

Office of River Protection EM Project(s)
Baseline Summary
June 2008

BACKGROUND

The Hanford Site is the largest of the three original defense production sites founded in World War II as part of the Manhattan Project. It is about half the size of the State of Rhode Island, at 586 square miles.

Over its 40 years of operations, the site produced approximately 74 tons of plutonium—nearly two-thirds of all the plutonium recovered for government purposes in the United States. Between 1943 and 1963, nine plutonium production reactors were built along the Columbia River. Plutonium and reusable uranium were separated from irradiated fuel using various chemical precipitation and solvent extraction techniques. The plutonium and uranium was shipped to other DOE sites for eventual use in United States nuclear weapons.

During plutonium production, highly radioactive waste resulting from site operations was piped to underground tanks. In some cases small amounts of radioactive waste, representing small amounts of radioactivity were discharged underground. For example, uncontaminated and slightly contaminated liquids and cooling water were pumped to ditches and ponds. Contaminated water discharged from the reactors was pumped to nearby soil as well as into the Columbia River. Solid waste was buried in shallow trenches or stored inside facilities. The result is more than 1,600 identified waste sites and more than 500 waste facilities at Hanford. Forty percent of the approximately one billion curies of radioactivity within the DOE nuclear weapons complex resides at Hanford. These materials must be dealt with in a safe and protective manner.

In order to more effectively manage the River Protection Project and in response to Section 3139 of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999, the Secretary of Energy established the Office of River Protection at the Hanford Site in the State of Washington as a separate Department of Energy Field Office.

SCOPE DESCRIPTION

Office of River Protection is responsible for the storage, retrieval, treatment, immobilization, and disposal of tank waste and the operation, maintenance, engineering, and construction activities in the 200 Area Tank Farms. These Tank Farms include 177 underground storage tanks (149 Single-shell tanks and 28 Double-shell tanks) that contain approximately 190 million curies in approximately 53 million gallons of chemically hazardous radioactive waste from past processing operations. A multi-year construction project to build a Waste Treatment and Immobilization Plant (WTP) to process and immobilize the tank waste is ongoing. Additional projects are planned for the retrieval, transfer, and treatment of tank waste as well as for the storage and disposal of the WTP's immobilized waste products.

PROJECT MANAGEMENT

Based on the direction from EM Headquarters, the Office of River Protection developed the Tank Farm cleanup project lifecycle baseline and the Waste Treatment and Immobilization Plant Project baseline. These project baselines have undergone independent reviews, validation or certification to verify the reasonableness of the scope, cost, and schedule for each project.

An operating project’s certified near-term baseline reflects the identified scope that can reasonably be accomplished for the identified cost in the identified time period if near-term work scope is funded and contingency funds are provided as required during project execution. It also establishes the baseline as an acceptable point from which to track and control future change. The review and approval process accommodates any change in the EM complex, site priorities and funding plans. These changes could affect both near-term (within the next five years) and life-cycle cost, schedule and scope. Changes may be required to comply with applicable environmental legal obligations while maintaining essential functions necessary to protect human health, the environment and national security; reflect funding different from the baseline assumptions; incorporate technological advances; realize specific programmatic risks; or implement programmatic business cases. Because the cleanup extends beyond the near-term, out-year planning estimates (ranges) have also been developed and independently reviewed and determined to be reasonable.

The Waste Treatment and Immobilization Plant’s baseline was approved in accordance with DOE’s program and project management requirements in December 2006.

LIST OF PROJECTS

The Office of River Protection’s EM program consists of two projects, Tank Farm PBS ORP-0014 (Radioactive Liquid Tank Waste Stabilization and Disposition) and the Waste Treatment and Immobilization Plant PBS ORP-0060. The Near-Term Baseline (NTB) for ORP-0014 is from FY 2007 – FY 2012 and the Out Year Planning Estimate Range (OPER) is from FY 2013 through FY 2042. The WTP baseline covers all work required to complete design, procurement, construction and commissioning of the facilities by November 2019.

Project	Date Approved	
	Near Term Baseline (NTB)	Out Year Planning Estimate Range (OPER)
ORP-0014 – Radioactive Liquid Tank Waste Stabilization and Disposition	May 2007	May 2007
ORP-0060 – Major Construction – Waste Treatment Plant (LICP 01-D-416)	December 2006	

PROJECT SCOPE

ORP-0060 – Major Construction – Waste Treatment Plant

The scope of this PBS includes design, procurement, construction, and commissioning of the Waste Treatment and Immobilization Plant. This plant is critical to the completion of the

Hanford tank waste program by providing the primary treatment capability to immobilize (vitrify) the radioactive tank waste at the Hanford Site.

The Waste Treatment and Immobilization Plant is managed as a line-item construction project and is currently funded as five separate subprojects as follows: 01-D-16A Low Activity Waste Facility, 01-D-16B Analytical Laboratory, 01-D-16C Balance of Facilities, 01-D-16D High-level Waste Facility, and 01-D-16E Pretreatment Facility.

The Waste Treatment and Immobilization Plant's Pretreatment Facility will separate the radioactive tank waste into low activity and high-level waste fractions. The high-level waste fraction will be transferred to the High-Level Waste Facility for immobilization. The low-activity waste fraction will be transferred and immobilized (vitrified into glass) in the Low-Activity Waste Facility. The Analytical Laboratory will provide real-time analytical support for plant operations. The Balance of Facilities includes office facilities, chemical storage, site utilities, and infrastructure to support the main facilities.

By the end of FY 2010, significant progress is anticipated and the overall completion of the plant facilities is projected to be: Pretreatment Facility 54% complete, Low Activity Waste Facility 95% complete, High Level Waste Facility 57% complete, Balance of Facilities 67% complete, and the Analytical Laboratory 68% complete.

ORP-0014 – Radioactive Liquid Tank Waste Stabilization and Disposition

This PBS includes activities required to safely manage approximately 53 million gallons of radioactive waste stored underground in 177 tanks. Activities include waste retrieval, treatment, disposal and closure of the facilities. It also includes the operations and decontamination and decommissioning of the Waste Treatment and Immobilization Plant.

The radioactive waste stored in the Hanford tanks was produced as part of the nation's defense program and has been accumulating since 1944. Due to the age of the tanks, up to sixty-seven tanks are suspected of leaking a total of about one million gallons of waste into the soil. Continued leakage could threaten the Columbia River, located between seven and ten miles away. In order to protect the river, the waste must be removed and processed to a form suitable for disposal, and the tanks stabilized.

A Tank Closure and Waste Management Environmental Impact Statement is being prepared to determine how to close the waste storage tanks and address ancillary equipment below grade, and any residual waste that cannot be retrieved, as well as above ground facilities. Appropriate caps and barriers will be used to remediate the contaminated soil surrounding the tanks as required.

Significant activities during this project's NTB are: maintain tank farms in a safe and compliant manner, operate the 242-A Evaporator and 222-S Laboratory, perform mandatory tank farm project and facility upgrades, retrieve single-shell tanks, conduct single-shell tank integrity evaluations, upgrade tank farm infrastructure and facilities to support Waste Treatment and Immobilization Plant operations by 2019, evaluate supplemental treatment alternatives, construct interim surface barriers, remove hose-in-hose transfer lines, and initiate design of the Immobilized High Level Waste Storage Facility.

Corporate Performance Measure accomplishments that are projected to fall within the NTB are the “Legacy and Newly Generated Low-Level/Mixed Low-Level Waste” and “Liquid Waste in Inventory Eliminated” measures. It is estimated that 9,268 cubic meters of low-level waste will be generated/disposed of. In addition, 173 thousands of gallons of liquid waste in inventory will be eliminated during the NTB period.

PROJECT COST

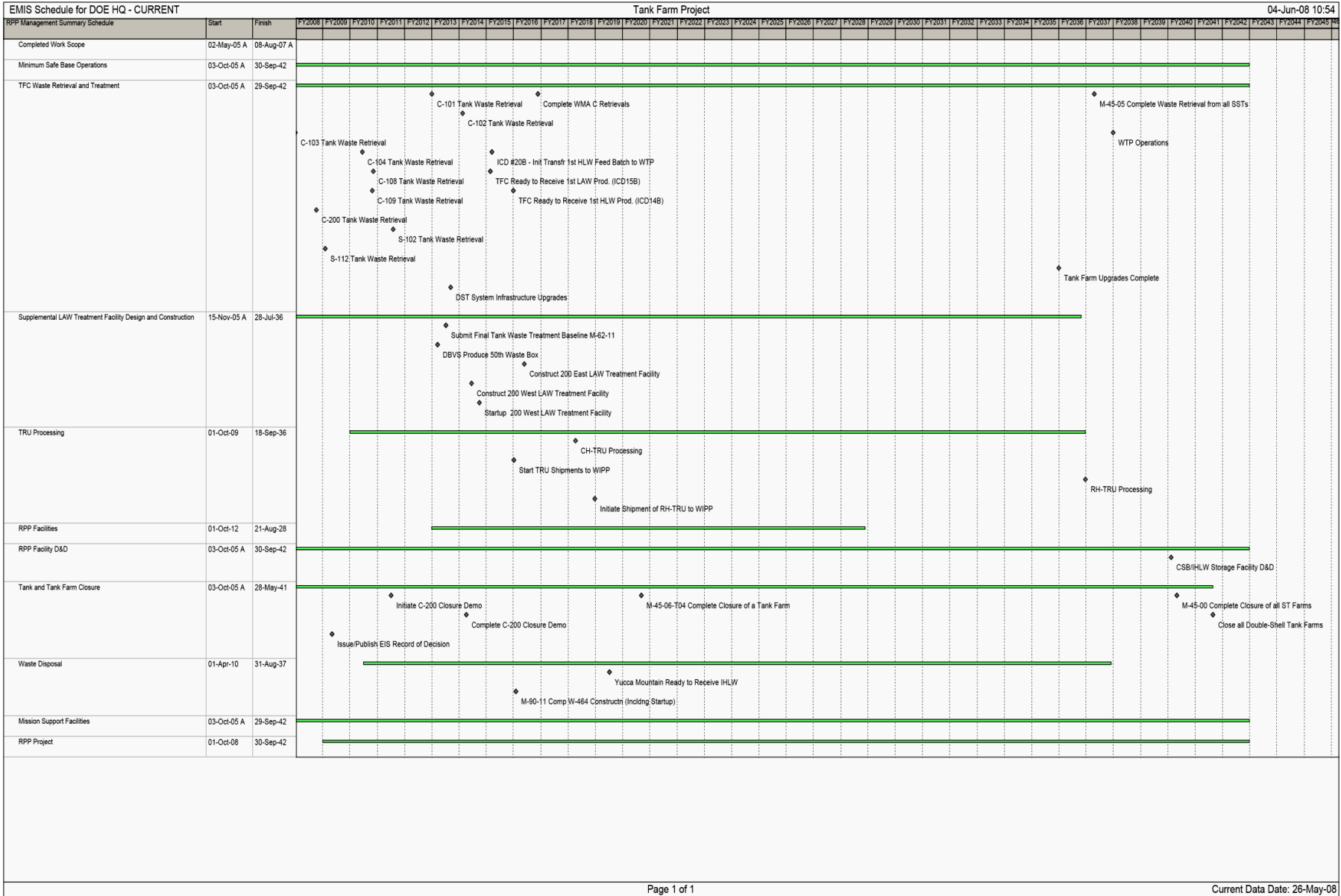
(dollars in millions)

Cost Element	Project Number	
	ORP-0014*	ORP-0060
1. Prior Year Costs (1997-2006)	\$3,525	\$3,389
2. Total Near-Term Baseline (50% Confidence Level)	\$2,330	
3. Unfunded Contingency - NTB	\$124	
4. Performance Baseline (80% Confidence Level)**	\$2,454	\$8,874
5. Out Year Planning Estimate Range	\$38,414 – \$56,227	
6. Total Life Cycle Cost	\$62,206	\$12,263

*Also includes HQ-HLW-0014X

**The WTP PBS ORP-0060 includes the contractor’s 80% confidence level baseline plus DOE Contingency

SUMMARY LIFECYCLE BASELINE SCHEDULE (Tank Farm PBS ORP-0014 and HQ-HLW-0014X)



SUMMARY LIFECYCLE BASELINE SCHEDULE (WTP PBS ORP-0060)

