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Benchmarking Survey for Recycling

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Benchmarking Survey for Recycling

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Abstract

This report describes the methodology, analysis and conclusions of a comparison survey of recycling programs at ten Department of Energy sites including Sandia National Laboratories/New Mexico (SNL/NM). The goal of the survey was to compare SNL/NM's recycling performance with that of other federal facilities, and to identify activities and programs that could be implemented at SNL/NM to improve recycling performance.

Acknowledgements

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Executive Summary

This report was completed by the Sandia National Laboratories/New Mexico (SNL/NM) Pollution Prevention (P2) Program. SNL/NM's P2 program, in the Solid and Hazardous Waste Management Department, Organization 6334, was tasked with completing this benchmark survey as SNL/NM is required to perform benchmarking in its prime contract with the U.S. Department of Energy (DOE).

SNL/NM P2 staff identified nine other DOE facilities as potential survey participants. The nine sites were within the National Nuclear Security Administration, considered to have an exemplary program, and/or were also a national laboratory. A P2 staff member contacted individuals at the identified DOE facilities and requested their participation in this survey. No sites declined. Waste generation and recycling data for fiscal year 2003, available on the DOE P2 website, were retrieved to obtain the quantities of materials recycled and disposed as sanitary waste for each participating site. Each participant was asked a set of standard questions with respect to recycling and sanitary waste programs in fiscal year 2003. The responses were documented and compared among sites.

The DOE annual report data and interview information were analyzed to evaluate specific recycling program elements. Three major program elements were studied. Recycled materials generated as a result of routine operations were evaluated to compare quantities and types of materials recycled by each site, and a more detailed evaluation was completed for paper products. Recycling program costs, revenues, and opportunities were studied but this analysis was limited by the available information. Non-routine materials such as those generated from construction, D&D, or environmental restoration activities were analyzed because these materials combined with routine recycle materials and sanitary waste comprise the total waste materials generated by a site.

Because of the many differences among sites, absolute comparisons between sites are difficult to make. However, the following general conclusions are offered:

- The success of a program has a strong correlation with the local infrastructure and community support.

- The amount of money being spent on a recycling program does not necessarily reflect the success of a program.

- Minimizing the sanitary waste generation is an important aspect for overall program success.

- Total recycle as a percent of sanitary waste can only be calculated if a site is capturing all construction and D&D waste generation data.

Recycling concrete is necessary to have a successful total program.

Acronyms and Abbreviations

ANL-East	Argonne National Laboratory - East
D&D	Decontamination and Demolition
DOE	U.S. Department of Energy
FY03	fiscal year 2003
kg	kilogram(s)
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
P2	Pollution Prevention
PNNL	Pacific Northwest National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico
SRS	Savannah River Site

1.0 Introduction

This report was completed by the Pollution Prevention (P2) staff at Sandia National Laboratories/New Mexico (SNL/NM). SNL/NM is required to perform benchmarking in its prime contract with the U.S. Department of Energy (DOE), Sandia Site Office. This requirement flows through the Performance Evaluation Plan, Objective 8. As a result SNL/NM is completing several benchmarking studies, and the P2 staff decided to benchmark recycling in a comparison survey.

The goal of the survey is to compare SNL/NM's performance in recycling with that of other federal facilities, and to identify activities and programs that could be implemented at SNL/NM to improve its performance. SNL/NM is interested in establishing an on-site concrete recycling program and increasing paper product recovery from the sanitary waste stream. Learning how other sites are handling and reporting construction, and Decontamination and Demolition (D&D) waste could be beneficial to the development of SNL/NM's program. Understanding how other sites collect, process, and manage program costs could provide helpful information for improving paper recovery.

All information in this report is based on the understanding of the author from interview notes and memory of conversations. The author attempted to report the information clearly and truthfully. Apologies are extended if any of the information is not entirely complete, correct, or misinterpreted. Information provided in this report is based solely on the 2003 annual reports to DOE and on conversations with site contacts; it has not been audited in any way for accuracy.

2.0 Methodology

Several sites within the DOE and four other government agencies were identified as possible survey participants. Sites within the DOE were selected because they were within the National Nuclear Security Administration, considered to have an exemplary program, and/or were also a national laboratory. The recycling programs external to the DOE were selected because they were identified as exemplary programs on the Office of the Environmental Executive website. A list of P2 contacts for selected sites was developed and is provided in Attachment 1.

A standardized question set was drafted with questions in the following three areas:

1. the types and quantities of materials being recycled;

2. the costs, revenues, and opportunities for recycling associated with other recycling programs; and

3. whether the data set elements include recycling and sanitary waste data from all construction and D&D efforts.

The original question set included a table requesting a listing of recycled materials with quantities. The first site contacted, Savannah River Site (SRS), noted that the fiscal year 2003 (FY03) recycled material types and quantities were available for each site on the DOE website http://www.eh.doe.gov/P2/. The question set was modified, eliminating the request for materials and quantities. Instead, the data were obtained from the DOE website. The standard question set is provided as Attachment 2.

Individuals were contacted, given a brief overview of the basis for the survey and asked if they were willing to participate. No sites declined participation. However, It was determined that the four non-DOE sites were not relevant to this survey. Activities at these sites were either one-time programs that had been completed or the coordinated effort of dedicated volunteers within the organization who were determined to have recycling programs. The volunteer programs were from organizations that are much smaller than the DOE sites.

Each participant was sent an e-mail message with the question set and the site's DOE annual report data. A phone interview was scheduled to discuss answers to the questions. Participants were informed that they would receive a copy of the report generated from the information gathered.

The P2 contact person for the Hanford Site was not available but another individual agreed to participate stating they would not be able to provide answers to all questions.

The data for each site from the DOE website are presented in Table 1. Each participant validated their site's FY03 recycling and sanitary waste data for accuracy. FY03 was selected for this survey because it is the most recent year of information. Individuals also confirmed that the data represented the materials generated by the stated number of employees and contractors on site.

3.0 Results

Nine DOE sites participated in the survey. These sites were Argonne National Laboratory – East (ANL-East), the Hanford Site, Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), the Nevada Test Site (NTS), Oak Ridge National Laboratory (ORNL), Pacific Northwest National Laboratory (PNNL), Pantex, and SRS. The Hanford Site includes the Richland Operations Office and the Office of River Protection, and will be referred to in this text as Hanford. Table 2 presents a matrix showing recycling system attributes for the participating sites. This matrix contains abbreviated answers to most of the interview questions, making it easier to compare answers among all sites. The complete interview notes are included in this report as Attachment 3.

The DOE annual report data and interview information were analyzed to evaluate specific recycling program elements. Three major program elements were studied. Recycled materials generated as a result of routing operations were evaluated to compare quantities and types of materials recycled by each site, and a more detailed evaluation was completed for paper products. Recycling program costs, revenues, and opportunities were studied but this analysis

Table 1. Fiscal Year 2003 Annual Report Data from the DOE Website.

Recycled Material	ANL-East	Hanford	LLNL	LANL	NTS	ORNL	PNNL	Pantex	SNL/NM	SRS
Paper Products:										
Office and Mixed Paper	505.56	398.42	271.69	232.00	505.97	218.36	158.77	7.42	110.77	1,018.00
Corrugated cardboard	0.00	74.44	154.98	247.40	7.95	108.68	70.53	37.75	199.23	0.00
Phone Books	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.99	2.41	0.00
Newspapers/ Magazines	0.00	0.00	44.87	182.30	0.00	0.00	0.00	0.00	0.71	0.00
Scrap Metals:										
Stainless steel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.02	65.28
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.61
Iron/Steel	0.00	251.81	0.00	0.00	587.20	0.00	0.37	0.00	1,055.20	2,785.88
Aluminum	0.00	0.00	0.00	0.00	101.34	0.00	1.20	0.00	14.54	17.07
Aluminum Cans	33.78	0.00	0.00	0.00	0.80	3.36	0.00	0.00	1.42	0.00
Lead	18.86	2.06	0.00	0.00	19.47	0.00	0.00	0.00	25.15	18.20
Zinc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other:	183.21	73.37	970.59	1,369.00	0.00	796.69	52.91	620.98	53.89	139.95
Precious metals:										
Silver	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Platinum	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Other:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00
Other Items:										
Antifreeze	1.00	14.14	0.66	0.00	0.00	0.00	0.00	0.00	0.00	22.55
Engine oils	16.48	51.92	6.32	0.00	161.81	16.68	7.13	21.61	12.83	88.52
Toner cartridges	3.29	8.88	4.93	0.00	1.16	5.23	6.35	0.84	4.23	7.95
Batteries	2.25	13.72	29.77	0.00	16.33	20.19	7.72	46.50	28.86	59.15
Tires	2.50	10.17	14.84	31.60	18.40	0.00	0.00	13.81	0.82	26.50
Food waste	0.00	0.00	1.76	0.00	59.65	0.00	0.06	3.81	0.00	0.00
Concrete/Asphalt	500.00	0.00	21,494.80	3,115.00	0.00	0.00	0.63	8,459.08	12,154.21	0.00
Fluorescent Bulbs	5.93	7.75	0.00	14.70	2.99	0.00	2.31	2.93	12.39	10.46
Ballasts	0.00	2.88	0.00	0.00	0.00	0.00	0.82	0.00	3.61	0.00
Glass	39.70	0.46	0.00	0.00	0.03	0.00	1.45	0.00	0.00	0.00
Plastic	25.50	0.24	4.15	3.00	0.25	0.00	1.20	0.33	2.85	0.00
Styrofoam	10.30	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
Transformers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood (chips, compost)	150.00	12.40	771.40	265.70	0.00	0.00	32.69	212.30	33.44	376.30
Computers/Electronics	17.92	33.60	81.63	0.00	0.00	0.00	4.77	0.00	49.42	0.00
Other	3,921.36	1,383.53	2,524.36	2,816.00	28.95	2.99	25.81	82.72	91.15	77.00
Sanitary Waste:										
Routine	1,062.70	264.58	1,689.73	1,481.00	4,425.10	1,038.84	1,021.37	811.30	1,417.12	1,472.10
Cleanup/Stabilization	748.27	222.01	2,830.00	699.00	19,023.60	1,547.29	0.00	3,060.39	4,063.94	12,962.00

ANL-East	Argonne National Laboratory - East	ORNL	Oak Ridge National Laboratory
LANL	Los Alamos National Laboratory	PNNL	Pacific Northwest National Laboratory
LLNL	Lawrence Livermore National Laboratory	SNL/NM	Sandia National Laboratories/New Mexico
NTS	Nevada Test Site	SRS	Savannah River Site

Table 2. Recycling Program Attributes.

Requested Information	Site									
	ANL-East	Hanford	LLNL	LANL	NTS	ORNL	PNNL	Pantex	SNL/NM	SRS
# of Employees	4,800	12,000	10,000	14,000	not provided	4,800	3,900	3,500	10,000	12,000
Recyclable collection	Segregated collection system	Segregated collection system	Segregated collection system	Segregated collection system	Segregated collection system	Segregated collection system	Segregated collection system	Segregated collection system	Segregated collection system	Single stream; No C&D
Recyclables stored	Dumpsters	Centralized Consolidation Recycling Center	Dumpsters	Materials Recovery Facility	Recycle/sw facility (NTS); dumpsters (in town)	In building collection areas; aluminum in recycle/sw facility	Dumpsters	Waste facility	Sanitary Waste Transfer Facility	Did not ask
Recycle removed by	Vendor	Contractor	Contractor	Multiple entities. Some transported by LANL.	Vendor (NTS); municipality (in town)	Vendor	Vendor (300 Area); City (Richland North)	Vendors, Some transported by Pantex	Multiple entities. Some transported by SNL.	Did not ask
Distance to Recycle	Within 50 miles	Locally to as much as 1,300 miles	Locally to within 350 miles	3 miles minimum, Albuquerque, or picked up	Local recyclers	Local recyclers	Mostly local recyclers	Local recyclers	20 miles minimum or picked up	100 miles
Recycle Destination for Processing	within 50 miles	Locally to as much as 1,300 miles	Locally to within 350 miles	Local and Remote	Southern CA 300 miles	1 hour aluminum; 1 hour mixed paper mill	Paper mill within 30 miles of tri-city	Most within Texas, as far as CA	Local and Remote	North Augusta MRF
Cost to Recycle	included in $175,000 for sanitary waste plus approx. $6,300/yr for roll offs	Did not know (Candice may have numbers)	Did not know	$1,200,000	Hard to answer, budget is $150,000 at NTS. In town separate contract.	$30,000 contract for recyclables	Did not know	Did not know	$274,000	$100,000
Revenue from Recycle	Disposal cost avoidance plus recycling revenue	Some makes money and some looses money, net loss	Did not know yet		Small income from recycling	Revenue goes to vendor; included in cost of $30,000 contract	White paper & cardboard pay to recycle mixed paper, glass and tin	Break even or costs a little extra. Make money on metal & lead acid batteries	$75,000	Revenue received from MRF
Sanitary Waste stored	Dumpsters	Dumpsters	Dumpsters	Stored at on-site MRF	Dumpsters	Dumpsters	Dumpsters	Dumpsters	Stored at on-site SWTF	Did not ask
Sanitary Waste removed by	Vendor	Local sanitary company	Laborers at LLNL	Transported by LANL Contractor to Landfill	Teamsters at NTS; municipality in town	Laborers at ORNL	Vendor (300 Area); City (Richland North)	Laborers at Pantex	Transported by SNL Contractor to Landfill	Did not ask

Table 2. Recycling Program Attributes. (Concluded)

Requested Information	Site									
	ANL-East	Hanford	LLNL	LANL	NTS	ORNL	PNNL	Pantex	SNL/NM	SRS
Sanitary Waste destination	Landfill in Pontiac, Illinois	Roosevelt Landfill	Local landfill	Disposed at LA County Landfill $29.50/ton	On-site landfill (NTS); municipal landfill (in town)	On-site landfill	Roosevelt Landfill (300 Area); Richland Landfill (Richland North)	Amarillo Municipal Landfill	Disposed at Rio Rancho Landfill	MRF sends to county landfill
Distance to Landfill	70 miles	150 miles	10 miles	3 miles	1-2 miles (NTS); 10-15 miles (in town)	6 miles	4 and 10 miles	25 miles	25 miles	Did not ask
Annual Cost to dispose of Sanitary Waste	$175,000	(264.58 mt + 222 mt + 1250.85 mt)*$260/mt = $450,000	Did not know	$800,000	Budget in other dept; 2+ million includes operating expenses for landfills and waste collection (NTS)	No current information. Used to use $52/cubic yard	Did not know	$190/metric ton. Using 811 mt of routine sanitary waste in FY03 = $154,000	$310,500	105,000
Savings or Increased cost for recycling	Savings	Costs more	Did not know yet	Costs more	Costs more	Previously calculated as a savings	A wash	Break even or costs a little extra	Savings (if not recycle would have disposal costs)	Savings
Capturing Construction and D&D Waste	No	No	Yes	No	Yes	No	Yes, mostly LLW	Yes	Yes	Not yet

ANL - East	Argonne National Laboratory - East
C&D	Construction and Demolition
D&D	Decontamination and Demolition
FY03	Fiscal Year 2003
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
LLW	Low-Level Waste
MRF	Material Recovery Facility
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
PNNL	Pacific Northwest National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico
SRS	Savannah River Site
SW	Sanitary Waste
SWTF	Sanitary Waste Transfer Facility

was limited by the available information. Non-routine materials such as those generated from construction, D&D, or environmental restoration activities were analyzed because these materials combined with routine recycle materials and sanitary waste comprise the total waste materials generated by a site.

3.1 Routine Materials Recycled

Materials generated routinely in office settings include white and mixed paper, cardboard, aluminum cans, plastic and glass. Metals, batteries, fluorescent tubes, and other items were also discussed, but the collection and storage of recyclables typically related to office materials.

All sites except SRS use a segregated collection system with containers distributed throughout the site. Individuals are responsible for segregating their materials at the point of collection. Containers for collecting different materials are staged in convenient locations for individuals to deposit materials. In most cases, the containers are emptied by custodial staff and taken to dumpsters located outside the buildings.

At Hanford, LANL, NTS, Pantex, and SNL/NM waste management personnel empty the dumpsters and take the materials to an on-site facility to store the recyclables until later transfer to a recycler. These sites with on-site storage facilities have some contractors that come on-site to remove some of the recyclables, and also have laborers and trucks that take other materials off-site to recyclers.

ANL-East, LLNL, NTS in Las Vegas, and PNNL store the recyclables in the dumpsters until the materials are removed from the site. Either contractors or municipal sanitary waste departments come on-site to empty the dumpsters, remove the materials from these sites, and deliver the materials to recycling facilities. ORNL is the only site that has a contract with a recycler who comes into the buildings to remove the recycle materials.

Sanitary waste and recyclables are commingled at the SRS. This is the only site that is using a single stream waste collection system. All waste is sent 100 miles away to North Augusta, Georgia's material recovery facility. The recyclables are inexpensively segregated at the facility from the sanitary waste by a prison labor force. The cost to recycle is $100,000 per year. In addition to this single stream waste collection system, SRS is working on increasing recovery from the sanitary waste stream by implementing a waste to energy program using process engineered fueled pellets.

The data from the DOE website was plotted and included in several graphs in this report to illustrate and compare results. The data presented are only for the most recent year, fiscal year 2003 (FY03). Several years of data might provide different results if more time were devoted to a comparison survey.

Figure 1 shows the routine recycle quantities in metric tons by the material groupings used in the DOE website. Based on this graph alone, it is not possible to determine how successful a site is at recovering recyclable materials. For example, if a large and a small site recover similar quantities they appear equally successful, when in fact the large site should be recovering more materials. Only by normalizing the data can sites be compared.

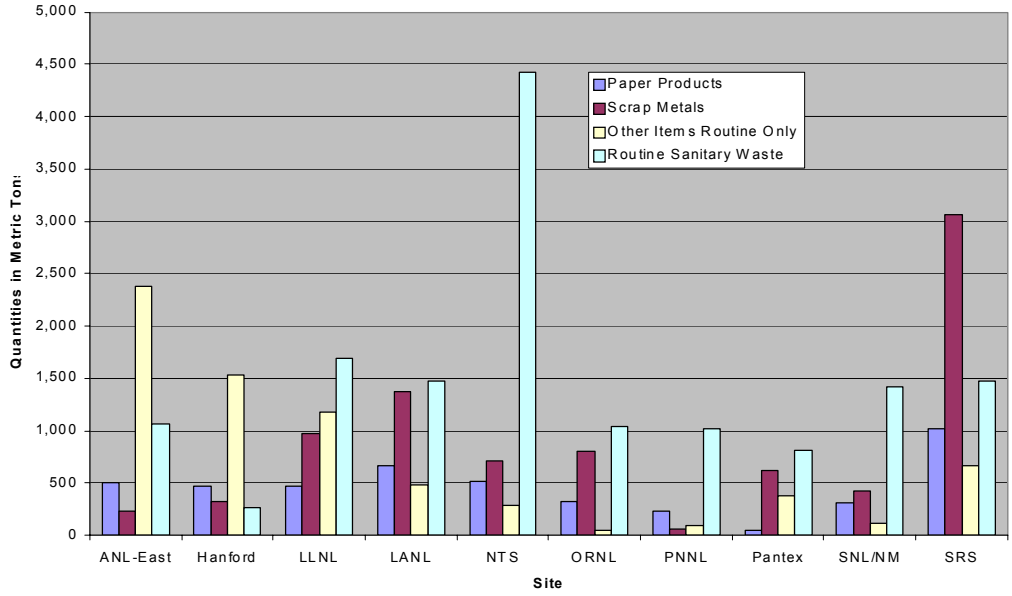

Figure 1. Routine Recycled Materials and Sanitary Waste in Fiscal Year 2003.

The data were normalized based on the number of employees at each site. The quantities shown in Figure 2 have been adjusted to represent the quantity of recyclables and sanitary waste generated per person. Quantities were converted to kilograms (kg) because these units are more appropriate when using smaller quantities.

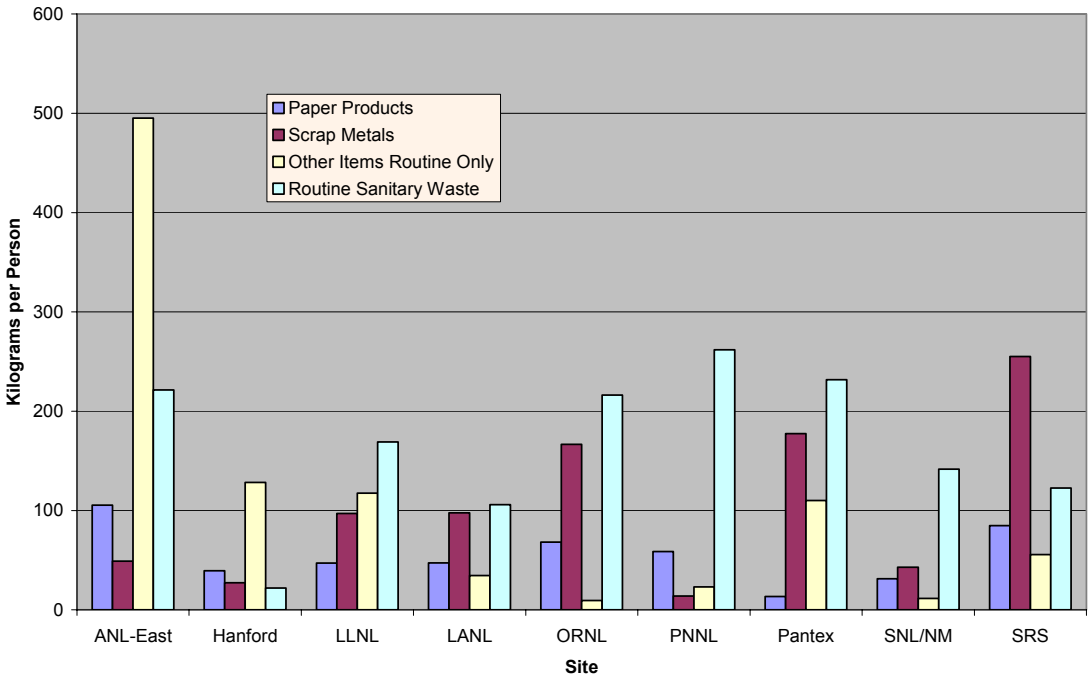

Figure 2. Quantities by Material per Person in Fiscal Year 2003.

The participant at the NTS was not able to provide a total employee count for the site due to fluctuations in the site population from lay-offs, rehiring staff, and frequent on-site visitors. Therefore, NTS is not included in per person data comparisons. It is noted that while NTS recycle quantities are in-line with other sites, their sanitary waste is almost three times greater than any other site and seems disproportionately large (Figure 1).

NTS, however, should be recognized for a unique food waste program. A local pig farmer provides the site with 55-gallon drums for storing NTS cafeteria food waste. The drums are kept in an old walk-in refrigerator and emptied every two weeks by the pig farmer. The farmer cooks the food waste for consumption by the pigs. In FY03, NTS recycled 60 metric tons of food waste. Three other sites, LLNL, PNNL, and Pantex recycled food waste in FY03. However, these sites recycled less than 4 metric tons each.

3.1.1 Paper Products Recycling

Paper products include white paper, mixed paper, corrugated cardboard, phone books, newspapers, and magazines. Table 3 contains the paper product raw data from the DOE website and the normalized per person data. The site with the most paper recovery is shown at the top and the site with the least recovery is at the bottom. The "Per Person" columns show the normalized data that result in a different rank order of sites than the raw data.

Table 3. Raw and Normalized Paper Product Recycling Data.

Paper Products				
Descending Order	**Raw Data (mt)**		**Per Person (kg)**	
Most Recovery	SRS	1,018.00	ANL-East	105.33
	LANL	661.70	SRS	84.83
	ANL-East	505.56	ORNL	68.13
	Hanford	472.86	PNNL	58.79
	LLNL	471.54	LANL	47.26
	ORNL	327.04	LLNL	47.15
	SNL/NM	313.12	Hanford	39.41
	PNNL	229.30	SNL/NM	31.31
Least	Pantex	47.16	Pantex	13.47

ANL-East	Argonne National Laboratory - East
kg	Kilogram(s)
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
mt	Metric ton(s)
ORNL	Oak Ridge National Laboratory
PNNL	Pacific Northwest National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico
SRS	Savannah River Site

Although the SRS recovered the most paper, ANL-East recovered the most paper quantity per person. SRS recovered the second highest paper quantity per person. The relative position changed for all other sites except for Pantex.

Figure 3 shows the per person quantities of paper recycled at nine sites. SNL/NM estimates its sanitary waste stream may contain as much as 60% paper. The percent paper recovered was calculated for each site to learn how much paper was recovered as a percent of sanitary waste using the equation:

% Paper Recovery = Paper Recycled/(Routine Sanitary Waste + Paper Recycled).

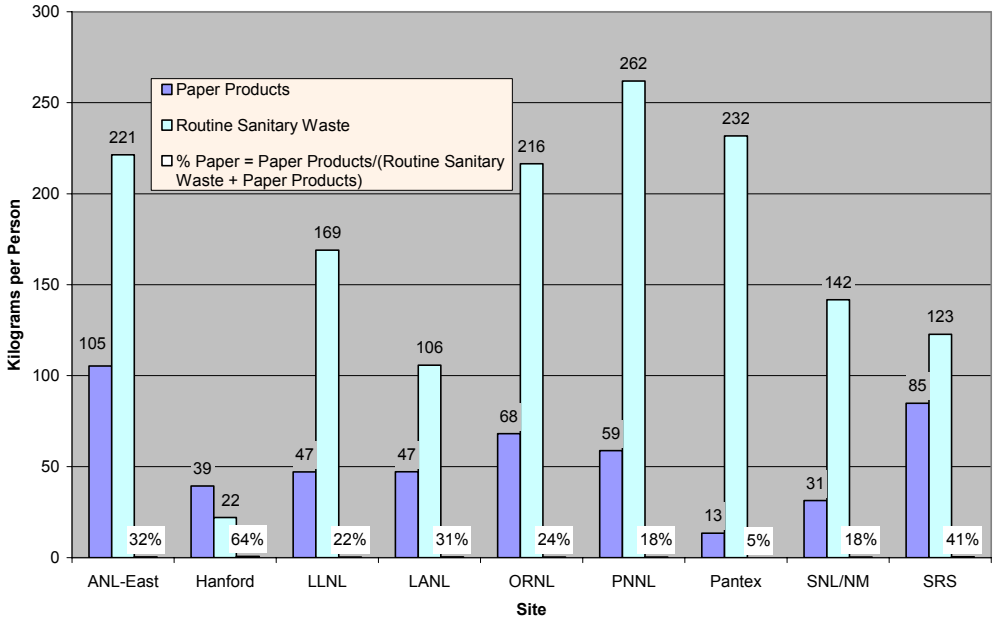

Figure 3. Paper Products Recycled and Sanitary Waste per Person in Fiscal Year 2003.

ANL-East recovered the largest quantity of paper per person in FY03. Paper recovery of 105 kilograms per person or 32% of the sanitary waste was recycled paper is impressive. However, the sanitary waste per person is one of the higher values among sites.

The large quantity of paper recovered by SRS provides evidence that single stream collection, followed by segregation, can work well in recovering mixed paper. The data indicate that SRS recovered 85 kg/person or 41% paper recovery. The paper product recovery program at SRS and the relatively small amount of sanitary waste generated per person are commendable.

Hanford's sanitary waste per person is much smaller than the other sites because Hanford participates in a waste to energy program. Hanford sends waste to a landfill that has a methane gas recovery system. Therefore, Hanford reports 30% of their sanitary waste as disposed and the remaining 70% of the sanitary waste as recycled. In FY03, the 70 percent reported as recycled equaled 51 kg/person. If this recycled portion is added to the 30 percent reported as sanitary waste, the total (73 kg/person) sanitary waste would remain less than any other site's and the percent paper recovery would be 53%, at 39 kg/person,. The individual interviewed at Hanford mentioned that a source reduction campaign for junk mail had been completed a few years ago. Further conversation with Hanford is warranted to learn about other source reduction activities.

ORNL and PNNL also recovered sizable quantities of paper, but the percent paper recovery for these sites was 24% and 18%, respectively. LANL is noteworthy for good paper recovery and, second to Hanford generated the smallest amount of sanitary waste resulting in a relatively high percent paper recovery of 31%.

The sites most successful in paper recovery have programs in place for collecting mixed paper. SNL/NM has been collecting white paper only and recycling only a small portion of junk mail collected by the mailroom. Although this survey shows that no site recovered as much as 60% of their sanitary waste as paper, other sites recovered more paper products than SNL/NM, indicating that paper recovery needs to be improved. Prior to this survey SNL/NM P2 Staff independently identified that routine sanitary waste at SNL/NM can be reduced most by the recovery of mixed paper.

3.1.2 Other Items

Each site recycled other miscellaneous items in addition to the items requested specifically by the DOE website data entry format. These miscellaneous items are different for each site. For example, ANL-East recycled several "other items" that are unique to that site. These materials included over 600 metric tons each of coal fines, lime sludge, and coal combustion fly ash and are included in the "Other Items Routine Only" data in Figure 2. However, for comparison purposes, only the items listed in the DOE website are summarized in the data shown in Table 4. The other items listed in the DOE website include antifreeze, engine oils, toner cartridges, batteries, tires, food waste, concrete/asphalt, fluorescent bulbs, ballasts, glass, plastic, Styrofoam, transformers, wood, and computer/electronics. Concrete/asphalt is not included in the table as sites indicated the concrete/asphalt reported is from non-routine construction and D&D. Non-routine recycling is discussed in Section 3.3.

Table 4. Raw and Normalized Other Item Recycling Data.

Other Items[a]				
Descending Order	**Raw (mt)**		**Per Person (kg)**	
Most Recovery	LLNL	915.46	Pantex	24.66
	SRS	591.43	ANL-East	11.93
	LANL	315.00	LLNL	9.15
	Pantex	302.13	PNNL	4.24
	ANL-East	274.87	SRS	4.11
	Hanford	156.16	ORNL	1.83
	SNL/NM	148.45	LANL	1.61
	PNNL	64.50	SNL/NM	1.48
Least	ORNL	42.13	Hanford	1.08

[a]These data are the sum of the "other items" specifically listed on the DOE website. Concrete is not included.

ANL-East	Argonne National Laboratory - East	mt	Metric ton(s)
DOE	U.S. Department of Energy	ORNL	Oak Ridge National Laboratory
kg	Kilogram(s)	PNNL	Pacific Northwest National Laboratory
LANL	Los Alamos National Laboratory	SNL/NM	Sandia National Laboratories/ New Mexico
LLNL	Lawrence Livermore National Laboratory	SRS	Savannah River Site

Again, raw and normalized data are shown together and the rank order is different for raw versus per person quantities. In this case, LLNL had the highest recovery but was third in per person recovery. Pantex ranked fourth in the raw data but had the best per person recovery. The "other items" recycle category includes so many different materials it is difficult to compare the effectiveness of each site's program. For example, if a site were to perform a re-lamping project the numbers could change dramatically.

3.1.3 Scrap Metals

Only LLNL and SNL/NM had information to distinguish between scrap metals generated by routine and cleanup/stabilization (non-routine) activities. As a result, some of the scrap metals shown in Figure 2 as routine materials come from cleanup and stabilization activities. The scrap metal from non-routine activities is not included in the routine data for both LLNL and SNL/NM. Table 5 ranks the sites with respect to scrap metal recycling. SRS had both the highest recovery and the highest per person recovery.

Table 5. Raw and Normalized Scrap Metal Recycling Data.

Scrap Metals				
Descending Order	**Raw (mt)**		**Per Person (kg)**	
Most Recovery	SRS	3061.99	SRS	255.17
	LANL	1369.00	Pantex	177.42
	LLNL	970.59	ORNL	166.68
	ORNL	800.05	LANL	97.79
	Pantex	620.98	LLNL	97.06
	SNL/NM	429.09	ANL-East	49.14
	Hanford	327.24	SNL/NM	42.91
	ANL-East	235.85	Hanford	27.27
Least	PNNL	54.48	PNNL	13.97

ANL-East	Argonne National Laboratory - East
kg	Kilogram(s)
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
mt	Metric ton(s)
ORNL	Oak Ridge National Laboratory
PNNL	Pacific Northwest National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico
SRS	Savannah River Site

3.1.4 Routine Percent Recycle

Figure 4 shows the routine recycle and routine sanitary waste quantities. The percent recovery of routine materials for recycling is provided and shows that Hanford and SRS have the highest recoveries. The percent routine recycle is calculated using the following formula:

Routine % Recycle = Routine Recycle/(Routine Sanitary Waste + Routine Recycle).

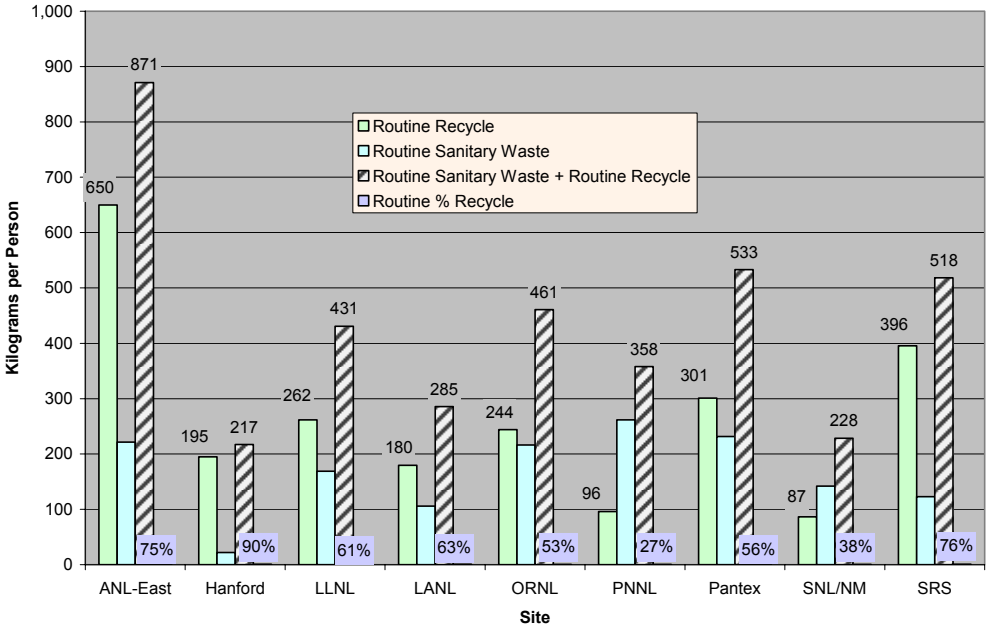

Figure 4. Routine Recycling and Sanitary Waste per Person, and %Recycle.

The routine total for ANL-East looks exceptionally large because ANL-East is recovering additional materials that are not being recycled by other sites. These materials include coal fines, lime sludge, and coal combustion fly ash. If these materials are removed from the data set shown in Figure 4 to compare this site's recovery rate with other sites, the recovery decreases to 61%, which is still admirable.

The routine recycle quantities shown in Figure 4 include scrap metals. As previously mentioned, most sites do not distinguish the amount of scrap metals from routine versus cleanup/stabilization activities. Because this distinction cannot be made, some of the sites' routine recycle quantities are higher than they would be if the scrap metals from routine activities only were used in the calculation of routine percent recycle.

Table 6 presents the quantities of all routine materials generated by each site. The ranking in this table is in ascending order. The order is opposite from the ranking in the other raw and per person data tables because in this case the smallest quantity is most desirable. The site with the lowest routine material generation is at the top and the most generation of materials is at the bottom in Table 6.

Table 6. All Routine Materials Generated by Each Site[a].

Routine Recycle and Sanitary Waste				
Ascending Order	**Raw (mt)**		**Per Person (kg)**	
Least Generation	PNNL	1395.47	Hanford	217.03
	Pantex	1864.98	SNL/NM	228.36
	ORNL	2211.05	LANL	285.48
	SNL/NM	2283.27	PNNL	357.81
	Hanford	2,604.39	LLNL	430.70
	LANL	3996.70	ORNL	460.64
	ANL-East	4181.49	SRS	518.38
	LLNL	4306.96	Pantex	532.85
Most	SRS	6220.52	ANL-East	871.14[b]

[a]Quantities shown equal the routine recycled material plus routine sanitary waste.
[b]ANL-East includes the additional miscellaneous other recycled materials.

ANL-East	Argonne National Laboratory - East	ORNL	Oak Ridge National Laboratory
kg	Kilogram(s)	PNNL	Pacific Northwest National Laboratory
LANL	Los Alamos National Laboratory		
LLNL	Lawrence Livermore National Laboratory	SNL/NM	Sandia National Laboratories/ New Mexico
mt	Metric ton(s)	SRS	Savannah River Site

Studying the data in terms of waste minimization or source reduction on a per person basis reveals that Hanford generated the smallest quantity of all routine materials (recyclables plus sanitary waste) per person. Hanford is followed closely by SNL/NM. Both sites generated relatively small quantities of all materials per person indicating good source reduction. LANL had better recycling recovery than Hanford and SNL/NM, and had only slightly more sanitary waste per person.

3.2 Recycling Program Costs, Revenues, and Opportunities

The information for costs and revenues associated with recycling is incomplete. Also, it is likely that the cost and revenue information provided by sites does not contain the same components. For example, one site may include tipping fees in total program costs while another site may not. Therefore, it is not possible to conclude whether one collection and storage system is more cost effective than another.

However, five sites provided recycling program costs. The annual program costs and the site size provided in Table 7 summarize information gathered during the interviews. This information along with the routine recycle quantities from the DOE website was used to calculate a cost per kg/person in FY03 for the five sites.

Table 7. Recycle Program Costs per Person.

	ANL- East[a,b]	LANL[a]	ORNL	SNL/NM	SRS[a]
Annual Costs	$181,300	$1,200,000	$30,000	$201,000	$100,000
Number of People	4800	14000	4800	10000	12000
Costs per person per year	$37.77	$85.71	$6.25	$20.10	$8.33
Routine Recycle kilograms per person	650	180	244	87	396
Cost per kilogram per person	$0.06	$0.48	$0.03	$0.23	$0.02

[a]Annual recycle costs for this site do not include the revenue the site receives from the sale of recyclables.
[b]The annual cost was calculated as $175,000 for one year of a two year contract which includes sanitary waste plus $6,300 on average per year for roll offs. The site's cost for recycling only is less than the value reported.

ANL-East Argonne National Laboratory - East
LANL Los Alamos National Laboratory
ORNL Oak Ridge National Laboratory
SNL/NM Sandia National Laboratories/New Mexico
SRS Savannah River Site

These few examples demonstrate the site-specific differences in costs to run a program. The information contained in Table 7 indicates the least expensive program is SRS's single stream collection system with access to a relatively inexpensive material recovery facility. Such an inexpensive material recovery facility is not an available option for other sites.

Oak Ridge had the least expensive distributed and segregated collection system. They have a relatively inexpensive recycling contract of $30,000 per year ($6.25 per person) with a contractor who comes on-site, empties the segregated distributed collection bins within each building and hauls the materials off-site. The contractor receives all revenues generated from the sale of the materials. An aluminum recovery processing facility and a paper mill are each within one hour of this site.

SNL/NM recycles approximately 40% of routine sanitary waste. Expenses for the routine sanitary waste management at SNL/NM in FY03 were about $585,000. Attributing 40% of the total costs to recycling suggests recycling costs were $234,000. An additional $40,000 worth of expenses were identified that were associated with recycling. Revenue from sales of recyclable materials equaled about $75,000. Using these numbers the total cost for recycling in FY03 was $201,000. SNL/NM's cost per kg/person is much higher than the least expensive sites (Table 7). However, the sites with the lowest costs are located in different regions of the country, the Southeast and Midwest. If SNL/NM did not recycle these materials it would cost more to dispose of them at the landfill.

In addition to obtaining incomplete cost information, the vast differences in location-specific variables makes these cost comparisons unreliable. Opportunities that exist in specific locations are not available in others. Currently, SNL/NM is recycling the same general materials as other sites. Recovery of two additional materials, mixed paper and D&D concrete, would increase SNL/NM's recycling success.

Four sites were not able to quantify the costs of their recycling programs. However, all sites stated that the cost for recycling each material was a factor in deciding what materials to recycle.

3.3 Non-Routine Recycled Materials

Construction and D&D waste are generated as the result of non-routine site activities. Although the generation of non-routine waste may be unpredictable from year-to-year and is not the product of ongoing routine operations, these wastes are generated by site activities. As the DOE requires that we report the total waste generated, SNL/NM has made a concerted effort to capture non-routine waste materials. Additionally, Lockheed Martin Corporation requires SNL/NM to report routinely and non-routinely generated materials separately. Therefore, we track these data separately.

SNL/NM has established a program to recycle both large and small construction project waste. D&D waste is recycled as much as possible. Prior to FY04, SNL/NM recycled concrete from D&D operations at the Kirtland Air Force Base (KAFB) Landfill. Unfortunately, the KAFB concrete recycling program was discontinued. SNL/NM is in the process of re-establishing a program. Because of concern over D&D concrete recycling, SNL/NM was interested to learn how other sites manage their construction and D&D recyclables and whether these data are being captured in the data reported to DOE.

Figure 5 shows total recycled and sanitary waste quantities. These data are not normalized because non-routine waste is independent of the number of people working at a site but is dependent on the number and size of non-routine projects. PNNL shows very little total waste because most of their D&D waste is considered to be low-level waste and is not included in this data set.

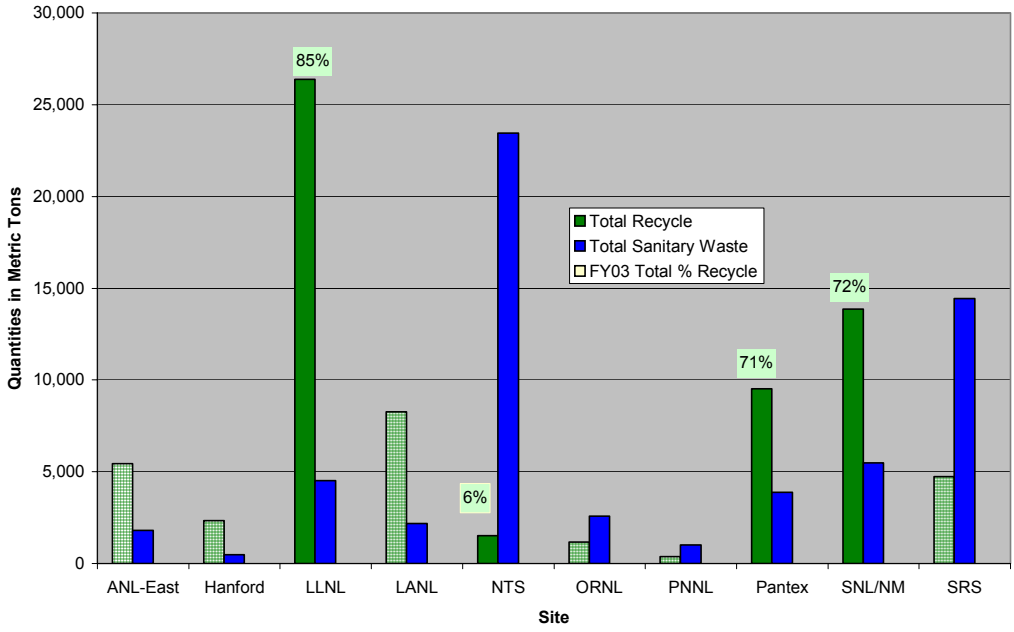

Figure 5. Total Recycling and Sanitary Waste, and Total Percent Recycle.

Only four of the sites, LLNL, NTS, Pantex, and SNL/NM, captured all routine and non-routine sanitary waste data in FY03. Consequently, the total percent recycle in Figure 5 is shown only for the four sites that captured all construction and D&D waste data. The total percent recovery was not calculated for ANL-East, Hanford, LANL, ORNL, and SRS as it is not meaningful. Additionally, the total percent recovery was not calculated for PNNL because the data were only for routine recycle and waste materials.

NTS generated 19,000 metric tons of cleanup and stabilization waste. None of their non-routine waste is allowed to leave the site for recycling due to concern that these materials could be contaminated. All of the non-routine waste is disposed on site in a landfill. Because all of the construction and D&D waste for NTS is being captured and none is allowed to be recycled the total percent recycle is only 6%.

LLNL accounts for all of their construction and D&D waste and recycles as much of the materials as possible. The total percent recycle for this site is 85%. Likewise, in FY03 when SNL/NM was recycling concrete, 72% of the total sanitary waste was recycled. Pantex captures the data for all construction and D&D waste, and recycles as much of this waste as possible. The total percent recycle for Pantex is 71%.

The routine percent recycle for all sites and the total percent recycle for sites that are capturing all construction and D&D waste are provided in Figure 6. The total percent recycle is effected by the addition of non-routine materials. The total percent recycle is calculated using the equation:

Total % Recycle = Total Recycle/(Total Sanitary Waste + Total Recycle).

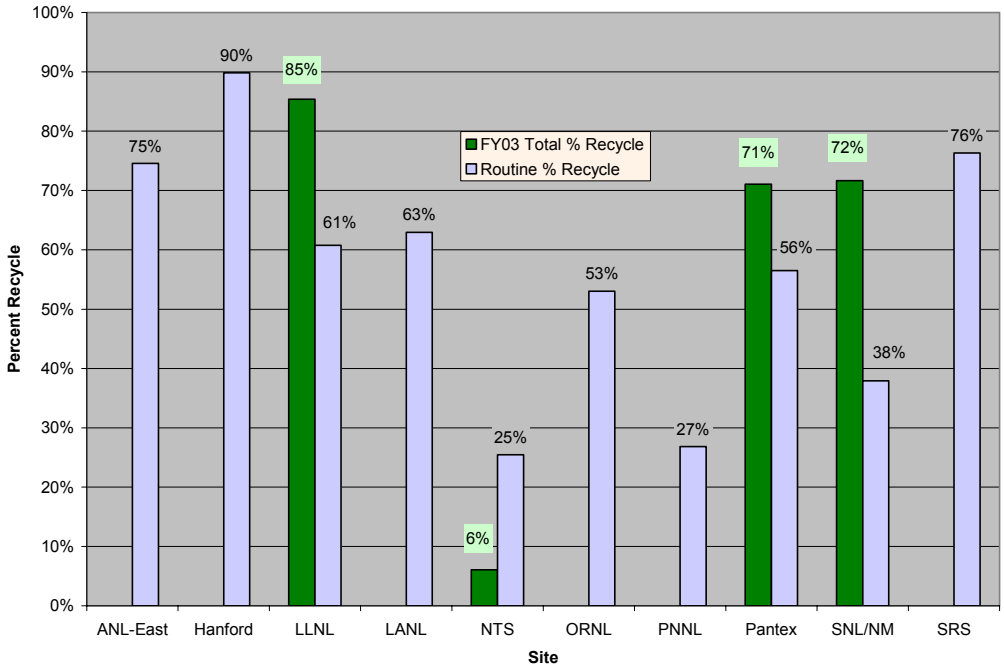

Figure 6. Routine % Recycle versus Total % Recycle.

Non-routine construction and demolition waste has the greatest effect on total recycle numbers because it is so heavy. For example, SNL/NM's D&D program generates so much concrete waste that if it were not recycled in FY03 the total percent recycle would have been less than 10%. And, if the concrete recycled at LLNL in FY03 had been disposed as waste instead of being recycled, the total percent recycle would have been 16% instead of 85%, a 69% reduction.

Table 8 shows the effect of capturing all recycling and waste data. The total percent recycle is 15% to 34% higher than the routine percent recycle for LLNL, SNL/NM, and Pantex. The site that has not been able to recycle non-routine materials, NTS, shows a decrease of 21% when non-routine recycle is added to the routine recycle.

Table 8. Routine versus Total Percent Recycle.

Routine		Total	
Hanford	90%		
		LLNL	**85%**
SRS	76%		
ANL-East	75%		
		SNL/NM	**72%**
		Pantex	**71%**
LANL	63%		
LLNL	**61%**		
Pantex	**56%**		
ORNL	53%		
SNL/NM	38%		
PNNL	27%		
NTS	**25%**	**NTS**	**6%**

ANL-East	Argonne National Laboratory - East
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
PNNL	Pacific Northwest National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico
SRS	Savannah River Site

ANL-East, Hanford, LANL, ORNL and SRS recycle some construction and D&D waste but currently are not capturing all waste generation data for these activities. These sites indicated that much of the data not captured is likely becoming sanitary waste. Therefore, it is probable that for these sites the total percent recycle is lower than the routine percent recycle shown in Table 8 and in some cases may not meet the DOE goal of 41% total recycle in FY03.

4.0 Conclusions

Because of the many differences among sites, absolute comparisons between sites are difficult to make. However, the following general conclusions are offered:

- The success of a program has a strong correlation with the local infrastructure and community support.
- The amount of money being spent on a recycling program does not necessarily reflect the success of a program.
- Minimizing the sanitary waste generation is an important aspect for overall program success.
- Total recycle as a percent of sanitary waste can only be calculated if a site is capturing all construction and D&D waste generation data.
- Recycling concrete is necessary to have a successful total program.

The authors identified best practices based on comparisons to SNL/NM and other facilities in the survey. Table 9 lists these practices.

Table 9. Best Practices.

Practice	Facility
Single source collection	SRS
Per person recovery of paper products	ANL-East, SRS, ORNL
Paper recovery as a percent of sanitary waste	Hanford, SRS, ANL-East, LANL
Per person recovery of other items	Pantex, ANL-East
Per person recovery of scrap metal	SRS, Pantex, ORNL
Least materials (waste and recycle together) per person – best source reduction	Hanford, SNL/NM, LANL
Least expensive per person recycle costs of programs that provided costs	SRS, ORNL, ANL-East
Capturing total data for sanitary waste and recycled materials from all site activities	LLNL, SNL/NM, Pantex, NTS
Most innovative and effective food waste recycling program	NTS

ANL-East	Argonne National Laboratory - East
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico
SRS	Savannah River Site

The SRS data indicate that single source collection is an effective method for recovering materials. That location is fortunate in that the greater community has recognized the importance of recycling. The facility receiving their waste is supported by several communities and is designed to handle large volumes. The cost for recycling is relatively insignificant because the prison labor used to process the materials is inexpensive.

The municipality adjacent to SNL/NM, the City of Albuquerque, has not previously been responsible for SNL/NM's waste. The City of Albuquerque should be contacted to determine if they would have interest in developing a materials recovery facility that would accommodate SNL/NM's waste.

SNL/NM needs to increase paper recovery. This may be achieved by changing the collection program to include a method for recovering mixed paper and improving white paper recovery. In combination, a recycling awareness and source reduction campaign may be useful in reducing the sanitary waste stream.

Additionally, SNL/NM is considering options for single stream or dual stream waste collection for segregation on-site at their Solid Waste Transfer Facility. If single stream or dual stream collection are not affordable, then SNL/NM will evaluate how to recover both mixed paper and additional white paper.

Further questions should be asked of sites with excellent paper recovery. Is it possible that they attribute their success to specific components of their program? Have they developed an awareness campaign? Is an awareness program ongoing? If they have an awareness campaign, what tools do they use?

Learning about the recycling programs at other sites has been very interesting. Each program is unique and has its own merits. An unanticipated benefit of this survey has been getting to know others within the DOE recycling community. The contact list of individuals (Attachment 1) is a great resource for communicating about recycling with other DOE sites. The compilation of all of this information in a single document is hopefully a good starting point in sharing information among sites and in learning about programmatic activities that may be applicable to other sites.

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ATTACHMENT 1

List of Pollution Prevention Contacts for Selected Sites

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DOE Sites

Argonne National Laboratory-East
Barbara Markwenas
(630) 252-8306
bmarkwenas@anl.gov

Hanford Site
Joe Coenenberg
(509) 376-1745
Joe_g_coenenberg@rl.gov

Candice Marple
(509) 373-6742
Candice_e_marple@rl.gov

Lawrence Livermore National Laboratory
Bruce Campbell
(925) 423-3481
campbell15@llnl.gov

Los Alamos National Laboratory
Monica Witt
(505) 667-8626
mwitt@lanl.gov

Nevada Test Site
Al Karns
(702) 295-5689
karnsaj@nv.doe.gov

Oak Ridge National Laboratory
Susan Michaud
(865) 576-1562
michaudsr@ornl.gov

Pantex Plant
Bill Allen
(806) 477-5669
ballen@pantex.com.

Pacific Northwest National Laboratory
Wayne Larson
(509) 376-2483
wayne.larson@pnl.gov

Savannah River Site
Steve Mackmull
(803) 208-7756
Stephen.mackmull@srs.gov

Solid Waste/Recycling
Rod Stewart
(803) 557-6348
rod.steward@srs.gov

P2 Program Lead
John Harley
(803) 557-6332
John.Harley@srs.gov

Other Sites

Department of the Interior
United States Geological Survey
Office of the Western Regional Service
Menlo Park, California
Sue Hunt
(650) 329-5860

Department of the Interior
Buenos Aires National Wildlife Refuge
Sasabe, Arizona
Bernard Freeman
(505) 248-7956
bernie_freeman@fws.gov

Environmental Protection Agency
Region 3
Philadelphia, Pennsylvania
Pilot Program not ongoing
Claudette Reed
(215) 814-2997
reed.claudette@epa.gov

General Services Administration
Research Triangle Park, North Carolina
Recycling project completed
Debra Yap
(202) 501-4373
debra.yap@gsa.gov

Partial program write ups for the non-DOE sites listed are available at
http://www.ofee.gov/wpr/practices.htm

ATTACHMENT 2

Question Set

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RECYCLING BENCHMARK QUESTIONS

How many employees/contractors work at the site?
How are recyclables collected?
How are recyclables stored until removal from the site?
How are recyclables removed from the site?
Who removes them from the site?
Where do recyclables go?
How far do recyclables go to be processed?
Do you have opportunities to recycle locally?
How much does it cost the site to recycle?
What factors does your site use when deciding which materials to recycle?
Is the cost of recycling included in these factors?
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.
How is sanitary waste collected?
How is sanitary waste stored until removal from the site?
How is sanitary waste removed from the site?
Who removes it from the site?
Where does your sanitary waste go?
How far does sanitary waste go to be disposed?
How much does it cost the site to dispose of sanitary waste?
Does recycling cost more than disposing of the material or is there a savings from recycling?
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?
If not, explain why.
Is construction and demolition waste recycled?
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?
Can you provide the quantity of waste disposed from these activities in FY03?
Is waste from work done by outside contractors recycled?

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ATTACHMENT 3

Interview Notes

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ARGONNE NATIONAL LABORATORY – EAST (ANL-East) RECYCLING	
Recycling	
How many employees/contractors work at the site?	4,800
How are recyclables collected?	Custodial personnel collect mixed office paper (including cardboard) in blue recycle containers which are then picked up by custodial staff and taken out to a "recycle" dumpster. Aluminum, glass, plastic and Styrofoam collected in blue bags are located in big gray containers all over the buildings. Batteries are sent to mail stop. Roll off boxes for scrap metal are picked up when full, same as asphalt, concrete, and rubber. Transparencies are sent to Barbara then she ships to 3M. Large toner cartridges are sent to receiving and then picked up by vendor. Desktop cartridges are put in pre-addressed postage-paid envelopes previously purchased from the remanufacturing vendor. Oil and antifreeze are picked up by the vendor. Fluorescent light bulbs are picked up on-site. Lead stored in clean lead storage facility are used internally then shipped to a local vendor for recycling. Computers are picked up by Fermi National Lab, 4-5 tons per month.
How are recyclables stored until removal from the site?	Dumpster. Emptied on Tuesday and Thursday.
How are recyclables removed from the site?	Dumpster emptied by vendor (Groan Waste).
Who removes them from the site?	Vendor (Groan Waste). Every Tuesday and Thursday.
Where do recyclables go?	To Eleanor Recycling within 50-mile radius, recycles get segregated.
How far do recyclables go to be processed?	All within 50 mile radius.
Do you have opportunities to recycle locally?	Do not know where materials actually get processed.
How much does it cost the site to recycle?	Roll off box 20 cubic-yard dumpster costs $265, and 30 cubic-yard dumpster costs $385. Average is 20 roll offs per year (($265 + $365)/2)*20) = $6,300/year. General waste $3.45/cu yard. Rebate for mixed office paper, and other recyclables. Cost for the two-year contract was $350,000 for sanitary waste and recycle dumpsters with roll offs at an extra cost. Monies from scrap metal are reimbursed. Batteries cost approximately $3,000/year to recycle and receive no revenue. Transparencies cost about $300/year to recycle. Toner cartridges are picked up by Office Products. Small cartridges cost 6 cents each. 6000 envelopes cost $60. The remanufacture gives 50 cents to Special Olympics for every toner cartridge sent back for remanufacture.
What factors does your site use when deciding which materials to recycle?	Cost. Look at safety factors, additional risk. Try to recycle as much as possible.
Is the cost of recycling included in these factors?	Yes.

ARGONNE NATIONAL LABORATORY – EAST (ANL-East) RECYCLING	
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	Laboratory will recycle if not cost prohibitive. Use spreadsheets to determine if it is worth it or not.
Sanitary Waste	
How is sanitary waste collected?	Custodial staff removes from building and places in sanitary waste dumpsters.
How is sanitary waste stored until removal from the site?	Dumpster.
How is sanitary waste removed from the site?	Vendor (Groan Waste) removes sanitary waste Monday, Wednesday, and Friday.
Who removes it from the site?	Vendor (Groan Waste).
Where does your sanitary waste go?	Goes to Pontiac, Illinois.
How far does sanitary waste go to be disposed?	70 miles.
How much does it cost the site to dispose of sanitary waste?	Two-year contract for $350,000 covers the tipping fee ($175,000 per year).
Does recycling cost more than disposing of the material or is there a savings from recycling?	There is a savings. Computers alone saved $25,000 in 3 months. Since 1996, 12 million dollars in disposal costs have been saved.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	No.
If not, explain why.	If there is a big project, and outside contractor is doing work Pollution Prevention does not get numbers. However, when contracts are awarded, there is a form that states they have to recycle.
Is construction and demolition waste recycled?	Yes.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	Only the roll-offs.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	Yes, for roll-offs.
Is waste from work done by outside contractors recycled?	Yes, but not keeping track. Outside contractor responsible for collection and recycling.

ANL-East Argonne National Laboratory - East

HANFORD SITE RECYCLING	
Contact Candice Marple not available. Joe Coenenberg answered the questions but said Candice would know more about the recycling.	
Recycling	
How many employees/contractors work at the site?	12,000
How are recyclables collected?	Centrally located bags for white paper. Aluminum cans are not tracked, individuals will cash in and use for different things. Newspaper and plastic in central location. Mixed paper goes into another bag. Had a program to reduce junk mail. Cardboard bundled and picked up.
How are recyclables stored until removal from the site?	Paper is picked up on periodic basis by a contractor and gets money for paper. Centralized consolidation Recycling Center is used for storing light bulbs, etc. and vehicle maintenance building.
How are recyclables removed from the site?	Picked up by a contractor.
Who removes them from the site?	Contractors.
Where do recyclables go?	Depends on what it is.
How far do recyclables go to be processed?	As far as Arizona.
Do you have opportunities to recycle locally?	Donate to schools. Tri-city development organization will receive equipment and used materials that can be used. Waste to Energy Program agreement with DOE. Landfill harvests methane gas making 70% of the sanitary waste considered recycled.
How much does it cost the site to recycle?	Amount is unknown, but there is a cost. Some make money, some loose, it comes out to net loss. Candice may have numbers.
What factors does your site use when deciding which materials to recycle?	Procedures that go into recycling. Demolition determined at the beginning of the project.
Is the cost of recycling included in these factors?	Not sure.
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	
Sanitary Waste	
How is sanitary waste collected?	Custodial staff takes out to dumpsters.
How is sanitary waste stored until removal from the site?	Dumpsters.
How is sanitary waste removed from the site?	Local sanitary company removes.
Who removes it from the site?	Local sanitary company removes.
Where does your sanitary waste go?	Roosevelt Landfill.
How far does sanitary waste go to be disposed?	150 miles.
How much does it cost the site to dispose of sanitary waste?	$260/metric ton.

HANFORD SITE RECYCLING	
Does recycling cost more than disposing of the material or is there a savings from recycling?	Costs more.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	No.
If not, explain why.	Not capturing all of the data. Waste treatment project does not report.
Is construction and demolition waste recycled?	Yes, but do not have the numbers.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	No.
If not, why?	Waste Treatment Project not required to report.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	No.
Is waste from work done by outside contractors recycled?	Yes.
If yes, please explain how this material is collected, picked up, stored, processed and shipped.	They handle their own waste.

DOE U.S. Department of Energy

LOS ALAMOS NATIONAL LABORATORY (LANL) RECYCLING	
Recycling	
How many employees/contractors work at the site?	8 at the Material Recycling Facility and 14,000 at site.
How are recyclables collected?	Distributed collection system.
How are recyclables stored until removal from the site?	Baled and stored in semi-truck or storage shed.
How are recyclables removed from the site?	By multiple organizations.
Who removes them from the site?	Removed by Recycle businesses.
Where do recyclables go?	White paper, cardboard, and mixed go to Weyerhouser who contracts with Knight Transportation to haul material. Metals go to Ace Metals. Swift takes cardboard to Abitibi through Weyerhouser. Rastra will pick up Styrofoam. Plastics and Aluminum - need to find out; Wood pallets are in the process of setting up contract with Wagon Wheel Sawmill in Penasco (north of Espanola). Concrete and asphalt are taken to staging area and crushed by county landfill, currently at no cost but the tipping fee is $29.50/ton. The County has a crushing contractor on-site.
How far do recyclables go to be processed?	Paper goes from NM to AZ to LA being audited by security.
Do you have opportunities to recycle locally?	Ace, Albuquerque; Rastra, Rio Rancho.
How much does it cost the site to recycle?	1.2 million.
What factors does your site use when deciding which materials to recycle?	Available markets, Proximity, Simplicity.
Is the cost of recycling included in these factors?	Yes.
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	The Styrofoam costs extra because they are working with a local company. Wood pallets extra cost, however, is worth it because 10% of waste stream is wood pallets. It will cost $2.00/pallet plus $10/hour plus gas. Negotiated a $20,000 contract and he will report how many pallets were processed.
Sanitary Waste	
How is sanitary waste collected?	Distributed collection system, cafeteria hauled directly to landfill, and the rest goes to the Material Recycling Facility.
How is sanitary waste stored until removal from the site?	Baled and stored in storage sheds (fit 400 pallets).
How is sanitary waste removed from the site?	Duratech contractor for LANL drives it to the landfill.
Who removes it from the site?	Duratech contractor LANL drives it to the landfill.
Where does your sanitary waste go?	Los Alamos County Landfill.
How far does sanitary waste go to be disposed?	3 miles.
How much does it cost the site to dispose of sanitary waste?	Operating costs and disposing .8 million at a tipping fee of $29.50/ton.

LOS ALAMOS NATIONAL LABORATORY (LANL) RECYCLING	
Does recycling cost more than disposing of the material or is there a savings from recycling?	It costs more.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	No. Not capturing the demolition waste or recycling.
Is construction and demolition waste recycled?	Not all of it.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	Not all of it.
If yes then, can you provide the quantity of waste disposed from these activities in fiscal year 2003?	3,115 concrete and 2,816 soil from on-site contractor KSL.
Is waste from work done by outside contractors recycled?	Yes, weighed at the Material Recycling Facility.
If yes, please explain how this material is collected, picked up, stored, processed and shipped.	The contractor loads trucks weighed at the Material Recycling Facility, send to landfill, segregated into concrete and asphalt. Contaminated pieces will end up in landfill after having been counted as recycled.

DOE U.S. Department of Energy
LANL Los Alamos National Laboratory

LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL) RECYCLING	
Recycling	
How many employees/contractors work at the site?	10,000
How are recyclables collected?	Most collected by janitorial staff Including mixed and white paper. Cardboard is taken to dumpsters along with food and beverage containers, glass, plastic and aluminum. Individuals culling aluminum, glass and plastic (data are not being captured). Currently lower value waste stream.
How are recyclables stored until removal from the site?	Dumpsters are in strategic locations for storing paper and cardboard. A courtyard in plant engineering is also used to place large quantities or cardboard, as well as wood pallets and packaging materials such as polywrap. Donation, Utilization and Sales (DUS) office, similar to reapplication at SNL/NM, also manages communication with other DOE organizations.
How are recyclables removed from the site?	Pickups of cardboard are done by contractor. Paper is picked up by contractor, escorted by security and transported. Classified are handled on-site in locked bins and transported to hammer mill on-site. Shipping and transportation going out through DUS.
Who removes them from the site?	Contractor removes materials.
Where do recyclables go?	Cardboard probably locally.
How far do recyclables go to be processed?	Do not know for sure. Probably in state.
Do you have opportunities to recycle locally?	Yes.
How much does it cost the site to recycle?	Unknown.
What factors does your site use when deciding which materials to recycle?	Cost.
Is the cost of recycling included in these factors? Yes.	Yes.
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	
Sanitary Waste	
How is sanitary waste collected?	Collected by janitorial staff and placed in dumpsters.
How is sanitary waste stored until removal from the site?	Stays in dumpsters.
How is sanitary waste removed from the site?	Have own trucks to empty dumpsters and transport to landfill.
Who removes it from the site?	Laborers at LLNL.
Where does your sanitary waste go?	Local landfill.
How far does sanitary waste go to be disposed?	10 miles.
How much does it cost the site to dispose of sanitary waste?	Unknown.

LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL) RECYCLING	
Does recycling cost more than disposing of the material or is there a savings from recycling?	Do not know, yet.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	Yes.
Is construction and demolition waste recycled?	Yes, Recycle wood, concrete, reinforcing steel (beams and columns). Salvage equipment and reuse, asphalt, and soil.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	Yes, in reported data.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	Yes, in reported data.
Is waste from work done by outside contractors recycled?	Yes.
If yes, please explain how this material is collected, picked up, stored, processed and shipped.	Some are setup where the contactor arranges to have recyclables removed from the site. LLNL will provide dumpsters to construction. Not sure about smaller projects.

DOE	U.S. Department of Energy
DUS	Donation, Utilization and Sales
LLNL	Lawrence Livermore National Laboratory
SNL/NM	Sandia National Laboratories/New Mexico

NEVADA TEST SITE (NTS) RECYCLING	
Recycling	
How many employees/contractors work at the site?	Unknown. This number fluctuates. It has gone from over 10,000 to 2,000 or 3,000 and increased again. Management and operation contractor has about 3,000 employees, three National Labs, plus other contractors, and DOE people.
How are recyclables collected?	There are different locations. NTS is about 65 miles outside of town. Recycle centers are set up in buildings. Laborers pick up and transport to one building. Out at the site, cardboard, mixed paper, aluminum cans, and plastic are segregated. All mixed papers are tossed together in plastic bags. Cardboard is set out in hallways for janitors to pick up, and Number 1 Plastic and aluminum cans are collected separately from each other. Janitors empty containers from the buildings into dumpsters. Laborers dump into giant roll offs. Quantities are estimated values.
How are recyclables stored until removal from the site?	Stored in a building at NTS. Stored in dumpsters and giant roll offs in town.
How are recyclables removed from the site?	Picked up by vendor at NTS and municipality in town.
Who removes them from the site?	At the NTS site, the vendor picks up every other week and transports to a recycler. Locations in town use local municipal waste collection, and is picked up two or three times a week.
Where do recyclables go?	Taken to local recyclers.
How far do recyclables go to be processed?	Southern California.
Do you have opportunities to recycle locally?	No.
How much does it cost the site to recycle?	Hard to answer. Budget is about $150,000 at NTS. Janitors in town are on a separate contract, so cost is not known. Municipal waste collection is not known. It does, however, cost more to recycle than to dispose because they have their own landfill on-site.
What factors does your site use when deciding which materials to recycle?	Most of the materials were started years ago, so not sure why these materials were selected. Because these materials are ongoing, NTS is working on keeping these few rather than looking for new materials to include in the program. It is an ongoing battle to maintain a program. They have added ink jet cartridges donated to schools. Electronic media now goes to Seattle. A small fee per pound for shipping charge is paid by information system department and sent to EcoDisk. Food waste at NTS cafeteria goes to a local pig farmer. Last year they generated 60 metric tons. They have an old walk-in refrigerator where food waste is stored in 55-gallon drums supplied by vendor, which is then picked up every two weeks and cooked into a meal for the pigs.
Is the cost of recycling included in these	Anything new would have to include a cost benefit.

NEVADA TEST SITE (NTS) RECYCLING	
factors?	
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	Yes, IS Department is willing to pay for sending used software/disks to EcoDisk.
Sanitary Waste	
How is sanitary waste collected?	Janitors collect sanitary waste and empty into dumpsters. The municipality collects in town and laborers at NTS site.
How is sanitary waste stored until removal from the site?	Dumpsters.
How is sanitary waste removed from the site?	Municipality in town, teamsters at NTS.
Who removes it from the site?	Municipality in town. NTS stays on-site.
Where does your sanitary waste go?	In town, waste goes to a local landfill. NTS goes to landfill on-site (three landfills, hydrocarbon, construction waste, and sanitary includes cafeteria and office waste)
How far does sanitary waste go to be disposed?	In town local landfill is 10-15 miles. NTS on-site landfill is 1-2 miles.
How much does it cost the site to dispose of sanitary waste?	Does not know the budget. It is in a different department. 2+ million includes operating expenses for landfills and waste collection at NTS.
Does recycling cost more than disposing of the material or is there a savings from recycling?	Recycling costs more, however, recycling at NTS gets a small income. Metal gets more money, but it still is not much and does not cover the costs.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	Yes.
Is construction and demolition waste recycled?	Most of it is not.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	Cannot separate from routine versus non-rotuine, but metals are recycled.
If not, why?	If it is porous it will not leave the site. Paper has an exemption. Any chance of contamination means it does not leave the site. This includes concrete, ceiling tiles, wood pallets, and carpet.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	Yes, it is included in cleanup/stabilization sanitary waste.
Is waste from work done by outside contractors recycled?	No, but if they do, it would be captured in our numbers.
If not, why?	Materials are not allowed to leave the site.

DOE U.S. Department of Energy
NTS Nevada Test Site

OAK RIDGE NATIONAL LABORATORY (ORNL) RECYCLING	
Recycling	
How many employees/contractors work at the site?	4,800
How are recyclables collected?	Collection containers are stored in approved locations. Mixed paper and aluminum cans are handled by volunteer programs. Pollution Prevention distributes can-crushers on collection bins. The volunteer monitors the bin, and when it is full they drive it to a central location. The revenues offset the cost of other recycling. Plastic and glass are only collected in, and paid for by four Leadership in Energy and Environmental Design (LEED) buildings. Historically, they decided not to collect because of high costs. Aluminum, plastic, and glass are collected separately and picked up by a vendor. Cardboard is collected by a union that comes, but they pay for the cardboard.
How are recyclables stored until removal from the site?	Vendor comes into each building, rolls the 85-gallon paper totes out to their collection truck.
How are recyclables removed from the site?	Picked up by vendor.
Who removes them from the site?	Vendor.
Where do recyclables go?	Other recyclables, plastic and glass are unknown.
How far do recyclables go to be processed?	The mixed paper mill is one hour away. Aluminum processing is within one hour.
Do you have opportunities to recycle locally?	Yes.
How much does it cost the site to recycle?	Contract for mixed paper, aluminum cans, plastic, and glass, net cost is $30K (includes proceeds from recycling).
What factors does your site use when deciding which materials to recycle?	Have used economics and market. For LEED buildings the need to recycle plastic and glass overrode economics.
Is the cost of recycling included in these factors?	Yes.
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	Plastic and glass for LEED buildings.
Sanitary Waste	
How is sanitary waste collected?	Custodial staff collects and places in dumpsters.
How is sanitary waste stored until removal from the site?	Dumpsters.
How is sanitary waste removed from the site?	Picked up in truck.
Who removes it from the site?	On-site laborers.
Where does your sanitary waste go?	On-site landfill.
How far does sanitary waste go to be disposed?	6 miles.
How much does it cost the site to dispose of sanitary waste?	Unknown. Formerly used $52/cubic yard for operation of landfill, however this cost did not include transportation or labor for collection and delivery.

OAK RIDGE NATIONAL LABORATORY (ORNL) RECYCLING	
Does recycling cost more than disposing of the material or is there a savings from recycling?	In the past, savings were calculated from recycling based on waste diversion and other expenses.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	No.
If not, explain why.	Not collecting the information.
Is construction and demolition waste recycled?	Some.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	In the past have done some asphalt or metals.
If not, why?	Because it is contracted out, it is no longer our responsibility. Have 180 degree change particularly with LEED. The engineering group is starting to include waste management plans with recycling requirements, but recycling data is not being captured.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	Probably have most of the waste in the cleanup/stabilization number.
Is waste from work done by outside contractors recycled?	Some.
If yes, please explain how this material is collected, picked up, stored, processed	Outside contractors responsible for it.

LEED Leadership in Energy and Environmental Design
ORNL Oak Ridge National Laboratory

PANTEX RECYCLING	
Recycling	
How many employees/contractors work at the site?	3,500
How are recyclables collected?	They are distributed, segregated, and put in containers by the generators.
How are recyclables stored until removal from the site?	Collected by the Waste Operations Department and stored at waste facility.
How are recyclables removed from the site?	Depends on the materials.
Who removes them from the site?	The Waste Operations Department removes disintegrated paper which goes to a compostor, Cardboard, plastics, and scrap wood go to the City of Panhandle, where they chip it up and use it for a mulch. Scrap metals and lead acid batteries are picked up by vendors. Other batteries, fluorescent tubes, and waste solvents are removed by a waste disposal company.
Where do recyclables go?	See above.
How far do recyclables go to be processed?	Most are recycled within the state of Texas, batteries go to CA, and fluorescent tubes and other batteries go to PA.
Do you have opportunities to recycle locally?	Only compost and mulch are local.
How much does it cost the site to recycle?	Unknown. Try to recycle things that cost a minimum amount of money.
What factors does your site use when deciding which materials to recycle?	Cost, ease of recycling, ease of collection, and associated transportation costs.
Is the cost of recycling included in these factors?	Yes, most important factor.
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	Fluorescent bulbs and batteries cost about the same as disposal. If recycling costs more than disposal, then new material considered.
Sanitary Waste	
How is sanitary waste collected?	In the state of Texas there are different categories of waste. Hazardous, Class 1 industrial waste (state of Texas regulates), Class 2 industrial, which is primarily what others would consider to be sanitary waste. Waste Operations collects the waste in a compacting truck.
How is sanitary waste stored until removal from the site?	Stays in dumpster until picked up by the truck.
How is sanitary waste removed from the site?	Waste operations truck.
Who removes it from the site?	Waste operations.
Where does your sanitary waste go?	Amarillo Municipal landfill.
How far does sanitary waste go to be disposed?	25 miles.
How much does it cost the site to dispose of sanitary waste?	10 metric tons costs about $1,900. Sanitary waste currently reported includes Class 1 industrial

PANTEX RECYCLING	
Does recycling cost more than disposing of the material or is there a savings from recycling?	Most of them are either break even or costs a little extra, however, scrap metal and lead acid batteries make money.
Construction and Demolition Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	Yes.
Is construction and demolition waste recycled?	Yes.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	Yes, 3,060.39.
Is waste from work done by outside contractors recycled?	Yes.
If yes, please explain how this material is collected, picked up, stored, processed and shipped.	Contractor is brought on-site with a crusher. Some materials are kept on-site to reuse. Also, had a contract to have it hauled to crusher, and it was put in the contract that materials have to be recycled. It is then hauled off to recycler.

PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL) RECYCLING	
Recycling	
How many employees/contractors work at the site?	3,900 at Battelle PNNL.
How are recyclables collected?	Basic recycling are collected in dumpsters. Outside cardboard paper are collected in bins. Mixed paper bins are down the hall and do not have a good method of collection. Chemicals and pressurized cylinders are collected and distributed in a segregated system.
How are recyclables stored until removal from the site?	Sanitary Waste/Paper are picked up weekly and entered into Waste Management (300 Area) trucks and City of Richland (Richland North). Some chemicals go to the building for combination and storage. Aluminum cans are recycled by janitors, who get the cash.
How are recyclables removed from the site?	Others are shipped back-east using a private shipping firm.
Who removes them from the site?	Waste Management or City of Richland. Some materials are shipped.
Where do recyclables go?	See above. The majority is local.
How far do recyclables go to be processed?	There is a paper mill within 30 miles of tri-city.
Do you have opportunities to recycle locally?	Yes.
How much does it cost the site to recycle?	Unknown. White paper and cardboard pay to recycle mixed paper, glass, and tin.
What factors does your site use when deciding which materials to recycle?	Labor cost of packaging transportation, cost of disposal, cost of distance to ship, cost of disposal versus recycling. For example, recycling of transparencies costs more to recycle than to dispose. If the volume is tiny, then it is not worth it, however, if the volume is great, then it is worthwhile.
Is the cost of recycling included in these factors?	Yes.
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	Paper and cardboard pays for glass and plastics. Recycling is getting more expensive for Fluorescent tubes, It is more expensive to dispose of it because the TCLP indicates mercury is insignificant.
Sanitary Waste	
How is sanitary waste collected?	Sanitary waste is collected in bins and luggers. The City of Richland is based on number of trips and volume of waste. It is cheaper to remove as many recyclables as possible.
How is sanitary waste stored until removal from the site?	Dumpsters.
How is sanitary waste removed from the site?	Waste Management (300 Area) and City of Richland (Richland North).
Who removes it from the site?	See above
Where does your sanitary waste go?	Richland north goes to city of Richland landfill within 4 miles. 300 Area goes to Roosevelt Landfill within 10 miles.
How far does sanitary waste go to be disposed?	4 to 10 miles.

PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL) RECYCLING	
How much does it cost the site to dispose of sanitary waste?	Disposal costs a few, but does not know how much.
Does recycling cost more than disposing of the material or is there a savings from recycling?	It depends on the material. It is a wash.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	Yes.
Is construction and demolition waste recycled?	PNNL contracts require construction and demolition to recycle when possible.
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	
If not, why?	Most of the demolition is low-level waste and disposed.
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	Insignificant wood.
Is waste from work done by outside contractors recycled?	
If not, why?	
If yes, please explain how this material is collected, picked up, stored, processed and shipped.	When you do get demolition concrete, recycling is used for fill in other construction sites. There is a facility that is being modified, but the specs required crushed rock. Approximation - Will crush concrete and break into useable size. Liaisons between contracting company and PNNL.

PNNL Pacific Northwest National Laboratory
TCLP Toxicity Characteristic Leaching Procedure

SAVANNAH RIVER SITE (SRS) RECYCLING	
Recycling	
How many employees/contractors work at the site?	12,000 generate between 2,100 and 2,400 tons per year.
How are recyclables collected?	All waste is collected as single stream.
How are recyclables stored until removal from the site?	Did not ask this question.
How are recyclables removed from the site?	Did not ask this question.
Who removes them from the site?	Did not ask this question.
Where do recyclables go?	Currently recyclables are being sent to a material recovery facility in North Augusta, GA. SRS waste is maintained separately and quantified.
How far do recyclables go to be processed?	100 miles from the SRS.
Do you have opportunities to recycle locally?	Yes, waste to energy program. Currently running new equipment that makes process engineered fuel (PEF) pellets, which look like compressed logs. The PEF pellets are made from combustible sanitary waste, such as white paper, cardboard, and mixed paper. Coal and PEF are burned together at the steam plant. By mixing the PEF with coal, the emissions are cleaner. Coal purchases are decreased by 30%. The equipment can process 6-10 tons/hour. SRS is only processing/generating 300 tons per month, so the equipment is only being run a few days a month. The PEF pellets ranges from 7,000-9,000 BTU/lb depending on plastic content. Coal has about 13,500 BTU/lb. SRS has invested approximately $1,000,000 in this system. Waste to energy will reduce tipping fees, coal costs, and will save $200,000 per year. Hope to put in a huge waste energy facility that will generate energy and include municipal waste from the surrounding area. The current set up is inside the fence and is expensive to run because it uses contract labor. If a waste energy facility is built just outside the fence, the costs could be greatly reduced. Currently costs about the same as purchasing coal. If made outside the fence, it could cost half as much as coal.
How much does it cost the site to recycle?	Recover about 45-50%, previously recovering 22-23%. Costs about $100,000 per year and are really low because the material recovery facility uses prisoners to sort materials.
What factors does your site use when deciding which materials to recycle?	Look at markets and try to recycle anything with an intrinsic value. Recycling costs money.
Is the cost of recycling included in these factors?	Yes.

SAVANNAH RIVER SITE (SRS) RECYCLING	
If yes then, are there certain products that your site feels are worth the additional cost to recycle? Please explain.	Working on recycling as much as possible.
Sanitary Waste	
How is sanitary waste collected?	Did not ask this question.
How is sanitary waste stored until removal from the site?	Did not ask this question.
How is sanitary waste removed from the site?	Did not ask this question.
Who removes it from the site?	Did not ask this question.
Where does your sanitary waste go?	Did not ask this question.
How far does sanitary waste go to be disposed?	Materials go to a waste sort facility which pulverizes, sorts, segregates, and makes a fluffed product. In process of putting together separation method that will segregate municipal waste stream into various components. Leased land to local counties. Hope to recover 70-90%.
How much does it cost the site to dispose of sanitary waste?	Prior to the agreement with a material recovery facility in North Augusta, GA., the SRS paid $250,000 to pick up the sanitary waste. $100,000 to Aiken to sell it with about 15,000 employees. Sending waste to the material recovery facility is costing a tipping fee of $30/ton x 200 tons/month x 12 months = $72,000 per year. About ½ of the municipal sanitary waste at the material recovery facility ends up going to the landfill and costs an additional $28/ton x 100 tons/month x 12 months = $33,600. Combined the cost is $105,000.
Does recycling cost more than disposing of the material or is there a savings from recycling?	Eight months total sales $217,000 recovered from recyclables.
Construction and Demolition Waste/Recycling	
Are all construction and demolition activities (including outside contractors) at your site contained in your recycling and/or sanitary waste numbers?	No.
If not, explain why.	Do not collect that information.
Is construction and demolition waste recycled?	Started a construction and demolition landfill, and will try to pull out steel I-beams and all other metal. Intend to stockpile concrete and will manage the area when staff has down time. Source segregation at site. Material goes directly to salvage yard. Concrete will go to stockpile and a crusher will be brought in once a year. New machines are taking rebar out. Will send name of vendor who sells crusher that removes concrete.

SAVANNAH RIVER SITE (SRS) RECYCLING	
If yes then, can you provide the quantity of materials recycled from construction and demolition in fiscal year 2003?	Not yet.
If not, why?	
Can you provide the quantity of waste disposed from these activities in fiscal year 2003?	No.
Is waste from work done by outside contractors recycled?	No. Require metals go to salvage.
If yes, please explain how this material is collected, picked up, stored, processed	Contractor hauls away.

BTU British Thermal Unit
PEF Process Engineered Fuel
SRS Savannah River Site

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