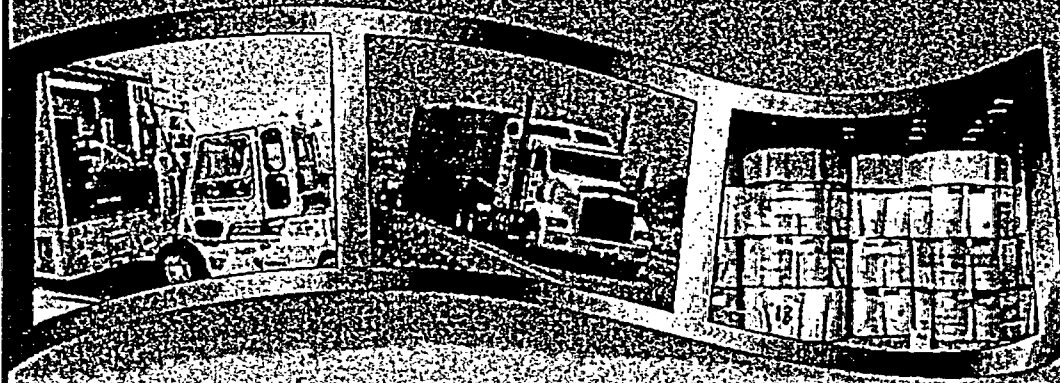


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Revision 3

National TRU Waste Management Plan

Corporate Board Annual Report



U.S. Department of Energy
Carlsbad Field Office

Chapter 4.0

Baseline Cost Estimates

4.0 BASELINE COST ESTIMATES

Chapter Change Summary - This chapter has been modified from Revision 2 of the plan based on recent changes in the IPABS data and discussions with personnel at the generator sites. The time period for cost baseline covers FY 2002 through FY 2034 and represents the "cost to completion" consistent with standard cost control terminology. In addition, the Carlsbad Operations costs for transportation, disposal, and other mission-critical activities have been adjusted beyond FY 2015 to account for average shipping rates that are less than the previously assumed 17 shipments per week throughout the WIPP facility operating lifetime.

The cost baseline for the Plan has been developed from the cost estimates identified in the IPABS data base with additional information from selected sites. The cost baseline assumes full compliance with environmental, safety, and other regulatory requirements, agreements and orders. This chapter of the plan will be revised as major changes that impact the current TRU waste system dictate that Program costs be re-baselined.

4.1 Generator Sites Cost Baseline

A major portion of each site's cost is a function of the throughput of waste, from retrieval/generation through shipment. These "variable costs" include processing (e.g., repackaging), waste characterization and certification, and preparation of shipments (i.e., package assembly, loading the shipping container, and transportation certification and documentation). Although these costs vary from site to site, over the complex they constitute about 75 percent of the total generator site budget. The variable cost component is a major driver for the detailed evaluation of potential efficiency improvements, particularly in the characterization and certification processes.

The generator sites baseline assumes that each major site will characterize, certify, and load its own waste in preparation for transportation to and disposal in the WIPP facility. Also, the baseline assumes that the individual site cost baseline is consistent with the waste quantities planned to be shipped to the WIPP in any given fiscal year (see Section 3.0). It should be noted that the current baseline for the total shipments of waste in the near term (about the next four years) exceeds the current transportation system capabilities (i.e., the number of trucks and shipping containers existing and planned is less than the demand projected by the generator sites). Until this apparent "mismatch" between generator site planning and the WIPP transportation system capability is corrected, it is assumed that the generator site will characterize and certify their waste on their current schedules, package and certify payload container assemblies ready for loading, and place the assemblies in storage until they can be shipped to the WIPP facility.

Site IPABS data for sites with continuing TRU waste operations beyond the WIPP schedule for closure in FY 2034 include costs for FY 2035 in the five-year IPABS

reporting period (i.e., FY 2031 – FY 2035). The IPABS costs for these sites are reduced by 20 percent before incorporation into the WIPP cost baseline.

4.2 Carlsbad Operations Cost Baseline

Carlsbad Operations include cost for operating the WIPP facility, developing and operating the waste transportation system, and funding the DOE and WIPP M&O support contractors. The WIPP planning budget provided in IPABS is based on relatively detailed planning through FY 2008. For FY 2009 through FY 2034, the IPABS budget is based on the budget estimates for FY 2004 through FY 2008, which are then escalated at 2.1 percent per year through completion of operations and account for known changes in activity level (i.e., panel closures, 5-year recertification cycle, etc.). The IPABS budget assumes that the work load at the WIPP facility will remain constant until the beginning of site closure in FY 2035 and does not take into account that the amount of waste to be received and disposed declines significantly in the out-years beyond FY 2015. The cost baseline for Carlsbad Operations provided in this chapter has been adjusted to account for the out-year reduction in shipping rates as discussed below.

The Carlsbad Operations costs have been subdivided into transportation, disposal, and other mission-critical cost categories to facilitate evaluating potential program improvements and other cost evaluations. As noted above, the baseline shipping schedule (i.e., the current shipping demand established from the planned annual shipments from the individual generator sites) peaks in FY 2004-2005 at more than 20 shipments per week then levels out for FY 2006 through FY 2015 at about 17 shipments per week. Beyond FY 2015 the annual shipping rate drops precipitously because many of the sites have completed processing and shipping their TRU waste and much of the remaining waste is being generated by ongoing site programs.

To account for the marked decrease in demand for Carlsbad Operations support for transportation, disposal, and other mission-critical activities, the individual scopes of the WBS elements for Carlsbad Operations were reviewed to determine which activities varied as a function of waste shipments and which activities remained essentially fixed over the operating life of the WIPP facility. The costs that were determined to be "variable" were converted to percentages of the total (i.e., variable plus fixed) costs for each of the three Carlsbad Operations cost categories. The percentages were then applied to the total costs for each 5-year period (4-year period for FY 2031-2034) starting in FY 2016. The percentages used are as follows:

- Transportation – 41 percent
- Disposal – 59 percent
- Other Mission-Critical – 13 percent

Review of the site total shipment numbers and the Carlsbad Operations capacity to

transport waste indicates that a load-leveled shipping rate of 17 shipments per week would be sustained to about the end of the FY 2010 - 2015 time period. Starting in FY 2016 the variable cost percentages listed above are applied to each of the Carlsbad Operation cost categories in each of the five-year periods in proportion to the variation in shipping rate below the baseline value of 17. For example, if the average shipping rate in a given five-year period were 12 per week, the variable cost for transportation in that year (i.e., 41 percent of the transportation total cost) is reduced by 29.4 percent (i.e., $1 - 12/17 = .294$).

The paragraphs below describe the activities included in each of the three Carlsbad Operations cost categories.

Transportation Costs

Transportation costs are derived from the IPABS data for the Carlsbad Operations as Projects CBFO - 03 (Transportation) and 99-PVT-1 (Privatization), plus the New Mexico Impact Assistance portion of CBFO - 08, which amounts to more than \$20 million per year for the improvement of highways in New Mexico. The Transportation Project, CBFO - 03, includes:

- Transportation of TRU waste to WIPP and selected intersite shipments;
- The TRUPACT II and HalfPACT fabrication contracts;
- Trailers for shipping both CH TRU and RH TRU waste;
- Opening and maintaining transportation corridors;
- Emergency response training along transportation corridors; and
- Other critical transportation support operations at WIPP and the CBFO.

The Privatization Project, 99-PVT-1, covers the RH 72-B Fabrication Contract awarded during calendar year 2000 for a total of \$15.5 million.

Disposal Costs

Disposal Costs include the following IPABS data:

- WIPP surface facilities, including utilities, waste handling systems, and plant operations;
- WIPP underground facilities, including hoisting, ground control, mining, underground utilities, operations support, and maintenance;
- Safety and health; and
- Other activities, including specific mining and readiness initiatives.

Other Mission-Critical Activities

The remaining mission-critical costs are associated with:

- Surface operations;
- Project planning and control;
- Security;
- Quality assurance;
- Permitting and regulatory compliance;
- Procurement, finance, and legal;
- Human Resources;
- Information Services and WWIS;
- Public affairs and outreach;
- Characterization and certification support; and
- Other related activities.

4.3 Baseline Cost Data

Table 4.3-1 presents the program cost baseline for the period FY 2002 through FY 2034. The baseline is identified on an annual basis through FY 2010 and in five-year increments thereafter (except for FY 2031-2034) consistent with the IPABS long-term planning cycle. Table 4.3-1 is based on IPABS data as of November 1, 2001, adjusted as described in the previous sections.

Table 4.3-1 - Baseline Cost Data⁽¹⁾
(Current Year Dollars In Thousands)

| SITE - DATA SOURCE/FISCAL YEAR | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| GENERATOR SITES | | | | | | | | | |
| Argonne National Laboratory - East - FY 00 Site Data | 8,450 | 9,450 | 700 | 700 | 700 | 700 | 700 | 700 | 2,700 |
| Argonne National Laboratory - West - FY 00 Site Data | | | | | | | | | 1,276 |
| ARCO - Extrapolated - Note (3) | | | | 23 | | | | | |
| Babcock & Wilcox-NES - Extrapolated - Note (3) | | 4,163 | | | | | | | |
| Battelle Columbus Laboratories - Extrapolated - Note (3) | 6,716 | | | | | | | | |
| Bettis Atomic Power Laboratory - Note (2) | | | | | | | | | |
| Energy Technology Engineering Center - FY 01 IPABS Data | 660 | 555 | 1,330 | | | | | | |
| GE-Vallecos Nuclear Center - Extrapolated - Note (3) | | | 1,196 | 1,196 | 1,196 | 1,196 | | | |
| Hanford Site - FY 01 IPABS Data | 24,269 | 31,956 | 31,782 | 32,377 | 30,355 | 32,906 | 33,697 | 37,253 | 42,595 |
| Idaho National Engineering and Environmental Laboratory - FY 01 IPABS data | 72,937 | 81,244 | 144,179 | 197,504 | 206,744 | 125,740 | 99,323 | 39,542 | 40,952 |
| Knolls Atomic Power Laboratory - Note (2) | | | | | | | | | |
| Knolls Atomic Power Laboratory - Nuclear Fuel Services | 14,090 | 14,385 | 12,239 | 10,747 | | | | | |
| Lawrence Berkeley National Laboratory - FY 01 IPABS data | | | | | | | | | |
| Lawrence Livermore National Laboratory - FY 01 IPABS data | 2,753 | 2,765 | 2,540 | 2,609 | 2,629 | 2,986 | 3,776 | | |
| Los Alamos National Laboratory - FY 01 IPABS data | 18,841 | 18,841 | 19,764 | 23,657 | 23,662 | 24,976 | 25,501 | 26,038 | 26,586 |
| Lovelace Respiratory Research Institute - FY 01 IPABS data | 1 | | | | | | | | |
| Mound - FY 01 IPABS data | 79 | | | | | | | | |
| Missouri University Research Reactor - Note (2) | | | | | | | | | |
| Nevada Test Site - FY 01 IPABS data | 6,394 | 6,691 | 5,488 | 5,853 | 3,115 | 4,694 | 5,912 | 3,716 | |
| Oak Ridge National Laboratory - FY 01 IPABS data | 8,272 | 78,004 | 53,853 | 35,455 | 17,025 | 16,742 | 8,946 | 8,422 | 3,359 |
| Paducah Gaseous Diffusion Plant - FY 01 IPABS data | | | 28 | | | | | | |
| Rocky Flats Environmental Technology Site - FY 01 IPABS data | 13,700 | 9,412 | 4,416 | 3,183 | 1,944 | 502 | | | |
| Savannah River Site - FY 01 IPABS data for 2002; FY 00 site data for rest | 16,726 | 26,244 | 18,942 | 14,047 | 37,872 | 39,127 | 40,794 | 16,226 | 79,133 |
| Separation Process Research Unit | | | | | | | | 2,716 | 2,773 |
| U.S. Army Material Command - Note (2) | | | | | | | | | |
| West Valley Demonstration Project | | | | | 20,414 | 20,843 | 21,281 | 21,729 | 22,185 |
| SUBTOTAL, Generator Sites | 193,888 | 291,720 | 296,457 | 327,351 | 345,856 | 270,412 | 239,930 | 156,342 | 221,559 |
| CARLSBAD OPERATIONS - Note (4) | | | | | | | | | |
| Transportation - Note (5) | 67,659 | 70,115 | 55,531 | 56,023 | 55,574 | 55,906 | 55,936 | 62,738 | 48,937 |
| Disposal - Note (6) | 54,410 | 54,843 | 60,374 | 46,856 | 51,132 | 48,722 | 53,411 | 66,985 | 34,932 |
| Remaining Mission-Critical Activities - Note (7) | 106,735 | 110,743 | 102,182 | 101,231 | 103,362 | 106,124 | 109,334 | 118,074 | 80,031 |
| SUBTOTAL, Carlsbad Operations | 228,804 | 235,701 | 218,087 | 204,110 | 210,068 | 210,752 | 219,681 | 247,797 | 163,900 |
| GRAND TOTAL | 422,692 | 527,421 | 514,524 | 531,461 | 555,924 | 481,164 | 459,611 | 404,139 | 385,459 |
| NOTES: | | | | | | | | | |
| (1) Cost data are based on budget planning levels. Near-term fiscal year target levels are achieved when planning level data are validated. | | | | | | | | | |
| (2) "0" in FY 2002 for small quantity site indicates that site costs for waste removal are either insignificant or will be funded from non-EM source. | | | | | | | | | |
| (3) Cost for an SQS with no IPABS or site provided data (ARCO, BCL, B&W, and GE) are estimated using the weighted average cost/cubic meter calculated from ANL-E and ETEC cost and volume data to be \$230/Km ³ . | | | | | | | | | |
| (4) The Carlsbad Operations IPABS costs for Transportation, Disposal, and Remaining Mission-Critical Activities from FY 2009 through FY 2034 are estimated based on FY 2004-2008 planning data escalated by 2.1% (See Notes (5), (6) and (7) for estimate adjustments). | | | | | | | | | |
| (5) Transportation includes CBFO projects: #03 - WIPP Transportation, #06 - Privatization, and #08 - Economic Assistance to the State of New Mexico. The privatization figure represents \$15.513 million budget outlay during FY 2001-2003 for budget authorized in FY 1999 for RH TRU cask procurement. The variable transportation cost (41% of the total) for each year from FY 2016 through FY 2034 is reduced in proportion to the reduction in shipping rate from the baseline average of 17 shipments per week to the rate applicable to each year. | | | | | | | | | |

Table 4.3-1 - Baseline Cost Data (Continued)
(Current Year Dollars in Thousands)

| SITE - DATA SOURCE / FISCAL YEAR | 2011-2015 | 2016-2020 | 2021-2025 | 2026-2030 | 2031-2034 Note (8) | TOTAL |
|--|------------------|------------------|------------------|------------------|-----------------------|-------------------|
| GENERATOR SITES | | | | | | |
| Argonne National Laboratory - East - FY 00 Site Data | 700 | 4,000 | 1,000 | 4,000 | 800 | 35,300 |
| Argonne National Laboratory - West - FY 00 Site Data | 14,453 | | | | | 15,729 |
| Atlantic Richfield Company - Extrapolated - Note (3) | | | | | | 23 |
| Babcock & Wilcox-NES - Extrapolated - Note (3) | | | | | | 4,163 |
| Battelle Columbus Laboratories - Extrapolated - Note (3) | | | | | | 6,716 |
| Bettis Atomic Power Laboratory - Note (2) | | | | | | 0 |
| Energy Technology Engineering Center - FY 01 IPABS Data | | | | | | 2555 |
| GE-Vallecitos Nuclear Center - Extrapolated - Note (3) | | | | | | 4,784 |
| Hanford Site - FY 01 IPABS Data | 243,815 | 279,807 | 308,121 | 303,978 | 17,479 | 1,448,388 |
| Idaho National Engineering and Environmental Lab - FY 01 IPABS | 174,014 | 59,954 | | | | 1,252,133 |
| Knolls Atomic Power Laboratory - Note (2) | | | | | | 0 |
| Knolls Atomic Power Laboratory - Nuclear Fuel Services | | | | | | 51,461 |
| Lawrence Berkeley National Laboratory - FY 01 IPABS data | | | | | | 0 |
| Lawrence Livermore National Laboratory - FY 01 IPABS data | | | | | | 20,058 |
| Los Alamos National Laboratory - FY 01 IPABS data | 126,782 | 155,565 | 172,646 | 191,595 | 110,739 | 965,393 |
| Lovelace Respiratory Research Institute - FY 01 IPABS data | | | | | | 1 |
| Miamisburg Environmental Management Project - FY 01 IPABS data | | | | | | 79 |
| Missouri University Research Reactor - Note (2) | | | | | | 0 |
| Nevada Test Site - FY 01 IPABS data | | | | | | 41,863 |
| Oak Ridge National Laboratory - FY 01 IPABS data | 10,302 | | | | | 238,380 |
| Paducah Gaseous Diffusion Plant - FY 01 IPABS data | | | | | | 28 |
| Rocky Flats Environmental Technology Site - FY 01 IPABS data | | | | | | 33,157 |
| Savannah River Site - FY 01 IPABS data for 2002; FY 00 data for rest | 421,199 | 297,163 | 338,787 | 385,168 | 355,667 | 2,085,105 |
| Separation Process Research Unit | 8,672 | | | | | 14,161 |
| U.S. Army Material Command - Note (2) | | | | | | 0 |
| West Valley Demonstration Project | 49,719 | | | | | 158,171 |
| SUBTOTAL, Generator Sites | 1,049,658 | 796,489 | 816,564 | 884,739 | 484,686 | 6,375,649 |
| CARLSBAD OPERATIONS - Note (4) | | | | | | |
| Transportation - Note (5) | 327,682 | 272,297 | 297,738 | 336,600 | 261,078 | 2,039,195 |
| Disposal - Note (6) | 301,844 | 214,796 | 232,473 | 266,287 | 194,551 | 1,698,671 |
| Remaining Mission-Critical Activities - Note (7) | 609,182 | 636,347 | 705,412 | 765,995 | 709,155 | 4,396,172 |
| SUBTOTAL, Carlsbad Operations | 1,238,708 | 1,123,440 | 1,235,623 | 1,368,883 | 1,164,784 | 8,134,038 |
| GRAND TOTAL | 2,288,364 | 1,919,929 | 2,052,187 | 2,253,622 | 1,649,470 | 14,509,687 |
| NOTES: | | | | | | |
| (6) Disposal includes underground facilities, surface facilities, safety and health, and mining and waste operations. The variable disposal cost (59% of the total) for each year from FY 2016 through FY 2034 is reduced in proportion to the reduction in shipping rate from the baseline average of 17 shipments per week to the rate applicable to each year. | | | | | | |
| (7) Disposal is not a stand-alone operation. It also requires other mission-critical activities, including security, quality assurance, permitting, regulatory compliance, and other related functions. The variable mission-critical activity cost (13% of the total) for each year from FY 2016 through FY 2034 is reduced in proportion to the reduction in shipping rate from the baseline average of 17 shipments per week to the rate applicable to each year. Non-mission critical activities (e.g., US/Mexico/Border/Material Partnership Initiative and other Congressional Mandates) are not included. | | | | | | |
| (8) Field site cost data for the period FY 2031-FY 2034 are 80% of the values reported in IPABS-IS or by the sites for the period FY 2031-2035. | | | | | | |