

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Carlsbad**

Site Summary Level: **Waste Isolation Pilot Plant**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0009**

General Project Information

Project Description Narratives

Purpose, Scope, and Technical Approach:

Once the WIPP has been shown to be in compliance with regulatory requirements, the disposal phase gives an opportunity to affirm the compliance status of the WIPP, enhance the operations of the WIPP and the national TRU system, and contribute to the resolution of national nuclear waste management technical needs. The scope of the WIPP Disposal Phase Certification and Experimental Program is designed to achieve two main objectives.

1. Support WIPP and national TRU system operations. Experimental activities supporting WIPP operations will be designed to maintain compliance certification. This will be accomplished by monitoring and verifying performance of the system's sensitive parameters, evaluating the information, and performing certification calculations at five-year intervals in accordance with the requirements of 40 CFR 194.4 and the WIPP Land Withdrawal Act (LWA). Enhanced operations will be accomplished through focused efforts to refine knowledge and develop new methods and procedures which will reduce worker exposure to radiation and other hazards, enhance operational efficiency, reduce design and operational complexity of the WIPP and the national TRU system, and reduce costs. These goals are inter-related (for example, reducing complexity of operations is likely to reduce worker exposure to hazards and also reduce costs).

2. Support future waste management needs. Experimental activities supporting future waste management needs will be designed to accomplish two goals:

a. Establish a focused international nuclear waste disposal research and development program by continuing and implementing applicable joint programs with other nations and other programs. This will be accomplished through the implementation of focused experimental activities in cooperation with other national and international waste management programs and efforts. Through synergistic activities with other nations and other programs, the DOE will gain access to relevant information from other programs, will provide information to other programs, and will share costs.

b. Enhancing proactive response to emerging DOE TRU waste management needs. This will be accomplished by providing guidance and support to generators of TRU waste, particularly in the area of waste characterization. The CAO, as the national TRU waste program leader, will develop and provide technical information for the DOE's use in formulating radioactive waste management policies.

Technical Approach: The technical approach used by the WIPP Disposal Phase Certification and Experimental Program includes efforts from the following TRU Waste Isolation R&D and Regulatory Assurance activities: Near Field; Seals Engineering; Far Field; Regulatory Compliance; Performance Assessment (PA); and International R&D.

The Near Field activity is involved in developing a system-level near-field PA model capturing the effects of coupled geomechanical, hydrological, and geochemical, and actinide chemical phenomena. It is responsible for the development of methodologies for estimating actinide releases to the accessible environment or far-field pathways, for use in recertification performance assessments.

Dataset Name: **FY 1999 Planning Data**

Date of Dataset: **9/20/1999**

Page 1 of 12

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Carlsbad**

Site Summary Level: **Waste Isolation Pilot Plant**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0009**

Project Description Narratives

The Seals Engineering work is necessary to achieve and maintain compliance. Shaft seal systems design simplifications, associated cost reductions and resolution of remaining seals engineering technical issues are the focus.

The primary objective of the Far Field activity is to develop and maintain the appropriate far-field portion of an up-to-date, multi-barrier performance assessment capability for the WIPP; i.e., an overall capability that demonstrates compliance with regulatory requirements, meets high standards of technical defensibility and documentation, and is used directly in WIPP recertifications. It is assumed that technical defensibility will require maintenance of state-of-the-art understandings of geologic information, detailed conceptual and/or mechanistic models, and numerical-modeling approaches to fluid flow, physical transport, and chemical transport in geologic units both above and below the Salado, and that documentation standards will require that updated "stand-alone" documentation be completed for each WIPP recertification.

The Regulatory Compliance effort is required to develop and implement a recertification strategy that includes integration of PA, experimental programs, and interaction with EPA and stakeholders. This effort assists DOE in developing a strategy for the recertification of WIPP; integrates experimental and performance assessment programs with this strategy; insures the successful implementation of this strategy with EPA agreement; and provides accurate, consistent, and timely response to EPA and stakeholder requests and comments during the Disposal Phase.

The Performance Assessment activity provides Performance Assessment and Software and Analysis QA capabilities to support the Disposal Phase and Recertification efforts in accordance with EPA requirements under 40 CFR 194. The scope of this effort includes maintaining codes, simplifying for increased efficiency, updating the PA methodology to incorporate new parameters and modified conceptual models as necessary, and performing PA calculations. Computer software used and analyses performed must conform to QA specifications.

The International Nuclear Waste Management Programs is responsible for actively participating in the international waste-management community to share current WIPP knowledge and to further increase our knowledge through cooperative technical projects.

Project Status in FY 2006:

The WIPP Disposal Phase Certification & Experimental Program will have completed the first five (5) year certification by FY 2004. The Complimentary Cumulative Distribution Function (CCDF) calculations and the Performance Input for the first five (5) year certification will be completed by the end of FY 2003.

Post-2006 Project Scope:

Continued disposal of the remaining TRU waste inventory until the WIPP waste volume capacity reaches the statutory limits in FY 2034, after which five years are planned to seal the repository and dismantle and decommission the surface facilities. Active institutional controls will then be activated and maintained for 100 years.

The WIPP Disposal Phase Certification & Experimental Program will complete the Complimentary Cumulative Distribution Function (CCDF) calculations and the Performance Input for the five (5) year certification by the end of FY 2008, FY 2013, FY 2018, FY 2023, FY 2028, FY 2033, and 2039.

Project End State

Dataset Name: **FY 1999 Planning Data**

Date of Dataset: **9/20/1999**

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Carlsbad**

Site Summary Level: **Waste Isolation Pilot Plant**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0009**

Project Description Narratives

TRU waste management activities for both CH and RH waste are projected to be completed by FY 2039 after completing the Disposal Phase in FY 2034 and five years for decommissioning of the surface facilities and permanently closing the underground. In accordance with the WIPP Land Withdrawal Amendment Act of 1996, DOE will have disposed of 175,600 cubic meters of TRU waste in the WIPP facility. Starting in FY 2039, a reduced Federal staff and technical contractor support will maintain the active institutional controls associates with the land and records of the WIPP. Monuments and markers will be built at the site to warn people of the presence of the repository. Active institutional controls over the site will be maintained for 100 years. Low risk has been assigned based upon performance assessments included in the licensing of the facility, which demonstrates there would be no migration of hazardous or radioactive material for 10,000 years. Following completion of the active institutional control phase, the surface area will be unrestricted for recreational and agricultural uses.

The WIPP Disposal Phase Certification and Experimental Program end state will occur by the end of FY 2034. The final Complimentary Cumulative Distribution Function (CCDF) calculations and the final Performance Input for the last five (5) year certification will be completed following dismantling and decommissioning (D&D) in FY 2038 and the final certification will be submitted to the regulator in FY 2039.

Cost Baseline Comments:

The CAO has institutionalized a formal program planning and budget execution process. The confidence level of cost estimates for the next three years is very high (+/- 5%). Out year estimates through FY 2006 have been developed with a confidence level of +/- 10 to 20%. Estimates from FY 2007 through completion are within +/- 30%. There are no contingency funds included in the CAO estimates.

Current CAO assumptions support operations of the WIPP facility, including its infrastructure, as an operational nuclear facility capable of receiving TRU waste at an initial disposal at a rate of 5 shipments per week and ramping to 17 shipments per week. The statutory requirement to pay impact assistance to the State of New Mexico is funded. Escalation has been applied to the activities in accordance with the DOE Environmental management guidelines.

The Cost Baseline for the WIPP Disposal Phase Certification and Experimental Program is based on the requirements in the WIPP Land Withdrawal Act (LWA) and the requirements of Title 40 of the Code of Federal Regulations parts 191 and 194. The program is based on the need to verify and more accurately model system's sensitive parameters, evaluate the information, and perform certification calculations at five-year intervals. Escalation has been applied to the activities in accordance with DOE Environmental Management guidelines.

The five-year certification activities will include experimental activities in Near Field, Far Field, and Seals Engineering. The experimental activities will collect additional data to verify and evaluate the system's sensitive parameters. This information will be used by the Compliance and Performance Assessment (PA) groups to perform the certification calculations. In addition, the activities will focus efforts to refine knowledge and develop new methods and procedures which will reduce worker exposure to radiation and other hazards, enhance operational efficiency, reduce design and operational complexity of the WIPP and the national TRU system, and reduce costs. The five-year certification intervals include increased activities and costs during the years the PA calculations are being performed and during the EPA review. The PA efforts for certification include maintaining and upgrading codes and the parameter database to support the five-year certification. PA Methodology will be continually updated, and sensitivity analyses will be performed to support new information during the disposal phase. The compliance effort facilitates communication with external organizations.

Dataset Name: **FY 1999 Planning Data**

Date of Dataset: **9/20/1999**

Page 3 of 12

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Carlsbad**

Site Summary Level: **Waste Isolation Pilot Plant**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0009**

Project Description Narratives

The WIPP Disposal Phase Certification and Experimental Program end state will occur by the end of FY 2034. The final Complimentary Cumulative Distribution Function (CCDF) calculations and the final Performance Input for the last five (5) year certification will be completed in FY 2038 and the final application will be submitted to the regulator in FY 2039. Escalation has been applied to the activities in accordance with the DOE Environmental management guidelines.

Safety & Health Hazards:

The S&H hazards at the WIPP site include fire, industrial, radiological, and occupational. The WIPP Fire Protection Program supports DOE Order 440.1, Fire Protection, and includes maintaining an inspection, testing and maintenance program of the site fire systems, loss prevention, and review or modification of the new facilities or systems. The water supply system meets the minimum 2 hour stored water capacity for fire water. The Industrial Safety Program applies guidelines of the OSHA Safety and Health Guidelines and implementing OSHA and MSHA regulations. The WIPP Site has implemented an Integrated Safety Management System (ISMS) to protect employees and manage environment, safety, and health obligations in a safe and effective manner. The ISMS establishes the necessary organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, and maintaining the WID Integrated Safety Management Policy, MP 1.28. The ISMS description was developed to present WID elements that make up the ISMS and to illustrate how these elements conform to the DOE's expectations of contractors as set forth in DOE P 450.4, Safety Management System Policy, the DOE Plan for the Development and Implementation of Integrated Safety Management (Implementation Plan for Board Recommendation 95-2), and DOE Acquisition Regulation Clauses 970.5204-2 and 970-5204-78. The WIPP site was the first DOE site to be awarded Star status under the DOE Voluntary Protection Program. The DOE-VPP Star means that the contractor was recognized for outstanding achievements in incorporating safety and health programs into the management system. Several DOE programs at other sites have been revised to reflect the rigorous and detailed attention to workplace safety at the WIPP. Revised manuals include the Model Electrical Safety Program, the Hoisting and Rigging Manual and the Pressure Safety Manual. The Industrial Hygiene program exists to anticipate, recognize, evaluate, and control industrial hygiene hazards in the workplace in compliance with the DOE Order 440.1. The program uses complete computerized system for the tracking of chemical use, quantity, and location. Types of chemicals that can be found at the WIPP include, but is not limited to diesel fuel. The Industrial Hygiene Status Report and Assessment Strategy continues to be an effective mechanism for determining sampling strategies during routine activities. Ergonomic concerns, especially in office areas and workplace design, represents an exposure that is being addressed through engineering, training, and implementation of the ergonomic plan. Radiological Engineering provides a safe working environment for WID employees, employees of other companies and government agencies, and the public visiting or working at the WIPP. This is accomplished by controlling exposure to ionizing radiation and radiological contamination; applying the principles of As Low As Reasonably Achievable to all aspects of operations, and maintaining appropriate records of activities. Radiological Engineering provides support to Operational Health Physics (OHP) with regard to regulatory compliance, procedure development, HP technician certification, and instrument research and development. Operational Health Physics program includes the implementation of the Defense-in-Depth radiation monitoring and contamination control programs at the WIPP. These activities are conducted in accordance with 10 CFR 835 and the DOE radiological control manual. OHP programs include calibration and operation of fixed and portable instruments; conducting routine and non-routine radiological surveys; operation of the airborne radioactivity detection systems; and maintenance of the HP Technical Certification Program. OHP support of Operations includes administration of Radiological work permits; surveys of TRUPACTS and waste packages; setup, posting, and control of radiological boundaries; personnel surveys; on-site radiological emergency response services; and waste handling procedure validation. Dosimetry and occupational dose recording and reporting are required by the DOE Radiological control Manual, DOE Orders and Code of Federal Regulation. The dosimetry program is also required to maintain accreditation by the DOE Laboratory Accreditation Program. The Occupational Health Program provides medical services in compliance with DOE Orders and Code of Federal Regulation, and other regulatory drivers. Activities include employee

Dataset Name: **FY 1999 Planning Data**

Date of Dataset: **9/20/1999**

Page 4 of 12

Project Baseline Summary Report

Data Source: **EM CDB**

Operations/Field Office: **Carlsbad**

Site Summary Level: **Waste Isolation Pilot Plant**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0009**

Project Description Narratives

wellness initiatives and counseling, employee health examinations, which are performed prior to placement and qualification, periodic return to work, fitness for duty, and termination. All of the examinations are maintained in accordance with the Americas with Disabilities Act applicable regulations and under applicable circumstances. Diagnosis and treatment of occupational illnesses is performed and maintained under the direction of the Occupational Medical Director. Medical equipment is upgraded as necessary to maintain appropriate levels of service.

Safety & Health Work Performance:

The WIPP Site began waste disposal operations in March 1999. Prior to startup, the WIPP underwent several reviews which demonstrated the facility was safe to begin operations for TRU waste disposal. DOE Order 425.1 was the driver for these reviews. The activities included a Management Assessment, an Integrated Facility Checkout, a Westinghouse Corporate Operational Readiness Review (ORR), and a DOE Operational Readiness Review. The Management Assessment was the first step in the process which determined the readiness of the WIPP to receive and emplace CH transuranic (TRU) and TRU mixed waste for permanent, deep-geologic disposal. The scope included an assessment of minimum core requirements applied to key functional areas, systems and organizations necessary to start waste disposal operations. The Integrated Facility Checkout (IFC) began on April 1, 1997. The purpose of the IFC was to place WIPP in an "operational mode", performing all activities associated with waste receipt and emplacement. During the first phase of the IFC, simulated operations of TRU waste receipt were conducted. These operational activities included preventive and corrective maintenance items in radiological areas, unloading of TRUPACT-II's, and simulated waste emplacement in the underground. The readiness reviews by Westinghouse and DOE were a part of the ORR process which objectively determined and documented the ability of WIPP to safely handle and emplace contract handled waste for permanent disposal in the underground repository. This readiness process implemented the requirements of DOE Order 425.1. Successful completion of the CH Waste Disposal ORR process was one of the primary factors involved in the Secretary of Energy's final decision to operate WIPP as a disposal facility. The average cost per Engineer (burdened rate) is \$90K/year and per technician is \$54K/year

PBS Comments:

The CAO has recommended a Management Plan configuration for implementation that will guide the ten-year planning process consistent with the strategic objectives, as well as achieve the overall TRU waste management goals. The facilities and activities described in the National TRU Waste Management Plan, Revision 1, combined with the disposal-ready waste preparation schedules, summarize current guidance to support development of site 2006 Plan.

The WIPP Disposal Phase Certification and Experimental Program is required to meet the requirements of the WIPP Land Withdrawal Act (LWA) of 1992 (public Law 102-579) as amended and the requirements of Title 40 of the Code of Federal Regulations (40 CFR) parts 191 and 194. The program is based on the need to verify performance of the system's sensitive parameters, evaluate the information, and perform certification calculations at five-year intervals as in accordance with the requirements of 40 CFR 194.4 and the WIPP LWA. The disposal phase is expected to last for 35 years, and will include certification activities no less than every five years, extending through D&D in 2038.

Baseline Validation Narrative:

The National Research Council's report on the WIPP dated October, 1996, validated the project as a viable solution for the permanent, safe disposal of defense generated radioactive TRU waste. Mevatec Corporation contracted in FY 1998 to perform an independent baseline validation of the scope, schedule, and cost of the National TRU Waste Program managed by the Carlsbad Area Office (CAO). This validation and the final report was issued

Dataset Name: **FY 1999 Planning Data**

Date of Dataset: **9/20/1999**

Page 5 of 12

Project Baseline Summary Report

Data Source: **EM CDB**

Report Number: **GEN-01b**

Operations/Field Office: **Carlsbad**

Print Date: **3/9/2000**

Site Summary Level: **Waste Isolation Pilot Plant**

HQ ID: **0009**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Project Description Narratives

in April, 1999. The validation findings are consistent with this IPABS update. Information sources used in the CAO independent budget validation include, but are not limited to: Integrated Priority List Details for the FY 2000 Budget (CAO, March 1998); FY 2000/2001 Validation Submittals from CAO and TRU Waste Sites, CAO Technical Assistance Contractors (CTAC), Sandia National Labs (Vols. 1-2), and Westinghouse, WID (Vols. 1-6); Minutes of all FY 1999/2000 Validation and FY 2000-2006 Program Review Meetings; FY 2000 Validation and FY 2001-2006 Program Planning; IPABS Handbook, Rev 8; International Research and Development Plan, 1 October 1997, Rev. 0; CAO FY 2000/2001 Validation and FY 2002 through FY 2006 Planning Addendum; "Budget Planning, Programming & Execution Process Description - Draft"; and The National TRU Waste Management Plan, DOE/NTP-9691204, Rev. 1.

General PBS Information

Project Validated? Yes **Date Validated:** 9/23/1996
Has Headquarters reviewed and approved project? No
Date Project was Added: 12/1/1997
Baseline Submission Date: 7/7/1999
FEDPLAN Project? No

Drivers:	CERCLA	RCRA	DNFSB	AEA	UMTRCA	State	DOE Orders	Other
	N	Y	Y	Y	N	Y	Y	Y

Project Identification Information

DOE Project Manager: Ines Triay
DOE Project Manager Phone Number: 505-234-7300
DOE Project Manager Fax Number: 505-234-7027
DOE Project Manager e-mail address: triayi@wipp.carlsbad.nm.us
Is this a High Visibility Project (Y/N): Y

Planning Section

Baseline Costs (in thousands of dollars)

	1997-2006	2007-2070	1997-2070	1997	Actual	1998	Actual	1999	2000	2001	2002	2003	2004	2005	2006
	Total	Total	Total		1997		1998								

Dataset Name: **FY 1999 Planning Data**

Page 6 of 12

Date of Dataset: **9/20/1999**

Project Baseline Summary Report

Data Source: **EM CDB**

Report Number: **GEN-01b**

Operations/Field Office: **Carlsbad**

Print Date: **3/9/2000**

Site Summary Level: **Waste Isolation Pilot Plant**

HQ ID: **0009**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Baseline Costs (in thousands of dollars)

	1997-2006 Total	2007-2070 Total	1997-2070 Total	1997	Actual 1997	1998	Actual 1998	1999	2000	2001	2002	2003	2004	2005	2006
PBS Baseline (current year dollars)	323,907	1,349,562	1,673,469	46,113	46,113	39,862	39,862	37,387	31,974	34,968	31,162	26,575	23,134	25,526	27,206
PBS Baseline (constant 1999 dollars)	307,778	794,630	1,102,408	46,113	46,113	39,862	39,862	37,387	31,133	33,348	29,107	24,312	20,729	22,402	23,385
PBS EM Baseline (current year dollars)	323,907	1,349,562	1,673,469	46,113	46,113	39,862	39,862	37,387	31,974	34,968	31,162	26,575	23,134	25,526	27,206
PBS EM Baseline (constant 1999 dollars)	307,778	794,630	1,102,408	46,113	46,113	39,862	39,862	37,387	31,133	33,348	29,107	24,312	20,729	22,402	23,385

	2007	2008	2009	2010	2011- 2015	2016- 2020	2021- 2025	2026- 2030	2031- 2035	2036- 2040	2041- 2045	2046- 2050	2051- 2055	2056- 2060	2061- 2065	2066- 2070
PBS Baseline (current year dollars)	28,842	31,234	26,569	27,180	158,405	177,471	198,827	222,755	249,565	228,714	0	0	0	0	0	0
PBS Baseline (constant 1999 dollars)	24,281	25,754	21,457	21,499	117,774	118,926	120,087	121,262	122,448	101,142	0	0	0	0	0	0
PBS EM Baseline (current year dollars)	28,842	31,234	26,569	27,180	158,405	177,471	198,827	222,755	249,565	228,714	0	0	0	0	0	0
PBS EM Baseline (constant 1999 dollars)	24,281	25,754	21,457	21,499	117,774	118,926	120,087	121,262	122,448	101,142	0	0	0	0	0	0

Baseline Escalation Rates

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0.00%	0.00%	0.00%	2.70%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%

Dataset Name: **FY 1999 Planning Data**

Page 7 of 12

Date of Dataset: **9/20/1999**

Project Baseline Summary Report

Data Source: **EM CDB**

Report Number: **GEN-01b**

Operations/Field Office: **Carlsbad**

Print Date: **3/9/2000**

Site Summary Level: **Waste Isolation Pilot Plant**

HQ ID: **0009**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	2051-2055	2056-2060	2061-2065	2066-2070
2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%

Project Reconciliation

Project Completion Date Changes:

Previously Projected End Date of Project: 9/1/2039

Current Projected End Date of Project: 3/26/2039

Explanation of Project Completion Date Difference (if applicable):

Project Cost Estimates (in thousands of dollars)

Previously Estimated Lifecycle Cost (1997 - 2070, 1998 Dollars):	1,079,149	Actual 1997 Cost:	46,113	Actual 1998 Cost:	39,862
Previously Estimated Lifecycle Cost of Project (1999 - 2070, 1998 Dollars):	993,174	Inflation Adjustment (2.7% to convert 1998 to 1999 dollars):			26,816
Previously Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	1,019,990				

Project Cost Changes

	Cost Adjustments	Reconciliation Narratives
Cost Change Due to Scope Deletions (-):		
Cost Reductions Due to Efficiencies (-):	27,811	Changed approach for first and future recertifications.
Cost Associated with New Scope (+):		
Cost Growth Associated with Scope Previously Reported (+):	25,307	1 year delay of waste receipt; Correction of WID unescalated labor rates unchanged since FY97.
Cost Reductions Due to Science & Technology Efficiencies (-):		
Subtotal:	1,017,486	
Additional Amount to Reconcile (+):	-1,053	IDMS de-escalation calculation assumes that each five year period is based on a linear plan.
Current Estimated Lifecycle Cost (1999 - 2070, 1999 Dollars):	1,016,433	

Dataset Name: **FY 1999 Planning Data**

Page 8 of 12

Date of Dataset: **9/20/1999**

Project Baseline Summary Report

Data Source: **EM CDB**

Report Number: **GEN-01b**

Operations/Field Office: **Carlsbad**

Print Date: **3/9/2000**

Site Summary Level: **Waste Isolation Pilot Plant**

HQ ID: **0009**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Milestones

Milestone/Activity	Field Milestone Code	Original Date	Baseline Date	Legal Date	Forecast Date	Actual Date	EA	DNFSB	Mgmt. Commit.	Key Decision	Intersite
Begin Passive Institutional Controls	CAO-002-019		3/26/2039								Y
Complete Actinide Source Term Test Program (STTP)	CAO-002-006		8/1/2000								Y
Complete TRU Waste Lab Experiments	CAO-002-007		1/1/2001								Y
Completion of Active Institutional Controls	CAO-002-020		3/26/2039								Y
Completion of Decommissioning Phase	CAO-002-016		3/26/2039								Y
Completion of Disposal Phase	CAO-002-015		3/26/2034								Y
Compliance Certification Application	CAO-002-008		5/30/2003								Y
Compliance Certification Application	CAO-002-009		5/30/2008								Y
Compliance Certification Application	CAO-002-010		5/31/2013								Y
Compliance Certification Application	CAO-002-011		5/31/2018								Y
Compliance Certification Application	CAO-002-012		5/31/2023								Y
Compliance Certification Application	CAO-002-013		5/31/2028								Y
Compliance Certification Application	CAO-002-014		5/31/2033								Y
Compliance Certification Application	CAO-002-017		5/31/2038								Y
Project Mission Complete	CAO-002-018		3/26/2039								Y
RCRA Permit Issued	CAO-002-005		10/9/1999								Y
Finalize Recertification Management Plan.			4/30/1999						Y		
Begin Paths to Closure and Life Cycle Costs			10/1/1996								

Milestones - Part II

Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Begin Passive Institutional Controls	CAO-002-019										

Dataset Name: **FY 1999 Planning Data**

Page 9 of 12

Date of Dataset: **9/20/1999**

Project Baseline Summary Report

Data Source: **EM CDB**

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Site Summary Level: **Waste Isolation Pilot Plant**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Report Number: **GEN-01b**

Print Date: **3/9/2000**

HQ ID: **0009**

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Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Complete Actinide Source Term Test Program (STTP)	CAO-002-006										
Complete TRU Waste Lab Experiments	CAO-002-007										
Completion of Active Institutional Controls	CAO-002-020										
Completion of Decommissioning Phase	CAO-002-016										
Completion of Disposal Phase	CAO-002-015										
Compliance Certification Application	CAO-002-008										
Compliance Certification Application	CAO-002-009										
Compliance Certification Application	CAO-002-010										
Compliance Certification Application	CAO-002-011										
Compliance Certification Application	CAO-002-012										
Compliance Certification Application	CAO-002-013										
Compliance Certification Application	CAO-002-014										
Compliance Certification Application	CAO-002-017										
Project Mission Complete	CAO-002-018					Y					
RCRA Permit Issued	CAO-002-005										

Dataset Name: **FY 1999 Planning Data**

Date of Dataset: **9/20/1999**

Project Baseline Summary Report

Data Source: **EM CDB**

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Print Date: **3/9/2000**

Site Summary Level: **Waste Isolation Pilot Plant**

HQ ID: **0009**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

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Milestone/Activity	Field Milestone Code	Critical Decision	Critical Closure Path	Project Start	Project End	Mission Complete	Tech Risk	Work Scope Risk	Intersite Risk	Cancelled	Milestone Description
Finalize Recertification Management Plan.											
Begin Paths to Closure and Life Cycle Costs				Y							Beginning of Paths to Closure and Life Cycle Costs

Performance Measure Metrics

Category/Subcategory	Units	1997-2006 Total	2007-2070 Total	1997-2070 Total	Actual Pre-1997	Planned 1997	Actual 1997	Planned 1998	Planned 1999	Planned 2000	Planned 2001	Planned 2002	Planned 2003	Planned 2004
Tech.														
Deployed	Ntd	3.00	0.00	3.00					3.00					
Category/Subcategory	Units	Planned 2004	Planned 2005	Planned 2006	Planned 2007	Planned 2008	Planned 2009	Planned 2010	Planned 2011 - 2015	Planned 2016 - 2020	Planned 2021 - 2025	Planned 2026 - 2030	Planned 2031 - 2035	Planned 2036 - 2040
Tech.														
Deployed	Ntd													
Category/Subcategory	Units	Planned 2036 - 2040	Planned 2041 - 2045	Planned 2046 - 2050	Planned 2051 - 2055	Planned 2056 - 2060	Planned 2061 - 2065	Planned 2066 - 2070	Exceptions	Lifecycle Total				
Deployed	Ntd								3.00	3.00				

Technology Needs

Project Baseline Summary Report

Data Source: **EM CDB**

Report Number: **GEN-01b**

Operations/Field Office: **Carlsbad**

Print Date: **3/9/2000**

Site Summary Level: **Waste Isolation Pilot Plant**

HQ ID: **0009**

Project **CAO-2 / WIPP Disposal Phase Certification and Experimental Program**

Technology Needs

Site Need Code: CAO-99-01

Site Need Name: On-line hydrogen and VOC analysis using low cost microsensors for CH-TRU and RH-TRU waste containers

Focus Area Work Package ID: SS-02

Focus Area Work Package: Barriers for Containmant and Control

Focus Area: SCFA

Agree with Technology Link: Y

Benefits (Cost, Risk Reduction, Both): Both

Technologies

Cost Savings (in thousands of dollars)

Range of Estimate

Technology Deployments

Deployment Year

Deployment Status

Planned

Forecast

Actual Date

Technology Name: Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation

Potential Deployment: 1999

Technology Name: NDA Support of the CAO's Performance Demonstration Program

Potential Deployment: 1999

Technology Name: Hydrogen Gas Getters

Potential Deployment: 1999