S

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 660090

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedure ☐ Cancel/Void ☐	A.D. Basche, Business Management, H6-64, 373-6306	☐ Yes ☒ No	4/21/00
	6. Project Title/No./Work Order No. Financial Analysis for Phase 1 Privatization for the TFC	7. Bldg./Sys./Fac. No. N/A	8. Approval Designator N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-2017, Rev. 1	10. Related ECN No(s). N/A	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Completed	12d. Restored to Original Condition (Temp. or Standby ECNs only)
☐ Yes (fill out Blk. 12b) ☒ No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change

13b. Design Baseline Document? ☐ Yes ☒ No

Revision to reflect changes in baseline.

14a. Justification (mark one)	14b. Justification Details
Criteria Change ☒ Design Improvement ☐ Environmental ☐ Facility Deactivation ☐ As-Found ☐ Facilitate Const. ☐ Const. Error/Omission ☐ Design Error/Omission ☐	

15. Distribution (include name, MSIN, and no. of copies)

RELEASE STAMP

APR 22 2000
DATE:
STA: 4
HANFORD RELEASE
ID: 18

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 660090

16. Design Verification Required
- ☐ Yes
- ☒ No

17. Cost Impact

	ENGINEERING	CONSTRUCTION
Additional	☐ $ N/A	☐ $ N/A
Savings	☐ $ N/A	☐ $ N/A

18. Schedule Impact (days)
- Improvement ☐ N/A
- Delay ☐ N/A

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	☐	Seismic/Stress Analysis	☐	Tank Calibration Manual	☐
Functional Design Criteria	☐	Stress/Design Report	☐	Health Physics Procedure	☐
Operating Specification	☐	Interface Control Drawing	☐	Spares Multiple Unit Listing	☐
Criticality Specification	☐	Calibration Procedure	☐	Test Procedures/Specification	☐
Conceptual Design Report	☐	Installation Procedure	☐	Component Index	☐
Equipment Spec.	☐	Maintenance Procedure	☐	ASME Coded Item	☐
Const. Spec.	☐	Engineering Procedure	☐	Human Factor Consideration	☐
Procurement Spec.	☐	Operating Instruction	☐	Computer Software	☐
Vendor Information	☐	Operating Procedure	☐	Electric Circuit Schedule	☐
OM Manual	☐	Operational Safety Requirement	☐	ICRS Procedure	☐
FSAR/SAR	☐	IEFD Drawing	☐	Process Control Manual/Plan	☐
Safety Equipment List	☐	Cell Arrangement Drawing	☐	Process Flow Chart	☐
Radiation Work Permit	☐	Essential Material Specification	☐	Purchase Requisition	☐
Environmental Impact Statement	☐	Fac. Proc. Samp. Schedule	☐	Tickler File	☐
Environmental Report	☐	Inspection Plan	☐	NONE	☒
Environmental Permit	☐	Inventory Adjustment Request	☐		☐

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
N/A	N/A	N/A

21. *Approvals*

Signature	Date	Signature	Date
Design Authority		Design Agent	
Cog. Eng. A.D. Basche	4/21/00	PE	
Cog. Mgr. C.R. Hutchins	4/21/00	QA	
QA		Safety	
Safety		Design	
Environ.		Environ.	
Other		Other	

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

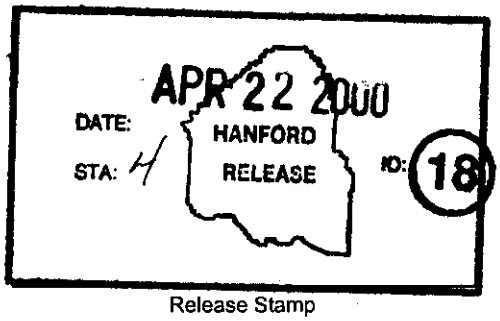
Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor

A. D. Basche
CH2M HILL Hanford Group, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-99RL14047

EDT/ECN: 660090 UC: 2030
Cost Center: 71300 Charge Code: 108521/AA3
B&R Code: EW3130010 Total Pages: 58

Key Words: River Protection Project, Retrieval and Disposal Mission, Phase 1, financial

Abstract:
The purpose of the Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor is to provide a third-party quantitative and qualitative cost and schedule risk analysis of HNF-1946.



Release Approval 4/22/00 Date

Release Stamp

Approved For Public Release

RECORD OF REVISION

(1) Document Number: HNF-2017, Rev. 2

(2) Title: Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor

Change Control Record

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) EDT-622747, 1/6/98	WE Wells	MD Ebben
1	Complete revision, per ECN # 646203, 1/9/98	MW Wells	MD Ebben
RS 2	Complete revision, per ECN #60090	AD Basche	CR Hutchins RD Hutchins 4/22/00

HNF-2017
Revision 2

Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

CH2MHILL
Hanford Group, Inc.
Richland, Washington

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC06-99RL14047

HNF-2017
Revision 2

Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor

Prepared by:

A. D. Basche
CH2M HILL Hanford Group, Incorporated

Date Published
April 2000

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

CH2MHILL
Hanford Group, Inc.

P. O. Box 1500
Richland, Washington

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC06-99RL14047

Document Title: **Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor**

Approved by: C.R. Hutchins

C.R. Hutchins, Vice President
Planning and Integration
CH2M HILL Hanford Group, Inc.

4/21/00
Date

CONTENTS

APPENDIX

FIGURES

TABLES

TERMS

AB	authorization basis
BNFL	BNFL, Inc.
CEIS	cost-estimating input sheet
CHG	CH2M HILL Hanford Group, Inc.
COB	clean-out boxes
DOE	U.S. Department of Energy
DST	double-shell tank
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ES&H	environmental, safety, and health
FFS	Fluor Federal Services
FHI	Fluor Hanford, Inc.
FY	fiscal year
HLW	high-level waste
IHLW	immobilized high-level waste
ICD	interface control documents
ITRS	initial tank retrieval systems
ILAW	immobilized low-activity waste
LAW	low-activity waste
MYWP	multi-year work plan
OND	operational need date
ORP	Office of River Protection
P3	Primavera Project Planner™ (a trademark of Primavera Systems, Inc.)
PBS	Project Baseline Summary
PC	Privatization Contractor
PHMC	Project Hanford Management Contract
PIO	Project Integration Office
RPP	River Protection Project
RTP	readiness to proceed
SAR	safety analysis report
SST	single-shell tank
TBR	technical basis review
TFC	Tank Farm Contractor
USQ	unreviewed safety question
WBS	work breakdown structure
WFD	waste feed delivery
WFDS	waste feed delivery system
WIT	Waste Integration Team

1.0 OVERVIEW

The purpose of this *Financial Analysis for Phase 1 Privatization for the Tank Farm Contractor* (TFC) is to document the results of the risk-based financial analysis of HNF-1946, *Programmatic Baseline Summary for Phase 1 Privatization for the Tank Farm Contractor* (Diediker 2000). This analysis was performed to evaluate how well the proposed baseline meets the U. S. Department of Energy, Office of River Protection (ORP) Letter OO-MSO-009, "Contract NO. DE-AC06-99RL14047 – The U.S. Department of Energy, Office of River Protection (ORP) Mission Planning Guidance for Fiscal Year (FY) 2002 - Revision 1" (Short 2000). The letter requires a confidence level in the baseline schedule that is consistent with the Phase 1A readiness-to-proceed (RTP) assessment conducted in fiscal year (FY) 1998. Because the success of the project depends not only on the budget but also on the schedule, this risk analysis addresses both components of the baseline.

The document begins with an outline of the approach for baseline development and the risk analyses process (Section 2.0). This discussion is followed by a description of the baseline (Section 3.0) for the period from FY 2000 through FY 2018. This document identifies the boundaries of the analysis scope and clarifies the planning process. The analysis then evaluates the executability of the baseline proposed in HNF 1946 (Diediker 2000). The risk analysis is for the period FY 2000 through FY 2008. The period chosen consists of the activities leading up to an including the first year of hot operations of the PC's facility. This financial analysis was limited to the Retrieval and Disposal Phase 1, which includes Infrastructure Waste Feed Delivery (WFD) and Immobilized Waste Storage and Disposal. This analysis recommends program additions for a success-oriented path forward (Section 4.0).

A systems engineering approach was applied to identify and analyze the updated Phase 1 Retrieval and Disposal mission. Program (Level 0) and summary activity (Level 1) Logics were prepared and further decomposed. Technical basis review (TBR) packages were prepared to work breakdown structure (WBS). The TBR package describes the scope and interfaces and presents unresolved decisions, enabling assumptions, and risks associated with performance for each defined task.

Detailed reviews of the subactivities within the Level 1 Logic TBR packages were conducted to provide the recommended solution to the Phase 1 Retrieval and Disposal Mission (for both minimum and extended order quantities). Independent cost analysis and risk assessment were performed by members of the CH2M HILL Hanford Group, Inc. (CHG), Business Management organization, along with risk analysis specialists from TRW, Inc. The analysis process evaluated schedule, cost, and technical (in terms of cost and schedule) risk. The results were developed by means of Monte-Carlo-based analysis and are included in Section 4.0. The modeling focused on infrastructure, low-activity waste (LAW) and high-level waste (HLW) feed delivery, and immobilized waste storage and disposal, and were compiled at the total Phase 1 Retrieval and Disposal program level.

The results of the analysis using the TBR package data were merged with the output from higher level evaluations to form the CHG Key Assumptions and the CHG Critical Risks, as identified in RPP-6118, *Memorandum of Readiness to Proceed with Phase 1 Privatization for the Tank Farm Contractor* (Honeyman and Voogd 2000), Attachments 1 and 2, which support the basis of this analysis.

The point of departure for this analysis is the FY 2000 multi-year work plan (MYWP). Table 1-1 shows the net change to the MYWP caused by replanning for the proposed baseline for Retrieval and Disposal Phase 1, as well as the CHG total program. The details of the net change are discussed in Section 3.2. The Retrieval and Disposal Phase 1 scope consists of infrastructure, waste feed delivery, and immobilized waste storage and disposal and associated subelements. The CHG total program consists of Retrieval and Disposal Phase 1 and the balance of the mission, including safe storage, characterization, safety issue resolution, management support project, and Phase 2 work scope.

Table 1-1. Fiscal Year 2000 Multi-Year Work Plan Compared to Proposed Baseline Budget (Fiscal Year 2000 through 2018) in Millions of Dollars (unescalated).

	Retrieval & Disposal Phase 1	CHG Total Program
Approved FY00 MYWP Budget	$ 3,850	$ 13,960
Net Change without adjustments (Section 3.2)	$ (676)	$ (973)
Proposed Budget	**$ 3,174**	**$ 12,987**

CHG = CH2M HILL Hanford Group, Inc.
FY = fiscal year.
MYWP = multi-year work plan.

Based on the planning effort, the updated CHG cost baseline for the period FY 2000 through FY 2018 is $12,987 million. The updated Phase 1 retrieval and disposal portion of this cost is $3,174 million, as shown in Table 1-1 and 1-2. The risk analysis suggests a need for an additional $66 million (Table 1-2) in risk allowance above this baseline to achieve a baseline that meets the desired goal of 80 percent probability of success as directed in Letter 00-MSO-009 (Short 2000). Also listed on Table 1-2 are budget adjustment costs that have been added to the proposed baseline, but were not analyzed, thus leading to the final totals for Retrieval and Disposal Phase 1 as well as the CHG total program costs. A detailed explanation of these adjustments can be found in Section 5.0.

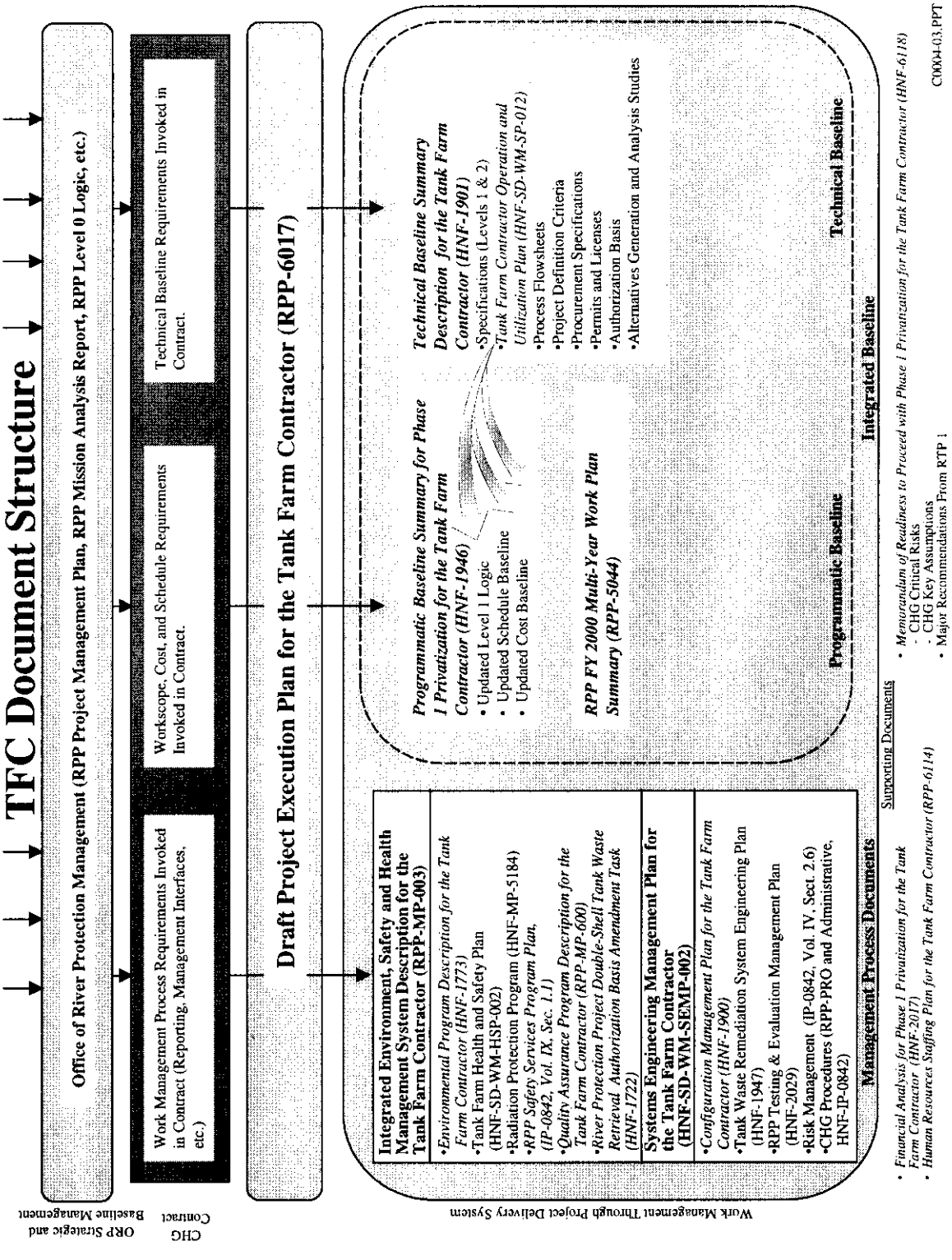
Table 1-2. Financial Analysis Summary (Fiscal Year 2000 through 2018) in Millions of Dollars.

	Retrieval & Disposal Phase 1	CHG Total Program
Proposed Budget	$ 3,174	$ 12,987
Additional Risk Allowance (Section 4)	$ 66	$ 66
Budget Adjustments (Section 5)	$ 288	$ 697
Subtotal	***$ 3,528***	***$ 13,750***
Escalation	$ 618	$ 3,387
Total	**$ 4,146**	**$ 17,137**

CHG = CH2M HILL Hanford Group, Inc.

This financial analysis was developed as part of CHG's assessment in support of RTP with Phase 1 Privatization. As shown in Figure 1-1, "River Protection Project Document Hierarchy," the financial analysis documentation supports the Programmatic Baseline.

Figure 1-1. River Projection Project Document Hierarchy.



2.0 APPROACH

This section briefly describes the baseline development approach used for the proposed baseline update and describes the risk analysis approach, including data development and collection, assessment, and probabilistic modeling using *@RISK*[1] and *Monte Carlo for Primavera*[2] software.

2.1 BASELINE DEVELOPMENT SUMMARY

The CHG "Integrated Planning Process" as defined in HNF-IP-0842, Volume X, Section 3.8 (CHG 2000), was used to develop the proposed scope, schedule, and cost baseline. Existing baseline planning documentation from the fiscal year 2000 MYWP was updated and revised as necessary to reflect the establishment of CHG as the TFC. The updated planning documents also incorporated planning guidance from the ORP as seen in Letter 00-MSO-009 (Short 2000).

The updated MYWP planning documents include Level 0 and Level 1 Logics, TBR planning packages, and detailed Primavera Project Planner[3] (P3) schedules. This work was performed by senior-level, multifunctional planning teams consisting of technically knowledgeable lead representatives from organizations responsible for performing the work to ensure that the planning was properly scoped, scheduled, and estimated.

The initial documents revised were the Level 1 Logic diagrams, which reflect the summary work scope activities and work flow. Each activity on the logic represents a TBR package.

After the Level 1 Logics were completed, the WBS was updated and revised. On the basis of the WBS and Level 1 Logic breakdowns, TBR packages were updated for each activity on the logic. Existing FY 2000 MYWP packages were revised or replaced with new activities. TBR packages consist of the following:

- TBR control logs
- TBR narratives
- P3-generated subactivity logic networks
- Subactivity cost-estimating input sheets (CEIS)
- P3-generated resource and cost-loading reports (pricing).

Using data from the TBR packages, the planning teams developed a revised detailed, integrated schedule in P3. The detailed subactivity logic networks and CEISs were used initially to define the activities in the schedule and their interrelationships and resource loading. Logic ties between TBR subactivities were developed as required.

The team first prepared an unconstrained draft schedule, however, changes to constrain FY 2001 to the funding limitations was necessary. For the period from FY 2002 to FY 2018, the budget

---

[1] RISK is a trademark of Parker Brothers, Division of Tonka Corporation and is used under license by Palisade Corporation for @RISK software products.
[2] Monte Carlo for Primavera is a trademark of Primavera Systems, Inc.
[3] Primavera Project Planner is a trademark of Primavera Systems, Inc.

remains unconstrained. The logic, relationships between activities, and activity durations were revised, and the schedule was modified accordingly. The final integrated schedule was reviewed to verify scope (activities), activity durations, logic, and resource loading. The final schedule is task oriented, logic driven, and resource loaded. It is traceable to the Level 1 Logic, WBS, activity owners, performing organizations, and TBR package data including the detailed subactivity logic networks and CEISs.

Key to this financial analysis is the fact that unresolved decisions, enabling assumptions, risk events, and risk mitigation actions are documented in the TBR narratives and estimating assumptions and exclusions are documented in the CEISs. The risk analysis approach was based on these planning data at the TBR level for cost and TBR subactivity level for schedule. The data also were used to develop the CHG key assumptions and CHG critical risk list identified in HNF-2019 (Honeyman and Voogd 2000).

The TBR documentation provided information for the independent risk assessment of this proposed baseline.

2.2 RISK ANALYSIS METHODOLOGY

This section provides an overview of the risk analysis process in accordance with HNF-IP-0842, Volume IV Engineering, Section 2.6, "Risk Management" (CHG 2000). It also provides a brief discussion of modeling techniques used in the process.

2.2.1 Risk Modeling

Risk analysis is performed on both cost and schedule data. Each of these analyses uses a data modeling approach to approximate the actual risk conditions for the planned work. As with all models, assumptions have been made to simplify the analysis. As a result, the model does not fully represent all characteristics of the situation being evaluated nor is it meant to do so. The resultant data therefore must be interpreted in light of the simplifying assumptions made.

The fundamental assumption used in both the cost and schedule models is that completing of the baseline tasking as planned will result in achieving of the project mission. As a result, the question that the risk analysis will answer is

> *Assuming that the TFC will complete every activity and assuming that the necessary time and funding will be available to support this work, what are the probability distributions of final cost and completion date?*

Given these distributions, the appropriate target can be selected. The target chosen for this analysis is 80 percent probability of success as directed by ORP via Letter 00-MSO-009 (Short 2000).

2.2.1.1 Cost Modeling. Cost analysis was performed at the TBR level. The analysis evaluated activities in the defined scope and derived data from a linear summation of the results. The basis for the cost model was developed with cost data obtained from the P3 baseline at the TBR level.

The effects of risks on costs then were added to the basis to identify a cost profile for each project being analyzed.

In addition to this assumption, the cost modeling approach assumes that the costs of each TBR are independent of the costs of the other TBRs. Although this approach is an over-simplification, the model has been deemed adequate for its intended purpose.

2.2.1.2 Schedule Modeling. Schedule analysis is performed at the detailed P3 activity (TBR subtask) level. Unlike the cost analysis, the schedule analysis does not evaluate all activities, but focuses on a subset of activities. Key milestones whose success would indicate overall performance are selected. The underlying assumption is that the status of these selected activities is a good indicator of the broader program success.

The schedule analysis is performed on the critical- and near-critical- (less than 6 months float) path activities leading to the selected milestones. The analysis results provide information about the completion date of the selected milestone. In contrast to the cost analysis model, the scheduling model accounts for the interdependencies among tasks. Schedule impacts introduced by risks are added to these networks where appropriate to produce a duration profile for each network.

2.2.2 Risk Analysis Process

The analysis process is based on the concept that scope can be translated into terms of cost and schedule and that any cost or schedule element can be characterized as one of four basic types.

Category 1. Fixed. An event that is certain to occur or an item that is certain to be required and whose cost or quantity is firmly known.

Category 2. Variable. An event that is certain to occur or an item that is certain to be required and whose cost or quantity varies over some finite range.

Category 3. Uncertain. An event that might happen or an item that might be required; if such an event occurs, the resulting effect on cost or schedule varies over some finite range.

Category 4. Showstopper. An event with a small probability of occurrence, but with a significant (often catastrophic) cost or schedule impact if it occurs.

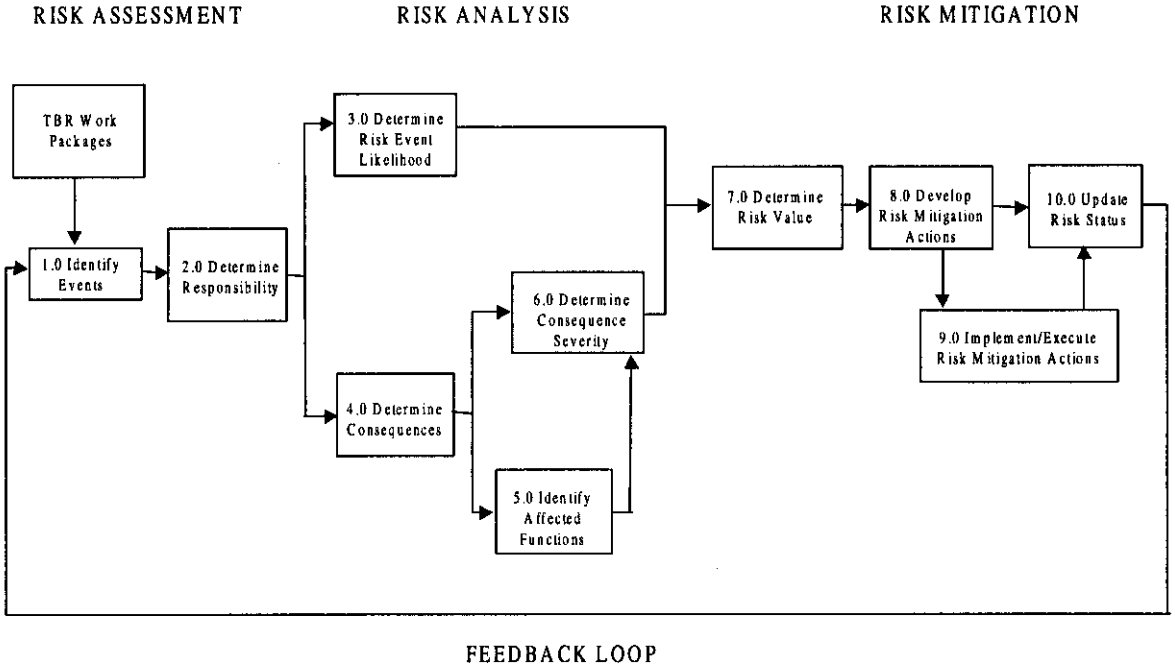
These four categories are mutually exclusive and their summation represents the total project cost or schedule.

To illustrate each category, an example of budgeting for a car can be used. The first expense to consider is the monthly car payment. This cost will fall into Category 1. The payment is required each month and the cost is known and remains constant. Another expense that is required and "certain to occur" is the monthly gasoline cost. This expense falls in Category 2 because, although required, the total bill will vary depending on the price of gas and the number

of miles driven. In addition, minor repairs such as fixing a flat tire or replacing a failed water pump must be included in the budget. These events not only have a variable range of costs, they also may or may not occur. Such an event represents Category 3. Finally, a Category 4 event, one of low likelihood but catastrophic consequence, is a massive collision. Because of the extreme consequences of such an event, efforts must be made to limit its effect. In this example, the consequences are limited by purchasing an insurance policy. The cost of the policy then becomes a Category 1 expense and is added to the calculation of the budget.

2.2.2.1 Process Flow. The risk management process is shown in Figure 2-1. The process is divided into three phases: risk assessment, risk analysis, and risk mitigation. Risk assessment identifies probable risk events that could affect the success of the mission. Risk assessment begins during development of the TBR packages. As scope is evaluated and work is defined in each TBR, risks are identified and noted in the TBR package. These risks are collected for use during the analysis phase. As TBR packages are completed and provided to the managers, they may identify additional "higher level" risks that affect more than one TBR. These risk events are added to those taken from the TBRs. Finally as these data are further combined, executive managers are allowed to identify additional risks for inclusion in the risk analysis.

Figure 2-1. Risk Management Process Flow.



In the risk analysis phase, risks are evaluated to identify cost and schedule impacts caused by both technical and programmatic uncertainties and cost and schedule variability. As the effects of individual risk events are identified, methods to mitigate the risks are considered. A plan for each risk mitigation action is outlined, and the residual risk, after completion of the action, is projected.

The final phase is risk mitigation. In this phase, final determination of risk mitigating actions is made. Funding is provided for selected actions and the associated tasks are added to the baseline. The progress of the overall risk mitigation activity is monitored periodically through status meetings to ensure that this work proceeds as planned or that adjustments are made in a timely fashion before problems become excessive, in accordance with the CHG Risk Management Procedure (CHG 2000).

This page intentionally left blank.

3.0 BASELINE DESCRIPTION

This section identifies the work scope for the proposed Retrieval and Disposal Phase 1 baseline on which this financial analysis was performed.

3.1 SCOPE DEFINITION

The total CHG proposed baseline of $12,987 million (unescalated), as seen in Table 1-1, includes the following costs:

- The Retrieval and Disposal mission (TW-01, 03, 04, 05, 08, 09) totaling $3,174 million
- Balance of Mission activities including Base Characterization (TW-01) and Safety Issue Resolution projects (TW-02), Base Operations (TW-03), support to Phase 2 Privatization Contractor (PC) operations and Tank Farm Closure (TW-04), and Management Support Project (TW-10). The Regulatory Unit and Phase 1 operations of the PC facilities costs are excluded from this analysis.

Interfaces with other essential Hanford Site facilities have been coordinated and integrated. The costs for these facilities are not included herein, but are funded and supported through Phase 1 by Fluor Hanford, Inc. (FHI). Additional services required to support specific needs of the Retrieval and Disposal mission will be included in the baseline. The excluded facility base operations are the following:

- The 222-S Laboratory base operations support to tank characterization
- The 242-A Evaporator operations
- The Effluent Treatment Facility, which is necessary to support treatment of the 242-A Evaporator condensate and supports the PC
- The Liquid Effluent Retention Facility, which is necessary for treatment of radioactive or dangerous liquid effluents generated by the PC
- The Treated Effluent Disposal Facility, which is necessary to provide treatment of non-radioactive, non-dangerous liquid effluents generated by the PC.

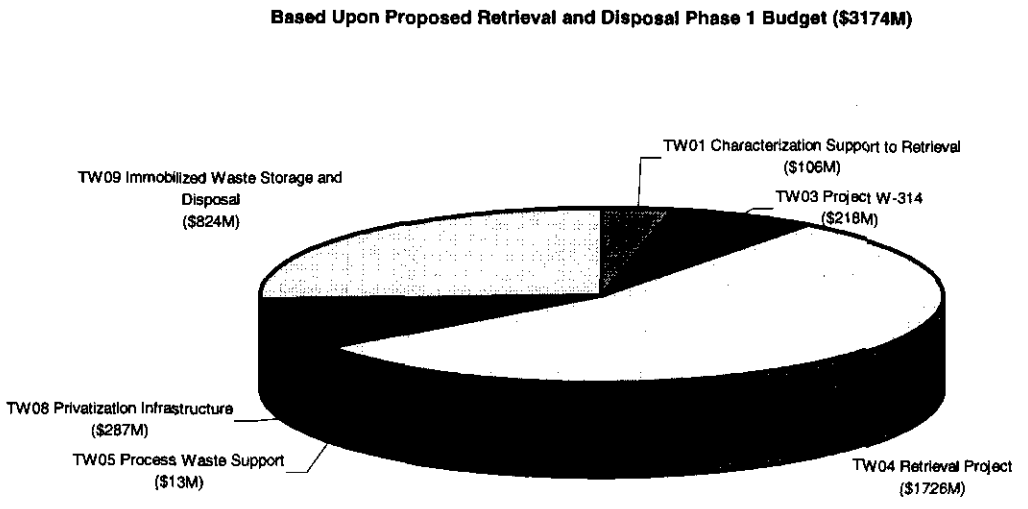
This financial analysis was limited to the Retrieval and Disposal Phase 1, which includes Infrastructure (TW-09), Waste Feed Delivery (WFD) (TW-01, TW-03, TW-04, TW-05), and Immobilized Waste Storage and Disposal (TW-08).

Table 3-1 and Figure 3-1 represent the time-phased budget requirements by Project Baseline Summary (PBS) for the Retrieval and Disposal Phase 1 Mission from FY 2000 through FY 2018. Figure 3-1 shows the relative size of each PBS.

Table 3-1. Detailed Costs by Project Baseline Summary for Fiscal Year 2000-2018 in Millions of Dollars (unescalated and without adjustment).

	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	Sub Total	FY09 - FY18	Total
TW01 Characterization Support to Retrieval	$ 17	$ 10	$ 8	$ 6	$ 9	$ 6	$ 6	$ 3	$ 5	*$ 70*	$ 36	**$ 106**
TW03 Project W-314	$ 26	$ 51	$ 68	$ 31	$ 31	$ 11	$ -	$ -	$ -	*$ 218*	$ -	**$ 218**
TW04 Retrieval Project	$ 51	$ 70	$ 171	$ 195	$ 132	$ 132	$ 138	$ 107	$ 93	*$ 1,089*	$ 637	**$ 1,726**
Waste Feed Delivery Subtotal	*$ 94*	*$ 131*	*$ 247*	*$ 232*	*$ 172*	*$ 149*	*$ 144*	*$ 110*	*$ 98*	*$ 1,377*	*$ 673*	***$ 2,050***
TW05 Process Waste Support	$ 1	$ 1	$ 1	$ 2	$ 2	$ 2	$ 2	$ 2	$ -	*$ 13*	$ -	**$ 13**
TW08 Privatization Infrastructure	$ 19	$ 17	$ 8	$ 6	$ 11	$ 34	$ 14	$ 15	$ 15	*$ 139*	$ 148	**$ 287**
TW09 Immobilized Waste Storage and Disposal	$ 9	$ 10	$ 11	$ 19	$ 39	$ 65	$ 44	$ 13	$ 24	*$ 234*	$ 590	**$ 824**
Total Retrieval and Disposal Phase 1	**$ 123**	**$ 159**	**$ 267**	**$ 259**	**$ 224**	**$ 250**	**$ 204**	**$ 140**	**$ 137**	**$ 1,763**	**$ 1,411**	**$ 3,174**

Figure 3-1. Total Cost by Project Baseline Summary for Fiscal Years 2000 through 2018 (unescalated and without adjustment).



The following paragraphs define each of these elements in order of occurrence.

3.1.1 Privatization Infrastructure

Privatization Infrastructure (TW-08) includes the TFC scope associated with the design, permitting, procurement, construction, and start-up of site preparation and utility systems upgrades necessary to support the PC's, construction, start-up, operation, and deactivation of the Phase 1 pretreatment and immobilization facilities. Included are site preparation, electrical power systems, water systems (raw, potable and fire), roads, radioactive solid waste disposal

systems and liquid effluent systems. Project W-519 has been established for the infrastructure upgrades, including the installation of the PC tie-in points to the services. Other scope includes 242-A Evaporator Condenser replacement, 242-A Evaporator life extension upgrades, and DynCorp Tri-Cities Services, Incorporated, costs to deliver the utility services and operations costs for the utilities and radioactive solid waste disposal systems. Finally, in accordance with ORP direction, budget has been included for training of 270 employees to operate the Phase 1 PC pretreatment and immobilization facilities.

3.1.2 Waste Feed Delivery

Characterization Support to Feed Delivery (TW-01) includes treatability sampling and analysis (grab and core samples per ICD-23); certification sampling and analysis for LAW per ICD-19 and HLW per ICD-20 (grab samples are required for LAW and grab and core samples are required for HLW); and sampling and analysis to support single-shell tank (SST) sluicing to double shell-tanks (DSTs) (vapor and grab samples).

Project W-314, Tank Farms Restoration and Safe Operations (TW-03), provides upgrades for selected tank farm instrumentation control, tank ventilation, waste transfer, and electrical systems to restore these systems to an acceptable design basis and operating condition. The project focuses primarily on modifications needed to support routine safe operations of existing DST farm facilities and feed delivery.

Retrieval (TW-04) includes scope necessary to retrieve waste from SSTs and DSTs, transfer waste, and deliver the minimum- and extended-order feed quantities to the PC for Phase 1 pretreatment and immobilization. The scope includes the following projects for design, construction, and start-up of tank mixing and pumping systems, tank farm transfer system upgrades, and Site transfer system upgrades. Management assessment and transfer operations costs are included for waste transfers from SSTs to DSTs and from DST to the PC.

Specific program scope includes management; feed and process development and definition; SST and DST retrieval project and system definition and process tests; and demonstrations, authorization basis (AB) documentation, and permitting.

- **Project W-211, Initial Tank Retrieval Systems (ITRS)**, is the line item project that provides for the design, procurement, installation, and start-up of mixing and pumping systems for the retrieval of waste required for Phase 1 feed from DST AP-102, AP-104, AN-105, AN-104, AN-103, AN-102, SY-102, AZ-102, and AY-102.

- **Project W-521, Waste Feed Delivery Systems (WFDS)**, is the line item project that provides for the design, procurement, installation, and start-up of mixing and pumping systems for the retrieval of waste required for Phase 1 feed from an additional nine DSTs. The tanks are AW-101, AN-101, AN-107, SY-101, SY-103, AW-104, AZ-101, AY-101, and AW-103. Pumping these additional DSTs is beyond the scope of Project W-211. Other scope includes updates to the AP tank farm control system, adding an AP valve pit, and adding a waste transfer line to the PC facilities.

- **Project W-522, DST Retrieval Projects**, is a new line item project that provides for the design, procurement, installation, and start-up of mixing and pumping systems for the retrieval of waste required for Phase 1 feed from three additional DSTs, AP-106, AP-105 and AP-108. These represent the remaining required DSTs not included in the scope of Projects W-211 and W-521.

- **Project W-523, SST Retrieval Systems**, is a new line item project that provides for the design, procurement, installation and start-up of SST retrieval systems for the retrieval of Phase 1 feed from SSTs C-104, C-107, S-102, and S-105.

- **Project W-525, Tank Farm Waste Feed Delivery Upgrades**, is a new project scoped to cover remaining DST waste transfer system upgrades not included in other existing projects. Three types of upgrades are required. The first comprises upgrades to bring the DST transfer system clean-out boxes (COB) into compliance with the *Washington Administrative Code* (WAC) 173-303-640. The second comprises upgrades to the power distribution network to support WFD. The third comprises upgrades to bring the DST transfer system piping into compliance with WAC 173-303-640. Upgrades include scope for project definition, design, procurement, construction and installation, and closeout.

3.1.3 Immobilized Storage and Disposal

Immobilized Storage and Disposal (TW-09) provides for the TFC interim storage of immobilized high-level waste (IHLW) and the disposal of immobilized low-activity waste (ILAW) products from the privatization contractor during Phase 1.

Project W-464 has been established to store 880 IHLW canisters expected to be produced in Phase 1. A new Project W-XXX is planned for the remaining canisters. The scope of these projects includes management, design, permitting, AB and safety analysis report (SAR) documentation, construction, start-up, and operations during Phase 1.

Project W-520, the Remote Trench, includes scope for management, design, permitting, AB and SAR documentation, construction, start-up, and operations during Phase 1.

Other Phase 1 scope in TW09 includes developing transportation systems and handling equipment for moving IHLW and ILAW from the privatization contractor's facility to interim storage and disposal, respectively, as well as the performance assessment required for permitting ILAW disposal.

3.1.4 Interface Definition/DOE and Regulatory Support

The following activities affect multiple projects, and were analyzed separately. They include Process Waste Support (TW05), support to DOE operational readiness reviews and support to authorization basis and environmental permitting. Although not included in specific project analyses, these items were included in the analysis of the overall Retrieval and Disposal project.

Process Waste Support (TW-05) provides for the management of the Phase 1 Privatization interface between the TFC and the PC. Scope includes cross-program coordination for scope and schedule integration among the TFC, PC, and ORP. The interface coordination will provide consistency across program elements, and technical input and administrative support to ensure that the interfaces are defined clearly, commitments are met, interface protocol is understood, and interface configuration is maintained. The basis for this scope is derived from Section C.2.c of the PC contract which states that "DOE will use the Integrated Process and Product Development (IPPD) approach to manage interactions with the contractor."

Specific work includes the following:

- Coordination and training of interface process members
- Development of the interface implementation analysis to trace contract and interface control document (ICD) requirements into baseline plans
- Negotiation, review, maintenance, and implementation of ICDs 10, 22, 25, and 26
- Review and team member response coordination of PC deliverables
- Maintenance of an interface action tracking system
- Maintenance of a contract and ICD requirements database
- Privatization interface office administration (interface project management).

3.2 BASELINE CHANGES TO PHASE 1

Cost reductions to the FY 2000 MYWP version of the Phase 1 baseline have reduced the overall budget needs for Retrieval and Disposal Phase 1 by approximately $676 million. This reduction is shown in Table 3-2 and discussed in more detail in the following paragraph. However, because of scope shift and time phasing as well as other programmatic adjustments, most of this reduction to Phase 1 is a reallocation to other program areas, as discussed further in Section 5.0.

Table 3-2. Reductions to Fiscal Year 2000 Multi-Year Work Plan Retrieval and Disposal Phase 1 Activities Millions of Dollars (unescalated).

	PBS	Total
Approved MYWP FY00		***$ 3,850***
Reduction to Characterization	TW01	$ (65)
SST Retrieval System Demo and Program Support	TW04	$ (254)
Future SST Retrieval Projects	TW04	$ (64)
W-522 DST Retrieval Projects	TW04	$ (128)
W-525 Tank Farm Upgrades	TW04	$ (102)
Privatization Infrastructure	TW08	$ (9)
Elimination of W-465, Reduction to W-520	TW09	$ (59)
Miscellaneous Reductions and Increases	TW04,08,09	$ 5
	Total Reductions	$ (676)
Total Retrieval and Disposal Phase 1		**$ 3,174**

Following is a brief description of the major reductions and increases as outlined in Table 3-2. In addition to those shown, there are numerous minor increases and reductions that contribute to the overall reduction number. These are shown in aggregate as miscellaneous reductions and increases.

- Waste feed characterization sampling and analysis scope was reduced by $65 million for Phase 1. Changes to requirements contained in ICDs 19, 20, and 23 reduced the number of HLW and LAW samples and associated laboratory analysis required to certify feed delivered to the privatization contractor.

- SST retrieval system demonstration and program support is a reduction of $254 million to Phase 1 caused by timing.

- Future SST retrieval projects represent a reduction of $64 million to Phase 1 by rephasing of the original MYWP activities from Phase 1 to Phase 2. SST Project scope as an adjustment to the total CHG program will be discussed further in Section 5.0.

- The scope of Project W-522 to install DST mixing and pumping systems was reduced from five tanks to three, which resulted in a reduction of $128 million. The three tanks are AP-105, AP-106, and AP-108. In accordance with the Phase 1 Advanced Work Authorization direction provided by ORP in October 1999, tanks were added, deleted, and moved within and between Projects W-211, W-521, and W-522 to support the specified quantities as well as derived tank sequence. Projects W-211 and W-521 still include nine tanks each, as scoped in the FY 2000 MYWP baseline.

- Project W-525 further defined the work scope and reduced the estimates by $102 million.

- Privatization Infrastructure reductions of $9 million are primarily attributable to a change in the labor rates and an overall reduction in the approved escalation rates. No scope or schedule changes occurred.

- Project W-465 was evaluated as part of an alternative study that determined that a lined trench was a more cost-effective alternative for storage and disposal of ILAW. Project W-465 was terminated and the line-trench approach was incorporated into the baseline of Project W-520. Overall reduction of W-465 included eliminating the vaults, vault buildings, and associated infrastructure for a total reduction of $59 million.

- Miscellaneous reductions and increases on various elements contribute to the $5 million adjustment line.

3.2.1 Limits and Boundaries

A clear understanding of the scope of required work is essential for developing a credible baseline. Key to understanding the workscope is a clear definition of the limits and boundaries. This section describes the scope limits that were used in the preparation of the proposed Phase 1 baseline.

3.2.1.1 CH2M HILL Hanford Group, Inc., Key Assumptions. The CHG key assumptions, as presented in HNF-2019 (Honeyman and Voogd 2000, Attachment 1), are the assumptions used for the proposed baseline as the primary bases for its planning. Many of these assumptions were derived from the RPP assumptions issued by Letter 00-PGO-002, "Contract No. DE-AC06-99RL14047 – River Protection Project (RPP) Key Enabling Assumptions" (Barrett 2000). However, not all the RPP assumptions are considered key to the TFC. Those not considered key have not been included in the CHG key assumptions list. Others, such as no waste regulated by the *Toxic Substances Control Act of 1976*, were key assumptions for the FY 2000 MYWP and were still considered to be relevant to the planning.

The CHG key assumptions are a combination of assumptions that help to define the boundaries or limits of the TFC scope and those that enable the planning of the TFC scope to proceed in the absence of confirmatory technical data and/or a management decision. An example of a bounding assumption is CHG-18, which states that the waste in AP-101 will not be mixed before it is sampled and transferred to the PC and, therefore, will be certified in the unmixed condition. Most of the assumptions derived from the ICDs are bounding assumptions because they define the respective roles and responsibilities of the TFC and the PC.

An example of an assumption that enables planning to proceed is CHG-17, which states that the mixer pumps will mix and mobilize the DST waste adequately so that it can be retrieved and transferred to the PC. This assumption is reasonable, because these mixer pumps have been used successfully at Savannah River and West Valley. However, the AZ-101 operational testing of the mixer will further confirm their performance with Hanford Site tank waste.

3.2.1.2 CH2M HILL Hanford Group, Inc., Critical Risks. The CHG critical risks, as presented in RPP-6118 (Honeyman and Voogd 2000, Attachment 2) are the risks that the TFC will need to mitigate to execute its role in the RPP mission successfully. These risks are typically programmatic or technical in nature and specifically exclude environmental, safety, and health (ES&H) risks, (i.e., risks to public health, worker safety or the environment). Programmatic and technical risks are identified and analyzed at three levels within the TFC: the work planning (TBR) level, the program (e.g., WFD) or project (e.g., W-211) level, and the CHG senior management level. The CHG critical risks are those that are elevated from the TBR or program or project level because they meet one or more of the following conditions:

- Risk value is high
- Consequences are serious
- Immediate action is required
- Issue has high visibility or interest from stakeholders or the Federal government
- Required mitigation actions are difficult to coordinate
- Senior management decision is required.

CHG key assumptions carry with them commensurate risk, (i.e., the assumptions may prove to be incorrect). Many of these associated risks are critical to CHG and therefore are included in the CHG critical risk list. An example is Critical Risk CR-058, which states that "if permission to transfer waste from a watch list tank is not received from DOE in accordance with the WFD schedule, then CHG may not be able to deliver sufficient waste feed to BNFL in time." This risk is derived directly from CHG key assumption CHG-04, which assumes that permission to pump

from and subsequently receive waste from "Watch List" tanks will be granted in a timely manner.

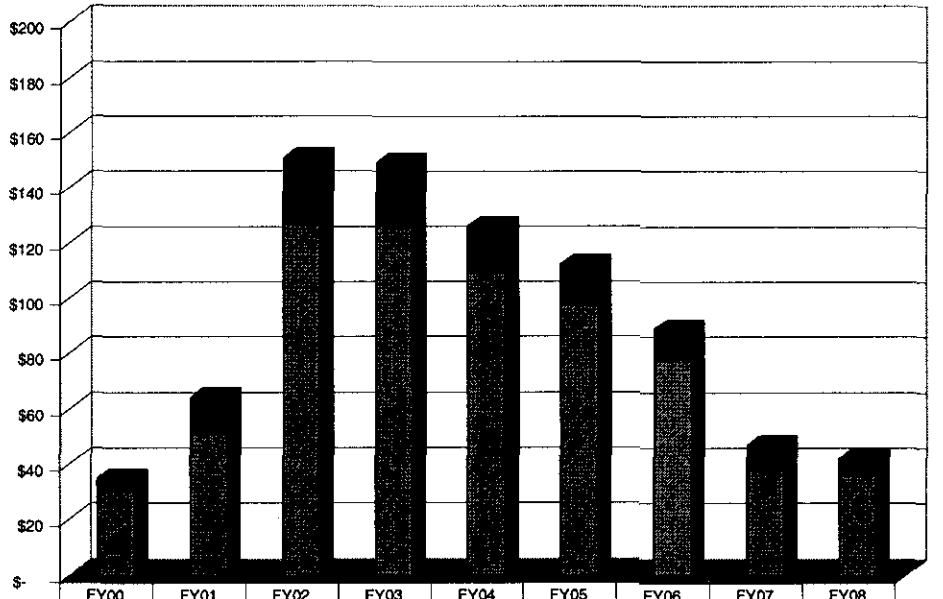
Programmatic and technical risks, e.g., unplanned radiological exposures (CR-011) and plugged transfer lines (CR-027), also exist and do not have a commensurate key assumption. Mitigation of such risks nevertheless is considered critical to CHG's successful execution of its RPP mission scope.

3.2.1.3 Exclusions. Two types of activities in the proposed baseline have been excluded from the risk analysis.

One type is the overall program and technical activities performed by Program Management and other technical support. These activities by nature are level-of-effort work scope and have minimal or no risk. The total value of these activities is $387 million for the period FY 2000 through FY 2008.

The other type of activities excluded from the risk model and financial cost curves is capital-funded work for the line item projects as coded in the P3 schedule. These activities already contain risk-based contingency dollars in the Project estimates. The value of these activities is $815 million of which approximately $122 million is project risk contingency, as seen in Figure 3-2.

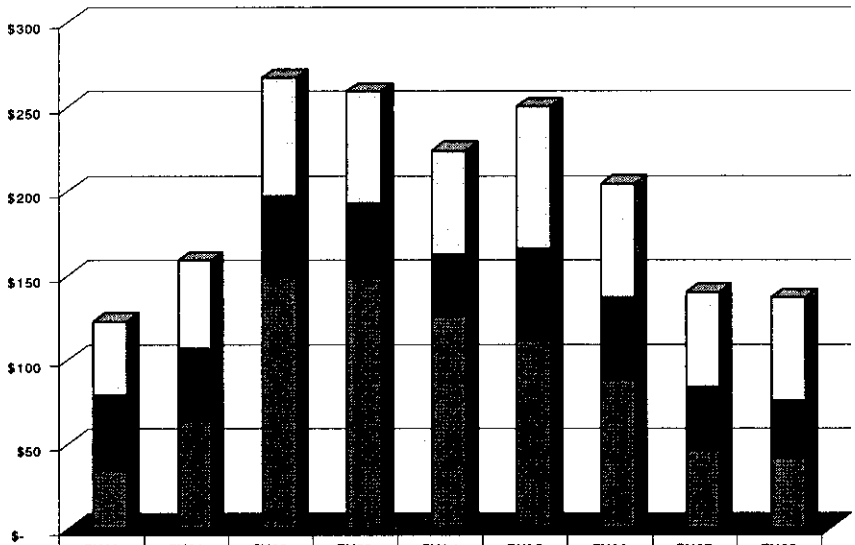
Figure 3-2. Capital Project Funding Profile Fiscal Year 2000 through 2008 in Millions of Dollars (unescalated).



	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
TOTAL Capital ($M)	$35	$64	$151	$149	$126	$112	$89	$47	$42
Proj Risk Contingency	$5	$13	$24	$23	$17	$14	$11	$9	$6
Planned Proj Scope	$30	$51	$127	$126	$109	$98	$78	$38	$36

Figure 3-3 displays the proportion of the excluded and analyzed activities to the total proposed Retrieval and Disposal Phase 1 cost profile for years FY 2000 through FY 2008.

Figure 3-3. Retrieval and Disposal Phase 1 Excluded Activities versus Total Proposed Phase 1 Cost Profile Fiscal Year 2000 through 2008 in Millions of Dollars (unescalated).



	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
TOTAL ($M)	$123	$159	$267	$259	$224	$250	$204	$140	$137
Expense (Analyzed)	$44	$52	$70	$68	$61	$84	$67	$56	$61
Pgm Mgt/Tech Supt (Excluded)	$44	$43	$46	$44	$37	$54	$48	$37	$34
Capital (Excluded)	$35	$64	$151	$149	$126	$112	$89	$47	$42

This page intentionally left blank.

4.0 ANALYSIS RESULTS

This section presents the results of the risk analysis for the period FY 2000 through FY 2008. The period chosen consists of the activities leading up to and including the first year of hot operations of the PC's facility. Many of these activities are first-occurrence events. The analysis was limited to this period because of the difficulty in projecting the effect of lessons learned on new and residual risks in distant years. The analysis consisted of the cost and schedule estimates for privatization infrastructure (Section 4.1), WFD (Section 4.2), and immobilized waste (Section 4.3). A risk analysis on the proposed Phase 1 Program also was performed. This analysis included management scope and critical risks that could occur and affect any given project (Section 4.4).

The selected target for each analysis was 80 percent probability of success. This goal was derived from guidance received in Letter 00-PGO-002 (Barrett 2000) on RPP Key Enabling Assumptions, assumption #14, which states that "The availability of contingency feed is a key feature for ensuring 80 percent confidence of successful feed delivery" and the RPP mission planning guidance for FY 2002, Rev. 1, Section 2, program specific guidance item #9, which states "CHG should assume a level of confidence in the baseline schedule consistent with the phase 1A readiness to proceed assessment conducted in FY 1999." The target used in that analysis was 80 percent probability of success. In accordance with the risk modeling description (see Section 2.2.1), the definition of success is completion of all planned activities (and only those activities) in the scope of the work being analyzed.

The sections that follow provide a discussion of the results of both the cost and the schedule analyses. The results of the cost analyses are probability distributions plotted against cost. The distribution data are displayed in a cumulative manner that results in an "S" shaped curve. Each "S" curve plots the probability vs. the range of final cost. Thus, for a selected probability (80 percent in this case) the corresponding dollar amount on the curve can be obtained. The final cost will be at or below the dollar amount at the selected probability.

In a similar manner, the schedule analyses produce "S" curves that plot probability vs. completion date. These curves are read in the same manner as the cost curves. The schedule curves show that the completion date will be on or before the corresponding date from the curve at the selected probability.

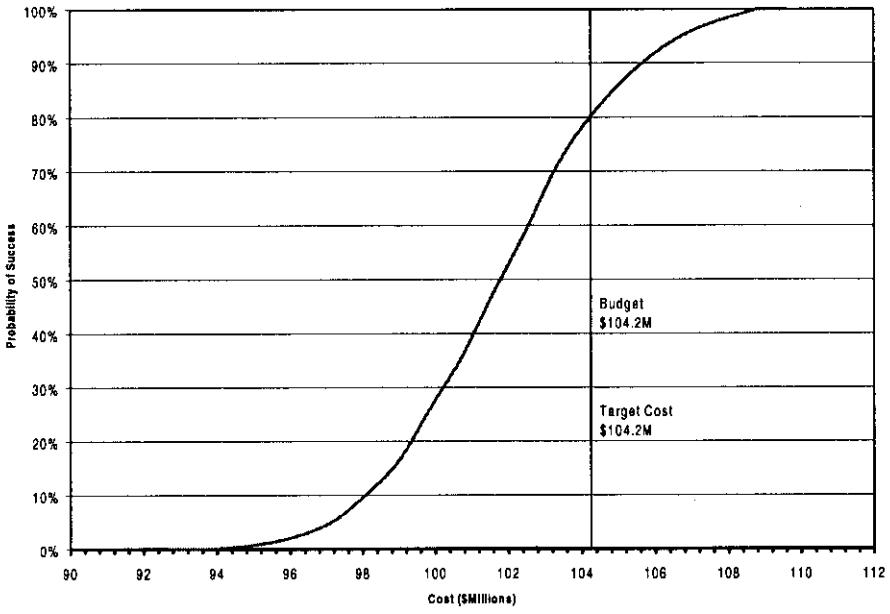
4.1 PHASE 1 PRIVATIZATION INFRASTRUCTURE

The infrastructure project consists of scope required to prepare the PC's pretreatment and immobilization plant site for use and to provide utility and waste services during construction and operations.

4.1.1 Privatization Infrastructure Cost Analysis

The cost analysis evaluated $104 million of the total $139 million budgeted for FY 2000 through FY 2008, for the privatization infrastructure project. The remaining $35 million consists of capital expenses and level-of-effort work (see Figure 3-2 and Table 3-3). The results of the cost analysis are shown in Figure 4-1.

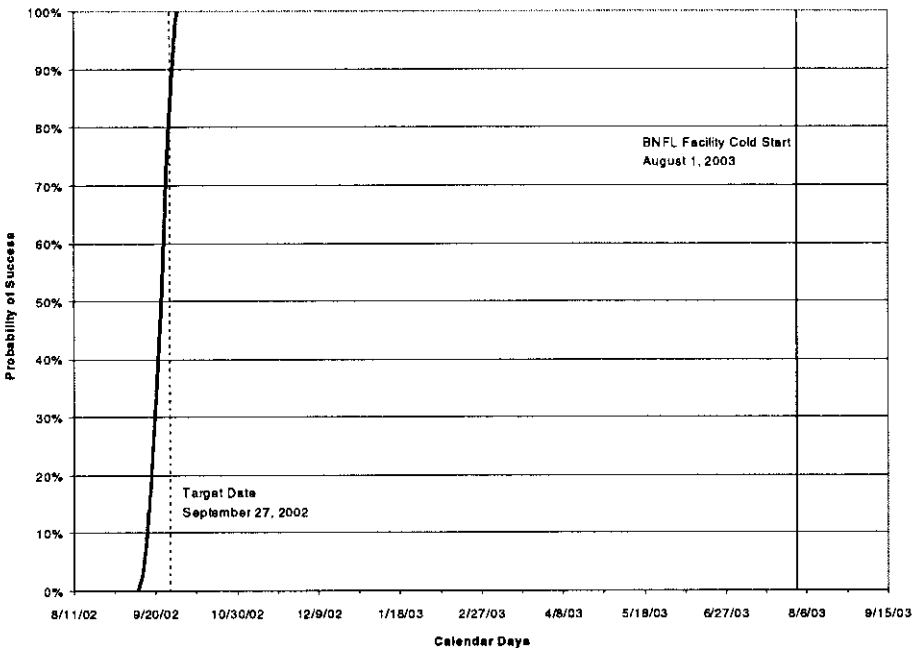
Figure 4-1. Privatization Infrastructure Cost Risk Curve.



4.1.2 Privatization Infrastructure Schedule Analysis

The interim milestone chosen for the schedule analysis (and deemed to represent project status) is completion of Project W-519 construction. The results of the analysis are shown in Figure 4-2. This figure shows the probability distribution of end date, given successful completion of the planned activities. For a selected probability on the curve, the completion date will be on or before the corresponding date.

Figure 4-2. Infrastructure Schedule Analysis.



The need date was determined from the requirements identified in ICDs 1 and 2. The 80-percent target date occurs approximately 10 months before the cold start of the PC's facility.

Project W-519 work scope is well understood and being performed by experienced contractors using best commercial practices. The contracts are of a fixed-price nature, on a well-defined work scope, with a low probability of risk. This approach provides for a narrow distribution that results in a very steep curve.

4.1.3 Privatization Infrastructure Risk Analysis Summary

Based on the results of the risk analysis, judgement is that the infrastructure program has a very high probability of completion at or under budget and on or before the contractual need date. No changes are recommended.

4.2 WASTE FEED DELIVERY

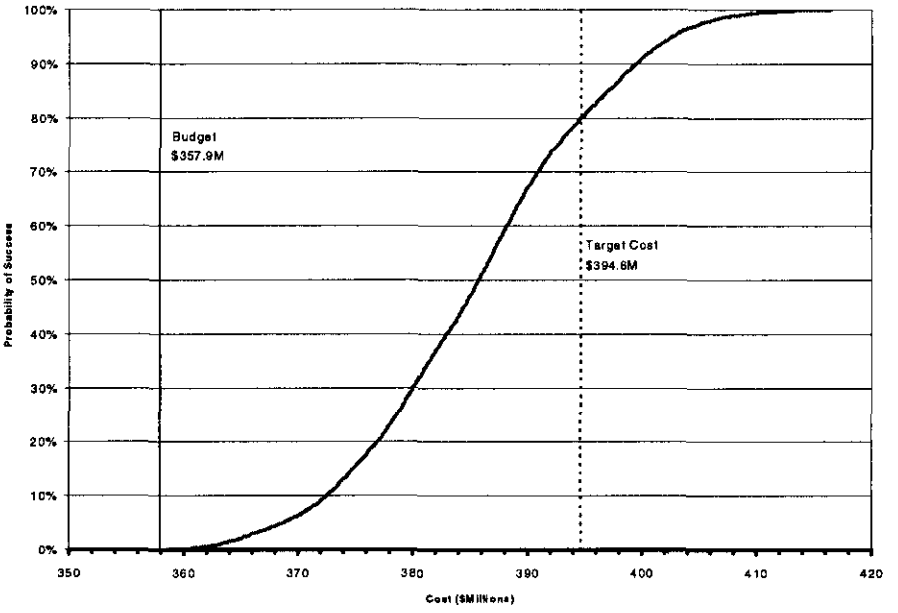
The WFD program consists of the work necessary to retrieve and transfer tank waste to the PC.

4.2.1 Waste Feed Delivery Cost Analysis

The cost analysis evaluated $358 million of the total $1,377 million budgeted for FY 2000 through FY 2008 on the WFD project. The remaining $1,019 million consists of capital

expenses and level-of-effort work (see Figure 3-2 and Table 3-3). The results of the cost analysis are shown in Figure 4-3.

Figure 4-3. Waste Feed Delivery Cost Risk Curve.



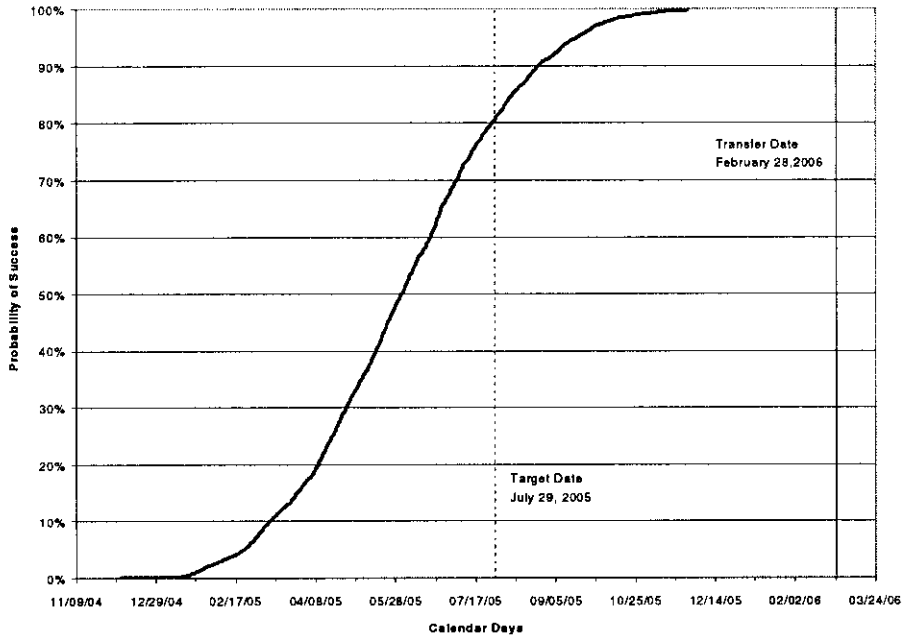
The project has low probability of meeting the ORP-directed 80 percent target with the $358 million budget. However, the target could be achieved with a budget of $395 million (an addition of $37 million).

4.2.2 Waste Feed Delivery Schedule Analysis

The interim milestones chosen for the WFD schedule analysis included the start of the first LAW (AP-101) transfer, start of the first HLW (AZ-101) transfer, and start of the first SST (C-104) transfer. These milestones were deemed to be representative of project status.

4.2.2.1 AP-101 (First LAW) Schedule Analysis. The results of the analysis for AP-101 are shown in Figure 4-4.

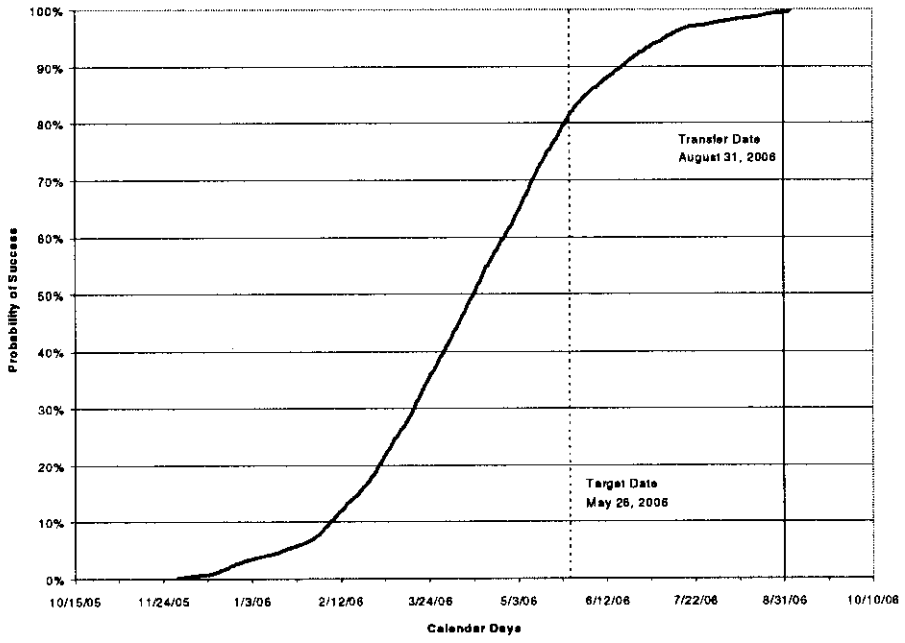
Figure 4-4. First Low-Activity Waste (AP-101) Schedule Analysis Curve.



The figure shows that the 80 percent target date of July 29, 2005, is approximately 7 months before the transfer date of the PC as identified on the mission summary diagram (RPP-5019).

4.2.2.2 AZ-101 (First HLW) Schedule Analysis. The results of the analysis for AZ-101 are shown in Figure 4-5.

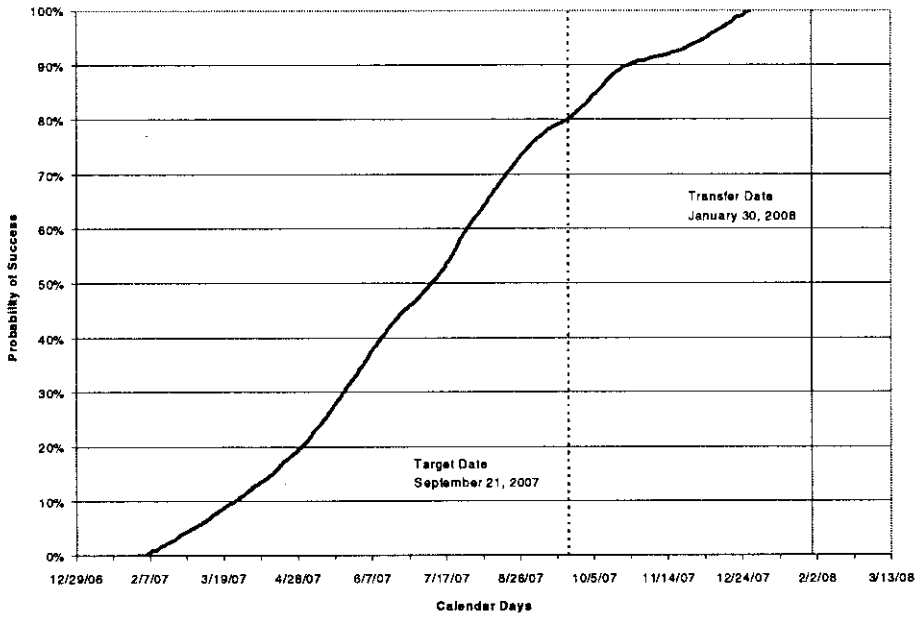
Figure 4-5. First High-Level Waste (AZ-101) Schedule Analysis Curve.



The figure shows that the 80 percent target date of May 26, 2006, is approximately 3 months before the transfer date of the PC as identified on the mission summary diagram (RPP-5742).

4.2.2.3 C-104 First SST Retrieval. The results of the analysis for C-104 are shown in Figure 4-6.

Figure 4-6. First Single-Shell Tank (C-104) Schedule Analysis Curve.



This figure shows that the 80 percent target date of September 21, 2007 is approximately 4 months before the transfer date to the PC as identified on the mission summary diagram (RPP-5742).

4.2.3 Waste Feed Delivery Risk Analysis Summary

Based on the results of the cost risk analysis, judgement is that the WFD project has a low probability of completion at or under the current budget. An increase to the budget of $37 million is recommended to meet the required 80 percent target.

The schedule analysis shows that all three selected milestones meet the required 80 percent target well before the mission summary transfer dates. No changes are recommended.

The revised mission summary (RPP-5742) contains operational-need dates (OND) or "black-dot" dates that represent the dates when all construction upgrades of tanks, farms, and the PC interfaces, as well as start-up and turnover are completed. They also represent the dates beyond which predecessor activities in the schedule cannot slip without incurring risk to feed batch delivery. In addition, the ONDs were developed to provide for backup waste (backup tank planning) and contingency waste, both of which are key to mitigating risks associated with WFD

certification and tank sequence uncertainties, waste retrieval efficiencies and glass waste loading as directed in the RPP Key Enabling Assumptions Letter 00-PGO-002 (Barrett 2000).

The revised mission summary was used as a key planning guidance document for preparing the proposed baseline including logics, TBR packages, and the detailed P3 logic schedule. The P3 schedule was reviewed and found to be consistent with and in support of the ONDs.

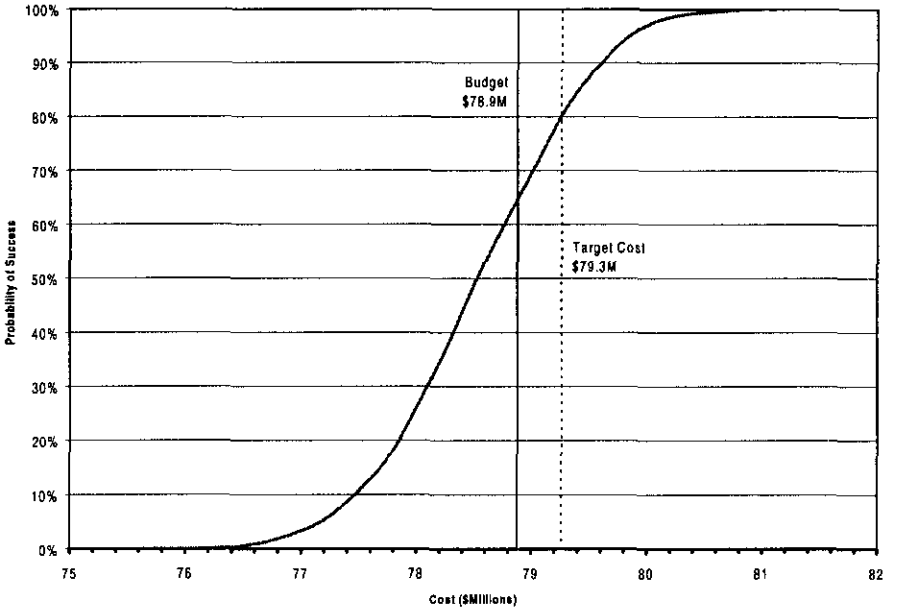
4.3 IMMOBILIZED WASTE STORAGE AND DISPOSAL

The Immobilized Waste Storage and Disposal program consists of tasks needed to develop an ILAW disposal facility and an IHLW storage facility.

4.3.1 Immobilized Waste Storage and Disposal Cost Analysis

The cost analysis evaluated $79 million of the total $234 million budgeted from FY 2000 through FY 2008 for the Immobilized Waste Storage and Disposal Project. The remaining $155 million consists of capital expenses and level-of-effort work (see Figure 3-2 and Table 3-3). The results of the cost analysis are shown in Figure 4-7.

Figure 4-7. Immobilized Waste Cost Risk Curve.



The figure shows that the current budget of $79 million (rounded) has a 65 percent probability of success, thus falling short of the required 80 percent target. The target could be achieved with an additional $400 thousand. This is manageable compared to the overall budget.

4.3.2 Immobilized Waste Storage and Disposal Schedule Analysis

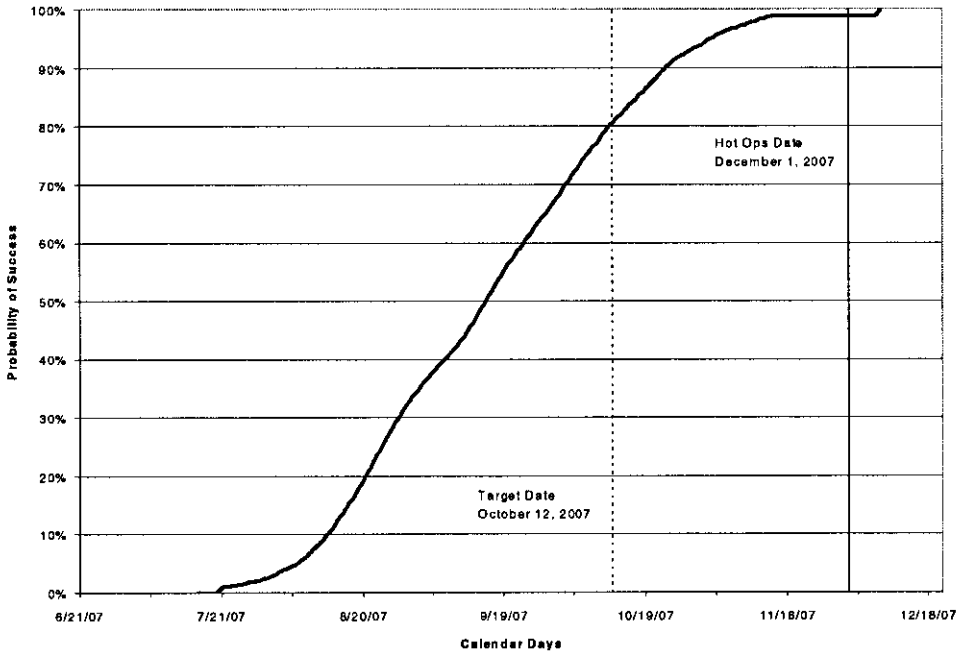
Two interim milestones were chosen for the schedule analysis:

- ILAW storage availability (receipt of the first ILAW container)
- IHLW storage availability (receipt of the first IHLW canister).

These milestones were deemed to be representative of project status.

4.3.2.1 ILAW Schedule Analysis. The results of the analysis for the ILAW Storage Availability Analysis are shown in Figure 4-8.

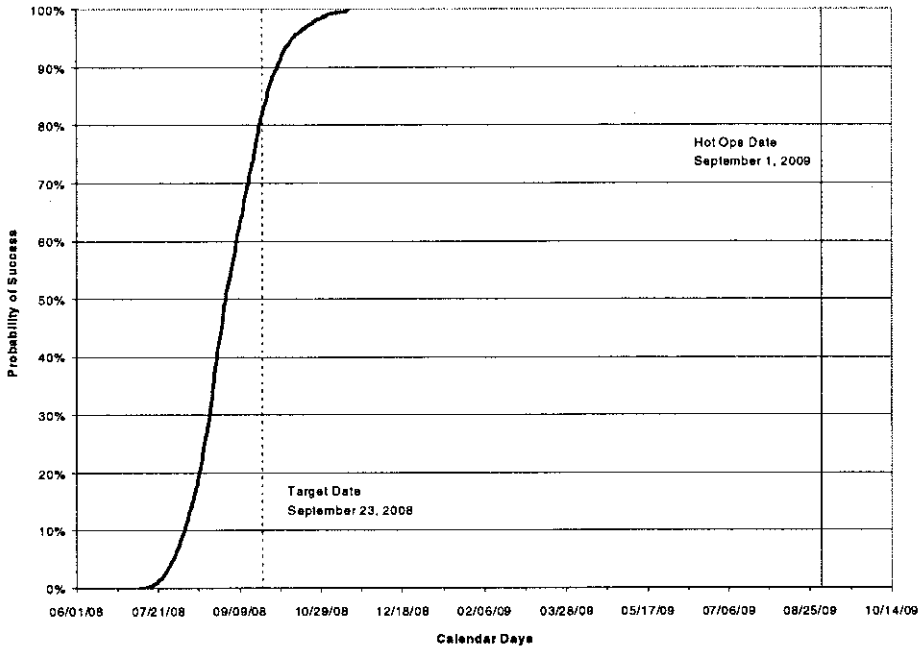
Figure 4-8. Immobilized Low-Activity Waste Storage Availability Schedule Analysis Curve.



The figure shows that the 80 percent target of October 12, 2007 is approximately 1½ months before the beginning of hot operations of the ILAW storage disposal as identified in the RPP Key Enabling Assumptions (Barrett 2000).

4.3.2.2 IHLW Schedule Analysis. The results of the analysis for the IHLW Storage Availability Analysis are shown in Figure 4-9.

Figure 4-9. Immobilized High-Level Waste Storage Availability Schedule Analysis Curve.



The figure shows that the 80 percent target date of September 24, 2008, is approximately 11 months before the hot operations startup of the IHLW Storage Facility as identified in the RPP Key Enabling Assumptions (Barrett 2000).

4.3.3 Immobilized Waste Storage and Disposal Risk Analysis Summary

The results of the cost risk analysis indicate that the Immobilized Waste Storage and Disposal project requires additional funding to achieve the required target of 80 percent probability of completion at or under budget. The increase of $400 thousand is manageable compared to the overall budget.

The schedule analysis results show a high probability of completion on or before the identified need date for both selected milestones. No schedule changes are recommended.

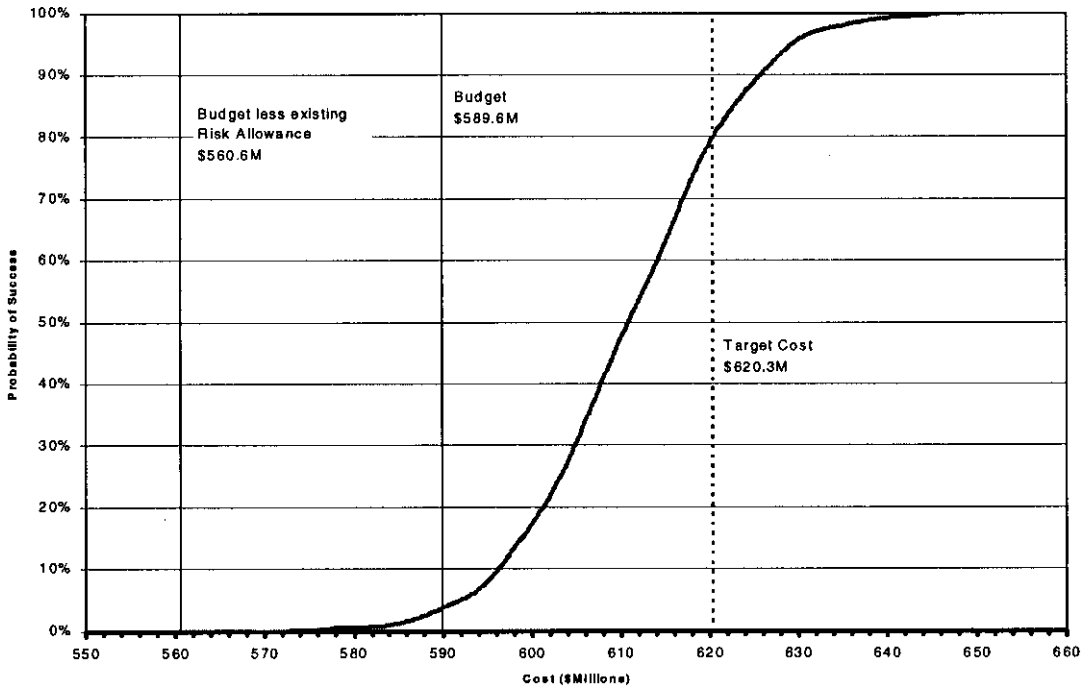
4.4 RETRIEVAL AND DISPOSAL PROJECT

The Tank Waste Retrieval and Disposal Project consists of the Infrastructure Project, the Waste Feed Delivery program, and the Immobilized Waste Storage and Disposal project, as well as the program management and technical support tasks and critical risks.

4.4.1 Retrieval and Disposal Cost Analysis

The cost analysis evaluated $561 million of the total $1,763 million budgeted for FY 2000 through FY 2008 for the Retrieval and Disposal project. The remaining $1,202 million consists of capital expenses and level-of-effort work (see Figure 3-2 and Table 3-3). The results of the cost analysis are shown in Figure 4-10.

Figure 4-10. Total Retrieval and Disposal Phase 1 Tank Farm Contractor Integrated Cost Risk Curve.



The target probability, directed by ORP in Letter 00-PGO-009 (Barrett 2000), is 80 percent. The project has a low probability of meeting the target with the $561 million budget. However, the current baseline includes $29 million in risk allowance. When this amount is added, the resulting $590 million budget improves, but still is below the required target. An additional $31 million is required to achieve the target. Thus a total risk allowance of $60 million is required (existing $29 million plus the added $31 million) for the period from FY 2000 through FY 2008.

4.4.2 Retrieval and Disposal Schedule Analysis

The schedule analyses of the six selected milestones are representative of the overall work and indicate that the planning is sufficient to provide a high probability of completing the work in accordance with the proposed baseline schedule.

4.4.3 Retrieval and Disposal Risk Analysis Summary

The results of the cost risk analysis indicate that the Retrieval and Disposal project requires additional funding to achieve the desired target of 80 percent probability of completion at or under budget. Although $60 million is required for risk allowance, an increase of only $31 million is recommended to increase the budget to meet the required target because of the existing risk allocation. Details can be seen in Table 4-1.

Table 4-1. Risk Adjustments for Fiscal Years 2000 through 2008.

	Existing Budget (Analyzed)	Existing Budget (Excluded)	Total Existing Budget	Probability with Existing Budget	Target Probability	Change Required to Meet Target	Funded Risk Allowance	Net Increase Needed	Total
Privatization Infrastructure (Section 4.1)	$ 104	$ 35	$ 139	80%	80%	$ -	$ -	$ -	**$ 139**
Waste Feed Delivery (Section 4.2)	$ 358	$ 899	$ 1,257	0%	80%	$ 37	$ -	$ 37	**$ 1,294**
Immobilized Waste Storage and Disposal (Section 4.3)	$ 79	$ 156	$ 235	65%	80%	$ -	$ -	$ -	**$ 235**
Scope not Analyzed *	$ 20	$ 112	$ 132	-	-	$ -	$ -	$ 0	**$ 132**
Retrieval and Disposal Phase 1 Project (Section 4.4)	$ 561	$ 1,202	$ 1,763	4%	80%	$ 60	$ 29	$ 31	**$ 1,823**

* Includes Privatization Infrastructure, Waste Feed Delivery, Immobilized Waste Storage and Disposal, and Interface Definition/DOE and Regulatory Support (not separately analyzed).

The schedule analysis results show a high probability of completion on or before the identified need date for both selected milestones. No schedule changes are recommended.

4.5 RETRIEVAL AND DISPOSAL RISK EVALUATION FOR FISCAL YEARS 2000-2018

The detailed retrieval and disposal risk evaluation was performed for the period FY 2000 through FY 2008, and an extrapolation of risk allowance for FY 2000 through FY 2018 was performed.

Figure 4-11 shows the Monte Carlo-calculated cost risk dollars distributed by fiscal years (FY 2000 through FY 2008).

The total risk dollar value of $60 million is required to achieve an 80 percent probability of completing the work on schedule. The $60 million includes $29 million in risk allocation included in the FY 2000 MYWP baseline during FY 2005 and FY 2006. The FY distribution of risk dollars is based on the P3 schedule start and completion dates for the risk-bearing activities.

For risks that are single-occurrence events, the distribution was front loaded to include the entire impact of the risk at the earliest point of occurrence. For recurring risks, the impact was spread

Figure 4-11. Fiscal Year Distribution of Risk Costs.

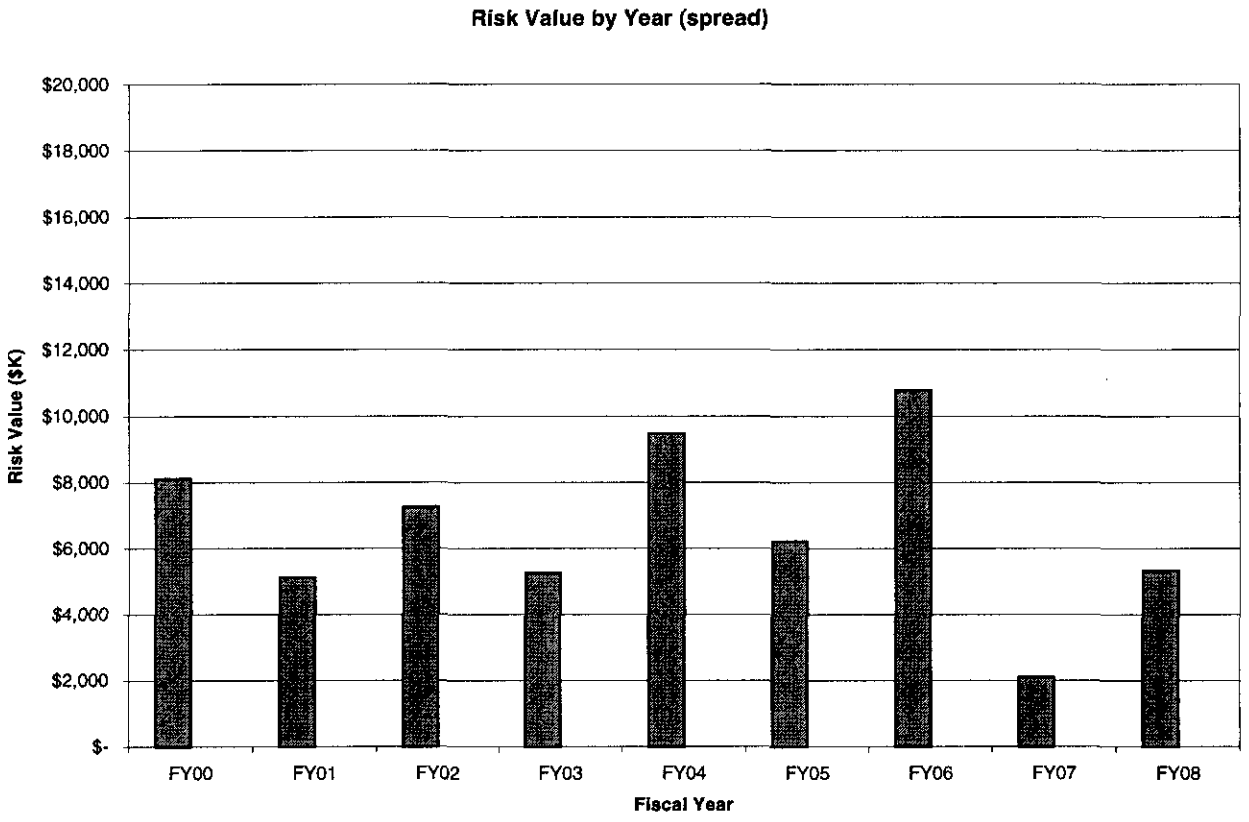


Figure 4-12 reflects an acceleration of the existing risk allocation from FY 2005 to FY 2003 and augments the allocation to include the recommended additional $60 million as risk allowance. Because FY 2000, FY 2001, and FY 2002 do not include risk dollars, the FY 2000 through FY 2002 risk costs have been redistributed with two-thirds to FY 2003 and one-third to FY 2004. It is assumed that these FY 2000 through FY 2002 risk dollars will still be required in FY 2003 through FY 2004 to mitigate risks on deferred activities and to address risks imposed on follow-on or successor activities because of potential risk driven work reprioritization from the earlier timeframe.

The cost risk for FY 2009 through FY 2018 was not modeled. Instead, an extrapolation of the data for FY 2003 through FY 2008 to the remaining years was made (approximately $3.5 million per year).

This additional $35 million added to the $60 million for FY 2000 through FY 2008 brings the total risk dollars for FY 2000 through FY 2018 to $95 million as seen in Table 4-2.

Figure 4-12. Fiscal Year Distribution of Risk Costs (Fiscal Years 2003 to 2008).

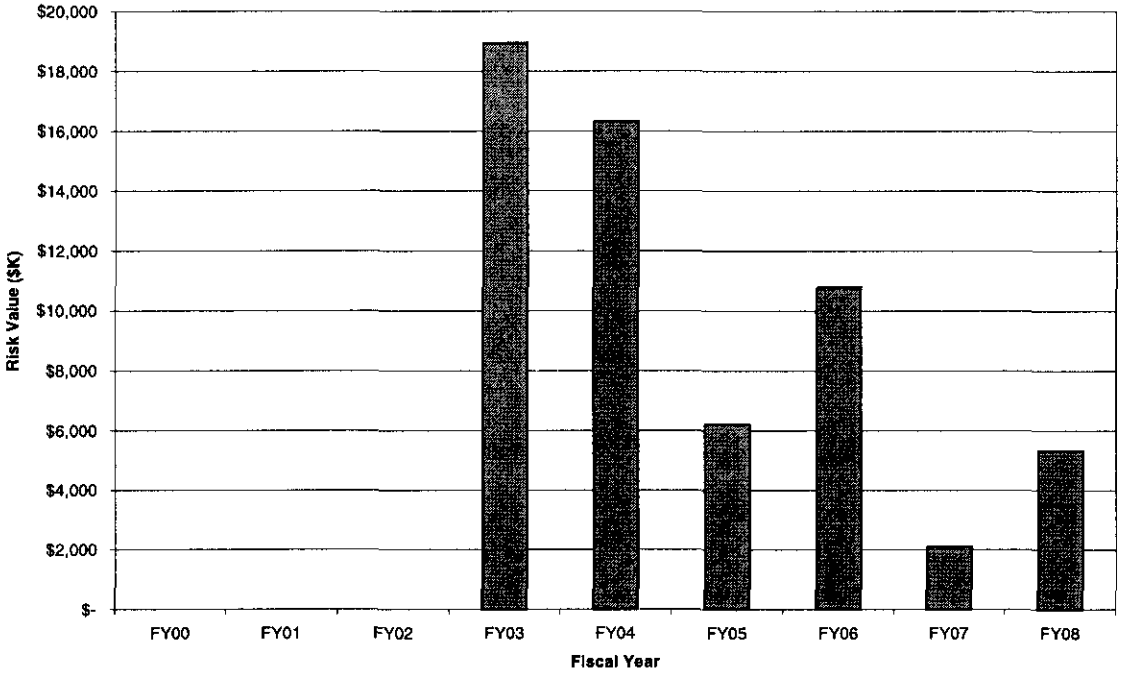


Table 4-2. Risk Allocation for Retrieval and Disposal Phase 1 Budget Requirements (Millions of Dollars Fiscal Years 2000 to 2018)

	Change Required to Meet Target	Funded Risk Allowance	Net Increase Needed
Risk Allocation for Retrieval and Disposal Phase 1 Project (FY00 - FY08)	$ 60	$ (29)	$ 31
Risk Allocation for Retrieval and Disposal Phase 1 Project (FY09 - FY18)	$ 35	$ -	$ 35
Total	**$ 95**	**$ (29)**	**$ 66**

FY = fiscal year.

This page intentionally left blank.

5.0 TOTAL TANK FARM CONTACTOR COST

This financial analysis was based on the proposed Retrieval and Disposal Phase 1 activities as defined in the P3 schedule. The balance of mission costs for the remainder of the TFC work scope was not analyzed, nor were adjustments that have recently been made to the proposed baseline. Following is a list of adjustments that have been identified for Retrieval and Disposal Phase 1, as well as adjustments to the total CHG updated baseline. A more detailed cost profile including life-cycle costs can be found in Appendix A.

5.1 RETRIEVAL AND DISPOSAL PHASE 1 ADJUSTMENTS

The following adjustments, as identified in Table 5-1, are added costs to the previously discussed Phase 1 budget requirements. These adjustments total $288 million, which, added to the proposed budget requirements, including risk allocation, result in a new budget requirement total of $3,528 million.

Table 5-1. Adjustments to Retrieval and Disposal Phase 1 Budget Requirements (Fiscal Years 2000 to 2018 in Millions of Dollars) (unescalated).

	Total
Proposed Budget	$ 3,174
Risk Allowance	$ 66
Updated Budget (including Risk Allowance)	*$ 3,240*
Characterization Allocation	$ 301
Project W-521	$ (10)
Privatization Infrastructure	$ (3)
Total Adjustments	$ 288
Adjusted Budget Requirements for Retrieval and Disposal Phase 1	**$ 3,528**

The characterization allocation is for program management costs from TW-01 for the Retrieval and Disposal Phase 1 mission. This cost is not included in each respective sample, but rather is pro-rated to each of the appropriate programs based on volume of need.

The W-521 adjustment is caused by the rephasing of the project and refinement of the cost estimates.

Privatization Infrastructure reduction is caused by carryover adjustments in FY 2001.

5.2 BALANCE OF MISSION ADJUSTMENTS

Table 5-2 provides an itemized list of the key adjustments to the balance of mission budgets. These adjustments are caused by recent Mission Planning Guidance and known errors and

omissions that were identified recently. These adjustments total $697 million, which, added to the proposed budget requirements, including risk allocation, result in a new budget requirement total of $13,750 million.

Table 5-2. Adjustments to Balance Mission Budget Requirements (Fiscal Years 2000 to 2018 in Millions of Dollars) (unescalated).

	Total
Proposed Budget	$ 12,987
Risk Allowance	$ 66
Updated Budget (including Risk Allowance)	$ 13,053
Adjustments for Retrieval and Disposal Activities	$ 288
Characterization Adjustment	$ 3
Safe Storage Adjustment	$ 79
Retrieval and Disposal Phase 2 Adjustment	$ 305
Management Support Adjustment	$ 22
Total Adjustments	$ 697
Adjusted Budget Requirements for CHG Program	**$ 13,750**

The FY 2000 MYWP showed a significant reduction in the FY 2006 budget for Characterization support to minimum safe operations from FY 2005. This reduction under-budgets the program and is inconsistent with the need to provide sustained sampling and analysis services to operations. Accordingly, an adjustment has been made in FY 2006 to add $3 million to ensure continuity of the sampling and analysis support.

In accordance with direction provided by Mission Planning Guidance Letter 00-MSO-009, dated February 3, 2000, $79 million in life-cycle costs (FY 2002 through FY 2018) has been added to provide for the security patrol rover, and patrol overheads as direct costs.

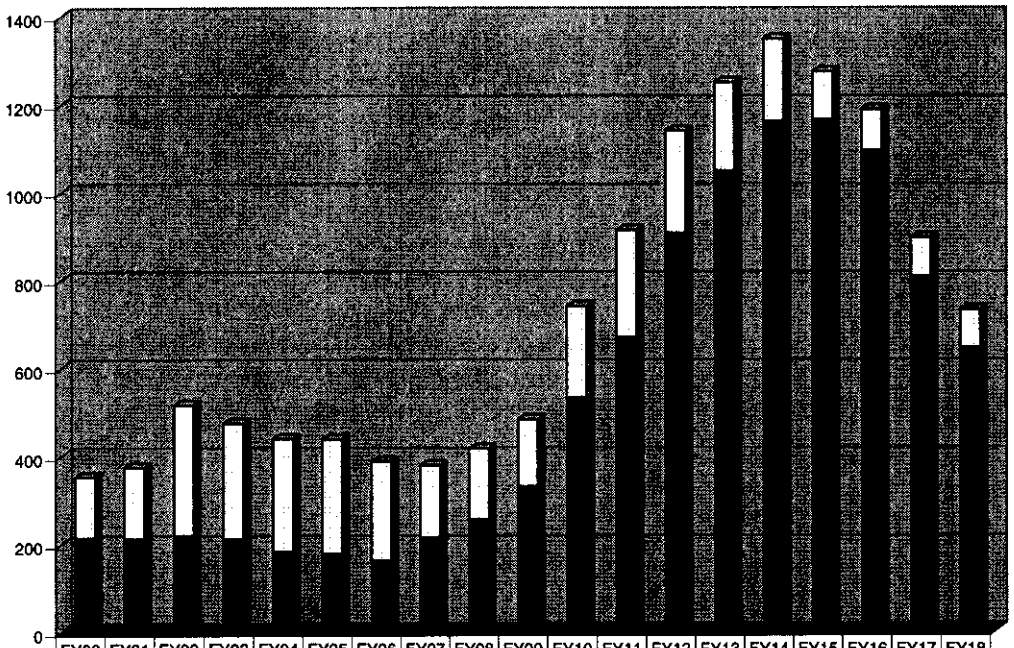
Significant changes have been made to the FY 2000 MYWP baseline for the SST Retrieval Projects. Based on the W-523 project changes the SST test and deployment demonstration projects were reevaluated and determined to not be required in Phase 1 to support SST retrievals. Accordingly, these test and demonstration projects and associated costs in the amount of $305 million were moved to Phase 2.

Two items contribute to the adjustment in Management Support Project. The operator staffing plan adjustment is a cost adjustment in the amount of $4.5 million made to address the operator training and staffing issue resulting from RPP-6114, *Human Resources Staffing Plan for the Tank Farm Contractor* (Bosley 2000). This study identified that for FYs 2002 to 2004, Hanford Site contractors other than the TFC will have a reduced need for nuclear process operators. Further, these operators generally are of a higher seniority level than the TFC contractors, and the bumping process will require a 6- to 12-month overlap of the TFC and incoming operators will be needed while the new operators are hired and trained. This overlap is required to ensure continuity of operations. Payment in Lieu of Taxes of $20 million has been added to the baseline costs. This adjustment is in accordance with direction provided by the ORP Mission Planning Guidance. These payments are a community mandate resulting from implementation of the U.S. Department of Energy policies.

5.3 TOTAL CH2M HILL HANFORD GROUP, INC., COST PROFILE

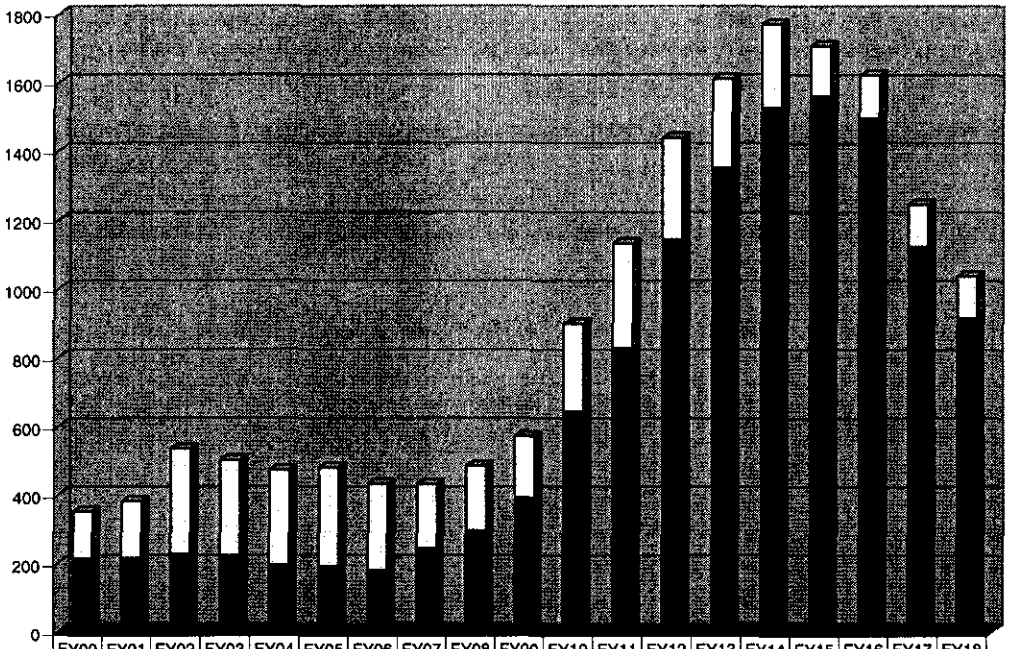
The Retrieval and Disposal Phase 1 budget with risk allowance and adjustments constitutes $3,528 million of the total CHG Program costs of $13,750 million. Figure 5-1 displays the portion of Retrieval and Disposal Phase 1 compared to TFC from FY 2000 through FY 2018 (unescalated), and Figure 5-2 displays the escalation comparison. For further detail on these cost dollars see Attachment A.

Figure 5-1. Retrieval and Disposal Phase 1 Costs Compared to Total CH2M HILL Hanford Group, Inc., Costs (unescalated).



	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
Phase 1	138	163	297	263	257	262	225	163	161	152	208	244	233	200	186	109	92	88	86
Balance of Mission	215	212	220	212	183	177	163	216	256	331	533	670	907	1050	1162	1165	1096	809	647

Figure 5-2. Retrieval and Disposal Phase 1 Costs Compared to Total CH2M HILL Hanford Group, Inc., Costs (escalated).



	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
□Phase 1	138	166	309	279	278	289	253	188	189	181	254	304	295	259	245	146	126	123	122
■Balance of Mission	215	216	228	224	196	193	181	245	297	393	646	830	1146	1353	1528	1562	1498	1125	917

6.0 CONCLUSION

The risk analyses indicate that the proposed Phase 1 baseline as identified in HNF-1946 (Diediker 2000) is sound. Scheduling of work appears to include adequate flexibility for resolution of unforeseen problems and difficulties. The budget is sufficient for completion of planned activities, but a minor adjustment is needed to cover eventual problems that will occur, thus resulting in compliance with the 80 percent probability of success target as directed by ORP via Letter 00-MSO-009 (Short 2000) as well as Letter 00-PGO-002 (Barrett 2000).

This page intentionally left blank.

7.0 REFERENCES

Barrett, M. K., 2000, "Contract No. DE-AC06-99RL14047 – River Protect Project (RPP) Key Enabling Assumptions," (letter 00-PGO-002 to M. P. DeLozier, CH2M HILL Hanford Group, Inc., April 10), U.S. Department of Energy, Office of River Protection, Richland, Washington.

Bosley, J. W., 2000, *Human Resources Staffing Plan for the Tank Farm Contractor*, RPP-6114, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

CHG, 2000, *RPP Administration,* HNF-IP-0842, CH2M HILL Hanford Group, Inc., Richland, Washington.

- "Risk Management," Vol. IV, Sec. 2.6
- "Integrated Planning Process," Vol. X, Sec. 3.8

Diediker, J. A., 2000, *Programmatic Baseline Summary for Phase I Privatization for the Tank Farm Contractor*, HNF-1946, Rev. 2, CH2M HILL Hanford Group, Inc., Richland, Washington

Honeyman, J. O., and J. A. Voogd, 2000, *Memorandum of Readiness to Proceed with Phase 1 Privatization for the Tank Farm Contractor*, RPP-6118, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-5742, 2000, *Tank Farm Contractor, Phase 1, Feed Delivery, Storage and Disposal Mission Summary for 2006 Hot Start*, CH2M HILL Hanford Group, Inc., Richland, Washington.

Short, J. J., II, 2000, "Contract No. DE-AC06-99RL14047 – The U.S. Department of Energy, Office of River Protection (ORP) Mission Planning Guidance for Fiscal Year (FY) 2002 – Revision 1," (letter 00-MSO-009 to M. P. DeLozier, CH2M HILL Hanford Group, Inc., February 3), U.S. Department of Energy, Office of River Protection, Richland, Washington.

Toxic Substance Control Act of 1976, Pub. L. 94-469, 90 Stat. 2003, 15 USC 2601 et. seq.

This page intentionally left blank.

APPENDIX A

LIFE-CYCLE COST SUMMARY

This page intentionally left blank.

Table A-1. Life-Cycle Cost Summary.

		FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	TOTAL
PHASE 1 COSTS																					
TW01	CHARACTERIZATION	16,983	9,777	7,619	5,850	9,165	6,227	5,854	3,512	4,682	18	3,933	5,265	4,201	11,010	3,320	7,056	160	533	11	105,176
TW03	W-314	26,213	50,908	67,595	30,618	31,287	10,719	--	-	--	--	--	--	--	--	--	--	--	--	--	217,340
TW04	RETRIEVAL	50,693	70,109	170,701	195,223	131,695	132,175	138,173	106,857	93,304	103,037	113,931	101,886	76,284	54,110	59,326	39,838	32,316	28,526	28,006	1,726,188
TW05	PROCESS WASTE SUPPT	1,219	1,276	1,717	1,592	1,598	1,592	1,586	1,548	--	--	--	--	--	--	--	--	--	--	--	12,128
TW08	INFRASTRUCTURE	18,611	17,384	7,958	6,535	11,181	34,415	14,087	14,851	14,969	14,910	14,910	14,910	14,851	14,685	14,675	14,675	14,734	14,617	14,617	287,574
TW09	IMMOB. WASTE	9,042	9,988	10,994	18,585	38,972	64,702	44,699	13,372	24,492	45,349	67,704	98,913	116,695	96,008	84,119	22,691	20,151	19,992	18,684	825,153
TW10	MGMT SUPPORT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL PHASE 1 COSTS IN SCHEDULE		122,760	159,441	266,585	258,404	223,898	249,830	204,399	140,140	137,446	163,314	200,478	220,974	212,031	175,813	161,440	84,260	67,360	63,668	61,318	3,173,559
REQUIRED PHASE 1 ADJUSTMENTS																					
TW01	CHARACTERIZATION	15,428	11,317	12,887	12,029	12,582	12,269	13,009	13,877	16,194	855	13,688	20,039	20,717	20,942	21,048	21,082	21,199	21,074	20,808	301,044
TW03	W-314	--	22	--	--	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22
TW04	RETRIEVAL	--	(4,965)	17,892	(7,243)	20,193	86	7,238	9,260	7,378	(12,611)	(6,035)	3,273	252	3,221	3,500	3,500	3,500	3,500	3,500	55,439
TW08	INFRASTRUCTURE	--	(2,798)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2,798)
TOTAL PHASE 1 SUPPORT COSTS		15,428	3,576	30,779	4,786	32,775	12,355	20,247	23,137	23,572	(11,756)	7,563	23,312	20,969	24,163	24,548	24,582	24,699	24,574	24,308	353,707
TOTAL PHASE 1 COSTS		138,188	163,017	297,364	263,190	256,673	262,185	224,646	163,277	161,018	151,558	208,131	244,286	233,000	199,976	185,988	108,842	92,059	88,242	85,626	3,527,267
BALANCE OF TFC PROGRAM & PHASE 2 COSTS																					
TW01	CHARACTERIZATION	4,359	7,601	9,734	10,404	8,098	6,862	2,026	8,757	6,625	21,573	1,083	1,153	124	125	125	125	126	125	124	89,149
TW02	SAFETY	21,985	17,619	10,132	10,563	8,138	8,327	7,914	7,913	7,912	--	--	--	--	--	--	--	--	--	--	100,503
TW03	OPERATIONS	125,927	129,892	130,122	118,267	92,925	95,744	72,864	80,260	75,587	75,419	73,236	72,920	72,659	71,814	72,433	72,936	72,659	72,095	72,653	1,650,412
TW04	RETRIEVAL	7,493	7,561	8,402	7,613	9,441	9,918	8,804	16,621	36,248	48,505	283,297	439,577	608,372	673,666	706,439	662,495	606,926	404,624	245,929	4,791,933
TW05	PROCESS WASTE SUPPT	7,000	8,577	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	159,431
TW08	INFRASTRUCTURE	--	603	4,580	4,923	1,049	1,045	4,256	13,028	14,840	42,615	42,615	13,603	73,458	73,752	73,752	73,752	74,043	73,458	73,458	658,829
TW09	IMMOB. WASTE	3	--	--	1	--	465	1,077	525	18,107	65,590	59,253	59,063	83,635	132,566	239,712	298,859	291,890	210,947	208,110	1,669,802
TW10	MGMT SUPPORT	48,320	40,148	44,392	47,840	44,102	41,840	36,881	39,684	31,898	31,789	31,916	31,789	31,764	31,916	31,789	31,789	31,897	31,849	31,722	693,325
TOTAL		215,087	212,002	215,824	208,072	172,215	172,663	142,284	175,250	199,680	293,952	499,861	626,567	878,474	992,300	1,132,712	1,148,418	1,086,004	801,561	640,458	9,813,383
ADJUSTMENTS TO BALANCE OF TFC PROGRAM & PHASE 2 COSTS																					
TW01	CHARACTERIZATION	--	(45)	--	--	--	--	3,552	--	--	--	--	--	--	--	--	--	--	--	--	3,507
TW02	SAFETY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-
TW03	OPERATIONS	--	--	3,041	1,726	1,619	1,638	5,441	5,456	5,446	5,451	5,451	5,451	5,456	5,451	5,451	5,451	5,446	5,456	5,456	78,887
TW03	W-314	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TW04	RETRIEVAL	--	--	53	781	4,425	1,634	10,552	34,159	49,496	30,506	26,313	37,358	22,168	51,095	22,725	10,066	3,775	526	--	305,632
TW05	PROCESS WASTE SUPPT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TW08	INFRASTRUCTURE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TW09	IMMOB. WASTE	--	(2)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2)
TW10	MGMT SUPPORT	--	--	1,501	1,508	4,267	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	1,025	21,626
TOTAL		--	(47)	4,595	4,015	10,311	4,297	20,570	40,640	55,967	36,982	32,789	43,834	28,649	57,571	29,201	16,542	10,246	7,007	6,481	409,650

TOTAL TFC ACTUALS & PROGRAM REQ'TS		ACTUAL COSTS FY 1997 ACWP	FY 1998 ACWP	FY 1999 ACWP	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	TOTAL
TW01	CHARACTERIZATION	54,897	42,431	34,036	36,770	28,650	30,240	28,283	29,845	25,358	24,441	26,146	27,501	- 22,446	18,704	26,457	25,042	32,077	24,493	28,263	21,485	21,732	20,943	630,240
TW02	SAFETY	33,042	27,148	31,988	21,985	17,619	10,132	10,563	8,138	8,327	7,914	7,913	7,912	--	--	--	--	--	--	--	--	--	--	192,681
TW03	OPERATIONS	144,384	103,656	123,397	125,927	129,892	133,163	119,993	94,544	97,382	78,305	85,716	81,033	80,870	78,687	78,371	78,115	77,265	77,884	78,387	78,105	77,551	78,109	2,100,736
TW03	W-314	6,241	11,386	17,442	26,213	50,930	67,595	30,618	31,287	10,719	--	--	--	--	--	--	--	--	--	--	--	--	--	252,431
TW04	RETRIEVAL	31,277	55,523	54,138	58,186	72,705	197,048	196,374	165,754	143,813	164,767	166,897	186,426	169,437	417,506	582,094	707,076	782,092	791,990	715,899	646,517	437,176	277,435	7,020,130
TW05	PROCESS WASTE SUPPT	5,352	9,020	7,656	8,219	9,853	10,179	10,054	10,060	10,054	10,048	10,010	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	8,462	193,587
TW08	INFRASTRUCTURE	1,772	5,132	4,385	18,611	15,189	12,539	11,458	12,230	35,459	18,343	27,879	29,809	57,524	57,524	28,512	88,309	88,437	88,427	88,427	88,777	88,075	88,075	954,893
TW09	IMMOB. WASTE	4,687	10,257	4,796	9,045	9,986	10,994	18,586	38,972	65,167	45,776	13,897	42,599	110,939	126,957	157,976	200,330	228,574	323,831	321,550	312,041	230,939	226,794	2,514,693
TW10	MGMT SUPPORT	24,968	37,078	27,068	48,320	40,148	45,893	49,348	48,369	42,865	37,906	40,709	32,923	32,814	32,941	32,814	32,789	32,941	32,814	32,814	32,922	32,874	32,747	804,065
TOTAL TFC REQUIREMENTS		306,620	301,631	304,906	353,276	374,972	517,783	475,277	439,199	439,144	387,500	379,167	416,665	482,492	740,781	914,686	1,140,123	1,249,848	1,347,901	1,273,802	1,188,309	896,809	732,565	14,663,457
ESCALATION		--	--	--	--	7,167	19,822	27,478	34,125	43,397	46,535	53,118	69,082	91,164	158,947	218,625	301,526	361,808	425,199	434,288	436,455	351,845	306,406	3,386,988
TOTAL TFC ACTUALS & PROGRAM REQUIREMENTS (ESCALATED)		306,620	301,631	304,906	353,276	382,139	537,605	502,755	473,324	482,542	434,035	432,285	485,747	573,656	899,729	1,133,312	1,441,649	1,611,656	1,773,100	1,708,090	1,624,764	1,248,654	1,038,972	18,050,445

This page intentionally left blank.

DISTRIBUTION

Onsite

1	U.S. Department of Energy Richland Operations Office	
	DOE Public Reading Room	H2-53
1	Pacific Northwest National Laboratory	
	Hanford Technical Library	P8-55
2	Lockheed Martin Services, Inc.	
	Central Files	B1-07
	Document Processing Center	A3-94

This page intentionally left blank.