

Annual Waste Minimization Summary Report

Calendar Year 2007

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Nevada Site Office**



**Prepared by
National Security Technologies, LLC**



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ACRONYMS AND ABBREVIATIONS

CY	calendar year
DOE	U.S. Department of Energy
EMS	Environmental Management System
m ³	cubic meter
MJ/day	megajoule per day
mton	metric ton
NLVF	North Las Vegas Facility
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
P2	Pollution Prevention
RCRA	<i>Resource Conservation and Recovery Act</i>
TSCA	<i>Toxic Substance Control Act</i>

Introduction

This report summarizes the waste minimization efforts undertaken by National Security Technologies, LLC (NSTec), for the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NNSA/NSO), during calendar year (CY) 2007. This report was developed in accordance with the requirements of the Nevada Test Site (NTS) *Resource Conservation and Recovery Act* (RCRA) Permit (number NEV HW0021), and as clarified in a letter dated April 21, 1995, from Paul Liebendorfer of the Nevada Division of Environmental Protection 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 the NNSA/NSO 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 the NNSA/NSO.

Pollution Prevention Program

It is the priority of the 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. This commitment includes providing adequate administrative and financial materials on a continuing basis to ensure goals are achieved. When economically feasible, source reduction is the preferred method of handling waste, followed by reuse and recycling, treatment, and, as a last resort, landfill disposal.

NNSA/NSO requires contractors/laboratories to develop and maintain an Environmental Management System (EMS) per U.S. Department of Energy Order DOE O 450.1, "Environmental Protection Program." The EMS requires that contractors must reduce or eliminate the generation of waste, the release of pollutants to the environment, and the use of Class I ozone-depleting substances through source reduction, reuse, segregation and recycling, and by procuring 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 should be incorporated into the project plan and adequate funding allocated to ensure implementation.

For wastes that have already been generated, 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, scrap metal, rechargeable batteries, lead-acid batteries, fluorescent light bulbs, mercury lamps, metal hydride lamps, and sodium lamps.

An effective method for reuse is the coordination of the Material Exchange Program. Created in 1998, the Material Exchange Program has diverted over 190 metric tons (mtons) of supplies, chemicals, and equipment from landfills. Unwanted chemicals, supplies, and equipment are made available through electronic mail or postings on the intranet material exchange database so that individuals can obtain supplies at no cost. These materials are destined for disposal, either as solid or hazardous waste, as a result of process modification, discontinued use, or shelf life expiration. Rather than disposing of these items, the majority of them are provided to other employees for their intended purpose, thus avoiding disposal costs and costs for new purchases. If items are not placed with another user, they can be returned to the vendor to be recycled or reused.

As required by Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management," NNSA/NSO maintains an Environmentally Preferable Purchasing Program where specific Environmental Protection Agency-designated items, when purchased, must contain a percentage of recycled materials. Purchasing items containing recycled materials stimulates a market for recycled content products and closes the loop on recycling.

The NNSA/NSO P2 Program also includes an employee and public awareness program. Awareness of P2 issues is accomplished by disseminating articles through electronic mail, contractor and NNSA/NSO newsletters, the 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

- Conservation of materials through reuse was accomplished in the renovation of the B-03 building at the NNSA/NSO North Las Vegas Facility (NLVF). More than 75 percent of the existing structure was conserved. The 25 percent new construction included water and energy conservation upgrades from new landscaping; new roofing materials; heating, ventilating, and air conditioning units; glazed windows; low-flow bathroom fixtures; improved (new and refurbished) lighting; better insulation; and adding B-03 to the automated energy monitoring and management system. Renovation resulted in a 17.5 percent increase in occupancy over the previous configuration. Housing more employees has eliminated cross-town commuting from other NSTec facilities as much as 10 miles away, saving fuel and exhaust emissions from the 20 mile round trip. This project will be submitted to the U.S. Green Building Council for consideration for Leadership in Energy and Environmental Design certification.
- Equipment replacements and lighting upgrades resulted in substantial energy cost reductions at NSTec Livermore facilities. Chiller replacement resulted in saving 497 megajoules per day (MJ/day); a new air compressor saved 583 MJ/day; "Energy Star" appliances replaced

old appliances, saving 3 MJ/day; and LED [Light Emitting Diode] lighting (in place of fluorescent lighting) saved 112 MJ/day. The total energy savings is approximately \$56 per day, and there is also a corresponding reduction in carbon dioxide emissions.

- The NNSA/NSO NLVF applied for inclusion in the state of Nevada Storm Water General Permit to comply with the storm water pollution prevention regulations of the Clean Water Act. The layout and logistics of the facility made compliance with the permit standards and conditions difficult. NSTec developed a plan to evaluate the need for raw materials and, through recycling, scraping, and relocation, eliminated exposed raw materials that could contribute to increased pollution from runoff at this facility. This activity allowed the company to qualify for a “Condition of No Exposure” and provided an exemption from a costly monitoring and inspection program required under state and federal regulations. In addition to doing something positive for the environment and saving future compliance costs, a total of 690 mtons of material was relocated for reuse, and 295 mtons of mixed metals and 80 mtons of steel plate were sold to a recycler. The entire project was completed in 60 days.
- The Material Exchange Program reused 1.3 mtons of materials destined for solid waste disposal in CY 2007.

Comparison of Waste Generated in CY 2007 to Prior Years

Waste generation activities are presented in two source categories:

1. **Routine waste** is waste generated from ongoing operations such as 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 (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 2007 and prior years. NNSA/NSO has not reported radioactive waste generated routinely, except for an occasional one-time generation. Personal protective equipment 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 personal protective equipment was tracked and reported as routine radioactive waste.

Routine transuranic waste has been generated the past few years by the Joint Actinide Shock Physics Experimental Research project. In CY 2007, no transuranic waste was generated from this project.

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 (m³)*	Cleanup (m³)	Total (m³)
CY 2007	0.00	1,940.70	1,940.70
CY 2006	0.00	1,663.70	1,663.70
CY 2005	0.00	601.80	601.80
CY 2004	0.00	334.70	334.70
CY 2003	0.23	647.20	647.43

*m³ = cubic meters

Table 2 compares the amounts of hazardous waste generated in CY 2007 and the previous four years. Routine hazardous waste generation decreased in CY 2007 after a gradual increase over the previous four years. 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 (m³)	Cleanup (m³)	Total (m³)
CY 2007	7.10	40.90	48.00
CY 2006	11.20	354.50	365.70
CY 2005	23.20	5.00	28.20
CY 2004	18.40	36.00	54.40
CY 2003	10.40	518.90	529.30

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 (m³)	Cleanup (m³)	Total (m³)
CY 2007	2,355.20	5,723.70	8,078.90
CY 2006	4,824.00	6,175.00	10,999.00
CY 2005	5,380.00	11,193.00	16,573.00
CY 2004	4,092.00	6,346.00	10,438.00
CY 2003	4,502.00	16,975.00	21,477.00

Comparison of Volume and Toxicity Reductions of Waste in CY 2006 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 2007 to prior years.

Table 4. Waste Reduced through P2 Activities

	Radioactive Waste Reduced (m³)	Hazardous Waste Reduced (m³)	Solid Waste Reduced (m³)
CY 2007	0.00	53.00	418.00
CY 2006	0.00	147.00	803.00
CY 2005	0.00	13,992.00	1,194.00
CY 2004	0.00	115.00	1,430.00
CY 2003	40.00	207.00	1,547.00

The following tables show an overview of the estimated volume reductions accomplished during CY 2007 through implementation of P2/waste minimization activities. Table 5 shows an estimated 167 mton reduction of RCRA, TSCA, and state-regulated hazardous waste. Table 6 shows an estimated 1,698 mton reduction of sanitary waste.

Table 5. CY 2007 Hazardous Waste Reductions

Waste Minimization Activity	Activity	Volume Reduction (m³)
Recycle/Reuse	Bulk used oil was sent to an offsite vendor for recycle.	76.60
Recycle/Reuse	Lead acid batteries were shipped to an offsite vendor for recycle.	48.30
Recycle/Reuse	Computer equipment was returned to the vendor to be refurbished and sold for reuse.	38.20
Recycle/Reuse	Lead scrap metal was sold for recycle/reuse.	0.80
Recycle/Reuse	Spent fluorescent light bulbs, mercury lamps, metal hydride lamps, and sodium lamps were sent to an offsite vendor for recycle.	2.10
Recycle/Reuse	Rechargeable batteries were sent to an offsite vendor for recycle.	0.30
Recycle/Reuse	Lead tire weights were reused instead of being disposed as hazardous waste.	0.70
Recycle/Reuse	The Material Exchange Program found new users for hazardous chemicals destined for disposal.	0.00
Total		167.00

Table 6. CY 2007 Solid Waste Reductions

Waste Minimization Type	Activity	Volume Reduction (m ³)
Recycle/Reuse	Mixed paper and cardboard was sent off site for recycle.	606.20
Recycle/Reuse	Scrap ferrous metal was sold to a vendor for recycle.	791.80
Recycle/Reuse	Food waste from the cafeterias was sent off site to be reused as pig feed for a local pig farmer.	47.50
Recycle/Reuse	Scrap non-ferrous metal was sold to a vendor for recycle.	232.30
Recycle/Reuse	Shipping materials including pallets, styrofoam, bubble wrap, and shipping containers were reused.	16.00
Recycle/Reuse	Spent toner cartridges were sent off site for recycle.	2.90
Recycle/Reuse	Non-hazardous chemicals, equipment, and supplies were relocated to new users through the Material Exchange program, diverting them from landfill disposal.	1.10
Recycle/Reuse	Aluminum cans were sent off site for recycle	0.70
Total		1,698.50