

**OFFICE OF RIVER PROTECTION**  
**ACTIVITIES AND FINANCIAL STATUS**  
**WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP)**  
**LINE ITEM – 01-D-416**

**Subprojects:**

<b>Low-Activity Waste Facility</b>	<b>-01-D-16A</b>
<b>Analytical Laboratory</b>	<b>-01-D-16B</b>
<b>Balance of Facilities</b>	<b>-01-D-16C</b>
<b>High-Level Waste Facility</b>	<b>-01-D-16D</b>
<b>Pretreatment Facility</b>	<b>-01-D-16E</b>

**FISCAL YEAR 2008**

**FIRST QUARTER REPORT**  
**RICHLAND, WASHINGTON**



## TABLE OF CONTENTS

1.0	Introduction.....	1
2.0	Financial Status – as of December 31, 2007.....	1
3.0	BNI EVMS Project Status – as of December 31, 2007 .....	3
4.0	Facility Activity and Planning – as of December 31, 2007 .....	8
5.0	Project Issues – as of December 31, 2007 .....	13
6.0	DNFSB Open Issues – as of December 31, 2007 .....	16
7.0	Project Reviews – Issue Status as of December 31, 2007 .....	19

## FIGURES

Figure 1.	Low-Activity Waste Facility – as seen from the PT Facility .....	8
Figure 2.	Analytical Laboratory – Hot Cell Operators Gallery .....	9
Figure 3.	Piping in the Chiller Compressor Plant .....	10
Figure 4.	High-Level Waste Facility – as seen from the Tower Crane .....	11
Figure 5.	Pretreatment Facility – South Side .....	13
Figure 6.	Pretreatment Engineering Platform (Evaporator Vessel) .....	14

## TABLES

Table 1.	December 2006 Performance Baseline (\$M).....	2
Table 2.	FY 2008 Available Funding and Commitments .....	3
Table 3.	BNI-Only Financial Spend (\$M) – Quarterly .....	3
Table 4.	BNI-Only EVMS Status (\$M) – Facility Percent Spent.....	4
Table 5.	BNI Monthly Earned Value Data Rolling 3-Month (\$ in thousands).....	4
Table 6.	Percent Complete by Facility Through First Quarter FY 2008 .....	5
Table 7.	Facility Design Status (Hours – Thousands) .....	6
Table 8.	Procurement Status (\$M).....	6
Table 9.	Construction Status (Craft Hours - Thousands).....	7
Table 10.	Balance of Facilities Percent Complete (as of December 2007) .....	11
Table 11.	Status of Issue Response Plans (as of end of April 2008) .....	21

## ACRONYMS

ACWP	Actual Cost of Work Performed
ANSI	American National Standards Institute
BCP	Baseline Change Proposal
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BNI	Bechtel National, Inc.
BOF	Balance of Facilities
CGD	commercial grade dedication
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
EFRT	External Flowsheet Review Team
EIA	Electronic Industries Alliance
EVMS	Earned Value Management System
FY	fiscal year
HEME	high-efficiency mist eliminators
HLW	High-Level Waste [Facility]
HPAV	hydrogen in piping and ancillary vessel
HVAC	heating, ventilating, and air conditioning
IRP	Issue Response Plan
ITS	important-to-safety
LAB	Analytical Laboratory
LAW	Low-Activity Waste [Facility]
NDE	nondestructive examination
ORP	Office of River Protection
PEP	Pretreatment Engineering Platform
PMB	Performance Measurement Baseline
PT	Pretreatment [Facility]
QA	quality assurance
QAM	Quality Assurance Manual
RCA	root cause analysis
RGM	revised ground motion
SSR	summary structural report
TSG	Technology Steering Group
WTP	Waste Treatment and Immobilization Plant

## UNITS OF MEASURE

cy	cubic yards
lb	pounds
lf	linear feet

## **1.0 INTRODUCTION**

The Conference Report accompanying the Energy and Water Development Appropriations Act, 2006 (H. R. Conference Report No. 109-275) requested the U.S. Department of Energy (DOE) "...report by December 1, 2005, on the actions taken to rectify the management failures of the Waste Treatment and Immobilization Plant (WTP) Project, and to report quarterly, beginning on January 1, 2006, on the activities and financial status of each of the subprojects within WTP." This WTP Quarterly Report provides the status of the project as of the end of the first quarter fiscal year (FY) 2008.

This report also satisfies a request of the Senate Appropriations Committee Report 109-274 accompanying the Energy and Water Appropriations Bill, 2007 (H.R. 5427) that states "the Committee directs the Department to submit a quarterly report to the Committee on Appropriations describing all interactions between the Department and the Defense Nuclear Facilities Safety Board (DNFSB) regarding the WTP. The report should include, but not be limited to, issues resolved, issues unresolved and corrective actions taken by the Department." The report provides a snapshot of the WTP Project performance utilizing the contractor's Earned Value Management System (EVMS) and financial reporting system. Also included are key job site accomplishments in first quarter FY 2008 and planned activities for the second and third quarters of FY 2008. The report covers project challenges and initiatives in the areas of: project planning and management; contractor performance; resolution of technical issues; certification of revised seismic ground motion criteria; certification of the project's EVMS; and engagement with the DNFSB.

The WTP Project is vital to DOE's mission to clean up millions of gallons of radioactive waste at the Hanford Site, located in Washington State, and will be the world's largest chemical-radioactive waste treatment facility. The overall WTP Project objective is to design and build the facilities and systems with the capacity to treat and immobilize approximately 53 million gallons of radioactive waste stored in 177 underground storage tanks.

The WTP is a massive endeavor comprising five separate subprojects:

- Low-Activity Waste (LAW) Facility
- Analytical Laboratory (LAB)
- Balance of Facilities (BOF) – made up of 20 facilities
- High-Level Waste (HLW) Facility
- Pretreatment (PT) Facility

Each facility fulfills a key function in treating and immobilizing waste at the Hanford Site.

DOE is fully committed to ensuring successful management of the WTP Project by exercising prudent project management and controls, executing and maintaining a credible cost and schedule baseline, resolving technology issues, and recruiting highly experienced personnel to plan, execute, and oversee this all-important project.

## **2.0 FINANCIAL STATUS – AS OF DECEMBER 31, 2007**

The December 2006 Performance Measurement Baseline (PMB) (Table 1) for the WTP Project was approved by DOE in accordance with DOE Order 413.3A, *Program and Project*

*Management for the Acquisition of Capital Assets.* The PMB assumes consistent annual funding of \$690 million through project completion in FY 2019.

**Table 1. December 2006 Performance Baseline (\$M)**

	Original Baseline (Dec06)	Current Baseline (1st Qtr FY08)
Performance Measurement Baseline	\$8,786	\$9,363
Management Reserve/Contract Contingency/Fee	\$2,278	\$2,011
<b>Contract Scope Cost</b>	<b>\$11,064</b>	<b>\$11,374</b>
Project Contingency	\$1,014	\$704
Other Project Cost	\$135	\$135
Transition Cost (from Privatization Contract)	\$50	\$50
<b>Total Project Cost</b>	<b>\$12,263</b>	<b>\$12,263</b>

DOE has received from the WTP Contractor, Bechtel National Inc. (BNI), a series of adjustments to the PMB totaling \$576M of approved BCPs. These adjustments were anticipated at the time of the performance baseline approval in December 2006, but they 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 (see Section 7.1), 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.

## **2.1 FY 2008 Funding and Commitments**

The WTP is about to enter its core-peak construction period over the next several years. The project will make use of all carryover funds as near-future planned spending increases.

Table 2 displays total available funding of \$1,073 million for FY 2008, which includes \$684 million of FY 2008 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.

**Table 2. FY 2008 Available Funding and Commitments**

Funding	Dollars (in millions)
FY 2007 Uncosted Carryover	\$320
FY 2008 New Budget Authority	\$684
Release of EVMS Holdback*	\$69
<b>Total FY 2008 Available Funding</b>	<b>\$1,073</b>
Estimated BNI FY 2008 Spend**	\$742
ORP Technical Support	\$24
Estimated FY 2008 Uncosted	\$307
<hr/>	
BNI's Termination Liability***	\$167
Subcontractor & Purchase Order Commitments****	\$115
Labor Carryover for Oct 2008 BNI Labor	\$25
S/T - Current & Estimated Commitments	\$307
<b>Total - Uncommitted Carryover Funds</b>	<b>\$0</b>

\* Release of 10% (\$69M) holdback for EVMS certification

\*\* Latest ORP estimate of WTP Line-Item spend plan for FY 2008

\*\*\* BNI terminations liability includes BNI Labor (\$52M) and termination liability for supplier/subs and leases (\$115M)

\*\*\*\*BNI commitments to subcontractor work in progress, equipment in fabrication, materials on order, and long-lead items that will be needed over the next few years

## 2.2 FY 2008 Financial Status

The total expenditures to date (December 2007) for the WTP Project is \$4,112 million, which includes all BNI costs (\$3,857M), BNI fee paid (\$54.5M – for completed performance milestones, \$48.5M – provisional), technical support (\$102M), and FY 2001 transition costs (\$50M). Table 3 provides a quarterly breakout of BNI-only planned spending and actual spend for FY 2008.

**Table 3. BNI-Only Financial Spend (\$M) – Quarterly**

Facilities	Q1 FY 2008		Q2 FY 2008		Q3 FY 2008		Q4 FY 2008		FY 2008 Cumulative Total	
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual
<b>Total</b>	<b>159</b>	167	<b>175</b>		<b>157</b>		<b>251</b>		<b>742</b>	<b>167</b>

## 3.0 BNI EVMS PROJECT STATUS – AS OF DECEMBER 31, 2007

Tables 4 through 10 provide project status based on the BNI EVMS. The EVMS data are reported against the December 2006 cost and schedule baseline updated for approved PMB changes. EVMS data are represented by the following performance measures:

Budgeted Cost of Work Scheduled (BCWS) – the “Plan”

Budgeted Cost of Work Performed (BCWP) – what was accomplished or “Earned”

Actual Cost of Work Performed (ACWP) – what the work “Cost”

### 3.1 EVMS Cost Status

Table 4 shows cumulative ACWP for each of the five facilities during first quarter FY 2008, and a percentage of actual cost as compared to the current Budget at Completion (BAC) (excludes management reserve and any fees paid).

**Table 4. BNI-Only EVMS Status (\$M) – Facility Percent Spent**

Facilities	Budget At Completion Estimate (Dec07)*	Total Spent through FY 2007 (ACWP)**	Actual Spend thru 1st Qtr FY 2008		Forecast FY 2008 Spend	
			Total ACWP	% Spent	Forecast Total ACWP	% Spent
Low-Activity Waste	1,369	894	940	69%	1,076	79%
Analytical Lab	550	205	220	40%	262	48%
Balance of Facilities	927	416	433	47%	492	53%
High-Level Waste	2,480	843	876	35%	1,003	40%
Pretreatment	4,037	1,318	1,367	34%	1,570	39%
<b>Total WTP Percent Spent</b>	<b>9,363</b>	<b>3,676</b>	<b>3,837</b>	<b>41%</b>	<b>4,403</b>	<b>47%</b>

\* These values represent the original BAC of \$8,786M plus approved baseline change proposals and undistributed budget.

\*\* Total EVMS ACWP does not include fee, transition, or technical support costs.

Note: There may be differences in totals due to rounding.

### 3.2 EVMS Performance Data

Table 5 presents an earned value rolling 3-month data for the last eight months—May 2007 through December 2008.

**Table 5. BNI Monthly Earned Value Data Rolling 3-Month (\$ in thousands)**

Month	BCWS	BCWP	ACWP	SV	SPI	CV	CPI
May-Jun-Jul	131,625	136,155	127,951	4,530	1.03	8,204	1.06
Jun-Jul-Aug	154,813	152,437	171,432	(2,376)	0.98	(18,995)	0.89
Jul-Aug-Sep	174,283	164,857	174,425	(9,426)	0.95	(9,568)	0.95
Aug-Sep-Oct	177,893	172,519	181,315	(5,374)	0.97	(8,796)	0.95
Sep-Oct-Nov	150,214	144,944	158,244	(5,270)	0.96	(13,300)	0.92
Oct-Nov-Dec	135,017	134,615	160,592	(402)	1.00	(25,977)	0.84

Note: May be differences in totals due to rounding.



While overall (cumulative schedule variance) the WTP project is on schedule there are certain activities that are behind. These generally include procurement of materials and equipment from vendors and engineering performance.

Schedule impacts are partly due to vendor delays from lack of shop capacity and fabrication re-start problems. Acquisition Services is working closely with vendors to prevent further schedule delays. Monthly BNI procurement focus meetings are also occurring to closely track the status of procurement deliveries.

Continued poor engineering productivity factors have impacted cost indicators across the facilities. Staffing levels have been increased to improve schedule performance. Engineering processes are being reviewed to determine where efficiencies can be achieved without affecting the overall quality of the final design.

The PT Facility has experienced higher than planned costs for the development of a hydrogen in piping and ancillary vessels (HPAV) control database. This database ensures that piping and components are correctly installed to ensure prevention of hydrogen accumulation.

Research and technology including delivery, design, and testing delays for the Pretreatment Engineering Platform (PEP) have also impacted cost and schedule. While additional shifts and a new testing approach have been planned to accelerate the project, some unfavorable variances will not be recoverable.

The BOF and LAB are also experiencing delays in major procurements including emergency diesel generators, Glass Former Storage Facility silos, an autosampling system, hot cell lighting, and the laser ablation test unit. Meetings are being held to understand the causal factors and re-plan work where possible. Acquisition services personnel are working closely with key vendors to assist with technical and procedural requirements.

### 3.3 Facility Completion Status

The WTP design is 75 percent complete, procurement is 46 percent complete, and construction is 33 percent complete (Table 6).

**Table 6. Percent Complete by Facility Through First Quarter FY 2008**

<b>Facilities</b>	<b>Design (Hours)</b>	<b>Procurement (Dollars)</b>	<b>Construction (Hours)</b>
<b>Low-Activity Waste</b>	95%	66%	55%
<b>Analytical Lab</b>	90%	44%	49%
<b>Balance of Facilities</b>	76%	47%	58%
<b>High-Level Waste</b>	83%	43%	23%
<b>Pretreatment</b>	69%	39%	26%
<b>Facility Subtotal</b>	78%	46%	33%
<b>Common/Distrib Hours/Dollars</b>	70%	Incl'd Above	Incl'd Above
<b>Total WTP Completion Status</b>	75%	46%	33%

Note: Percent Completes based on earned hours/dollars.

### 3.4 Design Status

Table 7 provides facility design status through the end of the first quarter FY 2008. Progress on design tasks are measured on a person-hour basis. Design percent completes are based on



the number of engineering hours earned divided by the total budgeted engineering hours for that facility.

**Table 7. Facility Design Status (Hours – Thousands)**

Facilities	Total Budget At Completion Estimate (Dec 2007)	Total Hours Earned through FY 2007 (actual)	Total Hours Earned through (1Q, FY 2008)		Forecast Earned Hours through FY 2008	
			Hours	% Complete	Hours	% Complete
Low-Activity Waste	1,570	1,475	1,488	95%	1,543	98%
Analytical Lab	477	421	429	90%	458	96%
Balance of Facilities	778	584	591	76%	684	88%
High-Level Waste	2,519	2,055	2,090	83%	2,213	88%
Pretreatment	4,293	2,902	2,948	69%	3,257	76%
Facility Subtotal	9,637	7,437	7,545	78%	8,155	85%
Common Engineering Hours	6,405	4,373	4,469	70%	4,837	76%
<b>Total Design</b>	<b>16,042</b>	<b>11,809</b>	<b>12,015</b>	<b>75%</b>	<b>12,992</b>	<b>81%</b>

Note: Differences in totals are due to rounding.

### 3.5 Procurement Status

Table 8 provides facility procurement status and progress through the end of the first quarter FY 2008. Procurement progress is measured on a dollar basis. Procurement entails the purchasing of all building materials and equipment needed to construct the plant including structural steel, concrete, piping, ductwork, electrical trays and cables, electronics, laboratory equipment, and specialized items.

**Table 8. Procurement Status (\$M)**

Facilities	Total Budget At Completion Estimate (Dec 2007)	Total Dollars Earned through FY 2007	Total Dollars Earned to Date (1Q, FY 2008)		Forecast Dollars Earned through FY 2008	
			Dollars	% Complete	Dollars	% Complete
Low-Activity Waste	628	401	417	66%	482	77%
Analytical Lab	182	75	81	44%	101	55%
Balance of Facilities	379	173	177	47%	200	53%
High-Level Waste	978	398	420	43%	483	49%
Pretreatment	1,635	625	638	39%	736	45%
<b>Total</b>	<b>3,803</b>	<b>1,672</b>	<b>1,733</b>	<b>46%</b>	<b>2,002</b>	<b>53%</b>

Note: Differences in totals are due to rounding. Percentages are based on total allocated dollars.

### 3.6 Construction Status

Table 9 provides construction progress through first quarter FY 2008. Progress is measured in number of craft hours earned associated with the quantity of installed commodities.

**Table 9. Construction Status (Craft Hours - Thousands)**

Facilities	Total Budget At Completion Estimate (Dec 2007)	Total Earned through FY 2007	Total Hours Earned to Date (1Q, FY 2008)		Forecast Earned Hours through FY 2008	
			Hours	% Complete	Hours	% Complete
<b>Low Activity Waste</b>						
Concrete	710	489	689	97%	702	99%
Steel	319	178	256	80%	297	93%
Piping	609	193	296	49%	410	67%
Electrical	571	107	156	27%	252	44%
Equip/Other	787	171	255	32%	360	46%
<b>Total</b>	<b>2,997</b>	<b>1,137</b>	<b>1,653</b>	<b>55%</b>	<b>2,021</b>	<b>67%</b>
<b>Analytical Lab</b>						
Concrete	237	153	217	92%	219	93%
Steel	80	50	72	90%	80	99%
Piping	173	51	73	42%	89	52%
Electrical	117	3	5	4%	8	7%
Equip/Other	225	27	43	19%	88	39%
<b>Total</b>	<b>831</b>	<b>284</b>	<b>410</b>	<b>49%</b>	<b>484</b>	<b>58%</b>
<b>Balance of Facilities</b>						
Concrete	445	213	301	68%	306	69%
Steel	74	12	20	27%	26	35%
Piping	552	211	302	55%	347	63%
Electrical	366	113	159	43%	194	53%
Equip/Other	945	423	611	65%	667	71%
<b>Total</b>	<b>2,383</b>	<b>972</b>	<b>1,393</b>	<b>58%</b>	<b>1,539</b>	<b>65%</b>
<b>High Level Waste</b>						
Concrete	3,195	891	1,265	40%	1,415	44%
Steel	584	33	46	8%	61	10%
Piping	978	19	26	3%	31	3%
Electrical	765	45	63	8%	63	8%
Equip/Other	1,403	109	172	12%	275	20%
<b>Total</b>	<b>6,925</b>	<b>1,095</b>	<b>1,572</b>	<b>23%</b>	<b>1,845</b>	<b>27%</b>
<b>Pretreatment</b>						
Concrete	3,767	1,485	2,077	55%	2,254	60%
Steel	915	89	125	14%	149	16%
Piping	3,532	197	276	8%	285	8%
Electrical	1,012	50	71	7%	73	7%
Equip/Other	1,516	142	235	16%	338	22%
<b>Total</b>	<b>10,743</b>	<b>1,963</b>	<b>2,783</b>	<b>26%</b>	<b>3,099</b>	<b>29%</b>
<b>Total Construction</b>	<b>23,880</b>	<b>5,451</b>	<b>7,811</b>	<b>33%</b>	<b>8,988</b>	<b>38%</b>

Note: Differences in totals are due to rounding. Field distributable craft hours are included in the numbers above.

#### **4.0 FACILITY ACTIVITY AND PLANNING – AS OF DECEMBER 31, 2007**

The following sections provide first quarter FY 2008 key accomplishments along with plans for the second and third quarters of FY 2008 for each facility. Photographs provide visual confirmation of construction accomplishments.

#### **4.1 Low-Activity Waste (LAW) Facility – 01-D-16A**

The LAW Facility will immobilize (vitrify) the low-activity fraction of the waste for onsite (Hanford) disposal.

**Figure 1. Low-Activity Waste Facility – as seen from the PT Facility**



#### ***Accomplishments for First Quarter FY 2008***

- Placed two melter assembly pads
- Completed melter power supply factory acceptance testing
- Completed annex steel elevated slab concrete placement
- Initiated siding and roofing installation on the annex
- Issued final structural steel fireproofing design
- Completed container import bay steel erection
- Set Process Cooling Water System water pumps and heat exchangers (+28' elevation)
- Installed and inspected over 5,250 lf of process piping and 13,000 lb of heating, ventilating, and air conditioning (HVAC) duct and supports

#### ***Plans for Second and Third Quarters FY 2008***

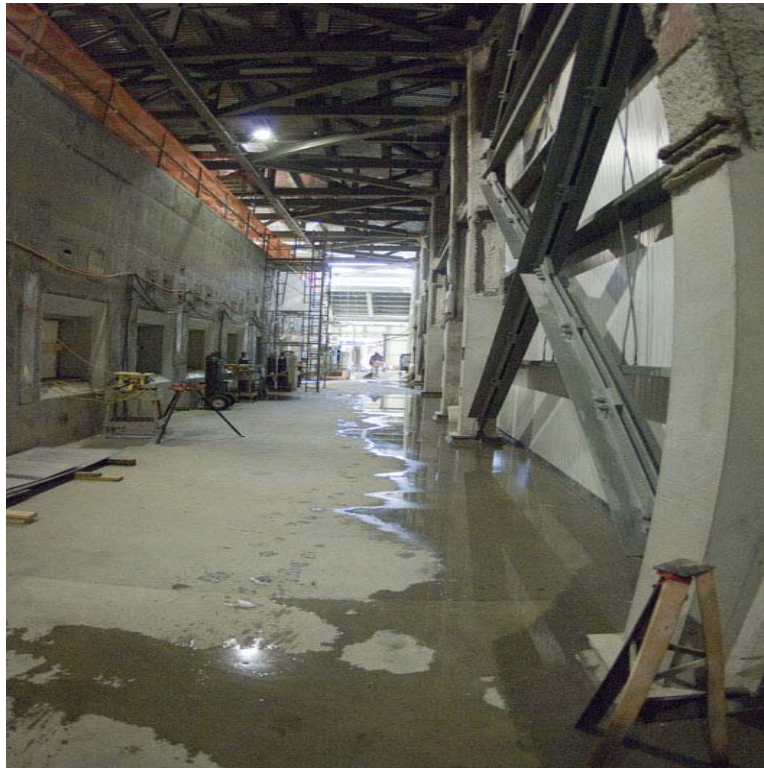
- Complete third and final concrete placement for the LAW melter assembly pad
- Receive container finishing line swab and monitoring system
- Receive melter heater power supplies and Plant Service Air System receiver
- Receive non-important-to-safety (ITS) uninterrupted power supply equipment (+28' elevation)

- Receive glass former hopper/mixer components
- Install 22,500 lf of process pipe

#### **4.2 Analytical Laboratory – 01-D-16B**

The LAB will provide analysis of the waste at different points throughout the treatment and immobilization process to validate the characteristics of the waste and to better optimize the processing of the waste.

**Figure 2. Analytical Laboratory – Hot Cell Operators Gallery**



#### ***Accomplishments for First Quarter FY 2008***

- Issued over 2,800 lf of piping for fabrication
- Approved vendor piping and instrumentation design diagrams for the Autosampling System
- Released over 22,000 lf of cable for construction
- Received first master slave manipulator and non-ITS uninterruptible power supply
- Successfully completed supplier factory acceptance testing for laser ablation equipment
- Completed structural steel framing installation
- Initiated installation of the hot cell trolley and partition
- Installed over 490 lf of piping and 180 tons of structural and miscellaneous steel

#### ***Plans for Second and Third Quarters FY 2008***

- Receive the hot cell trolley linear motor/cart and 15 of the master slave manipulators
- Receive laser ablation equipment and begin assembly setup
- Complete C3/C5 liner plate, hot cell trolley, and shroud installations

- Complete installation of roofing and exterior siding
- Initiate preassembly of facility stack (steel and HVAC)

#### 4.3 Balance of Facilities (BOF) – 01-D-16C

The BOF comprises approximately 20 facilities, which encompass the remaining elements of the WTP, including the Glass Former Storage Facility, Chiller Compressor Plant, and Water Treatment Plant (Table 10).

**Figure 3. Piping in the Chiller Compressor Plant**



#### *Accomplishments for First Quarter FY 2008*

- Received first two Glass Former Storage Facility silos
- Completed factory acceptance tests for the standby diesel generators
- Installed over 1,780 lf of electrical conduit and 1,370 lf of process piping
- Completed fire protection upgrades in the warehouse

#### *Plans for Second and Third Quarters FY 2008*

- Complete installation of the last waste feed piping between the PT and HLW Facilities (trench 4X)
- Complete Fire Service Water Storage & Distribution System turnover from Construction to Startup
- Receive standby diesel generators
- Receive non-ITS uninterruptible power supply (UPS) electrical equipment for Buildings 82 (Chiller Compressor Plant), 87 (non-ITS Switchgear Building), and 91 (BOF Switchgear Building)
- Complete Steam Plant construction



**Table 10. Balance of Facilities Percent Complete (as of December 2007)**

Facility	Engineering % Complete	Construction % Complete	Scheduled Completion Date
Guard House Facility	100.0%	100.0%	Complete
Erected Tanks - Process/Potable	100.0%	100.0%	Complete
Maintenance Shop	100.0%	100.0%	Complete
Warehouse Building	100.0%	100.0%	Complete
Fire Water Pump House Facility	100.0%	97.0%	Jul 2008
Steam Plant Facility	100.0%	99.0%	Jul 2009
Water Treatment Building	100.0%	69.0%	Aug 2009
Non-Dangerous, Non-Radioactive Effluent Facility	98.0%	87.0%	Sep 2009
Cooling Tower Facility	99.0%	99.0%	Oct 2009
Fuel Oil Facility	100.0%	91.0%	Oct 2009
Switchgear Building	94.0%	65.0%	Dec 2009
BOF Switchgear Building	93.0%	73.0%	Dec 2009
Chiller Compressor Plant	99.0%	87.0%	May 2010
Anhydrous Ammonia	48.0%	0.0%	Jan 2011
Glass Former Storage Facility	92.0%	9.0%	Mar 2011
Simulator Facility	100.0%	86.0%	Mar 2011
ITS Switchgear Building	97.0%	83.0%	Nov 2011
Diesel Generators Facility	53.0%	0.0%	Jan 2012
Administration Building	13.0%	0.0%	Nov 2014
Wet Chemical Storage Facility	63.0%	0.0%	Jan 2016

#### 4.4 High-Level Waste (HLW) Facility – 01-D-16D

The HLW Facility will immobilize (vitrify) the high-level fraction of the waste for offsite disposal (geologic repository).

**Figure 4. High-Level Waste Facility – as seen from the Tower Crane**



### ***Accomplishments for First Quarter FY 2008***

- Completed HLW Summary Structural Report (SSR) and submitted to DNFSB
- Issued design for multi-commodity rack steel at -21' elevation
- Issued revised Waste Acceptance Impacting Items and Activities list that determine the quality levels of those items
- Issued listing of penetration schedules for all elevations up to and including 58' elevation
- Released mechanical handling and process closed circuit televisions (CCTV) for procurement
- Placed concrete for 2 slabs-on-grade and 1 wall section at 0' to 14' elevations (~680 cy)
- Issued embed plate design calculations for +37' elevation
- Reviewed and approved 57 vendor prints for the melter shield doors
- Received melter startup heater power supply
- Received load center for non-ITS equipment at +37' elevation

### ***Plans for Second and Third Quarters FY 2008***

- Resolve DNFSB comments on the HLW SSR
- Award fabrication of electrical joggles for installation between 0' and 14' elevations
- Complete testing of melter cave/crane/power manipulators
- Complete revised ground motion (RGM) evaluation of HLW melters
- Receive carbon bed absorbers, a primary component of the offgas system
- Receive pour tunnel bogie rails
- Issue RGM calculation for walls between 14' and 37' elevations
- Release autosampling system, feed preparation vessels, canister racks, high-efficiency mist eliminators (HEME), and submerged bed scrubber for procurement
- Place approximately 2,080 cy of concrete for 2 slabs-on-grade; 2 elevated slabs at 14' elevation, and 9 wall sections at 0' to 14' elevations

## **4.5 Pretreatment (PT) Facility – 01-D-16E**

The PT Facility will separate the tank waste into its low-activity and high-level waste fractions.

### ***Accomplishments for the First Quarter FY 2008***

- Completed pulse jet mixer multiple overblow testing
- Issued jumper conceptual design and stress analysis – Area 24
- Completed cable tray design 0' to 28' elevations
- Completed readiness assessments for construction resumption (December 11)
- Resumed structural steel placements in December 2007 (December 18)
- Delivered final (second of two) filter cave crane shield door to Marshalling Yard
- Issued PT SSR, Rev. 0



**Figure 5. Pretreatment Facility – South Side**



***Plans for the Second and Third Quarters FY 2008***

- Issue jumper design – Areas 1 and 25
- Issue system design package for cesium resin addition process, waste feed evaporation process, anti-foam, sodium permanganate, and strontium nitrate reagent systems
- Resume concrete wall placements
- Complete RGM embed calculations for 56’ to 77’ elevations
- Fabricate, deliver, and install structural steel for 0’ to 28’ elevations on south side
- Complete and issue final pulse jet mixer multiple overblow report
- Complete PEP fabrication and delivery

**5.0 PROJECT ISSUES – AS OF DECEMBER 31, 2007**

Project issues that are reported “closed” in the following sections will not appear in future reports.

**5.1 WTP Capacity Enhancement Modifications**

**Issue:** A key issue raised by ORP and re-affirmed in the External Flowsheet Review Team (EFRT) evaluation (Section 7.1) was the effectiveness of the PT Facility design to process the waste to meet mission capacity requirements. The team estimated it could take over 35 years to treat the Hanford Site tank waste if design and process flowsheet modifications were not made. BNI recommended implementation of these capacity modifications and ORP approved their implementation in contract modifications made in 2007.

The treatment capability of the PT Facility is affected primarily by the design capacity (the rate at which the waste is processed) and the design availability (the percentage of time the facility is operational). The relative relationship of these two parameters (design capacity and design availability) results in a potential range of waste treatment capabilities and resultant waste treatment schedules.

The primary systems in the PT Facility that limit waste treatment capacity are the (1) ultrafiltration system, used to separate solids from liquids; (2) ion exchange system, used to remove cesium-137 from the liquids processed through ultrafiltration; and (3) caustic and oxidative leaching processes, used to limit the amount of aluminum and chromium in the high-level waste glass. This leaching process is also performed in the ultrafiltration system, adding to the demands on the system.

**Discussion:** In response, DOE directed BNI to perform a number of studies to identify options to increase the treatment capability of the PT Facility. Two primary areas of focus, ultrafiltration and waste leaching operations, are being addressed with the design, construction, and commissioning of an integrated pretreatment test stand (referred to as the Pretreatment Engineering Platform [PEP]).

The PEP is a 1:4.5 scale test of the WTP ultrafiltration system that will treat tank waste simulants during operation (Figure 6). The PEP is to be assembled on 16 skids in Carlsbad, New Mexico, then shipped to the Hanford Site in Richland, Washington. This testing is required to address issues associated with the system's caustic and oxidative leaching processes and system capacity.

**Outlook:** Skid deliveries for the PEP continue to be closely monitored. Five skids have been received, three are in transit, one remains in final fabrication, and the remaining seven skids await transport to the Hanford Site. Skid fabrication activities are expected to be complete in April 2008. PEP assembly is scheduled for completion in June 2008 and Phase I testing is set to begin in November 2008.

**Figure 6. Pretreatment Engineering Platform (Evaporator Vessel)**



## 5.2 Certification of Earned Value Management System

**Issue:** DOE directed BNI to implement a certified EVMS that complies with the American National Standards Institute/ Electronic Industries Alliance (ANSI/EIA)-748 standard.

The *John Warner National Defense Authorization Act for Fiscal Year 2007* (Public Law 109-364; 120 Stat. 2510), Section 3120, includes a limitation of funds, pending the certification of the BNI WTP EVMS by the Secretary of Energy.

**Discussion:** 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.

**Outlook:** *On March 4, 2008, the Secretary of Energy certified the BNI WTP EVMS and notified Congress of this action. This issue is closed.*

### 5.3 Quality Assurance (QA)

**Issue:** ORP has identified QA issues with BNI QA program description, BNI suppliers, and engineering flow-down of quality, technical, and authorization basis requirements to suppliers.

**Discussion:** ORP continues to perform assessments of the BNI QA program description, application of QA program grading, corrective action management, procurement of items important to safety and commercial material, commercial grade dedication (CGD), and several supplier inspections of BNI vendors. These assessment and inspection activities have identified the need for improvements in BNI’s QA program, support programs, procurement, and welding activities. Examples of ORP issues include:

- In 2005, ORP field inspection activities identified issues with the flowdown of nondestructive examination (NDE) requirements for vessel ring beam welds at the HLW Facility. As part of the extent of condition review for the issue, BNI determined that the requirement for NDE was not being identified on drawings as required. BNI issued a corrective action report requiring review of structural and equipment drawings to ensure that requirements were being correctly referenced across the WTP Project.
- ORP’s review of BNI QA program upgrades and an ORP assessment of BNI’s QA program implementation identified that the BNI’s Quality Assurance Manual (QAM) required upgrading to provide the necessary level of detail to demonstrate an acceptable program that met regulatory and DOE Order requirements. This included the need for significant improvement in documentation of the process for applying QA in a graded fashion.
- BNI’s CGD program was found to have significant technical and quality-related problems regarding the manner in which BNI Engineering was identifying critical design characteristics and specifying methods for verifying these characteristics. This issue resulted in BNI placing a management hold on CGD procurements while BNI developed and implemented adequate corrective actions to improve this program.
- A recent ORP field inspection identified significant problems with the way BNI implemented a quality (Q) procurement of HEME tanks. This issue again pointed out issues with the application of the BNI CGD program and flowdown of quality requirements during a procurement activity.
- While completing validation of a closed corrective action, BNI recently identified that up to 1,000 “black cell” (cells where access will not be available after completion of construction) pipe spools had been procured without proper material history

documentation and the specified volumetric examination as required. (The applicable code required 5 percent random examination, which was performed, but contract Authorization Basis documents required 100 percent examination of pipe welds located in black cells).

- ORP's review of BNI's Root Cause Analysis (RCA) report for the black cell piping concerns identified additional issues that require resolution. ORP's review identified two additional root cause problem definitions: (1) failure to ensure processes were in place to verify requirements in a consistent and reproducible manner and (2) failure of the supplier QA organization to identify this issue. Additionally, ORP identified that the RCA did not identify BNI's lack of an implemented Positive Material Identification process as required by the Safety Basis. ORP has formally requested BNI to broaden the RCA to address these issues.

**Outlook:** Although BNI's procurement quality oversight program has improved, engineering activities associated with procurement requirement flowdown to suppliers still requires improvement. BNI has approved the corrective actions implemented for one supplier that had been taken off their approved suppliers list due to poor performance. ORP has approved the BNI QAM and graded approach process and will validate the implementation of the revised documents in the summer of 2008.

ORP's Environmental Safety and Quality organization reached agreement with BNI regarding their approach for performing CGD of procured items and services from vendors and suppliers that do not possess a formal Nuclear Quality Assurance (NQA)-1 quality assurance program. As a result of the November 16, 2007, agreement, BNI will implement all the necessary programs and procedures for the eventual release of the BNI-imposed management suspension of CGD work.

With regard to the HLW Facility vessel ring beam weld issue, BNI met with one of its vessel fabricators to explore alternatives for repairing the ring beam welds to meet NDE requirements. Selection of the preferred option was made and the repairs have been completed.

BNI has assembled a team of engineers and QA engineers to review five specific component engineering and procurement activities and five program activities that have cross-cutting engineering and procurement impacts. The review plans are being developed, teams are being assembled, and some reviews have started. BNI anticipates completion of the reviews along with issuance of an interim report in June 2008.

## **6.0 DNFSB OPEN ISSUES – AS OF DECEMBER 31, 2007**

The Assistant Secretary for Environmental Management briefs the DNFSB monthly to discuss status of issues and concerns. DOE also participates in DNFSB meetings that include Safety-in-Design issues associated with the WTP.

The DNFSB provides in-depth safety and technical reviews and oversight of the project, and a number of issues have been raised and resolved. DOE will continue to meet with the DNFSB on a regular basis to discuss issues, provide status of technical issues, and make available information as requested.

## 6.1 Hydrogen in Piping and Ancillary Vessels

**Issue:** 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. The 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 ITS components), detonations are allowed. However, where there are 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.

**Discussion:** BNI has identified safety controls to address this concern. These include new and revised design features, and administrative controls to prevent the accumulation of hydrogen concentrations that could cause events large enough to deform the piping or ancillary vessels.

An HPAV database was developed which provides an electronic filing system to document final system designs meeting the 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 database, documenting the analysis and required controls for 330,000 lf of pipe.

The most significant outstanding technical concern is designing the associated pipe hangers and supports to withstand the associated reaction loads from these events. 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 will be initiated in June 2008 and will include three testing phases. BNI will use the test data to benchmark its analysis.

**Outlook:** ORP approval of the piping and ancillary vessel generic safety controls is expected by July 2008. BNI is continuing to evaluate control selections and has submitted subsequent approval requests. ORP approval of these requests is expected by July 2008. Follow-up experiments, analysis, and design of the associated pipe hangers and supports are expected to extend into early 2009. DOE briefed the DNFSB and their technical staff on the HPAV issue and has followed up with a letter to the Board asserting closure that the above mentioned processes and any ensuing design changes will resolve any outstanding DNSFB issues

## 6.2 Fireproofing

**Issue:** The structural integrity of WTP facilities must be sustained during and following fire events. If such an event were to occur, there is potential for reduction in the strength of some structural supporting steel columns and beams due to extreme heat exposure. A design approach was implemented that provides fire protection for selected structural steel members based on their plant-wide supporting structure roles. In October 2005, the DNFSB agreed that this strategy was acceptable provided it can reasonably be demonstrated that unprotected

structural members with reduced material properties due to a fire would not be relied upon to support the building.

**Discussion:** In response to DNFSB comments, the project developed a technically sound methodology for identifying structural steel members that do not require fireproof coating. The BNI structural design criteria were modified to require the use of this method to preserve facility structural integrity and confinement, and to protect ITS structures, systems, and components after accounting for degradation of the non-fireproofed steel members as the result of a fire. The design requirement also identifies additional load combinations and stability evaluations required to be considered for fire events. An outline of the approach together with excerpts from the revised design criteria and a schedule for issuing revised calculations were sent to the DNFSB on July 19, 2007, and discussed with DNFSB technical staff during subsequent meetings. Updates to the calculation release schedule have occurred and as of mid-April approximately 30 percent have been issued.

**Outlook:** On March 20, 2008, a discussion with DNFSB staff was held on the approach and the details of the calculations required for closing this issue:

- Qualification of structural steel primary vertical and horizontal members (including only the mass of the secondary members) to resist all prescribed loads per the structural design criteria (approach was resolved)
- Acceptability of the floor slab to maintain its integrity to resist all prescribed loads per structural design criteria requirements, when the support of the secondary members is neglected (approach was resolved)
- Qualification of the structural frame primary members to resist loads resulting from the secondary members subjected to the effects of fire, in accordance with the existing structural design criteria requirements (Open Issue)

The majority of the calculations addressing the first two bullets above were released for DNFSB staff review in May 2008. Discussion with DNFSB staff on April 9, 2008, indicates further interactions are needed with DNFSB staff regarding the planned methodology for resolving the 3rd bullet. The approach will be provided and coordinated and further discussed with DNFSB staff.

### 6.3 Seismic and Ground Motion Criteria

**Issue:** In October 2005, the DNFSB raised issues concerning the adequacy of the seismic and ground motion criteria. Congressional language stated that construction on the PT and HLW Facilities could not resume until the “Secretary of Energy certifies to the Congressional Defense Committees that the final seismic and ground motion criteria have been approved by the Secretary and that the contracting officer for the Waste Treatment and Immobilization Plant Project has formally directed that the final criteria be used for the final design of the Pretreatment Facility and the High-Level Waste Facility.”

**Discussion:** In response to the DNFSB issues, DOE ORP requested that the DNFSB acknowledge the issuance of the *WTP Structural Design Criteria*, Revision 10, and requested closure of the ground motion criteria and structural engineering issues.

In September 2006, the DNFSB responded that the RGM criteria provide a reasonably conservative basis for validating the design of WTP and believes that the RGM criteria should

be used to complete the design. As a follow up, three boreholes and one corehole were drilled to best determine subsurface site specific ground motion. Based on data gathered, it was determined that the RGM does indeed provide a conservative basis for design. These data provided the detail necessary to determine the adequacy of the RGM criteria as required by Congress. BNI is now applying the structural design criteria in the structural analysis and design for the main process facilities. The details and results of these structural analyses are being provided to DNFSB in an update to the SSRs for the HLW and PT Facilities.

**Outlook:** HLW and PT resumption of construction was permitted after receiving Secretarial seismic certification on August 9, 2007, and completing readiness reviews to ensure safe construction. Construction activities resumed at the HLW Facility on August 23, 2007, and the first concrete slab was placed on September 20, 2007. Construction resumed at the PT Facility on December 18, 2007, with the erection of structural steel on the south side of the facility.

Revised SSRs using the RGM were forwarded to DNFSB staff for review. Comments were returned to ORP in January 2008 and are currently being addressed.

## **7.0 PROJECT REVIEWS – ISSUE STATUS AS OF DECEMBER 31, 2007**

### **7.1 External Review of Process Flowsheet**

During the EFRT review conducted in 2006, hundreds of possible plant waste processing issues and concerns were assessed. During the evaluation, the EFRT identified 31 total issues of which 28 were considered major. The EFRT defined a major issue as one that will prevent meeting plant waste treatment rates with currently planned commissioning and future waste feeds, all pursuant to waste treatment specific stipulations of the BNI WTP contract. In turn, each of the 31 issues required an Issue Response Plan (IRP).

Formal Issue Response Closure Record packages are being prepared under the guidance of the joint ORP/BNI Technology Steering Group (TSG) for these issues, and will be deemed resolved upon ORP approval of these packages. As of December 31, 2007, 18 issues have been formally closed. The actual closure dates for these and the remaining open IRPs are shown in Table 11. As of June 10, 2008, 23 of 31 issues are closed. Some of the major issues currently being addressed are as follows:

- M-1, “Plugging in Process Piping.” The revised IRP has been approved by BNI and has been submitted to ORP for approval. All testing has been completed.
- M-2, “Mixing Vessel Erosion.” An updated test matrix has been proposed by BNI and accepted by ORP. The test plan includes variations in particle size and hardness, solids concentration, jet velocity and angle, and materials of construction for wear plates. Five of eight planned ¼ scale Nuclear Quality Assurance (NQA)-1 tests have been completed. The sixth test is underway and all tests completed suggest that the erosion allowance in the BNI vessel designs are adequate.
- M-3, “Inadequate Mixing System.” The IRP is being revised to include the mixing issues identified in the Technology Maturation Plan. The revised IRP will be reviewed and approved by the TSG. Frequent meetings are being held between ORP and BNI to agree on the path forward.
- M-12, “Undemonstrated Leaching Process.” On May 23, 2008, mechanical and electrical installation of the PEP equipment skids was completed ahead of the current



schedule. Component testing has been initiated and is moving ahead smoothly. Site Integrated Testing will be initiated followed by integrated water testing, and simulant shakedown tests. These tests will be completed in October 2008. Phase 1 integrated testing with simulant will be initiated by November 2008. Procurement of simulant for PEP testing was initiated, and a 15-gallon trial batch of simulant has been fabricated. The PEP provides the equipment needed to perform a 1:4.5 scale test of the WTP ultrafiltration system to address questions associated with the system's caustic and oxidative leaching processes, equipment performance, and system capacity.

- P-9, “Undemonstrated Sampling System.” Plugging problems have continued during the prototypical sampler testing. Modifications to the sampling system design were made including a larger needle size and closer tolerances to avoid a crevice where solids can accumulate. The larger needle size caused holes in the septum that remained open. A hold has been placed on the testing to determine alternative approaches.

**Table 11. Status of Issue Response Plans (as of end of April 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	Mar-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	