



U.S. Department of Energy  
**Office of River Protection**

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**JUL 30 2008**

08-WTP-147

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HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER INTERIM MILESTONE M-62-01, "SEMI-ANNUAL COMPLIANCE REPORT FOR THE WASTE TREATMENT AND IMMOBILIZATION PLANT," FOR JANUARY 1 THROUGH JUNE 30, 2008

This letter transmits the U.S. Department of Energy, Office of River Protection, Semi-Annual Compliance Report (Attachment) required by Interim Milestone M-62-01 for the period January 1 through June 30, 2008. As stipulated in the M-62-01 Milestone, the attached report includes project summaries of accomplishments, issues encountered, and actions being taken.

If you have any questions, please contact me, or your staff may contact John R. Eschenberg, Project Manager, Waste Treatment and Immobilization Plant Project, (509) 376-3681.

Sincerely,

  
Shirley J. Olinger, Manager  
Office of River Protection

WTP:KLK

Attachment

cc: See page 2

JUL 30 2008

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08-WTP-147

-2-

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**U.S. DEPARTMENT OF ENERGY (DOE)  
OFFICE OF RIVER PROTECTION (ORP)  
SEMI-ANNUAL PROJECT COMPLIANCE REPORT FOR THE  
WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP)  
January 1, 2008 – June 30, 2008**



**U.S. DEPARTMENT OF ENERGY  
OFFICE OF RIVER PROTECTION  
2440 Stevens Center Place  
Richland, Washington 99354**

**June 30, 2008**

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## LIST OF ACRONYMS

AIP	agreement in principle
ANSI	American National Standards Institute
ASL	Approved Supplier List
BNI	Bechtel National, Inc.
BOF	Balance of Facilities
CDR	conceptual design report
CH2M HILL	CH2M HILL Hanford Group, Inc.
CY	calendar year
DAFW	days away from work
DCMA	Defense Contract Management Agency
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EFRT	External Flowsheet Review Team
EIA	Electronic Industries Alliance
EVMS	Earned Value Management System
FY	fiscal year
HFFACO	<i>Hanford Federal Facility Agreement and Consent Order</i>
HLW	High-Level Waste [Facility]
HPAV	hydrogen in piping and ancillary vessel
HVAC	heating, ventilation and air conditioning
IRP	Issue Response Plan
JHA	job hazard analysis
LAB	Analytical Laboratory
LAW	Low-Activity Waste [Facility]
NDE	nondestructive examination
ORP	Office of River Protection
P&ID	piping and instrumentation drawing
PAPR	powered air purifying respirator
PEP	Pretreatment Engineering Platform
PIP	Process Improvement Project
PJM	pulse jet mixer
PT	Pretreatment [Facility]
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RGM	revised ground motion
RPP	River Protection Project
SwRI	Southwest Research Institute
TCO	thermal catalytic oxidizer
WTP	Waste Treatment and Immobilization Plant Project

**U.S. Department of Energy, Office of River Protection**  
**River Protection Project – Waste Treatment and Immobilization Plant Project**  
**Semi-Annual Compliance Report**  
**Per Hanford Federal Facility Agreement and Consent Order Milestone M-62-01**

## 1.0 INTRODUCTION

A Semi-Annual Project Compliance Report (M-62-01P) that reflects the status of the U.S. Department of Energy (DOE), Office of River Protection (ORP) Waste Treatment and Immobilization Plant (WTP) Project is required by the *Hanford Federal Facility Agreement and Consent Order* (HFFACO) (Ecology et al. 1989) Milestone M-62-01. As detailed in M-62-01, this report documents for the period from January 1, 2008, through June 30, 2008, ORP's compliance with the HFFACO Milestone M-62-00 series requirements; updates WTP Project progress, activities, and issues relative to those milestones; and identifies activities expected in the near future.

**Hanford Site Background:** Hanford tank waste consists of approximately 53 million gallons of mixed hazardous waste containing 190 million curies of radioactive waste stored in underground storage tanks at the Hanford Site in Richland, Washington. This tank waste will be remediated through treatment and immobilization to protect the environment and meet regulatory requirements. DOE determined through the "Record of Decision for the Tank Waste Remediation System, Hanford Site, Richland, WA" (62 FR 8693) that the preferred alternative to remediate the Hanford tank waste is to:

- Pretreat the waste to prepare it for processing and vitrification;
- Immobilize the low-activity waste for onsite disposal; and
- Immobilize the high-level waste for ultimate disposal in the national repository.

**WTP Complex Description:** The River Protection Project (RPP) WTP complex is being designed, constructed, and commissioned for DOE by Bechtel National, Inc. (BNI) at the Hanford Site under DOE Contract No. DE-AC27-01RV14136.<sup>1</sup> The WTP will be designed, constructed, and permitted to treat and immobilize mixed hazardous waste to support the RPP mission.

The WTP complex will receive waste in batches from Hanford's double-shell tank system, operated by the Tank Farms Contractor (CH2M HILL Hanford Group, Inc. [CH2M HILL]), through a pipeline system interface. The pretreatment process will separate (or continue to refine) the waste into low-activity waste and high-level waste fractions for vitrification. The vitrification process will combine pretreated tank waste with glass-forming materials and melt the mixture into a liquid that is poured into stainless steel containers, where the hot glass cools and hardens. Each container will then be sealed in preparation for storage and permanent disposal. The dangerous waste and radioactive constituents will be immobilized in this durable

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<sup>1</sup> Contract No. DE-AC27-01RV14136 between the U.S. Department of Energy and Bechtel National, Inc., dated December 11, 2000.

glass matrix through the WTP process. The immobilized low-activity containerized glass waste will be disposed on site and the immobilized high-level containerized glass waste will be disposed at the national repository.

The WTP complex waste-processing facilities include the waste-separating Pretreatment (PT) Facility, the glass-making High-Level Waste (HLW) Vitrification Facility, and the glass-making Low-Activity Waste (LAW) Vitrification Facility. These process facilities are supported by the WTP complex Analytical Laboratory (LAB) for process testing and the WTP Balance of Facilities (BOF) for infrastructure and utility services.

This compliance report reviews each of the WTP Project functional areas, and the overall project. Financial data is through June 2008, unless otherwise noted. WTP Project status is also provided monthly through the Project Manager's Meeting and the Quarterly Milestone Review Meeting reports.

## 2.0 WTP PROJECT ACCOMPLISHMENTS AND ISSUES

### 2.1 Progress to Date

#### 2.1.1 ORP – Project Management

**Safety Record:** The WTP Project achieved 6 consecutive months (198 days and over 3.6 million hours) without a days away from work (DAFW) injury through June 2008. The calendar year (CY) 2008 cumulative recordable injury case rate total<sup>2</sup> through June was 1.17, compared to a rate of 1.51 in CY 2007 and to a rate of 1.72 for the same period in 2006. Although overall rates have improved, the recordable rates were uncharacteristically high in May and June 2008; there was a total of 12.

The declining recordable rate and absence of DAFWs continues to be encouraging. WTP management remains focused on safety through improvements in leadership, communication, and disciplined execution of existing programs, as well as continued implementation of workforce initiatives to achieve and sustain improved performance (see Section 2.2.5 for details).

#### 2.1.2 WTP Complex Design and Construction

**Project Overview:** Design for the WTP Project is 73% complete and construction is 37% complete (based on dollars). An average of 1,515 personnel (913 craft and 602 non-manual staff) work onsite, an increase of more than 650 staff since November 2007, yet still below the peak in March 2005 of 2,050 personnel.

Design, procurement, and construction activities continue at the LAW Facility, BOF, and LAB (LBL). The PT and HLW Facilities continued design and procurement and resumed construction following the Secretary of Energy certification to the Congressional Defense Committees that the Secretary had approved the final seismic and ground motion criteria based on Pacific Northwest National Laboratory's evaluation of the seismic response spectra from the Seismic Boreholes Project (SBP). Upon certification, the WTP Project Contracting Officer formally directed that the approved seismic criteria be used for the final design of the PT and HLW Facilities. BNI conducted and DOE oversaw readiness reviews for the PT and HLW Facilities to ensure that construction activities could be resumed safely and efficiently. Construction activities resumed at the HLW Facility on August 23, 2007, and at the PT Facility on December 18, 2007.

Due to the construction hold at the PT and HLW Facilities, consideration has been given to the concept known as "Start LAW First" where the LAW Facility would start operations in 2014, approximately five years earlier than the WTP PT and HLW Facilities. The LAW Facility is designed to receive pretreated feed from the WTP PT Facility in accordance with its waste feed specifications. Therefore, alternate tank farm-based pretreatment facilities are needed to

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<sup>2</sup> Recordable injury case rate total = Number of cases times 200,000 divided by cumulative hours; (Per OSHA, 200,000 represents the number of hours 100 employees working 40 hours per week, 50 weeks per year would work; this provides the standard base for calculating incidence rates.)

implement this concept. This concept received a Critical Decision (CD)-0 in December 2007. No decision to start operations of LAW early has been made; however, the WTP Project has developed a revised baseline schedule to evaluate this strategy.

Issues associated with the maturity of technology in the WTP design have been evaluated by independent DOE Review Teams and in DOE's design oversight process. The most notable evaluation was the "Comprehensive External Review of the Hanford Waste Treatment Plant Flowsheet and Throughput" (CCN 132846) completed in March 2006 by the External (Expert) Flowsheet Review Team (EFRT). The EFRT was a team of external, distinguished senior professionals from private industry and academia that BNI commissioned in December 2005 to evaluate the technological aspects of the WTP process and evaluate whether the plant will operate as designed. The EFRT identified 28 separate technical issues, some of which had not been previously identified by either BNI or DOE. Three additional issues were raised by an internal ORP review. A number of these issues originated from limited understanding of the technologies that comprise the WTP flowsheet. In response, BNI developed Issue Response Plans (IRP) for each of the major issues. A Technical Steering Group was formed collaboratively between DOE and BNI to develop issue closure criteria and accept the data object quality evidence verifying the closure of the EFRT identified issues to date. DOE reviewed and approved the IRPs as they were completed; 23 of these implementation plans have been closed. (See Section 3.1 for further discussion.)

**Pretreatment Facility:** The PT Facility is moving forward since lifting the construction hold imposed while uncertainties concerning seismic design criteria were resolved. Design is approximately 65% complete with construction approximately 24% complete. Since resumption of construction, PT construction activities have been focused on the civil/structural features at the west end of the facility. Three wall sections between the 28' and 56' elevations have been placed; only one more wall section remains to be placed at this elevation.

Many of the EFRT issues impacted the PT Facility, and while construction was suspended, the project made good progress resolving these issues. EFRT issue M-2, "Mixing Vessel Erosion," is nearing resolution. Six out of eight planned tests have been completed and the results from these tests show that the original design includes adequate allowance for erosion. If the remaining tests reflect the same results, there will be no need to add wear plates to a number of vessels. With the exception of cooling jackets, pulse jet mixer (PJM) cones, and vessel nozzles installation, vessel fabrication has been on hold pending resolution of technical and permitting issues surrounding safety margins for erosion. With the favorable results from the erosion testing, DOE has requested that the Washington State Department of Ecology (Ecology) release the hold they have placed on vessel fabrication. Ecology is currently considering DOE's request.

The most technically challenging activity is the waste leaching and ultrafiltration processes to be performed in the PT Facility (EFRT issue M12, "Undemonstrated Leaching Process"). In order to test these processes, a 1 to 4.5 scale-test platform, referred to as the Pretreatment Engineering Platform (PEP), was designed, fabricated, and assembled to ensure the facility can effectively process the range of waste streams the WTP will receive from the tank farms. Now that the PEP assembly is complete, site integrated testing has been initiated; Phase 1 testing is expected to

begin in October 2008 and be complete by December 2008. (See Section 2.2.4 for further discussion.)

In response to EFRT recommendations, BNI is evaluating the issues of line plugging and mixing in the various systems within the PT Facility. Line plugging testing has been completed and engineering is using the data from these tests to confirm line and pump sizing in the PT Facility. BNI has completed analysis of the PT vessels and developed mixing requirements for each vessel. Based upon this work, DOE has determined there are no mixing concerns for a third of the vessels. An IRP is being completed for the remaining vessels. However, approximately six of the vessels appear to have issues that may cause them to be incapable of meeting the technical requirements for mixing as currently designed. These issues are being investigated. Design changes or operational limitations may be necessary to ensure the vessels meet all requirements.

Other technical issues being resolved relative to the PT Facility include PJM overblow, capacity modifications, as well as incorporating the revised ground motion (RGM) into the PT summary structural report. BNI has determined that there is a possibility that more than one PJM could overblow simultaneously; this is referred to as a multiple overblow (MOB). In order to validate the current design criteria, testing was completed on two different configurations. The testing subcontractor has converted the data into hydrodynamic loads to be used by the vessels designer to ensure that the vessel internals are properly sized to resist these forces.

DOE has directed BNI to proceed with a number of facility modifications to increase the WTP capacity. The major changes involve increasing the size of the ultrafilters, modifying process vessels to allow leaching to be initiated earlier in the process and at a higher temperature, and increasing the capacity of the cesium ion exchange columns. BNI initial analysis concluded that the 100°C temperature requested by DOE could increase vessel corrosion. A panel of corrosion experts, referred to as the "Blue Ribbon Panel," was assembled to do further evaluation of the corrosion concern. Preliminary conclusions by the panel indicate that the PT process should be limited to 90°C or below if the stainless steel vessels designed for the facility are to be used. The panel also indicated the vessels would have to be fabricated from Hastelloy if operating temperatures are to be maintained at 100°C. BNI is performing modeling to compare a number of different operating and physical parameters that could resolve the concern.

BNI is currently reviewing the PT Facility summary structural report and expects to finalize the report pending receipt and resolution of any Defense Nuclear Facilities Safety Board (DNFSB) staff comments.

Civil/Structural Engineering continued work on the design of the concrete walls and slabs at and above the 56' elevation in the building; the last of the concrete drawings required for the 56' elevation has been released.

Mechanical Systems Engineering is actively working on revision of the piping and instrumentation drawings (P&ID) for the facility based upon resolution of a number of technical issues. They released draft versions of these drawings earlier in order to allow Plant Design to continue preparing the isometric drawings for piping. The isometrics cannot be released until the P&IDs have been officially released.

BNI's assessment program identified recurring problems with the lack of nondestructive examination (NDE), material test reports, and configuration management of both commercial material and "Q" piping spools to be installed in black cells at the WTP. Over 95% of the piping spools (prefabricated piping segments) in question are for the PT Facility (the remainder belongs to the HLW Facility). These issues require inspection of approximately 17,000 piping spools before the pipe spools can be cleared for installation in the black cells. BNI completed a root cause analysis and concluded there were two root causes for this problem:

- The Project did not establish processes to ensure that the supplier understood and would implement enhanced requirements for black cell piping.
- The Project did not have an adequate process to recognize the importance, significance, and consequences of previously identified issues.

Engineering revised its procedures to correct the problems identified and resumed design of piping spools after the engineers on the new procedures were trained. BNI also met with pipe fabricators and walked through the new procedures with them to ensure that it was clear which pipe spools must meet black cell requirements. Following these meetings, the suppliers were selectively released to resume fabrication of piping. (See Section 2.2.6 for further discussion.)

**Low-Activity Waste Vitrification Facility:** Engineering design is approximately 94% complete and construction is approximately 60% complete. Construction continues to focus on installing piping, mechanical equipment, heating, ventilation and air conditioning (HVAC), and electrical components throughout the facility. Subcontractors are working on coatings, fire protection, and partition walls.

The first component turnover from construction to startup was achieved on February 11, 2008, for the process cell crane (Crane 8). In mid-April 2008, BNI's Startup organization initiated functional tests on Crane 8 to verify the crane would perform according to the manufacturer's requirements for turnover to Construction for "beneficial use" as a construction aid. Crane 8 is the bridge crane over the process cells for the LAW Facility. Testing and training is expected to be complete this summer. This activity along with other ongoing BOF turnover activities has culminated in extensive efforts to establish the system/component startup and test program, process and procedures, including extensive lessons learned and maturation of completion requirements for engineering, procurement, and construction. Crane 8 will be used to help set process cell bulges, which arrived at the site in June 2008. A bulge is considered to be a complex pipe header in a secondary containment (tank) that helps to direct fluid flow to various locations.

BNI is developing a conceptual design report (CDR), which will identify requirements to support processing of low-activity waste in 2014. BNI is determining the requirements for early low-activity waste processing, such as utility requirements, fencing, specific piping changes, etc. that are required for operating the LAW Facility without the pretreatment system being on line. CH2M HILL is preparing the other component of this effort, a technology evaluation for an interim pretreatment system that would be required until the pretreatment system is brought on line. The CDR will be completed by the end of 2008.

Title II Engineering<sup>3</sup> is approximately 94% complete. The baseline change proposal that identifies Title II and Title III activities is under review. Title II milestones will be incorporated into the baseline schedule for more accurate tracking. Title II design encompasses the initial release of designs needed for construction teams to construct the facility. While there will still be significant field engineering, completion, and review of vendor designs, Title II design complete for the LAW Facility is scheduled for later this year and is a significant project-level milestone.

Important milestones achieved this year include the completion of 22,500 linear feet of pipe at all elevations, completion of the C2 Fan Room slab, complete installation of roof steel and interior crane maintenance platforms for the export bay, and complete installation of the partition walls in the C5 filter and exhaust fan rooms to support release of the area for electrical equipment and raceway used to support cable installation. (A raceway is a partially-enclosed electrical conduit covering surface-mounted wiring.)

The critical path for LAW continues to be procurement and installation of the offgas treatment unit operation components including the thermal catalytic oxidizer (TCO). The forecast schedule indicates a potential six-month delay to the milestone for construction completion; however, BNI has not investigated all of the potential mitigation actions. BNI has been providing many types of assistance to the fabricator of the TCO including project management, special welding, buying, and quality expertise. This is a key unit operation to the secondary offgas system as it reduces the NO<sub>x</sub> formation in the melter exhaust gas.

**High-Level Waste Vitrification Facility:** Design for the HLW Facility is approximately 84% complete and construction is approximately 19% complete. HLW Facility construction and engineering activities have moved forward at a steady pace since resumption of construction in August 2007. The number of craft personnel has increased steadily with more than 170 currently supporting placement of concrete walls and steel beams for slabs and installation of other commodities. Over 3,000 cubic yards of concrete have been placed and 40 tons of structural steel erected to support construction efforts at various elevations of the facility. Installation of forms, decking, rebar, piping, HVAC duct, cable tray components, and beam clips is ongoing.

Since December 2007, numerous engineering documents have been completed to support construction activities including seismic report revisions, revised drawings, specifications, calculations, and datasheets. Updates and design verifications of the lighting electrical system panel template update, low voltage emergency power distribution equipment, uninterruptible power supply distribution system, and process and mechanical handling closed-circuit television (CCTV) system were completed. Two HLW Canister Export Handling System jib cranes were successfully tested enabling the painting process to begin.

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<sup>3</sup> Title II Engineering is the preparation of all drawings and specifications necessary to construct and procure components for construction.

The HLW Facility summary structural report incorporating RGM was issued and forwarded to DNFSB staff in early 2008 completing one of the key deliverables towards closing DNFSB issues with the facility structural design.

In April 2008, the silver mordenite crane was set on the crane rail and the pour tunnel bogies, which transport canisters to and from the melter when filling canisters with glass, were received onsite, thus meeting the DOE gatepost milestone ahead of schedule.

The vendor resumed design of the Autosampling System in May 2008. Reviews of vendor submittals have been completed for the crane/power manipulator for the HLW Filter Cave Handling System and the mechanical sequence diagram for the HLW Canister Decontamination Handling System, adjustable speed drives, and canister rinse bogies. Equipment and environmental qualification datasheets for accident temperatures and other parameters were completed and forwarded to equipment vendors.

In May 2008, ORP performed an assessment of BNI Computational Fluid Dynamics to ensure adequacy of the process and assumptions. A final report is expected in July 2008.

Delivery of the melters has been delayed until RGM evaluations are completed (this delay does not impact the project schedule). Verification of existing welds, material thickness, and refurbishing of the melter shield doors continues. This follows an evaluation that revealed some of the doors lacked sufficient weld inspection documentation and traceability (by a former vendor).

**Balance of Facilities:** Overall design for BOF is approximately 74% complete and construction is approximately 62% complete. There is significant work being done on the Cathodic Protection System, which requires many excavations throughout the project to connect cables to the array of anodes buried in the ground. Cathodic protection is a technique to control the corrosion of a metal surface; the Cathodic Protection System is being built to help protect the underground piping throughout WTP. Most of this system should be installed by the end of the calendar year. This system is planned to be the second system turned over to startup.

Process service water line hydrostatic tests and installation were completed on the north side of the PT Facility in January 2008.

In February 2008, crews finished placing the melter assembly pad on the south side of the LAW Facility. Construction forces substantially completed the steam plant building. Some issues with providing increased safety during operations are still being evaluated. These include the requirements for double block and bleed valves in order to isolate steam lines during maintenance activities. By late August 2008, BNI is expected to present a resolution once they complete their evaluation of all the steam pipes that will require this upgrade.

Ammonia facility equipment plant design modeling, which precedes detailed design work, was completed. Detailed design work and engineering of this facility is ongoing.

In March 2008, BNI construction turned over a majority of the Fire Service Water Storage and Distribution System to the Startup organization. This was the first major system turned over from construction to startup and many lessons were learned as a result of the turnover process. These lessons learned will be utilized to aid in future turnovers. Currently, the system is being flushed; testing will commence prior to the system becoming fully operational. Activation of this system will enhance the site's fire suppression abilities during the rest of construction.

Controlled density fill has been placed over the last radiation lines between the HLW and PT Facilities. The final slope adjustment for the radiation transfer lines in the 4X trench was completed.

The Chiller Compressor Plant is on track for completion as crews continue to install and energize temporary power to the building's lighting transformer and panel. Electrical cable is being pulled from the motor controllers to the Plant Service Air System compressors and installation of small and large bore piping is progressing.

Procurement and technical issues regarding silo deliveries for the Glass Former Facility have been resolved. On March 24, 2008, an 80-foot tall glass former silo was installed at the WTP. The silo, which will store and dispense silica during vitrification operations, weighs 78,100 lb and is the tallest of the 13 silos needed at the plant. To date, nine silos have arrived onsite and have been installed. Each of the 13 silos will hold a different glass-forming material that will be dispensed to the WTP vitrification facilities in the proper combinations for each batch of glass.

**Analytical Laboratory:** LAB design is approximately 89% complete while construction is approximately 50% complete. Construction forces set the last duct section in the LAB exhaust stack and will continue assembling the remainder of the structural steel that supports the stack. Erection of the stack is scheduled for mid-July. The lower section of structural steel on the LAB exhaust stack was removed from the LAB in June 2008 to finish its construction and to allow installation of the exhaust ducts. The subcontractor completed leak testing the C-2, C-3, and C-5 ducts and construction crews placed the C-3 duct inside the stack's structural steel on May 28, 2008. Installation of the remainder of the structural steel and ductwork is continuing. Abrasive-blasting and coating of the remaining stack structural connections will resume.

Crews finished installing the three south-side ventilation intake louvers and welding the platform stand for the decontamination glovebox located in the radiological maintenance room. Installation of the sprinkler piping at the northeast corner on the 17' elevation was completed. Crews continue to install hot-cell partition walls, electrical cable tray hangers, multi-commodity steel, ductwork, and pipe hangers. The hot cell stainless steel liner plate is nearly completed with the exception of the north end construction entrance. Installation of hangers continues for the C-2 and C-3 ducting in the north center area of the LAB. Work also continues on coating application on the stack, fire protection sprinkler piping, and interior partition walls.

Engineering has reviewed and released 87 HVAC supports for the subcontractor that is installing the commercial grade HVAC in the LAB. Installation of hangers for C-2 and C-3 ducting in the north center area continues along with installation of hot cell partition walls and liner plate, multi-commodity steel, permanent lighting conduit, and pipe hangers. Other construction

activities included installation of interior partition walls in Planning Area 23 and coatings in Planning Areas 22, 24, and 32.

Milestones completed during this period include completion of the instrument database, issuance of the final control and instrumentation (C&I) conduit design, and completion of structural steel fireproofing. The facility was also fully enclosed, with the exception of some trim work and the construction openings; these openings are still being used to bring materials and equipment into the facility.

### 2.1.3 Commodities Installations

Based on the construction activities, the total WTP Project commodities placed or installed through June 2008 are summarized in Table 1.

**Table 1. Key Commodity Quantity Progress**

Quantity Progress	Current Planned at Completion Quantity	Installed To-Date Through June 2008	Percent Complete
Concrete	260,500 cy	176,000 cy	67.6%
Structural Steel	35,920 ton	11,790 ton	32.8%
Piping (in buildings)	888,550 ft	131,290 ft	14.8%
Piping (underground)	125,100 ft	94,270 ft	75.4%
Conduit (in buildings)	782,650 ft	82,160 ft	10.5%
Conduit (underground)	187,810 ft	177,710 ft	94.6%
Cable Tray	96,180 ft	17,430 ft	18.1%
Cable and Wire	4,743,230 ft	198,170 ft	4.2%
Heating, Ventilation, and Air-Conditioning Ductwork	4,181,980 lb	847,300 lb	20.3%

### 2.1.4 Environmental Permits Required for Start of Construction

**Permitting and Licensing:** DOE and BNI continue to work with state and federal regulatory agencies to maintain permits, licenses, and authorizations needed to support WTP construction and commissioning. Permits required to support construction are in place. Permit modifications and revisions on evolving engineering designs are required and submitted on an ongoing basis. Non-radioactive and radioactive air permit applications containing updated design information have been approved: The Washington State Department of Health approved the radioactive air permit in June 2006, and Ecology approved the non-radioactive air permit in December 2006.

In October 2006, Ecology released a proposed permit modification to reflect the change in plant design to two HLW melters and two LAW melters and other changes (i.e., 2+2 modification).

The public comment period ended January 5, 2007, and ORP and BNI provided comments on the proposed permit modification. Ecology issued their final permit decision and related comment responsiveness summary on October 28, 2007. DOE filed an appeal to Ecology's final permitting decision, specifically appealing two of the new permit conditions:

- Application of the High-Level Vitrification Land Disposal Restriction; and
- Requirement for DOE to ensure all waste streams generated at the WTP do not contribute to an exceedance of unspecified environmental standards on disposal at the Hanford Site.

The appeal has been resolved in principle and the parties are in the process of filing the appropriate documents with the Pollution Control Hearings Board.

The Dangerous Waste Permit includes a compliance schedule (*Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Chapter 10, and Attachment 51, "Waste Treatment and Immobilization Plant" [Ecology 2007]*) that requires the submittal of engineering and operational information. Commodity growth, performance deterioration in engineering and construction, hydrogen buildup in piping and ancillary vessels in the PT Facility, difficulty in mixing heavy fluids in the PT Facility, revised seismic criteria affecting structural design of the PT and HLW Facilities, and a reduced fiscal year (FY) 2006 funding level all contributed to increased project costs and schedule extension. In the December 2006 approved baseline, the estimated completion date for hot commissioning is May 2019. As a result, the remaining scheduled compliance schedule item listed in Table 2 will not be met.

**Table 2. Compliance Schedule Items**

Item Number	Description	Due Date
32.	Final Compliance Date.	02/28/2009

The following Dangerous Waste Permit Compliance Schedule item was due this reporting period and was missed.

**Table 3. Dangerous Waste Permit (RCRA)  
Compliance Schedule Items**

Item Number	Description	Due Date
1.	Submit documentation stating the WTP has been constructed in compliance with the Permit.	03/01/2008

## 2.2 Near-Term Issues

### 2.2.1 Earned Value Management System (EVMS) Certification

On March 4, 2008, the Secretary of Energy certified the BNI WTP EVMS and notified Congress of this action. The certification process started in November 2006, when BNI underwent an

EVMS certification review conducted by the Defense Contract Management Agency (DCMA) against the 32 elements of American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA)-748, *Earned Value Management Systems*. The EVMS review resulted in eight corrective action requests, three major and five minor findings, and three continuous improvement opportunities. In February 2007, BNI submitted its Corrective Action Plan for review. In May 2007, Tecolote Research, Inc, a nationally recognized firm now contracted by DOE to conduct EVMS certifications, conducted a follow-up review; Tecolote delivered its report to DOE on July 2, 2007. Tecolote agreed the previous DCMA findings had been successfully resolved and that BNI's EVMS meets the intent of the ANSI standard.

The FY 2007 Congressional language was amended in the *National Defense Authorization Act for Fiscal Year 2008*, Section 3115, allowing an "independent entity" to review and assess DOE project earned value metric systems. The BNI WTP EVMS assessment was completed in July 2007 and through that process the system was deemed ANSI/EIA-748 compliant.

This issue is closed.

### **2.2.2 Pulse Jet Mixers Design Closure**

New PJM testing is planned to address mixing concerns identified in the EFRT review of WTP. The work is defined in the EFRT IRP for issue M3, "Inadequate Mixing." PJM testing activities will be performed in scaled mixing platforms to: (1) demonstrate re-suspension of settled waste solids of Newtonian slurries<sup>4</sup>; (2) determine mixing times for various vessel mixing functions; (3) determine if a hydraulic "short circuit" could occur in non-Newtonian slurries, which would cause insufficient mixing; (4) confirm post-design basis event mixing of vessels; and (5) demonstrate that normal process mixing successfully meets the flowsheet mixing requirements. The schedule for the various related activities is detailed in the M3 IRP. The IRP is being revised to include the mixing issues identified in the ORP Technology Maturation Plan. Frequent meetings are being held between ORP and BNI to agree on the path forward.

### **2.2.3 Hydrogen in Piping and Ancillary Vessels (HPAV)**

There is concern regarding hydrogen detonations within WTP piping systems due to accumulations of flammable concentrations of hydrogen gas in piping and ancillary (small) vessels at the WTP, and designing safety controls to mitigate such events. The potentially flammable gas mixtures will be radiolytically and chemically generated, and ignition of significant accumulations is conservatively assumed. WTP is currently identifying and designing controls to prevent/mitigate hydrogen detonations. Where there is no potential for secondary impacts (i.e., impacts to adjacent important-to-safety components), detonations are allowed. However, where there is potential for secondary impacts, controls have been implemented to prevent detonation. Detonations are allowed in small piping, if it can be shown by analysis or testing that the piping system (pipe including hangers and supports) response to a detonation is elastic (i.e., no deformation). Safety controls are developed to prevent/mitigate detonations that result in an inelastic response regardless of pipe size.

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<sup>4</sup> Newtonian slurry has a low-viscosity like a liquid whereas non-Newtonian slurry has a higher viscosity like a sludge.

BNI has identified safety controls to address this concern. These include new and revised design features (active and passive), and administrative controls to prevent the accumulation of hydrogen concentrations that could cause detonations and deflagrations large enough to deform the piping or ancillary vessels. On June 19, 2008, ORP approved three Authorization Basis Amendment Requests (ABAR), 05-0040, 05-0041, and 07-0146, to address these control strategies (08-NSD-018).

An HPAV database was developed that provides an electronic filing system to document final system designs meeting HPAV safety criteria. The HPAV database also provides a design tool that can be used to evaluate proposed systems changes to ensure the proposed design meets the safety criteria. The database is maintained with and concurrent to the design as it evolves. The final systems design may include either passive or active controls or a combination of the controls. The HPAV database documents for each route analyzed the controls selected to prevent or mitigate HPAV events. There are roughly 3,600 routes in the HPAV database, documenting the analysis and required controls for 330,000 linear feet of pipe.

The most significant outstanding technical concern is designing the associated pipe hangers and supports to withstand the associated reaction loads from these detonations and deflagrations. Because there is little experimental data regarding such loads, ORP has contracted with CalTech to conduct experiments to measure prototypical detonation loads on pipe hangers and supports. Testing commenced in June 2008 and includes three testing phases to be completed by February 2009. In addition, BNI has also contracted with Dominion Engineering, who subcontracted to Southwest Research Institute (SwRI), to perform HPAV testing. ORP, BNI, Dominion Engineering, and SwRI met at CalTech on June 4 and 5, 2008, to ensure that the two testing programs were integrated to address remaining HPAV issues and determine the level of conservatism in the current design bases. BNI will use the test data and evaluate any impacts (e.g., reduction in classification of systems, structures, or components) on the safety analysis and design. Follow-up experiments, analysis, and design of the associated pipe hangers and supports are expected to extend into early CY 2009.

#### **2.2.4 Ultrafiltration System and Leaching Process Design**

The EFRT raised issues consistent with ORP's conclusions in its 2004 design oversight of the ultrafiltration system. EFRT Issue M12, "Undemonstrated Leaching Process," concluded the ultrafiltration system and leaching process have not been demonstrated beyond small-scale laboratory tests. In response, BNI is performing modeling to develop optimum ultrafiltration system operating approaches, testing tank waste samples using the optimized flowsheet, developing simulants, and testing the ultrafiltration flowsheet with an integrated engineering scale system referred to as the Pretreatment Engineering Platform (PEP).

The PEP is a 1:4.5 scale non-radioactive integrated test of the WTP ultrafiltration system. The PEP will demonstrate the ultrafiltration system, leaching process design, system scale-up, and improve projections of system capacity. The PEP was designed and fabricated in a number of modules, referred to as skids, at the subcontractor's facility in Carlsbad, New Mexico. The skids were trucked as completed to the Hanford Site, where they have been assembled into a completed test facility. The final skid was delivered in April 2008, and mechanical and electrical

installation of the PEP equipment skids was completed ahead of schedule. Component testing has been initiated and is moving ahead. Site integrated testing will be followed by integrated water testing and simulant shakedown tests (scheduled for completion in October 2008). Phase 1 testing will begin in October and is scheduled for completion in December 2008. Phase 1 testing will consist of four integrated tests. These tests will provide critical information needed to confirm ultrafiltration system design by demonstrating caustic leaching, oxidative leaching, solids washing, and process control strategies. Evaluation of this data in conjunction with other laboratory testing and modeling will confirm ultrafiltration system design and provide improved estimates of system capacity and projection of mission duration. During testing, the PEP will process a non-radioactive waste stimulant developed by Pacific Northwest National Laboratory. The PEP stimulant will demonstrate all aspects of sludge solids concentration and the sludge treatment flowsheet (e.g., caustic and oxidative leaching, filtration, filter cleaning).

### 2.2.5 Safety Culture/Safety Improvement Strategy

The WTP Safety Improvement Strategy focuses on:

- Demonstrating management's commitment to safety
- Communicating Project safety goals
- Ensuring employee involvement
- Making programmatic improvements

The following initiatives are examples of ongoing WTP efforts to reduce the frequency rates of general worker injuries:

- A major effort in 2008 is the Construction Ergonomics Initiative. BNI has had a stretching and office ergonomics program since inception, but not a full construction-based ergonomics program. Starting in 2007, Safety Assurance commissioned a Six Sigma Process Improvement Project (PIP) on construction ergonomics. BNI completed work on the Six Sigma PIP in late 2007. The final product of the PIP led to the finalization, approval, and issuance of the *WTP Ergonomic Program* (24590-WTP-PL-SA-08-0002) in February 2008. BNI finalized the PIP report and implementation plan in March. Preparation of an implementing procedure and guide is underway.
- Craft Safety Representative (Building Trades Union Representatives) program to improve acceptance of safety initiative at the implementation level by soliciting increased craft participation in the safety process.
- Revisions to the job hazards analysis (JHA)/safety task analysis risk reduction talk (STARRT) process. Revisions include improving the WTP hazard analysis process via use of a multi-discipline team to conduct the following:
  - Review scope of work
  - Conduct walkdown(s) of the work area
  - Analyze hazards and development of a JHA (including review of lessons learned data and Material Safety Data Sheet (MSDS) of products used during the work activities).

Revisions also include improving records to support the hazard identification and mitigation process.

- Instituting pre-job and annual physical evaluations to detect pre-existing conditions. As a consequence, individuals with, or predisposed to, types of injuries (e.g., hernias) are identified and treated before the condition becomes a “workplace injury.”
- Improving subcontractor safety performance evaluation and trending analysis processes.
- Upgrading double-eye protection while grinding from “face shield and safety glasses” to “face shield and goggles.” The analysis indicated that raising the face shield resulted in particles falling into the welder’s eyes. This is mitigated by using supplemental eye protection.

Because of the difficulties presented with goggles and prescription eyewear (primarily vision and fogging), WTP has worked to find solutions that work for a greater portion of the workforce. One solution that is both popular and safer is the use of helmet-powered air purifying respirators (PAPR). The PAPRs provide excellent eye and respiratory protection and allow the use of prescription glasses as well as the constant flow of air prevents fogging. The double-eye protection policy and the use of PAPR respirators have eliminated grinding-related eye injuries.

- A trend noted from a review of 2007 injury data is the number of recordable injuries resulting from the performance of routine activities such as walking, bumping body parts on overhead and other protrusion hazards, bending, and lifting. Specifically, 30 of the 40 recordable cases, or 75%, resulted from routine activities. Work planning does not typically address these activities. The converse of this finding is that most of the work performed is well-planned and effectively controls the hazards. BNI will study this condition in more detail to identify the efforts needed to minimize injuries.

### 2.2.6 Quality Issues

**Preservation Maintenance Program:** BNI completed the program improvements for maintenance required by its contract that involved the Federal Acquisition Requirements (FAR). The new set of procedures has been reviewed and approved for preservation and maintenance and provides an adequate program from the time of receipt of the project until the commissioning program starts. At that time, the operational program maintenance under the maintenance implementation plan will take over as is provided in the contract and the Standards Requirement Document. BNI is now in a six-month effectiveness period that ends in January 2009, at which time BNI will perform a management self-assessment and provide it to DOE. DOE will in turn make an independent assessment of effectiveness upon receipt of BNI’s assessment and consider closing the finding. This should be complete in the second quarter of FY 2009.

**WTP Black Cell Pipe Spool Issue:** BNI’s Safety Requirements Document and specifications required black cell pipe shop and field welds to include 100% radiography and positive material identification (PMI) examination. However, neither piping isometric drawings nor the procurement specifications contained sufficient information for pipe fabricators to differentiate black cell spools from non-black cell spools until June 2005. Black cells are areas where access

will not be available after completion of construction because the areas will be sealed off for the life of the facility. BNI has discovered that some black cell pipe spools were shop-fabricated and sent to the WTP Project without the required examinations. BNI completed a formal root cause analysis and issued a revision to the report in response to ORP comments. BNI is currently reviewing black cell pipe spool procurement information to determine extent of condition and corrective actions. In addition, BNI and ORP are reviewing the examination requirements for pipe spool welds that are inaccessible because of high-radiation hazards-designated hard-to-reach piping and components. Special examination of this inaccessible piping was not specifically required by the contract but may be necessary to ensure plant reliability. The proposed inspection requirements for hard-to-reach piping and components are equivalent to the black cell. Of the total inventory of 17,000, BNI has identified, to date, about 2,105 black cells and hard-to-reach spools that will require additional verification to meet the necessary requirements. None of these spools are installed at this time. A majority of the spools are on hold at the Marshalling Yard. Spools located on site are tagged and/or segregated. Additional corrective actions have been taken including updating isometric drawings to provide specific designation of black cell spools, proposing clarification of NDE requirements into the Basis of Design, and updating sub-tier project documents. ORP is closely monitoring BNI's actions and will verify that the required examinations are performed.

**WTP Fire Protection with DOE-STD-1066-97, *Fire Protection Design Criteria*:** In July 2008, ORP and BNI will conduct a review of the proposed fire protection features to reach agreement on the controls selected and analyses necessary to comply with DOE-STD-1066. The DOE, Office Environmental Management will participate in the review. DNFSB staff are expected to observe to better understand the path forward.

**WTP Structural Steel Fire Protection (Update):** ORP continues work to address DNFSB's concerns for the WTP structural steel fire protection. Calculations have been provided to DNFSB staff demonstrating that the progressive structural collapse of the WTP during and after a fire is not an issue. DNFSB found these calculations acceptable. ORP and BNI have also drafted a technical approach paper that is currently undergoing review. The paper will be formally submitted to the DNFSB by August 1, 2008.

**WTP Thin Metal Welding Pause Update:** On February 14, 2008, BNI lifted its August 23, 2007, thin metal welding work pause. This work pause affected any welding of material less than 1/8-inch thick after determining the Weld Control Manual and engineering specifications did not contain provisions to weld metals thinner than 1/8 inch thick. After obtaining concurrence from ORP, BNI revised its engineering specification for welding structural carbon steel to allow WTP Construction to take exception to the American Welding Society (AWS) D1.1, *Structural Welding Code—Steel*, lower metal thickness requirement of 1/8 inch. BNI also revised a number of welding procedures to reflect metal thicknesses less than 1/8 inch and have qualified or re-qualified applicable welders to the American Society of Mechanical Engineers (ASME) Section IX requirements. No rewelding was required. This issue is closed.

**Structural Steel Fabricator Sub-Tier Supplier Qualification Issue:** In April 2007, BNI and ORP concluded that one of the main subcontractors did not meet the minimum NQA-1

requirements for procuring steel for fabrication of safety-related structural steel members. BNI did authorize the fabricator to ship non-safety related structural steel members to the WTP for use at the LAB. No safety-related steel members were received from this fabricator. Prior to returning this fabricator to BNI's Approved Supplier List (ASL) for potential future fabrication of safety-related structural steel members, the fabricator was required to improve its overall quality program including improving procedures and recordkeeping to address this and other quality issues. The fabricator implemented improvements in their programs and, in December 2007, BNI performed a fabricator site survey and verified these improvements were adequate and placed the fabricator on BNI's inactive ASL for potential future fabrication of safety-related structural steel members. ORP performed a follow-up site visit of this fabricator on January 29, 2008, and confirmed the fabricator had addressed BNI and ORP issues and that their quality program improvements were adequate. This issue is closed.

### **3.0 ACTIONS TAKEN OR INITIATED TO RECOVER ANY AGREEMENT SCHEDULE SLIPPAGE**

#### **3.1 Actions and Status: External Review of Process Flowsheet**

EFRT issue resolution has focused on near-term project impacts. To date, 23 of the 31 issues identified by the EFRT have been resolved and approved by the ORP Project Manager (Table 4). Five additional issues are expected to be closed by the end of the year with the remaining three issues projected to be complete by September 2009. In March 2006, the EFRT completed a critical review of the WTP process flowsheet for BNI. The team identified 17 major issues and 11 potential issues that would prevent the WTP from meeting contract capabilities; 3 additional issues were raised by an internal ORP review, for a total of 31 issues. In response, BNI developed a project response plan describing the proposed actions to address the issues; IRPs were developed, issued, and approved for each issue. The IRPs include the actions required for issue resolution, a schedule for completion, integration with other issues, and integration with the overall project schedule. Examples of some of the identified issues include inadequate ultrafiltration area and flux, undemonstrated leaching process, plugging of process piping, mixing vessels erosion, inadequate mixing systems, instability of baseline ion exchange resin, PT Facility availability, lack of comprehensive feed testing in commissioning, and limited remotability demonstration.

#### **3.2 Congressional Interactions**

DOE prepares quarterly reports to House and Senate Committees on Authorization and Appropriations on the activities and financial status of each of the five subprojects within the WTP Project.

#### **3.3 Summary**

In summary, DOE and its contractor are working to resolve issues raised by various review teams in order to successfully complete this project and begin plant operations. DOE continues to evaluate all of the major project management systems, project controls, business systems, and technical processes.

**Table 4. Status of EFRT Issue Closure (as of June 2008)**

<b>Issue No</b>	<b>Issue Title</b>	<b>ORP Approval Date</b>	<b>Forecast Closure</b>	<b>Status</b>
M 7a	Lack of Spare LAW Melter	20-Nov-06	Nov-06	Closed
M 7b	Lack of Spare HLW Melter	20-Nov-06	Nov-06	Closed
P 3	Adequacy of Control Scheme	3-Jan-07	Dec-06	Closed
M 5	Must Have Feed Pre-Qualification Capability	22-Aug-06	Oct-07	Closed
M 8	Limited Remotability Demonstration	16-Nov-06	Oct-07	Closed
M 9	Lack of Comprehensive Feed Testing in Commissioning	18-Dec-06	Oct-07	Closed
M10	Critical Equipment Purchases	3-Jan-07	Oct-07	Closed
M14	Baseline IX Resin	9-Aug-06	Oct-07	Closed
M16	Misbatching of Melter Feed	13-Sep-06	Oct-07	Closed
P 6	Questionable Cross-Contamination Control	9-Aug-06	Oct-07	Closed
P 8	Effectiveness of Cs-137 Breakthrough Monitoring System	9-Aug-06	Oct-07	Closed
P10	Lack of Analysis of Silo Feeds	13-Sep-06	Oct-07	Closed
M 4	Designed for Commissioning Waste vs. Mission Needs	10-Oct-06	Nov-07	Closed
M 7	Inconsistent Short-term vs. Long-term Focus	3-Jan-07	Nov-07	Closed
M10a	Questionable Column Design	9-Aug-06	Nov-07	Closed
P 2	Effect of Recycle on Capacity	29-Jun-06	Nov-07	Closed
P 5	Inadequate Process Development	9-Aug-06	Dec-07	Closed
P11	Incomplete Process Control Design	18-Dec-06	Dec-07	Closed
M11	Loss of WTP Expertise Base	14-Sep-06	Mar-08	Closed
P 7	Complexity of Valving	9-Aug-06	Mar-08	Closed
P1	Undemonstrated Decontamination Factor	13-Jul-06	Apr-08	Closed
M17	HLW Film Cooler Plugging	9-Aug-06	Apr-08	Closed
M15	Availability, Operability, and Maintainability	13-Jul-06	Apr-08	Closed
M 1	Plugging in Process Piping	29-Jun-06	Sep-08	
M 6	Process Operating Limits Not Completely Defined	18-Oct-06	Sep-08	
M 2	Mixing Vessel Erosion	17-Nov-06	Sep-08	
M13	Ultrafilter Area and Flux	25-Sep-06	Dec-08	
P 4	Potential Gelation/Precipitation	18-Oct-06	Dec-08	
P 9	Undemonstrated Sampling System	9-Aug-06	Dec-08	
M 3	Inadequate Mixing System Design	6-Sep-06	Mar-09	
M12	Undemonstrated Leaching Process	13-Sep-06	Mar-09	

#### 4.0 BUDGET AND COST STATUS

**Status:** On December 22, 2006, the new WTP Project performance baseline of \$12.263 billion was approved by the DOE Secretarial Acquisition Executive. Through June 2008, DOE has received a series of approved adjustments to the performance measurement baseline totaling \$635 million. Many of these adjustments were anticipated at the time of the performance baseline approval in December 2006, but were only rough estimates or based on Monte Carlo risk analysis (a multi-iteration, statistical technique) for the costs. The proposed adjustments were initiated to resolve issues resulting from an external technical review of the WTP process flowsheet, implement facility capacity modifications in the PT Facility, and completion, startup, and commissioning of the LAW Facility. Note that the funds for these proposed adjustments will be drawn from management reserve and project contingency pools. Management reserve use is tracked and reported monthly to DOE. These proposed adjustments and strategies will not result in a change to the total project cost of \$12.263 billion.

Cost and schedule performance continues to trend downward and are driven by continued late equipment and material deliveries, engineering inefficiencies, plant equipment delays, and construction activities. A delay of six to nine months for LAW Facility construction completion is currently forecast by the contractor. BOF and LAB have also been impacted.

Work processes are being reviewed in an effort to mitigate future overruns. These include receipt of vendor information, document reviews, and identification, timely analysis, and closure of technical issues. Implementation of improvements is expected in October 2008 along with a comprehensive engineering work plan for elements included in the current estimate at completion. Work process changes will be implemented that focus on cost and schedule performance improvements. Integration of unplanned engineering work into the schedule is planned for completion in August 2008 in order to better understand the work remaining. Strong attention also continues to be given to vendor performance through enhanced team and collaboration efforts with vendors. Key equipment procurements will be handled by a focused equipment group with senior engineers to strengthen production focus.

**Budget:** Total funding available for the WTP Project in FY 2008 is \$1,073 million, which includes \$684 million new budget authority, \$320 million of FY 2007 uncosted but committed carryover, and release of the \$69 million (10%) holdback for the BNI-approved EVMS certification.

**Costs:** For FY 2008, contractor project costs through May 2008 were \$464 million; that combined with the affect of approved baseline change proposals implemented this year results in a forecasted spend of \$734 million. An additional \$26 million of spend is anticipated for technical support costs to ORP, giving a total FY 2008 anticipated WTP Project spend of about \$760 million.

## 5.0 DOE/DOE CONTRACTOR COMPLIANCE

The new performance baseline was approved on December 22, 2006, and included a cost of \$12.263 billion and completion date of November 2019 for the WTP Project. The December 2006 baseline assumes consistent Congressional appropriations of \$690 million from FY 2007 through construction and commissioning completion.

Now that the revised WTP cost and schedule have been approved by DOE's Secretarial Acquisition Executive, discussions are proceeding with the regulators to try to resolve the HFFACO and *Resource Conservation and Recovery Act of 1976 (RCRA)/Dangerous Waste Permit* schedule issues (refer to Table 5 for a listing of impacted milestones).

**Table 5. Impacted HFFACO Milestones**

Milestone	HFFACO Date	Description
M-062-00	12/31/2028	Complete Pretreatment Processing and Vitrification of Hanford High Level (HLW) and Low Activity (LAW) Tank Wastes.  Compliance with the work schedules set forth in this M-62 series is defined as the performance of sufficient work to assure with reasonable certainty that DOE will accomplish series M-62 major and interim milestone requirements.
M-062-00A	02/28/2018	Complete WTP Pretreatment Processing and Vitrification of Hanford HLW and LAW Tank Waste.  Tank Waste processing shall complete the WTP pretreatment and vitrification of no less than 10% of Hanford's Tank waste by mass and 25% by activity.
M-062-07B	12/31/2007	Complete Assembly Of Low Activity Waste Vitrification Facility Melter #1 So That It Is Ready For Transport And Installation In The LAW Vitrification Building (BNI Baseline Schedule Activity 4DL321A200 As Part Of DOE Contract No. DE-AC27-01RV14136).
M-062-08	06/30/2006	Submittal Of Hanford Tank Waste Supplemental Treatment Technologies Report, Draft Hanford Tank Waste Treatment Baseline, And Draft Negotiations Agreement In Principle (AIP).  DOE will submit a supplemental Treatment Technologies Report that describes the technical, financial, and contractual alternatives, which, in combination with the WTP and any required additional LAW vitrification facilities, are needed to treat all of Hanford's Tank Wastes.
M-062-09	02/28/2009	Start Cold Commissioning - Waste Treatment Plant.  DOE Will Start Cold Commissioning Of Its Tank Waste Treatment Plant. Start Of Cold Commissioning Is Defined As Introduction Of First Feed Simulant Into A Process Building.

**Table 5. Impacted HFFACO Milestones**

Milestone	HFFACO Date	Description
M-062-10	01/31/2011	<p>Complete Hot Commissioning - Waste Treatment Plant.</p> <p>DOE Will Achieve Sustained Throughput Of Pretreatment, Low-Activity Waste Vitrification And High-Level Waste Vitrification Processes, And Demonstrate WTP Treatment Complex Availability To Complete Treatment of no less than 10% of the tank waste by mass and 25% of the tank waste by activity by December 2018.</p>
M-062-11	06/30/2007	<p>Submit A Final Hanford Tank Waste Treatment Baseline.</p> <p>Following The Completion Of Negotiations Required In M-62-08, DOE Will Modify Its Draft Baseline As Required And Submit Its Revised Agreed-To Baseline For Treating All Hanford Tank Waste (HLW, LAW, and TRU) by 12/31/2028.</p>

## **6.0 AREAS OF NON-COMPLIANCE**

1. One Dangerous Waste Permit Compliance Schedule Item was missed this reporting period (see Section 2.1.4). The status of HFFACO milestones is addressed in Section 7.0.

## 7.0 STATUS OF HFFACO MILESTONES

The status of the HFFACO M-62-00 milestone series for the WTP is as follows:

### 7.1 M-62-00 – COMPLETE PT PROCESSING AND VITRIFICATION OF HANFORD HIGH LEVEL AND LOW ACTIVITY TANK WASTES

**Milestone Date:** December 31, 2028

**Description:** Compliance with the work schedules set forth in this M-62 series is defined as the performance of sufficient work to assure with reasonable certainty that DOE will accomplish series M-62 major and interim milestone requirements.

DOE internal work schedules (e.g., DOE approved schedule baselines) and associated work directives and authorizations shall be consistent with the requirements of this agreement. Modification of DOE contractor baseline(s) and issuance of associated DOE work directives and/or authorizations that are not consistent with agreement requirements shall not be finalized prior to approval of an agreement change request submitted pursuant to agreement action plan, Section 12.0.

**Status:** Unrecoverable/To Be Missed.

### 7.2 M-62-00A – COMPLETE WTP PT, PROCESSING AND VITRIFICATION OF HANFORD HLW AND LAW TANK WASTES

**Milestone Date:** February 28, 2018

**Description:** Tank waste processing shall complete the WTP pretreatment and vitrification of no less than 10% of Hanford's tank waste by mass\* and 25% by activity.

\*[In meeting this requirement DOE will pretreat and vitrify no less than 6,000 metric tons of sodium (in the instance of LAW feed) and 800 metric tons of waste oxides (in the instance of HLW feed)].

**Status:** Unrecoverable/To Be Missed.

### 7.3 M-62-07B – COMPLETE ASSEMBLY OF LAW MELTER #1 SO THAT IT IS READY FOR TRANSPORT AND INSTALLATION IN THE LAW VITRIFICATION BUILDING (BNI BASELINE SCHEDULE ACTIVITY 4DL321A3200 AS PART OF DOE CONTRACT NO. DE-AC27-01RV14136), AND COMPLETE SCHEDULE ACTIVITY ID 4DH46102A2 – MOVE #1 MELTER INTO THE HLW VITRIFICATION FACILITY

**Milestone Date:** December 31, 2007

**Description:** This milestone represents (1) the assembly of LAW Melter #1 to the point it is ready for refractory as part of BNI baseline activities 3EL3212A00 "Specifications and Analysis," 4DL321A000 "LAW - Procure Material & Equipment for Melters," and

4DL321A200 “LAW- Assemble Melter #1,” (Contract No. DE-AC27-01RV14136).

In addition, activities 4DL121U100 “LAW - Elev +3 South Melter FREP,” and 4DL131D000 “LAW - Elev +28 Columns, Beams & Q-Decking at +48,” shall be substantially completed; and (2) moving the first HLW melter into the HLW Facility as defined in BNI baseline activities ID 4DH46102A2.

Completion of this milestone will be met when (1) LAW melter #1 will have been fully fabricated, assembled, and ready for refractory material to be installed. Assembly of the melter is scheduled to occur near the end of LAW construction when the facility is most ready to have the assembled melter moved into the LAW cell where the refractory material will be installed. Meeting this milestone therefore represents significant accomplishment of the engineering, design, and construction of the LAW Facility; and (2) HLW melter #1 has been fully fabricated and moved into the HLW Vitrification Facility.

**Status:** Missed.

#### **7.4 M-62-08 – SUBMITTAL OF HANFORD TANK WASTE SUPPLEMENTAL TREATMENT TECHNOLOGIES REPORT, DRAFT HANFORD TANK WASTE TREATMENT BASELINE, AND DRAFT NEGOTIATIONS AGREEMENT IN PRINCIPLE (AIP)**

**Milestone Date:** June 30, 2006

**Description:** DOE will submit a supplemental treatment technologies report that describes the technical, financial, and contractual alternatives, which in combination with the WTP and any required additional LAW vitrification facilities, are needed to treat all of Hanford’s tank wastes. The report will identify and describe viable path(s) forward to complete treatment of all tank wastes by December 31, 2028. The report shall apply the same selection criteria to all options and include the second LAW vitrification facility as an option. The report will include the results of all waste form performance data (compared against the performance of borosilicate glass) for all the treatment technologies being considered; performance data will be adequate to make decisions as to the acceptability of any proposed waste form for the waste being considered; and description of the considered treatment technologies (including size, throughput, technical viability, and life cycle cost estimates).

This report will also include a discussion of waste treatment plant throughput commitments and the realistic potential for enhancing the throughput of currently planned melters, proposed additional melters and potential second generation melters installed at first melter change out.

The draft baseline will contain DOE’s proposed approach for treating all Hanford Site tank wastes (high-level, low-activity, and transuranic) by December 31, 2028, including life-cycle cost estimates that indicate projected funding requirements through completion of the RPP mission; a schedule for construction and operation of proposed new facilities and/or enhancements to the WTP; and projected throughput for each facility.

The report and baseline will be accompanied by a draft negotiations agreement in principle (AIP) and draft agreement change request containing milestones and associated agreement requirements sufficient to effectively drive all required work. These, include but are not limited to: (1) the establishment of requirements regarding any necessary WTP modification(s); (2) the establishment of requirements scheduling the acquisition and operation of any approved treatment technology systems; (3) the establishment of production metrics for treatment complex (WTP plus any supplemental treatment system or second LAW vitrification facility) consistent with completion of treatment by December 31, 2028; and (4) the establishment of requirements scheduling acquisition and operation of feed delivery systems for any approved supplemental technology (M-47 milestones). The AIP will be finalized within 30 days of submittal and provide for negotiations to be completed within 180 days of AIP finalization, and will provide that, in the event the parties do not reach agreement within this timeframe, the negotiations will be resolved as a resolution of a dispute via final determination of the Director of Ecology pursuant to HFFACO Article VIII. Unless otherwise agreed by the parties, this final determination will be issued within seven months of AIP finalization.

**Status:** Missed. Milestone M-62-08 was missed, due to (1) lack of supplemental technology process design and cost information that was to have been obtained from the Demonstration Bulk Vitrification System (DBVS) project; and (2) lack of information on enhancements to the WTP, including a second LAW vitrification facility.

#### **7.5 M-62-09 - START COLD COMMISSIONING - WASTE TREATMENT PLANT**

**Milestone Date:** February 28, 2009

**Description:** DOE will start cold commissioning of its tank waste treatment plant. Start of cold commissioning is defined as introduction of first feed simulant into a process building.

**Status:** Unrecoverable/To Be Missed.

#### **7.6 M-62-10 - COMPLETE HOT COMMISSIONING - WASTE TREATMENT PLANT**

**Milestone Date:** January 31, 2011

**Description:** DOE will achieve sustained throughput of PT, LAW vitrification, and HLW vitrification processes and demonstrate WTP treatment complex availability to complete treatment of no less than 10% of the tank waste by mass and 25% of the tank waste by activity by December 2018.

**Status:** Unrecoverable/To Be Missed.

#### **7.7 M-62-11 - SUBMIT A FINAL HANFORD TANK WASTE TREATMENT BASELINE**

**Milestone Date:** June 30, 2007 (See M-62-10)

**Description:** Following the completion of negotiations required in M-62-08, DOE will modify its draft baseline as required and submit its revised, agreed-to, baseline for treating all Hanford tank waste (high-level, low-activity, and transuranic) by December 31, 2028.

**Status:** Missed.

## 8.0 REFERENCES

- 08-NSD-018, letter, S. J. Olinger, ORP, to W. S. Elkins, BNI, "Modified Approval of Three Authorization Basis Amendment Request (ABAR) Addressing Hydrogen in Piping And Ancillary Vessels (HPAV)," dated June 19, 2008
- 62 FR 8693, 1997, "Record of Decision for the Tank Waste Remediation System, Hanford Site, Richland, WA," *Federal Register*, Vol. 62, pp. 8693-8704, February 26
- 24590-HLW-PCN-ENV-06-017, *Quarter Ending June 30, 2008 - Hanford Facility RCRA Permit Modification Notification Form Part III, Operating Unit 10 Waste Treatment and Immobilization Plant*, dated May 9, 2008
- 24590-WTP-PL-SA-08-0002, 2008, *WTP Ergonomic Program*, Bechtel National, Inc., Richland, Washington
- CCN 132846, letter, BNI to ORP, "Report of External Flowsheet Review Team for the Hanford Waste Treatment and Immobilization Plant-Final Report Titled: 'Comprehensive Review of the Hanford Waste Treatment Plant Flowsheet and Throughput'," dated March 17, 2006
- DOE Contract No. DE-AC27-01RV14136 between the U.S. Department of Energy and Bechtel National, Inc., dated December 11, 2000
- Ecology et al. 1989, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington
- Ecology 2007, *Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste*, WA7890008967, Rev. 8c, Washington State Department of Ecology, Olympia, Washington
- Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq., as amended