainable use of natural resources. To meet P2 goals identified each year, this commitment includes providing administrative support and financial resources. When economically feasible, source reduction is the preferred method of managing waste, followed by reuse/recycling treatment, and landfill disposal as a last resort.

NNSA/NSO requires contractors/laboratories to develop and maintain an Environmental Management System (EMS) per U.S. Department of Energy Order DOE O 450.1A, "Environmental Protection Program." The EMS requires that contractors reduce or eliminate the generation of waste, the release of pollutants to the environment, and the use of Class I ozone-depleting substances. This requirement is achieved by means of source reduction, reuse, segregation and recycling, and procurement of recycled-content materials and environmentally preferable products and services. To minimize the generation of waste, project managers are required to incorporate waste minimization into the planning phase of their projects. Waste generating processes must be assessed to determine if the waste can be economically reduced or eliminated. Waste minimization activities determined to be cost effective are incorporated into the project plan, and adequate funding allocated to ensure their implementation.

For wastes in which source reduction is not feasible, an aggressive recycling program is maintained. Items recycled through the NNSA/NSO recycling program include paper, cardboard, aluminum cans, toner cartridges, inkjet cartridges, used oil, food waste from the cafeteria, tires, computers and software, scrap metal, rechargeable batteries, lead-acid batteries, and electric lamps (fluorescent, mercury vapor, metal halide, and high pressure sodium).

As required by Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management," NNSA/NSO maintains an Environmentally Preferable Purchasing Program where specific EPA-designated items must contain a percentage of recycled materials. By following these guidelines when procuring supplies, the market for recycled content products is stimulated, resources are saved, and the loop is closed on recycling.

The NNSA/NSO P2 Program also includes an employee and public awareness program. Awareness of P2 issues is accomplished by disseminating articles by means of electronic mail, contractor and NNSA/NSO newsletters, maintenance of a P2 Intranet Web site, employee training courses, and participation at employee and community events. These activities are intended to increase awareness of P2 and environmental issues, and point out the importance of P2 for improving environmental conditions in the workplace and community.

Major Pollution Prevention Accomplishments

- The Pluto Disassembly Facility was closed under the *Federal Facility Agreement and Consent Order* with the State of Nevada. The decontamination and decommissioning of the facility was designed to support clean closure from May 2008 through February 2009. Closure activities were conducted by the Environmental Characterization and Remediation Services Contractor (Navarro Nevada Environmental Services) and the Management and Operations Contractor (NSTec). In an effort to support NNSA/NSO P2 objectives, reduce the volume, and minimize the disposal cost of materials generated and dispositioned as hazardous and regulated waste, approximately 90,000 pounds of materials in the facility were recycled. The following waste streams were successfully recycled or reused:
  - **Used Oil –** 37 gallons drained from overhead cranes, manipulators, pump and motor reservoirs, and miscellaneous air-oil reservoirs were sent to an offsite vendor for recycle/recovery. A total of 567 gallons of mineral oil were drained from six leaded-glass shielding windows and sent to an offsite vendor for recycle.
  - **Mercury Containing Items –** 185 pounds of thermometers and thermostats were sent to commercial mercury retort facility for recovery.
  - **Universal Waste –** Over 100 pounds of lead-acid batteries and electric lighting lamps were managed as universal waste and sent to an offsite vendor for recycle.
  - **Lead –** Over 72,000 pounds of leaded-glass shielding was transferred to Fermi National Accelerator Laboratory for reuse. Over 21,000 pounds of elemental lead, primarily lead shield plugs, were transported to an offsite vendor in Oak Ridge, Tennessee, for recycle and reuse within the DOE and Nuclear Regulatory Commission–licensed community.
- Because many of the NTS roads are aging and in need of repair, 26.2 miles of roadway were repaved using a method called "road bed modification," where existing pavement was recycled. The process consisted of pulverizing and grinding the existing roadway, along with a specified amount of the roadway subbase, adding cement and water, then compacting. A very stable, new roadbed was created for the new asphalt.

- The Acquisitions Group of the Information Technology Department developed a database for implementing a Software Asset Management (SAM) Program. The SAM Program's mission is to identify software used within the NSTec computing environment, document and tag each software purchase, and recapture unused software licenses for redeployment. In 2009, the Acquisitions Group redeployed over 100 software programs with an average cost of $400 per software package, for a cost savings of $40,000.

Comparison of Waste Generated in CY 2009 to Prior Years

Waste generation activities are presented in two source categories:

1. **Routine Waste** is waste generated from on-going operations (i.e., production, analytical, research and development laboratory operations, work for others, or any other periodic or recurring activity).

2. **Cleanup Waste** is waste generated from Environmental Restoration Program activities, laboratory closeouts (i.e., discarding off-specification or out-of-date materials), spill cleanups, legacy wastes, wastes from decommissioning and demolition/transition operations, and all *Toxic Substance Control Act* (TSCA) wastes.

Table 1 compares radioactive waste generated on site in CY 2009 with prior years. NNSA/NSO has not reported radioactive waste generated routinely, except for an occasional one-time generation. Personal protective equipment (PPE) that is generated during routine hotline activities has been used to fill void space in containers of radioactive waste generated by cleanup activities, and has not been reported as routine radioactive waste in prior years. Beginning in CY 2007, this PPE was tracked and reported as routine radioactive waste.

Routine transuranic (TRU) waste was generated in CY 2009 by the Joint Actinide Shock Physics Experimental Research project and is stored in Area 5 until it can be shipped to the Waste Isolation Pilot Plant for disposal. Typically, DOE sites use waste disposal records as a means of tracking waste generation. Prior to CY 2007, this routine TRU waste was not reported as waste generated. Beginning with CY 2007, this waste is now tracked and reported in the year it is generated.

The volume of routine and cleanup waste generated is dependent upon the number and scope of projects funded during the year.

Table 1. Radioactive Waste Generated

	Routine	Cleanup	Total
CY 2009	4.2 m^{3*}	1,684.7 m^3	1,688.9 m^3
CY 2008	251.6 m^3	991.7 m^3	1,243.3 m^3
CY 2007	0.0 m^3	1,940.7 m^3	1,940.7 m^3
CY 2006	0.0 m^3	1,663.7 m^3	1,663.7 m^3
CY 2005	0.0 m^3	601.8 m^3	601.8 m^3

***m^3 = cubic meters**

Table 2 compares the amount of hazardous waste generated in CY 2009 with the previous four years. Routine hazardous waste generation decreased slightly in CY 2009. The volume of cleanup waste generated is dependent upon the number and scope of cleanup projects funded during the year.

Table 2. Hazardous Waste Generated

	Routine	Cleanup	Total
CY 2009	5.1 mtons*	2.4 mtons	7.5 mtons
CY 2008	7.0 mtons	4.2 mtons	11.2 mtons
CY 2007	7.1 mtons	40.9 mtons	48.0 mtons
CY 2006	11.2 mtons	354.5 mtons	365.7 mtons
CY 2005	23.2 mtons	5.0 mtons	28.2 mtons

***mtons = metric tons**

Table 3 compares solid waste generation to prior years. Both routine and cleanup solid waste generation decreased from the previous year. The volume of cleanup waste generated is dependent upon the number and scope of cleanup projects funded during the year.

Table 3. Solid Waste Generated

	Routine	Cleanup	Total
CY 2009	1,963.8 mtons	4,049.2 mtons	6,013.0 mtons
CY 2008	2,654.1 mtons	5,027.0 mtons	7,681.1 mtons
CY 2007	2,355.2 mtons	5,723.7 mtons	8,078.9 mtons
CY 2006	4,824.0 mtons	6,175.0 mtons	10,999.0 mtons
CY 2005	5,380.0 mtons	11,193.0 mtons	16,573.0 mtons

Comparison of Volume and Toxicity Reductions of Waste in CY 2009 to Prior Years

P2 techniques and practices are implemented for all activities that may generate waste. These P2 activities result in reductions to the volume and/or toxicity of waste actually generated on site. Table 4 compares the amounts of radioactive, hazardous, and solid wastes reduced in CY 2009 to prior years.

Table 4. Waste Reduced through P2 Activities

	Radioactive Waste Reduced	Hazardous Waste Reduced	Solid Waste Reduced
****CY 2009**	45.2 mtons	114.0 mtons	624.0 mtons
CY 2008	28.9 m^3	189.6 mtons	746.4 mtons
CY 2007	0.0 m^3	53.0 mtons	418.0 mtons
CY 2006	0.0 m^3	147.0 mtons	803.0 mtons
CY 2005	0.0 m^3	13,992 mtons	1,194.0 mtons

**Beginning in CY 2009, Radioactive Waste Reduced is reported in mtons.

The following tables show an overview of the estimated volume reductions accomplished during CY 2009, through implementation of P2/waste minimization activities. Table 5 shows an estimated 114.0 mton reduction of RCRA, TSCA, and state-regulated hazardous waste. Table 6 shows an estimated 624.0 mton reduction of sanitary waste.

Table 5. CY 2009 Hazardous Waste Reductions

Waste Minimization Activity	Activity	Volume Reduction (mtons)
Recycle/Reuse	Bulk used oil was sent to an offsite vendor for recycle.	81.0
Recycle/Reuse	Lead acid batteries were shipped to an offsite vendor for recycle.	11.1
Recycle/Reuse	Computer equipment was returned to the vendor where it is refurbished and sold for reuse.	8.6
Recycle/Reuse	Lead scrap metal was sold for recycle/reuse.	9.8
Recycle/Reuse	Spent fluorescent light bulbs, mercury lamps, metal hydride lamps, and sodium lamps were sent to an offsite vendor for recycle.	3.0
Recycle/Reuse	Rechargeable batteries were sent to an offsite vendor for recycle.	0.5
TOTAL		**114.0**

Table 6. CY 2009 Solid Waste Reductions

Waste Minimization Type	Activity	Volume Reduction (mtons)
Recycle/Reuse	Mixed paper and cardboard was sent off site for recycle.	106.7
Recycle/Reuse	Single stream-mixed paper/cardboard/cans/plastic was sent off site for recycle.	470.5
Recycle/Reuse	Scrap ferrous metal was sold to a vendor for recycle.	0.7
Recycle/Reuse	Food waste from the cafeterias was sent off site to be reused as pig feed for a local pig farmer.	31.2
Recycle/Reuse	Scrap non-ferrous metal was sold to a vendor for recycle.	7.8
Recycle/Reuse	Shipping materials including pallets, styrofoam, bubble wrap, and shipping containers were reused.	5.6
Recycle/Reuse	Spent toner cartridges were sent off site for recycle.	0.9
Recycle/Reuse	Aluminum cans were sent off site for recycle.	0.6
TOTAL		**624.0**