BROOKHAVEN NATIONAL LABORATORY
POLLUTION PREVENTION, WASTE REDUCTION AND RECYCLING PROJECTS (CY 2003) TRACKING SYSTEM

WASTE DESCRIPTION	TYPE OF PROJECT	POUNDS REDUCED, REUSED, RECYCLED OR CONSERVED IN 2003	WASTE TYPE	POTENTIAL COSTS FOR TREATMENT & DISPOSAL	COST OF RECYCLE, PREVENTION	ESTIMATED COST SAVINGS	PROJECT DESCRIPTION DETAILS *
Radioactive Waste	Source Reduction	1,500	Radioactive Waste	$6,000	$2,500	$6,000	Waste Yard Sorting Table surveying to sort clean waste from radioactive waste
Radioactive Emissions	Emission Reduction	0	Radioactive Emissions	T/B/D in CY2004 after data analyzed (gaseous emissions reduction)	$13,400	$0	Installation of a shroud to fit over the 16-inch diameter shaft residing within the Hot Cell of the BLIP, thereby isolating the cooling water from the rapidly moving air of the exhaust system and allowing radiological decay within the water system. Slowing the diffusion into the hot cell air will effectively reduce gaseous emissions into the exhaust stack because these radionuclides have very short half lives.
Radioactive Waste generated through wet chemistry	Waste Minimization	30	Mixed waste / Liquid Radioactive Waste	$17,600	$20,000	$22,500	Elimination of mixed waste with a Kinetic Phosphorescence Analyzer (KPA) system for uranium analysis. Eliminates mixed waste generation, reduces by 90% the volume of liquid waste, reduces by 90% the amount of radioactive material handled in the laboratory, minimizes exposure to U by laboratory personnel, and decreases total labor time by 75%.
Radioactive Waste from labeled chemicals	Waste Minimization/ Volume Reduction	0	Solid Radioactive Waste	$2,168	$3,795	$2,168	Vial Crusher for glass vials, pipettes, and other glassware
Radioactive and Mixed Wastes from radio-labeled chemicals	Waste Minimization	112	Mixed Waste	$27,690	$35,000	$27,690	microplate scintillation counter for reduction in mixed waste generation
Pump Oil	Substitution	51	Hazardous Waste / Industrial Waste	$3,520	$6,000	$3,520	Replaced oil-displacement pumps with dry pumps for both laboratory and aircraft missions.
Photographic Waste	Substitution	3,840	Hazardous Waste / Industrial Waste	$7,600	$13,860	$16,489	This new photographic processor reduces the amount of chemicals used and waste generated by up to 80%.
Electrophoretic Mini-Gels	Microscale Chemical Use	2,200	Hazardous Waste - Lab Pack	$10,400	$0	$10,400	Minimization of Silver Waste from Silver-Staining Electrophoretic Mini-Gels. Savings reflect avoided waste disposal costs and lower material purchase costs ($6000)
Hydraulic Oil	Product Substitution	1,000	Industrial Waste	$17,000	$0	$17,000	Retrofit of Garbage Truck Hydraulics With Steel-braded Hydraulic Lines and a Vegetable Based Hydraulic Oil. This project will reduce the number of reportable spills along with the subsequent clean up costs ($15,000).
Hydraulic Oil	Product Substitution	3,000	Industrial Waste	$26,000	$0	$26,000	Retrofit of Hydraulic Lift Bays in Motor Pool Shop to Vegetable Based Hydraulic Oil. This project minimized the potential for petroleum based hydraulic oil leaks/spills and subsequent clean up costs ($20,000)
Sewage Sludge	Volume Reduction	234,000	Radioactive Waste	$910,000	$193,400	$716,600	60,000 gallons of radioactive STP liquid waste could have been disposed of through a contractor at a cost of $910,000. Instead, the waste was dried using rolloffs, absorbent and lime and sent off for disposal via rail cars. In addition, a second drying bed was built to dry sludge (96% volume reduction) from the anaerobic sludge digester..
CO2 Snow Cleaning	Source Reduction	0	Hazardous Waste / Industrial Waste	$5,000	$0	$0	Equipment purchased to evaluate CO2 Snow Cleaning for NSLS, Instrumentation and CAD applications. This project has the potential to reduce solvent usage (hazwaste), and aqueous cleaning wastes (industrial waste). Limited success due to moisture condensation.
Film and other radioisotopic imaging	Substitution	300	Hazardous Waste / Industrial Waste	$22,000	$0	$22,000	Replacement of Film-based Autoradiography and other radioisotopic imaging with a Phosphor Imager reduced hazardous waste generation by 200 pounds and industrial waste generation by 100 pounds. There are additional projected savings in annual supply costs ($3,000) and labor reduction ($15,000)
Digital Imaging System	Substitution	282	Hazardous Waste / Radioactive Waste / Industrial Waste	$25,000	$0	$25,000	Reduction of hazardous (134 lbs), radioactive (80 lbs) and industrial waste (68 lbs) with a digital imaging system. There are additional projected savings in annual supply costs ($3,000) and labor reduction ($20,000)
Fluorescence-Based Assay	Substitution	200	Mixed Waste	$30,550	$0	$30,550	Development of a fluorescence-based assay for the DNA-dependent protein kinase (DNA-PKcs) to replace current 32P assay
Photographic Waste	Segregation	2,320	Hazardous Waste	$5,500	$0	$5,500	During calendar year 2001 the Photography and Graphic Arts Division implemented a pollution prevention project that segregates hazardous fixer from non-hazardous developer. This reduced the hazardous waste stream by approximately 2,320 lbs.
Photographic waste from X-ray film processor	Source Reduction	765	Hazardous Waste	$3,115	$0	$3,115	During calendar year 2001 the X-ray film processor at the clinic was replaced with a more efficient processor, reducing hazardous waste generation by 90 gallons/year. This avoids the cost of disposal (765 lbs) and saves $1,585 from reduce labor.
Photoresist waste	Source Reduction	500	Hazardous Waste	$1,000	$0	$1,000	During calendar year 2001 a fully aqueous developer solution was installed in the printed circuit laboratory for processing dry film photoresist. The system replaced a solvent-based process that formerly generated approximately 500 lbs of hazardous waste annually.
Heavy metal solutions from Crystallography experiments	Source Reduction	10,200	Hazardous Waste	$26,400	$0	$26,400	This project, funded by the pollution prevention council during calendar year 2001, installed a xenon pressure cell to allow preparation of samples for protein crystallography without the use of toxic heavy metal solutions. The project is estimated to eliminate 1200 gallons of heavy metal hazardous waste (10,200 lbs) . Additionally, approximate $6,000 savings is estimated from reduced labor and handling.
Lead Acid Batteries	Recycled	9,200	Hazardous Waste	$18,400	$0	$18,400	Estimate 40 lbs./battery and avoided disposal costs as hazardous waste.
Ion Exchange wastewater	Source Reduction	1250	Hazardous and Sanitary Wastewater	$2,500	$100	$2,400	Prefilters were added to the deionization system to polish make up water entering the ion exchange system. This extended the useful life of the ion exchange resins, requiring less frequent regeneration. The regeneration process generates hazardous and sanitary wastewaters.
Tritium Exit Signs	Source Reduction	724	Mixed Waste	$152,040	$6,000	$146,040	Removed 28 tritium exit signs from service and returned to the manufacturer . Replaced with energy efficient light emitting diode (LED) signs. Project reduced risk of tritium gas release and avoided disposal as mixed waste (70 ft3).
Cooling Water MEL	Reuse	153,000	Radioactive Waste	$153,000	$0	$153,000	Approximately 18,000 gallons (153,000 lbs) of cooling water was reused in the main magnet cooling water system, avoiding disposal as radioactive waste water.
Short Half-life waste STEVE	Decay in Storage	625	Radioactive Waste	$380	$0	$380	Short half-life isotopes, particularly phosphorus-32 and phosphorus-33, are frequently used in life sciences experiments. Wastes generated from these operations (14.5 ft^3 solids and 6 gals. liq.) were managed in accordance with BNL decay-in-storage requirements, rendering the wastes eligible for volumetric release.

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Oily Waste Water	Source Reduction	6,240	Industrial Waste	$20,280	$0	$20,280	This project, funded by the pollution prevention council during calendar year 2001, installed automatic oil-water separators on compressor blowdown stations. These units capture the oily discharge and save significant labor hours compared to the previous system. Labor savings is estimated at $7800/yr.
Lubricating Oil	Energy Recovery	8,000	Industrial Waste	$16,500	$500	$16,500	Approximately 1,000 gallons of lubricating oils were collected, tested for suitable for use as waste oil fuel, and used for energy production at the Central Steam Facility. Cost of analysis is estimated at $500. The fuel use savings are estimated at $.50/gallon
Cooling Tower Chemicals	Source Reduction	6,375	Industrial Waste	$15,000	$0	$15,000	Ozone water treatment units were installed on cooling towers at two RHIC experiments to provide biological control of cooling water. These systems eliminate the need for water treatment chemicals (typically toxic biocides), save labor, and reduce analytical costs for monitoring cooling tower blowdown. Savings are estimated at $15,000/yr.
Hydraulic Oil	Source Reduction	6,000	Industrial Waste	$33,000	$0	$33,000	During calendar year 2001, a project (funded by the pollution prevention council) replaced hydraulic lines on heavy equipment with steel braided lines and replaced the petroleum based hydraulic oils with bio-based vegetable oils. Hydraulic line breaks were responsible for a significant number of reportable spills and costly response and clean-up. This project reduced the frequency of spills and resulting response and clean-up costs. The vegetable based oil is biodegradable and subject to fewer reporting requirements. Avoided disposal costs are based on 6000 lbs of industrial waste and savings from reduced response and clean-up costs are estimated at $33,000.
Blasocut Machining Coolant	Recycled/Reused	40,240	Industrial Waste	$80,480	$0	$92,780	Central Shops Division operates a recycling system that reclaims Blasocut machining coolant and supplies it labwide. 8180 gallons (65,440 lbs.) of Blasocut lubricant were recycled in 2002. Recycling involves aeration, centrifuge, and filtration. Avoids cost of disposal as industrial waste plus an avoided cost of procurement of 6 drums of concentrate ($800/drum) and 150 drums for waste ($50/drum). Cost of recycle is estimated to be the same as cost of procurement and preparation of proper dilution for use.
Used Motor Oil	Energy Recovery	31,360	Industrial Waste	$67,470	$0	$67,470	Used motor oil from the motor pool and the on-site gas station is picked for free up by Strebel's Laundry Service and used to fire their waste oil dryers. During calendar year 2002 4655 gallons of oil were picked avoiding cost for disposal and 95 drums for shipping ($50/drum)
Office Paper	Recycled	364,000	Sanitary Waste	$14,560	$0	$14,560	Estimate $80/ton for disposal as trash.
Cardboard	Recycled	352,000	Sanitary Waste	$14,080	$0	$14,080	Estimate $80/ton for disposal as trash.
Scrap Metal	Recycled	386,000	Sanitary Waste	$15,440	$0	$15,440	Estimate $80/ton for disposal as trash.
Bottles/Cans	Recycled	46,000	Sanitary Waste	$1,840	$0	$1,840	Estimate $80/ton for disposal as trash.
Construction Debris	Recycled	668,000	Sanitary Waste	$8,350	$0	$8,350	Estimate $25/ton for disposal as trash.
	TOTALS	**2,339,314**		**$1,759,863**	**$294,555**	**$1,581,452**	

***** Cost savings of Projects funded by the BNL Pollution Prevention Council will be carried on the tracking system for three years