INL/EXT-16-38154

Project Closeout Report for the MFC Firewater Replacement Project

Project Number: 31780

June 2016

The INL is a
U.S. Department of Energy
National Laboratory
operated by
Battelle Energy Alliance

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Reviewed by:

Zane Mickelsen — 6/20/16

Zane Mickelsen
Project Manager — Date

Approved by:

Stuart Jensen Approved via Email — 6/20/16

S. Jensen
MFC Engineering Director — Date

Bob Miklos Approved via Email — 6/20/16

R. Miklos
MFC Production Facilities Director — Date

EXECUTIVE SUMMARY

The Material and Fuels Complex (MFC) Firewater Replacement Project was an indirectly funded Institutional General Plant Project (IGPP) capital acquisition initiated in July 2013 and completed in June 2016. Its purpose was to improve the capacity, redundancy and reliability of the MFC fire water and potable water systems, making them compliant with DOE O 420.1C and applicable state and federal regulations. The individual sub-systems are collectively referred to as the MFC Firewater System. Key performance parameters (KPPs) for modifying or constructing new structures, systems, and components (SSCs) in the MFC Firewater System and demolishing old, obsolete SSCs were all completed and are summarized as follows.

- A new pump house facility (MFC-1740) was constructed. The pump house contains heating and ventilation systems, a new mixed oxide (MIOX) water treatment system, diesel-powered fire water pump, and four potable water pumps.
- A new welded steel 400,000 gallon fire water storage tank was designed, fabricated, installed and integrated with the new pump house and fire water loop.
- Controls for the pump house, systems and components were installed and integrated with the existing MFC Firewater Control System.
- Over a mile of trenching and pipe installation created a new fire water loop line from MFC to the TREAT Area, including installation and connection of a new fire water loop within the TREAT control area fence.
- An obsolete fuel oil pump house (MFC-755) was demolished and the underground piping and concrete pad were abandoned in place. The old fuel oil tanks and foundations (MFC-755A and MFC-755B) were demolished.
- The existing, obsolete 200,000 gallon fire water tank and foundation (MFC-754A) were demolished.

Total project cost (TPC) was estimated at $9,483K, which included $250K of contingency and $689K of management reserve. Risks related to underground interferences, unexpectedly large basalt deposits, and required design changes were realized. As a result, $501K of management reserve was allocated during the project execution phase. None of the contingency funds were needed and $189K of management reserve was unallocated. The project was completed for $8829K, with positive cost variance of $215K (CPI = 1.02). Schedule performance ranged between .99 and 1.01 throughout the duration of the performance measurement baseline with the exception of three months that dropped to a range of .91 to .95. Specific, significant accomplishments included:

- Surmounted multiple realized risks to submit the CDE-4 package ahead of schedule and under budget.
- Completed all KPPs without notable safety or environmental incident.
- Eliminated 16,850 square feet of unneeded footprint by demolishing an unserviceable firewater tank and antiquated fuel oil pump house and tanks.

- Executed a buy-down strategy to procure piping and demolish the old fuel oil pump house and tanks prior to award of the main contract, which leveled project costs across fiscal years and accelerated the start of construction.
- Re-bid the construction contract with a wider group of potential contractors, improving competition and bringing the awarded contract value closer in line with project estimates.
- Coordinated schedules with the Resumption of Transient Testing Program, installing fiber optic cable while the firewater trench was open. This shortened the TREAT re-start schedule and reduced costs for re-trenching and cable installation.

In summary, the project successfully upgraded the MFC Firewater System's capacity, redundancy, and reliability. The project was completed ahead of schedule and under budget, despite realization of significant risks. Value to the government was optimized by the procurement strategy and by coordination with activities supporting TREAT re-start. The MFC Firewater System is now fully compliant with DOE O 420.1C requirements and applicable regulations.

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ACRONYMS

AE	Acquisition Executive
BCP	baseline change proposal
BEA	Battelle Energy Alliance, LLC
CD	critical decision
CDE	critical decision equivalent
CDR	Conceptual Design Report
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
F&ORs	Functional and Operational Requirements
FPD	Federal Project Director
FY	fiscal year
GIO	General Plant Projects (GPP), Institutional General Plant Projects (IGPP), and Operating Funded Construction Projects (OFP)
IGPP	Institutional General Plant Project
INL	Idaho National Laboratory
KPP	Key Performance Parameter
MIOX	mixed oxide water treatment
MFC	Materials and Fuels Complex
TREAT	Transient Reactor Test
WBS	work breakdown structure

Project Closeout Report for the MFC Firewater Replacement Project

1. PROJECT SUMMARY

The MFC Firewater Replacement Project was an indirectly funded Institutional General Plant Project (IGPP) for capital acquisition of upgraded fire water and potable water systems at the Material and Fuels Complex (MFC). The purpose of this project was to improve the capacity, redundancy and reliability of the MFC Firewater System, making it compliant with DOE O 420.1C and with applicable state and federal regulations.

Fire water service and potable water service are integrated at MFC, and are collectively referred to as the MFC Firewater System. The Firewater System supplies both firewater and potable water services to MFC and to the Transient Reactor Test (TREAT) Area, which is located approximately half a mile to the northwest of MFC. The fire water tanks, pumps, controls and pump houses are located within MFC and were constructed or upgraded by the project. The supply lines to the TREAT Area were replaced with a piping loop to provide a redundant supply to the area, and to increase reliability and supply capacity. Potable water supplies to the TREAT Area were also upgraded. The project included demolition of an obsolete fuel oil tank system to make space for a new fire water tank and demolition of an old fire water tank that was no longer serviceable.

Delivery of the project is discussed below by project phase:

Project Definition:

A formal mission need document was not formulated for this project. Equivalent approval of critical decision (CD)-0, Approve Mission Need, was obtained via DOE approval of the Idaho National Laboratory (INL) 2015-2025 Ten-Year Site Plan consistent with the GIO process defined in Appendix E of MCP-7001(A "GIO" Project is a General Plant Project (GPP), Institutional General Plant Project (IGPP), or Operating-Funded Construction Project (OFP).). Project definition began in July 2013 with approval of baseline change proposal (BCP) IN-13-163 and changes to the baseline from that point forward are summarized in Section 1.1.2. During project definition, design requirements were developed to provide the basis for advanced planning, cost estimating, schedules, and scope definition, including:

- Development of functional and operational requirements (F&ORs)
- Technical evaluations
- Design requirements
- Preliminary drawings
- Safety evaluations
- Quality level determination
- Class 5 cost estimate
- Project schedule
- Davis Bacon and Funding determinations
- Environmental checklist

As an indirectly funded project, the MFC Firewater Replacement Project was incrementally funded on an annual basis. This resulted in an acquisition strategy that combined early buy-down of piping, new tank materials and demolition services with a design-bid-build approach for the major construction contract. After the relevant specifications were developed, early buy-down of selected scope was selected as a procurement strategy because it allowed use of well established, standard industrial specifications and practices that were not expected to change during final design. Title design was completed in-house in January 2015. The cost estimate was updated and the procurement process was initiated.

Two bid proposals were received in early March 2015 from the solicitation; neither of which aligned with the project estimates. A second solicitation, open to large businesses, was released with thirteen

bidders identified. The increased competition and construction methods available to large businesses is believed to have been a contributing factor in providing a range of proposals that were closer in line with the project estimates. The contract was awarded to North Wind Services, LLC on April 21, 2015.

Project Execution:

Because of the procurement delay for a second solicitation and its impact on the construction schedule, the Acquisition Executive (AE) authorized the start of construction on May 21, 2015 (IFM-15-014) within the constraints of the existing, bounding baseline, but without critical decision equivalent (CDE)-2/3 approval. Construction started on June 1, 2015. The PMB and CDE-2/3 package were assembled and submitted (CCN 235942), although approval of CDE-2/3 was deferred for extended comment resolution. The original construction completion date was retained, as were the existing variances as directed by the acquisition executive (AE) (CCN 236026). The revised CDE-2/3 package was re-submitted (CCN 236141) and approved as submitted (CCN 236196), establishing the PMB as detailed in Table 1 below.

Table 1: Total Project Cost estimated for the MFC Firewater Replacement Project at CDE-2/3

Description	Total Estimated Costs (TEC)	Other Project Costs (OPC)	Total
Performance Measurement Baseline	**$8,141,364**	**$402,490**	**$8,543,854**
CD-1 and CD-2/3 Development & Approval		$200,000	
Fire Water System	$4,518,373	$24,343	
Fire Water Line	$2,665,142	$18,932	
D&D Fuel Oil Tanks		$22,200	
Fuel Oil Tanks	$579,573		
Project Management	$378,276	$11,561	
Project Turnover/Closeout		$125,454	
Management Reserve	**$643,767**	**$45,000**	**$688,767**
Contract Budget Base (CBB)	**$8,785,131**	**$447,490**	**$9,232,621**
Contingency	$250,000		
Total	**$9,035,131**	**$447,490**	
Total Project Cost (TPC)			**$9,482,621**

Estimated costs presented in Table 1 were based on cost estimate (WES-EST-15-096), which was updated based on actual costs at CDE-2/3, the updated final design and the construction bid. Approximately 10% of the contract value was planned as anticipated contract change requests. Internal and external activity completion dates and project milestones were established at CDE-2/3 approval as follows, where the activity identification numbers correspond to the project schedule contained in Appendix A.

- Start New Tank Construction Milestone 24-Jun-15
- New Tank Construction Complete Milestone 30-Sep-15
- Start New Pump House Construction Milestone 30-Jun-15
- New Pump House Construction Complete Milestone 13-Oct-15
- Pipeline – FWL (Start/Finish) 23-Jun-15/22-Sep-15
- Construction Complete Milestone 30-Nov-15
- Turnover/Startup and Closeout 1-Dec-15/19-Jan-16

- Submit CDE-4 Package to DOE for Approval Milestone 14-Jun-16*
- Obtain CDE-4 Approval Milestone (Project Complete) 11-Jul-16

*Date was Revised on Nov 12, 2015 via BCP IN-16-050

As noted, construction started on June 1, 2015 with mobilization activities - the progression of construction is illustrated in Appendix B. Significant portions of the work were planned with six-day work weeks to maintain the construction completion date of November 30, 2015. Work started on the new 400,000 gallon tank and pump house foundations with excavation and footings. Excavation inside the MFC fence to make piping connections was performed by vacuum extraction and the majority of the pipeline trenching inside and between the MFC fences was performed with vacuum extraction due to the close quarters and some uncertainty in underground piping configurations. Underground interferences were encountered (Risk Register #6), but were addressed by vacuum excavation and minor design changes within the budget for change orders and without impact to the overall schedule.

Trenching between MFC and TREAT was performed in July and August with a rock trencher, and encountered a significant amount of basalt (Risk Register #2). Trenching was planned with float in the schedule as a risk mitigation measure, and an additional trencher was used on the south portion of the loop to prevent affecting the critical path. Costs were maintained within the budget for contract change orders. The 14-inch HDPE piping was assembled and placed in the trench as the major portions of the trench were completed. Backfill of the trenching was delayed to allow the Resumption of Transient Testing Program (RTTP) to lay fiber optic and coaxial cables in segments of the north trench. This did not affect the overall project schedule and avoided substantial trenching costs for the RTTP.

Permanent fire water and potable water connections were started inside MFC and at the TREAT area in late August and early September. The piping configurations inside TREAT were not as expected and considerably more rock cutting was needed, in part because of the piping configuration and also in part because additional basalt was discovered (Risk Register #2 and #6). The extent of condition was investigated using vacuum extraction and an additional rock cutter was employed. Additionally, finishing the trenching and piping with the TREAT fence replaced the electrical and mechanical work in the pump house as the critical path for completion of the construction.

Incremental discovery of additional basalt during vacuum extraction resulted in additional rock cutting, piping configuration design changes and schedule delays. The cumulative costs for those activities, as well as the additional costs of maintaining temporary services during the activities, required the allocation of management reserve and eventually resulted in a contract change that deferred the completion of construction to December 31, 2015. Deferral of the construction completion milestone used one month of schedule reserve baselined in June 2016. Associated change control documents are referenced in Section 1.1.2.

The new 400,000 gallon tank and the pump house were substantially erected in July and August. The tank was sandblasted in August and primed in September. Painting inside the tank was completed and insulation work inside and outside the tank started and continued through early fall. Electrical work in the pump house started in September, representing the critical path until the delays associated with trenching and piping in the TREAT Area replaced it. The fire water pump skid was received in September and tie-ins to the existing control system started in October. The mixed oxide water treatment (MIOX) system installation started in October and completed in November. Control system programming, fire water pump alignment and development of operating instructions were completed in November and early December. However, difficulty in integrating the deep well pump controls with the new fire water system controls and scheduling conflicts for vendor support resulted in a decision to defer training and partial turnover until January. As a result, the construction completion milestone was missed but operational certainty was improved by avoiding implementation of new procedures over the December curtailment.

Final system testing was started in January and an air vent was installed on the discharge of the diesel fire water pump to eliminate the risk of water surge. Minor adjustments were made, but no significant

issues were identified and partial turnover was commenced. During partial turnover, the design requirements regarding lead content in some of the diesel-powered fire water pump components were questioned. After evaluation, it was confirmed that Safe Drinking Water Act requirements apply to the fire water pump because it can be connected to the potable water system and those requirements were not adequately implemented in the design. The pump impeller shaft sleeve and wear rings were replaced with lead-free components and testing resumed in March 2016.

The firewater pump was isolated from the rest of the system since its installation and there was no risk to the MFC or TREAT Area potable water supplies at any time. Water samples confirmed that the lead content in the system was non-detectable at the time of discovery, during evaluation and component replacement, and prior to placing the system in service.

After testing, partial turnover of the fire water system to Operations was completed on April 7, 2016. The new system was placed in service and the old 400,000 gallon tank and pump house taken out of service for inspection and replacement of leaky valves. Work on the old system was completed and returned to service, followed by completion of the System Operability Test, final punch list items and project close-out.

Project close-out was started in December 2015 in parallel with final construction activities to the extent possible in order to complete as much of the work as possible in parallel. Conversion of as-built drawings, development of operating and maintenance procedures, and update of the design basis were performed off the critical path to maintain the date for submission of the CDE-4 package to DOE-ID. An Operations and Maintenance manual along with the as-built design was submitted (CCN 238138) to the Idaho Department of Environmental Quality (DEQ) and on May 4, 2016, DEQ provided final project approval (CCN 238230) which can be found in Appendix I.

Other significant activities that occurred off the critical path were the demolition of the old 200,000 gallon tank and punch list work such as painting, caulking and grouting. Demolition of the 200,000 gallon tank was performed in October and November. Asbestos was encountered (Risk Register #7) but properly identified and disposed of without incident. Injection of concrete under a void under the old pump house and reconstruction of the back wall were completed without affecting the critical path.

1.1 Summary of the Final Project Scope & Deliverables

The project delivered upgraded, reliable, redundant and compliant fire water and potable water systems for MFC and the TREAT Area. The project completed all Key Performance Parameters (KPPs) which spanned the planning, design, procurement, construction, startup, acceptance testing, and project closeout for new structures, systems, and components (SSCs) and modifications to existing SSCs as follows:

- Demolition of the MFC-755 Fuel Oil Pump House and earth berms.
- Demolition of the MFC-755A & MFC-755B 60,000- and 100,000-gallon fuel oil tanks and foundations.
- Abandonment- in- place of the MFC-755 Fuel Oil Pump House concrete slab, foundation, CERCLA injection well, underground fuel oil lines between the MFC-755 and MFC-768 power plant, and underground electrical and communications conduit duct banks. Removal of these systems and services was not included in the project work scope.
- Demolition of the MFC-754A 200,000 gallon water tank.
- Installation of a new fire water loop line from MFC to TREAT.
- Installation of a new fire water loop within the TREAT control area fence.
- Installation of a new welded steel 400,000 gallon fire water storage tank.
- Installation of a new water treatment system.

- Construction of a new pump house facility (including heating and ventilation systems), which will house the new diesel fire water pump, four potable/fire water pumps, and controls.
- Demonstration of system performance requirements were met by performance of a system operability test.

1.1.1 Technical, Cost, and Schedule Baseline Accomplishments

Significant accomplishments are described below.

- The CDE-4 package was submitted slightly ahead of schedule, at which time the project actual total costs were $215K less than the budget at completion.
- At CDE-4 submittal, the project cost and schedule variances were within established thresholds (CPI = 1.02 & SPI = 1.00).
- The project met all defined technical, functional and operational requirements, as verified through design review, inspection and quality control during construction, and documented facility turnover;
- All key performance parameters were completed as defined in the project execution plan (PEP).
- The project affected a successful buy-down strategy to procure piping and demolish the old fuel oil tanks prior to execution of the main contract. This leveled costs across fiscal years and accelerated the start of construction once CDE-2/3 was approved.
- The project eliminated 16,850 square feet of unneeded footprint by demolishing the old 200,000 gallon tank and the antiquated fuel oil pump house and fuel oil tanks.
- The project successfully re-bid the construction contract with a wider group of potential contractors, improving competition and reducing the original lowest bid by approximately $2.2M.
- The project successfully coordinated schedules with the TREAT re-start, allowing installation of fiber optic cable in the Firewater trench while it was open. This coordination avoided the cost of re-trenching under the RTTP Program.
- The project upgraded the MFC and TREAT Area potable water systems;
- The project upgraded the MFC Firewater System capacity, redundancy, and reliability. The system is now fully compliant with DOE O 420.1C requirements and applicable regulations.

1.1.2 Significant Changes to the Project Baseline and Performance Measurement Baseline

Project Baseline

The project was initiated in July 2013 with approval of BCP IN-13-163, authorizing the development of Functional and Operational Requirements (F&ORs), a conceptual design, and a Class 5 cost estimate. After the F&ORs were developed, conceptual design and a Class 5 estimate were completed; then the project was placed on hold due to indirect funding shortfalls.

The project was re-started in June 2014 with approval of BCP IN-14-132, authorizing Title Design and revision of the cost estimate, materials buy-down, and further planning. In July 2014 and August 2014, respectively, BCP IN-14-159 and BCP IN-14-161 converted planning packages into baseline activities for project buy-down of the Fuel Oil Tank demolition, fabrication of a new 400,000 gallon tank, and procurement of firewater loop piping.

BCP-15-003 revised the baseline to reflect changes to the INL business model, including rate changes, in October 2014. In November, BCP IN-15-036 was approved to align planning package dates

with the expected completion of Title Design. After completing Title Design, BCP IN-15-084 was approved in February 2015 to convert planning packages into specific procurement activities supporting release of the Request for Proposal (RFP). The first responses to the RFP were inconsistent with the INL cost estimate, and re-issue of the RFP led to award of the construction contract to North Wind Services, LLC on 4/21/2015. BCP IN-15-147 was approved in May 2015 to align construction planning packages with the revised expectations for the construction period in the contract. BCP IN-15-185 was approved in July 2015 to re-schedule planning packages because of delayed CDE-2/3 approval.

Performance Measurement Baseline

Following CDE-2/3 approval, BCP IN-15-186 was approved to establish the Performance Measurement Baseline through the Execution Phase of the project.

BCP IN-16-002 was approved October 2015 to convert planning packages to detailed work packages, enabling testing, turn-over and close-out activities to start earlier than originally planned. Realization of execution risks led to utilization of management and schedule reserve in BCP IN-16-050 (November 2015) and BCP IN-16-089 (January 2016). The transmittal date for the CDE-4 package was changed to June 14, 2016, but the completion date for the project remained unchanged, as did the contract budget base. The cumulative effect of the BCPs in FY2016 was use of $501K of management reserve and an increase in the budget at completion (BAC) to $9,044K. A Master Budget Log, contained in Appendix C, was used to capture the budget impact of each BCP.

1.2 Open Items Required to Complete the Project

There are no open items on the deficiency punch-list (see Appendix D) at the time of project closeout related to the MFC Firewater Replacement Project. Scope that was added to the contract to support the Resumption of Transient Test Program or to investigate leaks in the MFC Firewater System, unrelated to this project, was added under separate CFPs. Costs were maintained separately and at the time of project close-out there were no open items related to these CFPs.

All essential as-built drawings and vendor data submittals are complete and there are no pending lawsuits or warranty claims.

1.3 Permits, Licenses, Environmental Documentation Generated

Environmental Checklist INL-14-062 was developed to identify potential environmental concerns associated with the project and resulted in a Categorical Exclusion determination. All requirements of the Environmental Checklist were implemented during the project and have been completed. Discussions of the most significant project-related environmental activities follow:

Air Permitting Applicability Determination (APAD) INL-15-011 documents that the diesel-powered fire water pump qualifies for a Category II exemption for construction and permitting per IDAPA 58.01.01.22, but does require compliance with the Title V Tier I Operating Permit. Controls are established in fuel procurement documents and operating instructions, but there are no limitations on the hours of emergency operation.

Trenching across the north and south sections of the MFC interceptor canal and mounds (Institutional Control Areas ANL-01 and ANL-09), removed previously remediated CERCLA (OU 9-04) soils. Sample results taken prior to trenching were below the 23.3pCi/g remediation goal (MFC Analytical Laboratory Log #98776 and Log #98893). Hence, no extraordinary soil disposal requirements were required and the soils were placed back in the trench.

During August 2015, the Northwind Construction Services, LLC obtained permission from the construction field representative and security to waste their trench soil tailings in the Wastewater Ditch C which is permitted for reverse osmosis, industrial and storm water waste discharges under permit (WRU-I-0160-01). Ditch C was not identified as part of the environmental checklist. On August 6, 2015, a person from the environmental support group was performing plant inspections and noticed the tailings being applied to the ditch. Northwind was directed to stop placing soil tailings in the ditch and a fact finding meeting was conducted. DOE-ID and the Idaho DEQ were notified of the disturbance and a formal notification letter was transmitted to Idaho DEQ on August 12, 2015. Northwind was directed to formally suspend any further soil disposal in Ditch C and complete restoration of the ditch. On October 22, 2015 Idaho DEQ performed and inspection to review the system. During the inspection debriefing Idaho DEQ inspectors stated that there were no violations noted during the inspection and accepted that the ditch would be restored within the next four weeks. On November 19, 2015, Northwind completed the restoration of Ditch C and a formal notification letter was issued to Idaho DEQ stating that Ditch C was reconstructed.

As required by IDAPA 58.01.08, drinking water plans and specifications (system design) were provided to Idaho DEQ (PWS#6060036, Drinking Water, DEQ#15-01-12) and approved prior to construction (CCN235324). One variance was requested from IDAPA 58.01.08.547.02.b.iii.(1).(b) to approve a 9 foot sleeve (versus a 10 foot sleeve) on one side of a potable water supply line in the TREAT Area, as it passes an existing sewer line, due to physical constraints (CCN 237233). The variance was granted, in part due to infrequent use of the sewer line and because the sewer is encased in concrete (CCN 237307). Extension of the one-year construction approval beyond February 26, 2015 was requested and granted (CCN237746). The fire water system as a whole must comply with NSF 372 "Drinking Water System Components – Lead Content," and it was discovered that components in the firewater pump assembly had lead content that exceeded these requirements. As a result, the fire water pump shaft sleeve and wear rings were replaced with lead-free components which reduced the weighted-average lead content of the firewater pump assembly for compliance with "Reduction of Lead in Drinking Water Act" Section 1417 (ECAR 3205). The firewater pump was isolated before and when the condition was discovered, and water samples taken upon discovery and until the components were replaced confirmed that lead concentrations in the MFC-1740 water supply were non-detectable. The confirmatory sample reports are contained in the project record.

For the purposes of environmental compliance, the completion of construction defined by the turnover to Operations was accomplished on April 7, 2016. Transmittal of the Maintenance and Operations (M&O) Manual, and associated drawings to Idaho DEQ was required within 30 days of that date. Those documents were transmitted to Idaho DEQ on April 28, 2016 (CCN 238138). Idaho DEQ provided final project approval on May 4, 2016 (CCN 238230).

1.4 Warranties and Service Contracts Maintained by the Customer/Facility Manager or Owner

Warranties associated with the materials and services provided in this project are defined in the contract documents. The applicable contract with warranty considerations are defined below.

- Construction Subcontract 154606: Warrantied for one year from the date of partial or final acceptance of work (see contract documents for details).

1.5 Post Project Commitments

There are no incomplete post project commitments.

1.6 Project Files

A complete listing of project records and facility configuration information is available within the project files for the project. The documentation listed in the project files can be obtained from EDMS. Vendor data from the construction subcontracts can be obtained from the INL vendor data system. Vendor data schedule numbers are provided in Table 1.

Table 1: Vendor Data Schedule

Contract	Contract #	Vendor Data Schedule #
HDPE Pipe Procurement	N/A	31780-466842
MFC Firewater Storage Tank	148973	31780-474472
MFC Firewater Tank and Pump House Construction	154606	31780-484738
MFC Firewater Underground Piping	154606	31780-484881

A search for documents related to this project can also be performed using EDMS and project #31780.

1.7 Risk

A complete listing of the project risks, risk mitigation strategies, and risk results was included in the PEP. The most current revision of the PEP can be referenced on the Electronic Document Control System (EDMS) as PLN-4866 Rev.2, dated 7/22/2015. The risk register, as it appeared in PLN-4866 Rev. 2 at CDE-2/3 approval, is presented in Appendix E.

1.8 Lessons Learned

The lessons learned report for the project can be obtained from Appendix F.

1.9 Final Cost Report and Financial Closeout Status

The total project cost (TPC) was estimated at $9,483K. A breakdown of estimated final project costs by work breakdown structure (WBS) is provided in Table 2. Final project costs are through the fiscal month of May 2015 which is the last reporting period prior to submittal of the report. Additional minor costs may be incurred to for comment resolution and gain final approval of the CDE-4 package. Final cost closing statements will be prepared after CDE-4 approval as outlined in MCP-7001.

Table 2: Total Project Cost by WBS

WBS Description	Cost ($K)
Project Initiation/Conceptual Design	$118
Firewater System Design & Construction	$4,725
Firewater Lines Design & Construction	$2,936
Fuel Oil Tanks Design & Demolition	$416
Project Management	$555
Project Turnover/Closeout	$79
Total Project Cost	$8,829

1.10 Closeout Approvals

Upon approval of CDE-4 by the Project Management Executive (PME) the MFC Firewater Replacement Project will be closed. All project documents are closed and a final transfer from the Construction Subcontractor has been executed (see the executed form 432.04, Inspection and Project Transfer, in Appendix G). The facility has accepted the construction project in accordance with the Project Acceptance/Turnover Plan (Appendix H). The executed Transition to Operations Final Turnover Checklist is attached in Appendix I. Executed partial transfer checklists are not provided as attachments because the final transfer supersedes the partial transfers.

2. APPENDIXES

Appendix A, Final Project Schedule

Appendix B, Project Photos

Appendix C, Master Budget Log

Appendix D, Project Deficiency Punch List

Appendix E, Risk Register

Appendix F, Lessons Learned Report

Appendix G, Final Project Transfer

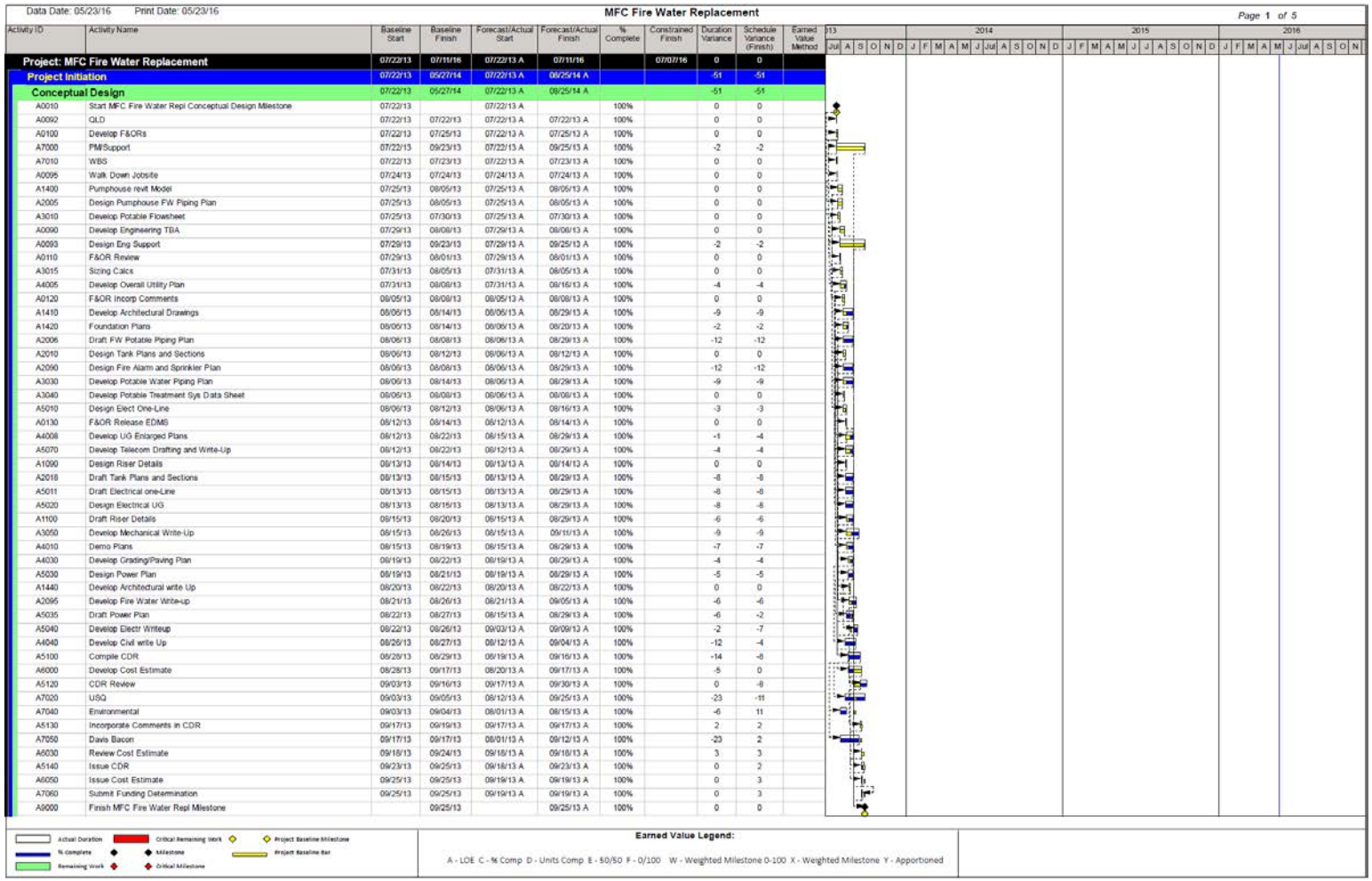
Appendix H, Project Acceptance/Turnover Plan

Appendix I, Executed Transition to Operations Final Turnover Checklist

Appendix J, Idaho Department of Environmental Quality Final Project Approval

Appendix A,

Final Project Schedule



Data Date: 05/23/16 Print Date: 05/23/16

MFC Fire Water Replacement

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Activity ID	Activity Name	Baseline Start	Baseline Finish	Forecast/Actual Start	Forecast/Actual Finish	% Complete	Constrained Finish	Duration Variance	Schedule Variance (Finish)	Earned Value Method
Project: MFC Fire Water Replacement		07/22/13	07/11/16	07/22/13 A	07/11/16		07/07/16	0	0	
Project Initiation		07/22/13	05/27/14	07/22/13 A	08/25/14 A			-51	-51	
Conceptual Design		07/22/13	05/27/14	07/22/13 A	08/25/14 A			-51	-51	
A0010	Start MFC Fire Water Repl Conceptual Design Milestone	07/22/13		07/22/13 A		100%		0	0	
A0092	QLD	07/22/13	07/22/13	07/22/13 A	07/22/13 A	100%		0	0	
A0100	Develop F&ORs	07/22/13	07/25/13	07/22/13 A	07/25/13 A	100%		0	0	
A7000	PM/Support	07/22/13	09/23/13	07/22/13 A	09/25/13 A	100%		-2	-2	
A7010	WBS	07/22/13	07/23/13	07/22/13 A	07/23/13 A	100%		0	0	
A0095	Walk Down Jobsite	07/24/13	07/24/13	07/24/13 A	07/24/13 A	100%		0	0	
A1400	Pumphouse revit Model	07/25/13	08/05/13	07/25/13 A	08/05/13 A	100%		0	0	
A2005	Design Pumphouse FW Piping Plan	07/25/13	08/05/13	07/25/13 A	08/05/13 A	100%		0	0	
A3010	Develop Potable Flowsheet	07/25/13	07/30/13	07/25/13 A	07/30/13 A	100%		0	0	
A0090	Develop Engineering TBA	07/29/13	08/06/13	07/29/13 A	08/06/13 A	100%		0	0	
A0093	Design Eng Support	07/29/13	09/23/13	07/29/13 A	09/25/13 A	100%		-2	-2	
A0110	F&OR Review	07/29/13	08/01/13	07/29/13 A	08/01/13 A	100%		0	0	
A3015	Sizing Calcs	07/31/13	08/05/13	07/31/13 A	08/05/13 A	100%		0	0	
A4005	Develop Overall Utility Plan	07/31/13	08/09/13	07/31/13 A	08/16/13 A	100%		-4	-4	
A0120	F&OR Incorp Comments	08/05/13	08/08/13	08/05/13 A	08/08/13 A	100%		0	0	
A1410	Develop Architectural Drawings	08/05/13	08/14/13	08/05/13 A	08/29/13 A	100%		-9	-9	
A1420	Foundation Plans	08/05/13	08/14/13	08/06/13 A	08/20/13 A	100%		-2	-2	
A2006	Draft FW Potable Piping Plan	08/06/13	08/08/13	08/06/13 A	08/29/13 A	100%		-12	-12	
A2010	Design Tank Plans and Sections	08/06/13	08/12/13	08/06/13 A	08/12/13 A	100%		0	0	
A2090	Design Fire Alarm and Sprinkler Plan	08/06/13	08/08/13	08/06/13 A	08/29/13 A	100%		-12	-12	
A3030	Develop Potable Water Piping Plan	08/06/13	08/14/13	08/06/13 A	08/29/13 A	100%		-9	-9	
A3040	Develop Potable Treatment Sys Data Sheet	08/06/13	08/08/13	08/06/13 A	08/08/13 A	100%		0	0	
A5010	Design Elect One-Line	08/06/13	08/12/13	08/06/13 A	08/16/13 A	100%		-3	-3	
A0130	F&OR Release EDMS	08/12/13	08/14/13	08/12/13 A	08/14/13 A	100%		0	0	
A4008	Develop UG Enlarged Plans	08/12/13	08/22/13	08/15/13 A	08/29/13 A	100%		-1	-4	
A5070	Develop Telecom Drafting and Write-Up	08/12/13	08/22/13	08/12/13 A	08/29/13 A	100%		-4	-4	
A1090	Design Riser Details	08/13/13	08/14/13	08/13/13 A	08/14/13 A	100%		0	0	
A2018	Draft Tank Plans and Sections	08/13/13	08/15/13	08/13/13 A	08/29/13 A	100%		-8	-8	
A5011	Draft Electrical one-Line	08/13/13	08/15/13	08/13/13 A	08/29/13 A	100%		-8	-8	
A5020	Design Electrical UG	08/13/13	08/15/13	08/13/13 A	08/29/13 A	100%		-8	-8	
A1100	Draft Riser Details	08/15/13	08/20/13	08/15/13 A	08/29/13 A	100%		-6	-6	
A3050	Develop Mechanical Write-Up	08/15/13	08/26/13	08/15/13 A	09/11/13 A	100%		-9	-9	
A4010	Demo Plans	08/15/13	08/19/13	08/15/13 A	08/29/13 A	100%		-7	-7	
A4030	Develop Grading/Paving Plan	08/19/13	08/22/13	08/19/13 A	08/29/13 A	100%		-4	-4	
A5030	Design Power Plan	08/19/13	08/21/13	08/19/13 A	08/29/13 A	100%		-5	-5	
A1440	Develop Architectural write Up	08/20/13	08/22/13	08/20/13 A	08/22/13 A	100%		0	0	
A2095	Develop Fire Water Write-up	08/21/13	08/26/13	08/21/13 A	09/05/13 A	100%		-6	-6	
A5035	Draft Power Plan	08/22/13	08/27/13	08/15/13 A	08/29/13 A	100%		-6	-2	
A5040	Develop Electr Writeup	08/22/13	08/26/13	09/03/13 A	09/09/13 A	100%		-2	-7	
A4040	Develop Civil write Up	08/26/13	08/27/13	08/12/13 A	09/04/13 A	100%		-12	-4	
A5100	Compile CDR	08/26/13	08/29/13	08/19/13 A	09/16/13 A	100%		-14	-8	
A6000	Develop Cost Estimate	08/28/13	09/17/13	08/20/13 A	09/17/13 A	100%		-5	0	
A5120	CDR Review	09/03/13	09/16/13	09/17/13 A	09/30/13 A	100%		0	-8	
A7020	USQ	09/03/13	09/05/13	08/12/13 A	09/25/13 A	100%		-23	-11	
A7040	Environmental	09/03/13	09/04/13	08/01/13 A	08/15/13 A	100%		-6	11	
A5130	Incorporate Comments in CDR	09/17/13	09/19/13	09/17/13 A	09/17/13 A	100%		2	2	
A7050	Davis Bacon	09/17/13	09/17/13	08/01/13 A	08/12/13 A	100%		-23	2	
A6030	Review Cost Estimate	09/18/13	09/24/13	09/18/13 A	09/18/13 A	100%		3	3	
A5140	Issue CDR	09/23/13	09/25/13	09/18/13 A	09/23/13 A	100%		0	2	
A6050	Issue Cost Estimate	09/25/13	09/25/13	09/19/13 A	09/19/13 A	100%		0	3	
A7060	Submit Funding Determination	09/25/13	09/25/13	09/19/13 A	09/19/13 A	100%		0	3	
A9000	Finish MFC Fire Water Repl Milestone		09/25/13		09/25/13 A	100%		0	0	

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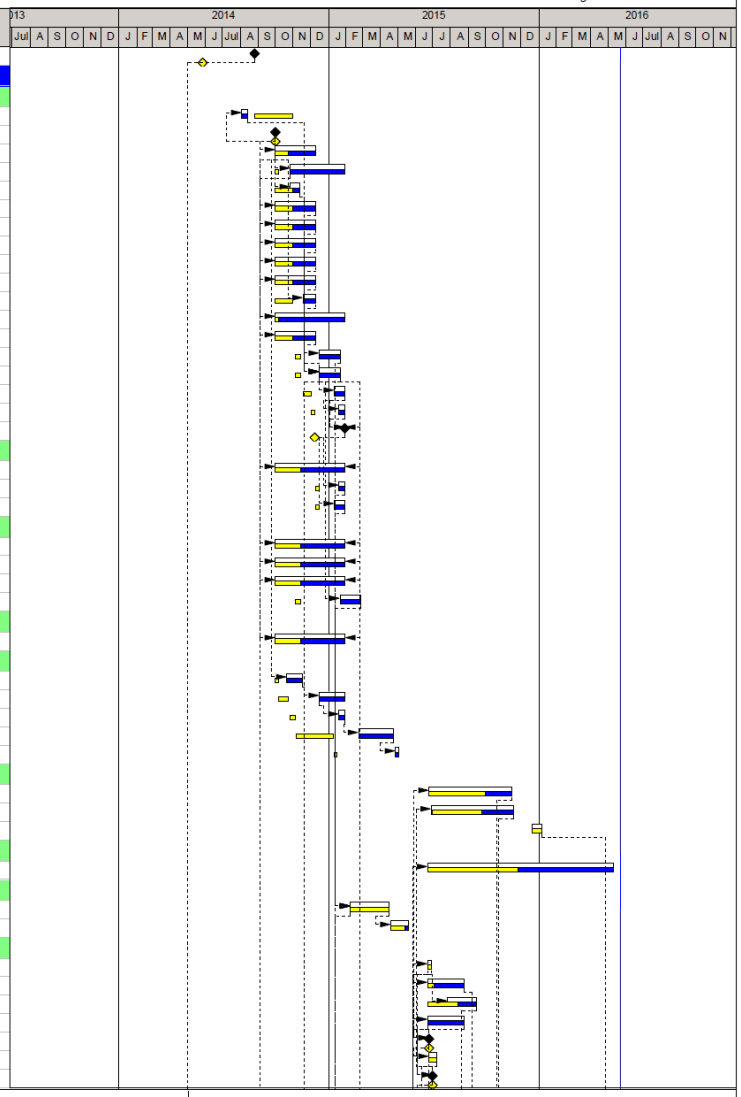
MFC Fire Water Replacement

Activity ID	Activity Name	Baseline Start	Baseline Finish	Forecast/Actual Start	Forecast/Actual Finish	% Complete	Constrained Finish	Duration Variance	Schedule Variance (Finish)	Earned Value Method
A9190	BCP IN-14-132 Approved	05/27/14		08/25/14 A		100%		0	-51	
MFC Fire Water System (FWS)		**08/25/14**	**02/03/16**	**08/04/14 A**	**05/19/16 A**			**-72**	**-60**	
Title Design for MFC FWS		08/25/14	12/08/14	08/04/14 A	01/29/15 A			-38	-26	
A9045	Tank Drawings	08/25/14	10/30/14	08/04/14 A	08/14/14 A	100%		32	44	
A10150	FY15 Start Milestone (BCP IN-003 Rate Changes)	10/01/14		10/01/14 A		100%		0	0	
A9010	Specification (FWS)	10/01/14	10/23/14	10/01/14 A	12/11/14 A	100%		-26	-26	
A9030	Subsurface Investigation	10/01/14	10/07/14	10/27/14 A	01/29/15 A	100%		-46	-60	
A9040	Profile Drawings	10/01/14	10/30/14	10/27/14 A	11/12/14 A	100%		8	-6	
A9050	Building Drawings	10/01/14	10/30/14	10/01/14 A	12/11/14 A	100%		-22	-22	
A9060	Flow Diagram Drawings	10/01/14	10/30/14	10/01/14 A	12/11/14 A	100%		-22	-22	
A9070	Piping Drawings	10/01/14	10/30/14	10/01/14 A	12/11/14 A	100%		-22	-22	
A9080	Detail Drawings	10/01/14	10/30/14	10/01/14 A	12/11/14 A	100%		-22	-22	
A9090	Electrical Drawings	10/01/14	10/30/14	10/01/14 A	12/11/14 A	100%		-22	-22	
A9100	Alarm/Communications Drawings	10/01/14	10/30/14	11/17/14 A	12/11/14 A	100%		4	-22	
A9110	Calculations	10/01/14	10/07/14	10/01/14 A	01/29/15 A	100%		-60	-60	
A9200	Water Tank/Pump House Modifications Drawings	10/01/14	10/30/14	10/01/14 A	12/11/14 A	100%		-22	-22	
A9020	Cost Estimate	11/03/14	11/13/14	12/15/14 A	01/21/15 A	100%		-9	-32	
A9120	Design Review	11/03/14	11/13/14	12/15/14 A	01/22/15 A	100%		-10	-33	
A9130	Incorporate Comments	11/17/14	12/01/14	01/12/15 A	01/29/15 A	100%		-3	-29	
A9135	Document Control	12/02/14	12/08/14	01/20/15 A	01/29/15 A	100%		-3	-26	
A9140	Issue FWS Final Design		12/08/14		01/29/15 A	100%		0	-26	
Construction Mgmt for MFC FWS		10/01/14	12/15/14	10/01/14 A	01/29/15 A			-22	-22	
A9580	Construction Management during Design	10/01/14	11/13/14	10/01/14 A	01/29/15 A	100%		-38	-38	
A9560	Develop Nine Block	12/09/14	12/15/14	01/20/15 A	01/29/15 A	100%		-2	-21	
A9570	Develop Specials	12/09/14	12/15/14	01/12/15 A	01/29/15 A	100%		-7	-21	
ESH&Q for MFC FWS		10/01/14	11/13/14	10/01/14 A	02/26/15 A			-54	-54	
A9740	Quality Engineering during Design	10/01/14	11/13/14	10/01/14 A	01/29/15 A	100%		-38	-38	
A9780	Environmental Support during Design	10/01/14	11/13/14	10/01/14 A	01/29/15 A	100%		-38	-38	
A9790	Safety & Health Support during Design	10/01/14	11/13/14	10/01/14 A	01/29/15 A	100%		-38	-38	
A9750	Develop Inspection Plans	11/03/14	11/13/14	01/22/15 A	02/26/15 A	100%		-13	-54	
Ops Support for MFC FWS		10/01/14	11/13/14	10/01/14 A	01/29/15 A			-38	-38	
A10130	Operations Support during Design	10/01/14	11/13/14	10/01/14 A	01/29/15 A	100%		-38	-38	
Water Tank Procurement for MFC FWS		10/01/14	01/15/15	10/20/14 A	05/04/15 A			-50	-60	
A9933	AFC Package for Procurement of Water Tank (MFC FWS)	10/01/14	10/06/14	10/20/14 A	11/17/14 A	100%		-13	-23	
A9934	Vendor - Ship Drawings	10/07/14	10/23/14	12/15/14 A	01/29/15 A	100%		-12	-50	
A9935	Vendor - Obtain Materials	10/27/14	11/04/14	01/20/15 A	01/29/15 A	100%		-1	-44	
A9936	Vendor - Finalize Fabrication	11/05/14	01/08/15	02/23/15 A	04/23/15 A	100%		-4	-60	
A9937	Vendor - Ship Tank	01/12/15	01/15/15	04/27/15 A	05/04/15 A	100%		0	-60	
Construction Subcontract Field Changes (FWS)		06/24/15	01/07/16	06/24/15 A	01/07/16 A			0	0	
A10256	New Tank Field Changes	06/24/15	09/30/15	06/24/15 A	11/16/15 A	100%		-25	-25	Y
A10268	New Pumphouse Field Changes	06/30/15	09/24/15	06/30/15 A	11/19/15 A	100%		-31	-31	Y
A10269	FC - FWS Execution Risk Response - 89	12/21/15	01/07/16	12/21/15 A	01/07/16 A	100%		0	0	Y
Operations Support for MFC FWS		06/23/15	11/25/15	06/23/15 A	05/12/16 A			-91	-91	
A9920	Operations Support for MFC FWS	06/23/15	11/25/15	06/23/15 A	05/12/16 A	100%		-91	-91	Y
AFC Packages for MFC FWS		02/09/15	05/14/15	02/09/15 A	05/20/15 A			-3	-3	
A9930	Develop AFC Package for MFC FWS	02/09/15	04/16/15	02/09/15 A	04/16/15 A	100%		0	0	C
A9931	Finalize Contractual Requirements for MFC FWS	04/20/15	05/14/15	04/20/15 A	05/20/15 A	100%		-3	-3	C
Construction Subcontract for MFC FWS		06/23/15	02/03/16	06/23/15 A	05/19/16 A			-60	-60	
A10210	Contract Submittals	06/23/15	06/29/15	06/23/15 A	06/29/15 A	100%		0	0	C
A10220	Procurement - Manufacture New PH Steel	06/23/15	07/02/15	06/23/15 A	08/25/15 A	100%		-29	-29	C
A10225	Procurement - Fire Pump Manufacture	06/23/15	08/13/15	07/27/15 A	09/15/15 A	100%		3	-16	C
A10230	Mobilization	06/23/15	06/23/15	06/23/15 A	08/25/15 A	100%		-35	-35	C
A10249	Start New Tank Construction Milestone	06/24/15		06/24/15 A		100%		0	0	C
A10250	Install New Tank Foundation	06/24/15	07/08/15	06/24/15 A	07/08/15 A	100%		0	0	C
A10258	Start New Pumphouse Construction Milestone	06/30/15		06/30/15 A		100%		0	0	C



Actual Duration
% Complete
Remaining Work
Critical Remaining Work
Milestone
Critical Milestone
Project Baseline Milestone
Project Baseline Bar

Earned Value Legend:

A - LOE C - % Comp D - Units Comp E - 50/50 F - 0/100 W - Weighted Milestone 0-100 X - Weighted Milestone Y - Apportioned

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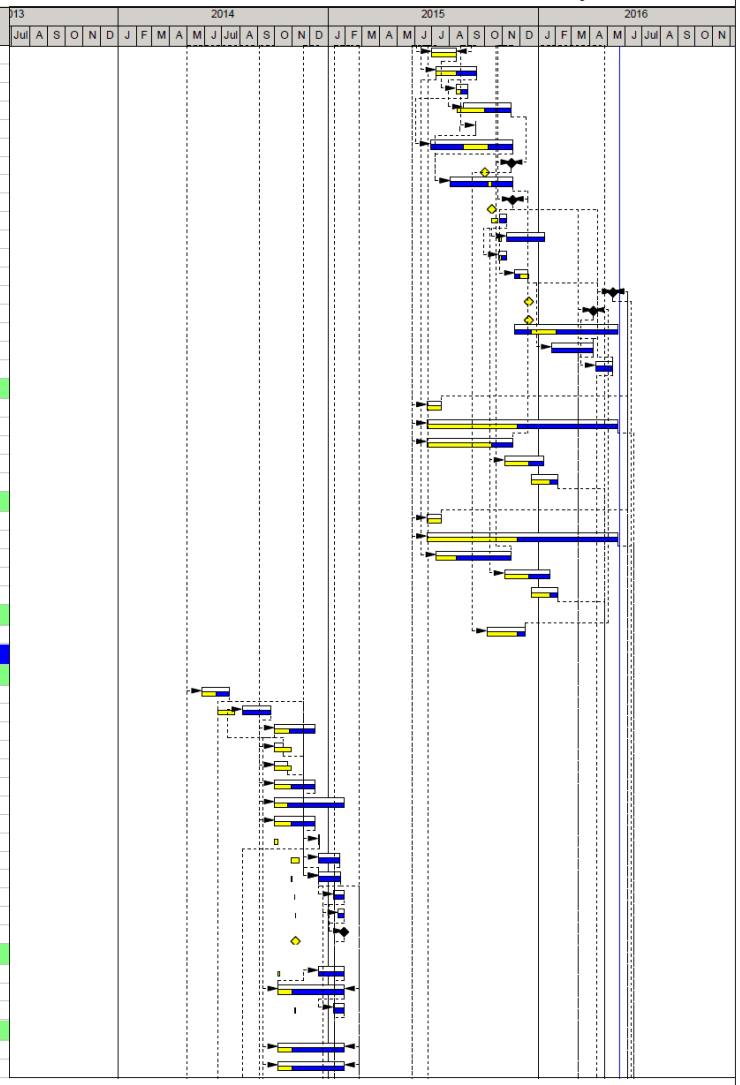
MFC Fire Water Replacement

Activity ID	Activity Name	Baseline Start	Baseline Finish	Forecast/Actual Start	Forecast/Actual Finish	% Complete	Constrained Finish	Duration Variance	Schedule Variance (Finish)	Earned Value Method
A10259	New Pumphouse Foundation/Structural Steel	06/30/15	08/11/15	06/30/15 A	08/11/15 A	100%		0	0	C
A10252	Erect New Tank	07/09/15	08/12/15	07/09/15 A	09/17/15 A	100%		-19	-19	C
A10260	Erect New Pumphouse Frame	08/12/15	08/20/15	08/12/15 A	09/02/15 A	100%		-6	-6	C
A10255	Perform Tank Cleaning /Insulate	08/13/15	09/30/15	08/24/15 A	11/16/15 A	100%		-20	-25	C
A10226	Procurement - Fire Pump Delivery	08/17/15	08/17/15	09/16/15 A	09/16/15 A	100%		1	-16	C
A10261	Install Pumphouse Mechanical and Electrical	08/24/15	10/07/15	06/29/15 A	11/19/15 A	100%		-56	-24	C
A10257	New Tank Construction Complete Milestone		09/30/15		11/16/15 A	100%		0	-26	C
A10265	Pipeline Tie Ins & Testing of Pumphouse	10/08/15	10/13/15	08/03/15 A	11/19/15 A	100%		-59	-21	C
A10271	New Pumphouse Construction Complete Milestone		10/13/15		11/19/15 A	100%		0	-21	C
A10280	Demo / Remove Tank 754A	10/14/15	10/22/15	10/27/15 A	11/09/15 A	100%		-1	-8	C
A10290	Refit Existing Pump House	10/26/15	10/29/15	11/09/15 A	01/14/16 A	100%		-30	-38	C
A10310	Install Paving in Affected Areas/Painting Hydrants & Bollards	10/26/15	10/29/15	10/26/15 A	11/09/15 A	100%		-4	-4	C
A10315	Manufactor Startup	12/01/15	12/17/15	11/23/15 A	12/14/15 A	100%		0	4	C
A10330	Complete Construction		12/17/15		05/12/16 A	100%		0	-79	C
A10360	Partial Turnover of FWS Complete		12/17/15		04/07/16 A	100%		0	-59	C
A10312	Punch-List Items	12/21/15	02/03/16	11/23/15 A	05/19/16 A	100%		-75	-60	C
A10320	Resolution of Brass Components			01/25/16 A	04/07/16 A	100%		-43		C
A10335	749/707 Repair and Modifications			04/11/16 A	05/12/16 A	100%		-19		C
Construction Mgmt (Const) for MFC FWS		06/23/15	01/21/16	06/23/15 A	05/19/16 A			-67	-67	
A9609	Construction Management Support Initial Construction	06/23/15	07/16/15	06/23/15 A	07/16/15 A	100%		0	0	F
A9610	Construction Management Support during Construction	06/23/15	11/25/15	06/23/15 A	05/19/16 A	100%		-95	-95	Y
A9611	Construction Management Support through Pumphouse Con - OT	06/23/15	10/12/15	06/23/15 A	11/19/15 A	100%		-22	-22	Y
A9612	Construction Management Support Execution Risk	11/05/15	12/17/15	11/05/15 A	01/12/16 A	100%		-9	-9	Y
A9613	CM Support Execution Risk Response - 089	12/21/15	01/21/16	12/21/15 A	02/04/16 A	100%		-8	-8	Y
ESH&Q (Const) for MFC FWS		06/23/15	01/21/16	06/23/15 A	05/19/16 A			-67	-67	
A9629	ESH&Q Support Initial Construction	06/23/15	07/16/15	06/23/15 A	07/16/15 A	100%		0	0	F
A9630	ESH&Q Support during Construction	06/23/15	11/25/15	06/23/15 A	05/19/16 A	100%		-95	-95	Y
A9631	ESH&Q Support during Tank Construction - OT	07/09/15	08/12/15	07/09/15 A	11/16/15 A	100%		-52	-52	Y
A9632	ESH&Q Support Execution Risk	11/05/15	12/17/15	11/05/15 A	01/21/16 A	100%		-16	-16	Y
A9633	ESH&Q Support Execution Risk Response - 089	12/21/15	01/21/16	12/21/15 A	02/04/16 A	100%		-8	-8	Y
FWS Closeout		10/06/15	11/25/15	10/06/15 A	12/10/15 A			-7	-7	
A9950	Prepare Partial Turnover of FWS	10/06/15	11/25/15	10/06/15 A	12/10/15 A	100%		-7	-7	C
TREAT Fire Water Lines (FWL)		05/27/14	12/24/15	05/27/14 A	02/02/16 A			-17	-17	
Title Design for TREAT FWL		05/27/14	11/11/14	05/27/14 A	01/29/15 A			-40	-40	
A9310	Specification (FWL) Material Only	05/27/14	06/19/14	05/27/14 A	07/14/14 A	100%		-12	-12	
A9621	Rock Probe Survey	06/25/14	07/22/14	08/06/14 A	09/24/14 A	100%		-11	-35	
A9150	Specification (FWL)	10/01/14	10/27/14	10/01/14 A	12/11/14 A	100%		-25	-25	
A9170	Subsurface Investigation	10/01/14	10/28/14	10/01/14 A	10/14/14 A	100%		9	9	
A9180	Profile Drawings	10/01/14	10/28/14	10/01/14 A	10/23/14 A	100%		3	3	
A9220	Piping Drawings	10/01/14	10/28/14	10/01/14 A	12/11/14 A	100%		-24	-24	
A9260	Calculations	10/01/14	10/22/14	10/01/14 A	01/29/15 A	100%		-51	-51	
A9300	Piping Sections/Details	10/01/14	10/28/14	10/01/14 A	12/11/14 A	100%		-24	-24	
A9620	Cost Estimate for FWL Material Only	10/01/14	10/07/14	12/15/14 A	12/18/14 A	100%		1	-40	
A9160	Cost Estimate	10/29/14	11/11/14	12/15/14 A	01/21/15 A	100%		-10	-35	
A9270	Design Review	10/29/14	10/30/14	12/15/14 A	01/22/15 A	100%		-17	-42	
A9280	Incorporate Comments	11/03/14	11/04/14	01/12/15 A	01/29/15 A	100%		-9	-43	
A9285	Document Control	11/05/14	11/06/14	01/20/15 A	01/29/15 A	100%		-5	-42	
A9290	Issue FWL Final Design		11/06/14		01/29/15 A	100%		0	-42	
Construction Mgmt for TREAT FWL		10/06/14	11/06/14	10/06/14 A	01/29/15 A			-42	-42	
A9640	Develop Nine Block	10/06/14	10/09/14	12/15/14 A	01/29/15 A	100%		-18	-57	
A9660	Construction Management during Design	10/06/14	10/30/14	10/06/14 A	01/29/15 A	100%		-46	-46	
A9650	Develop Specials	11/03/14	11/06/14	01/12/15 A	01/29/15 A	100%		-7	-41	
ESH&Q for TREAT FWL		10/06/14	11/11/14	10/06/14 A	02/26/15 A			-56	-56	
A9800	Quality Engineering Support during Design	10/06/14	10/30/14	10/06/14 A	01/29/15 A	100%		-46	-46	
A9840	Environmental Support during Design	10/06/14	10/30/14	10/06/14 A	01/29/15 A	100%		-46	-46	



Actual Duration | Critical Remaining Work | Project Baseline Milestone
% Complete | Milestone | Project Baseline Bar
Remaining Work | Critical Milestone

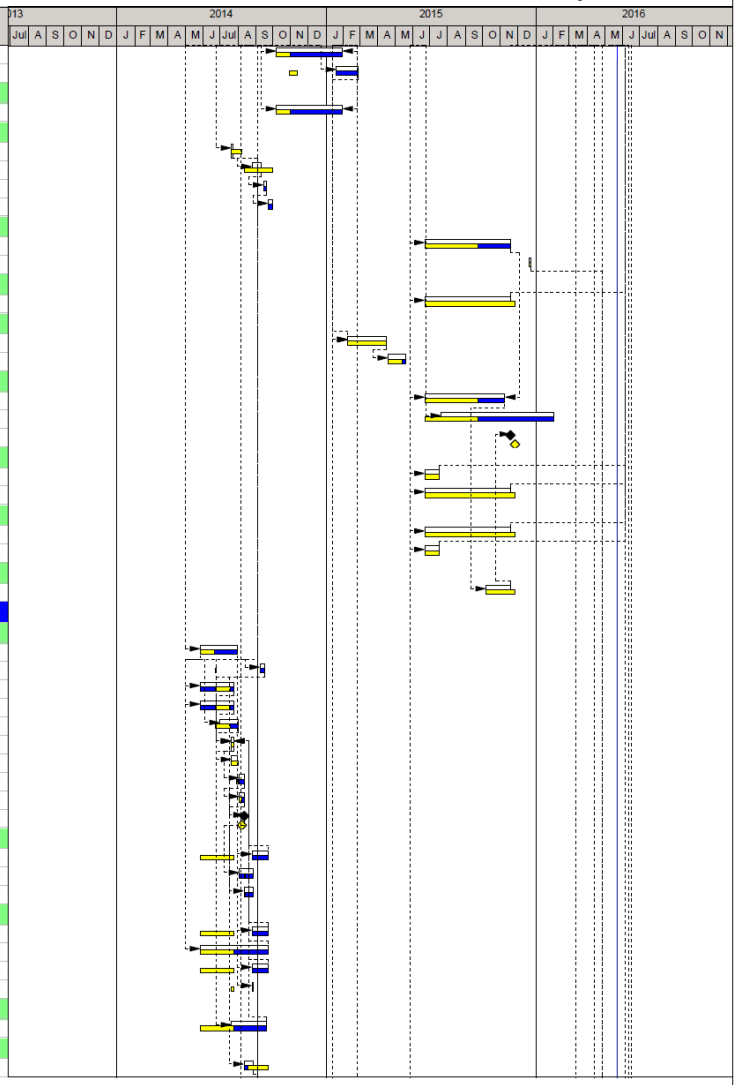
Earned Value Legend:

A - LOE C - % Comp D - Units Comp E - 50/50 F - 0/100 W - Weighted Milestone 0-100 X - Weighted Milestone Y - Apportioned

Data Date: 05/23/16 Print Date: 05/23/16

MFC Fire Water Replacement

Activity ID	Activity Name	Baseline Start	Baseline Finish	Forecast/Actual Start	Forecast/Actual Finish	% Complete	Constrained Finish	Duration Variance	Schedule Variance (Finish)	Earned Value Method
A9850	Safety & Health Support during Design	10/06/14	10/30/14	10/06/14 A	01/29/15 A	100%		-46	-46	
A9810	Develop Inspection Plans	10/29/14	11/11/14	01/20/15 A	02/26/15 A	100%		-15	-56	
Ops Support for TREAT FWL		10/06/14	10/30/14	10/06/14 A	01/29/15 A			-46	-46	
A9820	Operations Support during Design	10/06/14	10/30/14	10/06/14 A	01/29/15 A	100%		-46	-46	
Piping Procurement for TREAT FWL		07/21/14	09/30/14	07/21/14 A	09/30/14 A			1	1	
A9971	AFC Package for Procurement of Piping (FWL)	07/21/14	08/07/14	07/21/14 A	07/22/14 A	100%		10	10	
A9981	Vendor - Purchase/Manufacture Materials (piping) FWL	08/11/14	09/30/14	08/25/14 A	09/11/14 A	100%		18	10	
A9982	Vendor - Ship Materials			09/15/14 A	09/18/14 A	100%		-3		
A9983	Package Material at INL			09/22/14 A	09/30/14 A	100%		-5		
Construction Subcontract Field Changes (FWL)		06/23/15	12/24/15	06/23/15 A	12/24/15 A			0	0	
A9987	Trenching Field Changes - FWL	06/23/15	09/23/15	06/23/15 A	11/19/15 A	100%		-32	-32	Y
A9988	FC - FWL Execution Risk Response - 89	12/21/15	12/24/15	12/21/15 A	12/24/15 A	100%		0	0	Y
Operations Support for TREAT FWL		06/23/15	11/25/15	06/23/15 A	11/19/15 A			4	4	
A9960	Operations Support for MFC FWL	06/23/15	11/25/15	06/23/15 A	11/19/15 A	100%		4	4	Y
AFC Packages for TREAT FWL		02/09/15	05/14/15	02/09/15 A	05/20/15 A			-3	-3	
A9970	AFC Package for MFC FWL	02/09/15	04/16/15	02/09/15 A	04/16/15 A	100%		0	0	C
A9972	Finalize Contractual Requirements for MFC FWL	04/20/15	05/14/15	04/20/15 A	05/20/15 A	100%		-3	-3	C
Construction Subcontract for TREAT FWL		06/23/15	11/25/15	06/23/15 A	02/02/16 A			-33	-33	
A9980	Trenching (Trench Fiber) - FWL	06/23/15	09/23/15	06/23/15 A	11/09/15 A	100%		-25	-25	C
A9985	Pipeline - FWL	06/23/15	09/22/15	07/20/15 A	02/02/16 A	100%		-55	-70	C
A10370	Partial Turnover of FWL Complete		11/25/15		11/19/15 A	100%		0	4	C
Construction Mgmt (Const) for TREAT FWL		06/23/15	11/25/15	06/23/15 A	11/19/15 A			4	4	
A9989	Construction Management Initial Construction	06/23/15	07/16/15	06/23/15 A	07/16/15 A	100%		0	0	F
A9990	Construction Management during Construction	06/23/15	11/25/15	06/23/15 A	11/19/15 A	100%		4	4	Y
ESH&Q (Const) for TREAT FWL		06/23/15	11/25/15	06/23/15 A	11/19/15 A			4	4	
A10000	ESH&Q Support during Construction	06/23/15	11/25/15	06/23/15 A	11/19/15 A	100%		4	4	Y
A9999	ESH&Q Support Initial Construction	06/23/15	07/16/15	06/23/15 A	07/16/15 A	100%		0	0	F
FWL Closeout		10/07/15	11/25/15	10/07/15 A	11/19/15 A			4	4	
A10010	Prepare Partial Turnover of FWL	10/07/15	11/25/15	10/07/15 A	11/19/15 A	100%		4	4	C
D&D Fuel Oil Tanks (FOT)		05/27/14	12/01/14	05/27/14 A	03/12/15 A			-53	-53	
Title Design for D&D FOT		05/27/14	08/07/14	05/27/14 A	09/16/14 A			-20	-20	
A9320	Specifications (FOT)	05/27/14	06/19/14	05/27/14 A	07/30/14 A	100%		-23	-23	
A9330	Subsurface Investigation	06/23/14	06/24/14	09/08/14 A	09/16/14 A	100%		-3	-46	
A9340	Existing Configuration Drawings	06/23/14	07/17/14	05/27/14 A	07/24/14 A	100%		-19	-4	
A9350	D&D Drawings	06/23/14	07/17/14	05/27/14 A	07/24/14 A	100%		-19	-4	
A9360	D&D Sections	06/23/14	07/17/14	07/01/14 A	07/31/14 A	100%		-3	-8	
A9370	Design Review	07/21/14	07/24/14	07/21/14 A	07/24/14 A	100%		1	1	
A9400	Cost Estimate	07/21/14	07/31/14	07/21/14 A	07/31/14 A	100%		1	1	
A9380	Incorporate Comments	07/28/14	07/31/14	08/04/14 A	08/11/14 A	100%		0	-4	
A9385	Document Control	08/04/14	08/07/14	08/04/14 A	08/11/14 A	100%		0	0	
A9390	Issue D&D of FOT Final Design		08/07/14		08/11/14 A	100%		0	0	
Construction Mgmt for D&D FOT		05/27/14	08/14/14	08/04/14 A	09/23/14 A			19	-20	
A9710	Construction Management Support during Design	05/27/14	07/24/14	08/25/14 A	09/23/14 A	100%		19	-32	
A9690	Develop Nine Block	08/11/14	08/14/14	08/04/14 A	08/28/14 A	100%		-12	-8	
A9700	Develop Specials	08/11/14	08/14/14	08/11/14 A	08/28/14 A	100%		-8	-8	
ESH&Q for D&D FOT		05/27/14	07/24/14	05/27/14 A	09/23/14 A			-32	-32	
A9860	Quality Engineering Support during Design	05/27/14	07/24/14	08/25/14 A	09/23/14 A	100%		19	-32	
A9900	Environmental Support during Design	05/27/14	07/24/14	05/27/14 A	09/23/14 A	100%		-32	-32	
A9910	Safety & Health Support during Design	05/27/14	07/24/14	08/25/14 A	09/23/14 A	100%		19	-32	
A9870	Develop Inspection Plans	07/21/14	07/24/14	08/25/14 A	08/28/14 A	100%		0	-20	
Ops Support for D&D FOT		05/27/14	07/24/14	07/21/14 A	09/18/14 A			0	-31	
A9890	Operations Support during Design	05/27/14	07/24/14	07/21/14 A	09/18/14 A	100%		0	-31	
Construction Execution for D&D FOT		08/18/14	11/13/14	08/11/14 A	10/16/14 A			13	17	
A10030	CFP Package for D&D FOT	08/18/14	09/22/14	08/11/14 A	08/28/14 A	100%		8	12	



Actual Duration | Critical Remaining Work | Project Baseline Milestone
% Complete | Milestone | Project Baseline Bar
Remaining Work | Critical Milestone

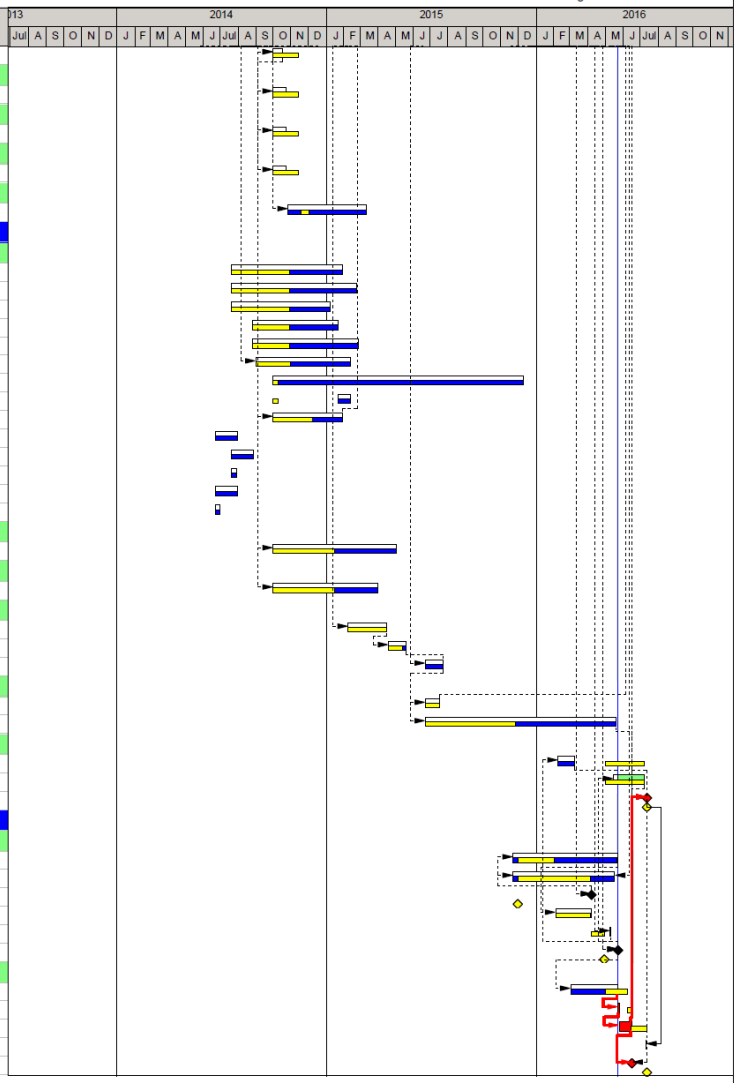
Earned Value Legend:

A - LOE C - % Comp D - Units Comp E - 50/50 F - 0/100 W - Weighted Milestone 0-100 X - Weighted Milestone Y - Apportioned

Data Date: 05/23/16 Print Date: 05/23/16

MFC Fire Water Replacement

Activity ID	Activity Name	Baseline Start	Baseline Finish	Forecast/Actual Start	Forecast/Actual Finish	% Complete	Constrained Finish	Duration Variance	Schedule Variance (Finish)	Earned Value Method
A10040	Construction for D&D FOT	10/01/14	11/13/14	10/01/14 A	10/16/14 A	100%		17	17	
Construction Management for D&D FOT Execution		10/01/14	11/13/14	10/01/14 A	10/23/14 A			13	13	
A10050	Construction Management during Construction	10/01/14	11/13/14	10/01/14 A	10/23/14 A	100%		13	13	
ESH&Q Support D&D FOT Execution		10/01/14	11/13/14	10/01/14 A	10/23/14 A			13	13	
A10060	ESH&Q Support during Construction	10/01/14	11/13/14	10/01/14 A	10/23/14 A	100%		13	13	
Operations Support for D&D FOT Execution		10/01/14	11/13/14	10/01/14 A	10/23/14 A			13	13	
A10020	Operations Support for D&D FOT	10/01/14	11/13/14	10/01/14 A	10/23/14 A	100%		13	13	
Closeout for D&D FOT		11/17/14	12/01/14	10/27/14 A	03/12/15 A			-65	-53	
A10070	Closeout for D&D FOT	11/17/14	12/01/14	10/27/14 A	03/12/15 A	100%		-65	-53	
Project Management (PM)		07/21/14	07/11/16	06/23/14 A	07/11/16		07/07/16	-16	0	
PM - Final Design Packages		07/21/14	12/08/14	06/23/14 A	12/10/15 A			-218	-202	
A9470	Develop Vendor Data Schedule	07/21/14	10/28/14	07/21/14 A	01/29/15 A	100%		-48	-48	
A9490	Issue Procurement Requisitions	07/21/14	10/28/14	07/21/14 A	02/23/15 A	100%		-60	-60	
A9540	Develop 540.10C & 540.14	07/21/14	10/28/14	07/21/14 A	01/08/15 A	100%		-35	-35	
A9440	AFC Cost Estimate	08/25/14	10/28/14	08/25/14 A	01/21/15 A	100%		-43	-43	
A9460	Develop Inspection Plan	08/25/14	10/28/14	08/25/14 A	02/26/15 A	100%		-64	-64	
A9410	Project Execution Plan (PEP)	09/01/14	10/30/14	09/01/14 A	02/12/15 A	100%		-54	-54	
A9480	USQ	10/01/14	10/08/14	10/01/14 A	12/10/15 A	100%		-235	-235	
A9510	Review Board	10/01/14	10/08/14	01/22/15 A	02/12/15 A	100%		-8	-67	
A9590	Project Management Support during Design	10/01/14	12/08/14	10/01/14 A	01/29/15 A	100%		-26	-26	
A9420	Environmental Checklist (EC)			06/23/14 A	07/30/14 A	100%		-23		
A9430	Turnover/Acceptance Plan			07/21/14 A	08/28/14 A	100%		-24		
A9450	Develop Material Purchase Package (FWL)			07/21/14 A	07/28/14 A	100%		-5		
A9500	Develop Risk Register			06/23/14 A	07/30/14 A	100%		-23		
A9520	Develop WBS			06/23/14 A	06/30/14 A	100%		-5		
PM - Procurements		10/01/14	01/15/15	10/01/14 A	05/04/15 A			-60	-60	
A10081	Project Management Support for Procurements	10/01/14	01/15/15	10/01/14 A	05/04/15 A	100%		-60	-60	
PM - Construction Execution		10/01/14	01/14/15	10/01/14 A	03/31/15 A			-43	-43	
A10091	Project Management Support for FOT	10/01/14	01/14/15	10/01/14 A	03/31/15 A	100%		-43	-43	
PM-AFC Packages		02/09/15	06/22/15	02/09/15 A	07/23/15 A			-18	-18	
A10080	Project Management Support to Develop AFC Package	02/09/15	04/16/15	02/09/15 A	04/16/15 A	100%		0	0	C
A10082	Project Management Support to Finalize Contractual Requirements	04/20/15	05/14/15	04/20/15 A	05/20/15 A	100%		-3	-3	C
A10083	Project Management Support to obtain CD 2/3 Equivalent Approval	06/22/15	06/22/15	06/22/15 A	07/23/15 A	100%		-18	-18	C
PM-Construction Subcontracts		06/23/15	11/25/15	06/23/15 A	05/19/16 A			-95	-95	
A10089	Project Management Support Initial Construction Subcontract	06/23/15	07/16/15	06/23/15 A	07/16/15 A	100%		0	0	F
A10090	Project Management Support for Construction Subcontract	06/23/15	11/25/15	06/23/15 A	05/19/16 A	100%		-95	-95	Y
PM Closeout		05/02/16	07/11/16	02/08/16 A	07/11/16		07/07/16	-48	0	
A10100	Project Management Prepare Lessons Learned	05/02/16	07/07/16	02/08/16 A	03/08/16 A	100%		21	69	C
A10340	Project Closeout - PM Support	05/02/16	07/07/16	05/16/16 A	07/07/16	35%	07/07/16	8	0	C
A10350	Project Complete		07/11/16		07/11/16*	0%		0	0	C
Readiness & Closeout		11/30/15	07/11/16	11/23/15 A	07/11/16		05/23/16	-2	1	
Turnover and Acceptance		11/30/15	04/28/16	11/23/15 A	05/23/16		05/23/16	-16	-13	
A10110	Complete Remaining Punchlist Items	11/30/15	02/03/16	11/23/15 A	05/23/16	99%	05/23/16	-65	-62	C
A10111	Complete Procedures/WO's/As-Builts	11/30/15	04/05/16	11/23/15 A	05/18/16 A	100%		-27	-24	C
A10109	Partial Turnover Complete (95%Construction Complete)		11/30/15		04/07/16 A	100%		0	-70	C
A10113	Prepare Training and Prepare OPS for TO	02/04/16	04/05/16	02/04/16 A	04/07/16 A	100%		-2	-2	C
A10112	Perform SO Testing	04/06/16	04/28/16	05/09/16 A	05/12/16 A	100%		11	-7	C
A10114	Final Turnover Complete		04/28/16		05/23/16	0%		0	-12	C
Closeout CD-4E		05/02/16	07/11/16	03/03/16 A	07/11/16		05/23/16	-32	1	
A10120	Prepare CDE-4 Package	05/02/16	06/07/16	03/03/16 A	05/23/16	90%	05/23/16	-25	8	C
A10125	Transmit Package to DOE-ID	06/08/16	06/14/16	05/24/16	05/25/16	0%		2	10	C
A10126	DOE-ID Review & Approval of CDE-4 package (w/Comment Incorporation)	06/15/16	07/11/16	05/26/16	06/16/16	0%		2	12	C
A9941	Schedule Reserve	07/11/16	07/11/16	07/11/16	07/11/16	0%		0	0	K
A10140	CDE-4 Approval Received		07/11/16		06/16/16*	0%		0	12	C



Actual Duration | Critical Remaining Work | Project Baseline Milestone
% Complete | Milestone | Project Baseline Bar
Remaining Work | Critical Milestone

Earned Value Legend:

A - LOE C - % Comp D - Units Comp E - 50/50 F - 0/100 W - Weighted Milestone 0-100 X - Weighted Milestone Y - Apportioned

Appendix B,

Project Photos

Buy-Down Activities – Late Summer 2014:

Fuel Oil Tanks Prior to Demolition (reference Environmental Checklist)

Fuel Oil Tanks during Demolition

Buy-Down Activities – Late Summer 2014 (continued):

400,000 gallon tank – individual components for entire tank purchased and delivered to MFC

Over 1 mile of 14” HDPE pipe purchased and staged at MFC

Start of Construction – Week of June 1, 2015:

Excavation for footings of new 400,000 gallon tank

Week of June 8, 2015:

Excavation of existing piping systems for tie-in of temporary lines

Week of June 15, 2015:

Structural steel for 400,000 gallon tank foundation

Vacuum excavation between MFC security fences

Week of June 22, 2015:

New 400,000 gallon tank foundation forms

Concrete pour for 400,000 gallon tank foundation

Excavation for pump house footings

Vacuum excavation inside the MFC fences

Week of June 29, 2015:


Tank Foundation backfill and Pump house excavation


East view of north loop trench; west view of trench behind TREAT support buildings

Rockcutter for 14” HDPE loop to TREAT

Week of July 6, 2015:

Temporary piping inside MFC Fence

Trencher approaching TREAT - black basalt tailings

New tank foundation, pump house footings and piping stubs

Week of July 13, 2015:

Lime Sand Base for Tank

Pumphouse Grade Beams Poured

Start of Tank Erection/Welding

Tie-ins of Temporary Lines to TREAT

Week of July 20, 2015:

Tank Construction

Assembly of 14" HDPE North Line

Tie in of 8" Temporary Line

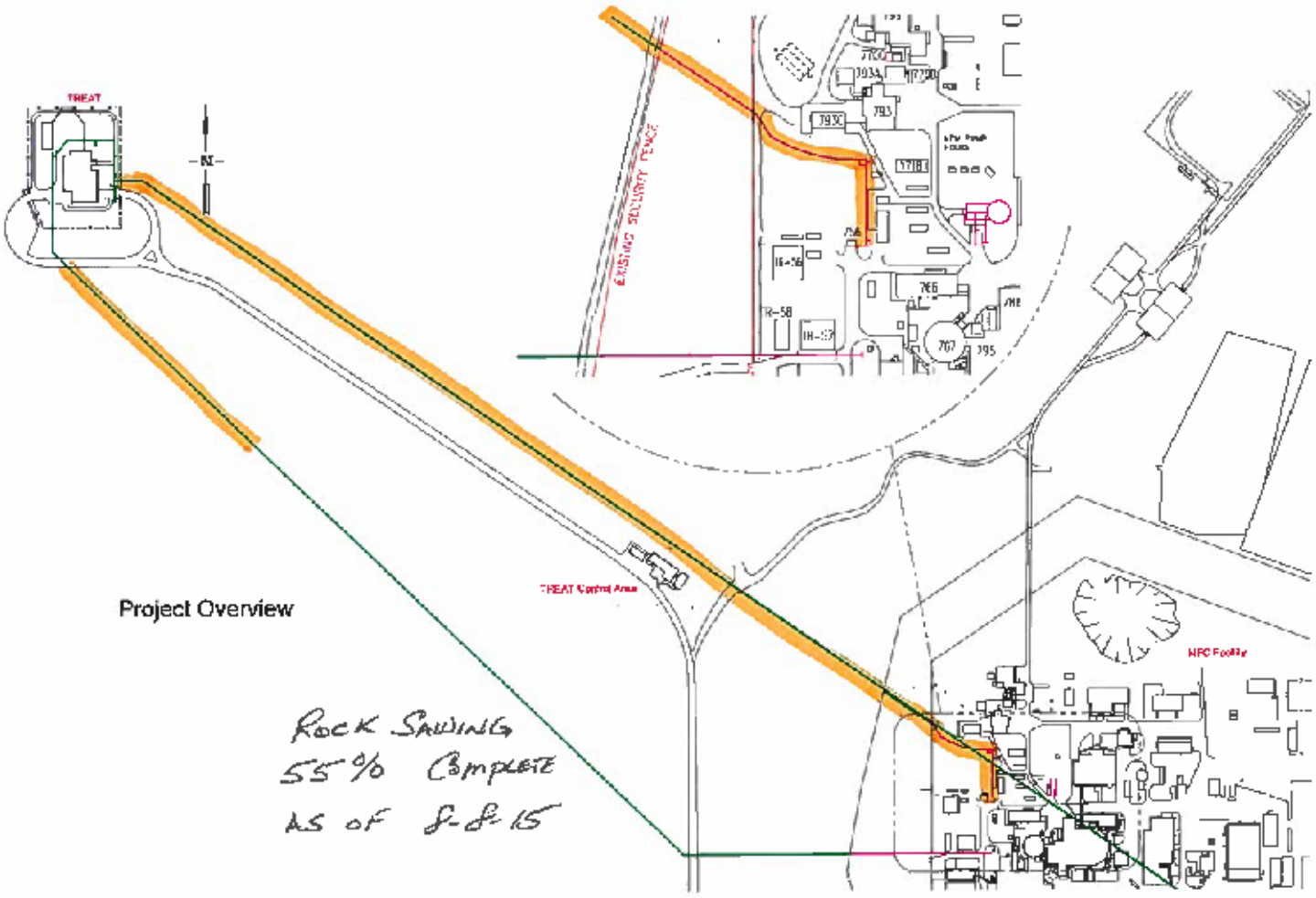
8" Temporary Line

Week of July 27, 2015:

New 400,000 Gallon Tank looking north with ladders and platforms attached

Two rock saws cutting the fire water trench through basalt on the south loop

Week of August 3, 2015:



Yellow highlighting indicates trenching completed to-date.

Week of August 10, 2015:

Trenching of South Line

14" HDPE Piping on North Line

Erection of Pump House Structural Steel

Week of August 17, 2015:

Installation and Compaction of Sand Bed in North Line

Week of August 24, 2015:

New Pump House – Wall Panel Installation

Sand Blasting Tank Exterior

Installation of Insulation Clips on Old Tank

Vacuum Excavation on South Line

Week of August 31, 2015:

South Line Pipe Assembly

TREAT Firewater Valve Tie-In

Roof and Wall Installation – Water Tank Primed

Week of September 7, 2015:

14" HDPE Installation Underneath Main Road to TREAT

Preparation of Tank Exterior – Old Tank

Vacuum Excavation inside the TREAT Area Fence

New Tank Internal Painting – Access Door

Week of September 14, 2015:


Pump House Trim, Drain Field, and Tie-Ins


Pump House Electrical and Mechanical


South Line Trenching


North Line Backfill and Graded

Old 400K Gallon Tank Insulation

Week of September 21, 2015:

Temporary Water Supply from North Line to MFC-724

Temporary Water Supply Connections

Temporary Water Supply from North Line to MFC-720

Backfill of Permanent Tie-ins at Pump House

Week of September 28, 2015:

Insulation on Old 400,000 Gallon Tank

Backfill and Grading along the North Line

Week of October 5, 2015:

Installation of Electrical and Mechanical in the Pump House

Rock Cutting & Excavation within TREAT Area

Permanent tie-in to MFC-724 from North Line

Week of October 12, 2015:

Backfill Along South Line

Backfill Along South Line

Tie-in from North Line

Week of October 19, 2015:

Sidewalks around Pump House

Duct Bank North of Pump House

Insulation Panels on New 400,000 Gallon Tank

Backfill North of MFC-724 & MFC-721

Week of October 26, 2015:

Road Outage by TREAT

Road Patches

Pipelines in TREAT Area

Week of November 2, 2015:

Demolition of the 200,000 Gallon Tank

Demolition of the 200,000 Gallon Tank

Final Grading Around Pump House

Installation of Insulation Panels on New Tank

Week of November 9, 2015:

Excavation of Tank Foundation

Old Pump House Wall and Refit

New Tank and Pump House

Week of November 16, 2015:

Startup of Potable Water Pumps

New Pump House Electrical & Mechanical

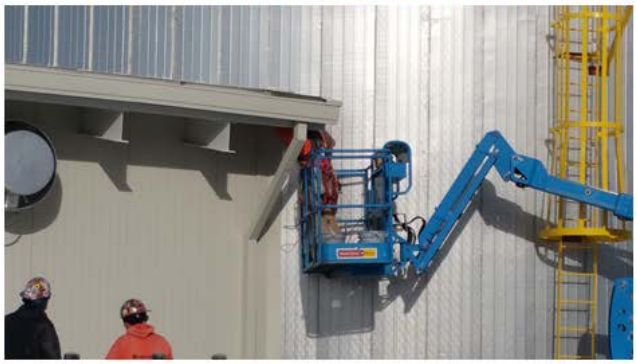
Fiber in South Line Trench

Backfill of South and East Lines at TREAT

Week of November 23, 2015:

Potable Water Pumps/Insulation of Tank Heaters

New Miox System



Completion of Punch List Items

Old Pump House Refit

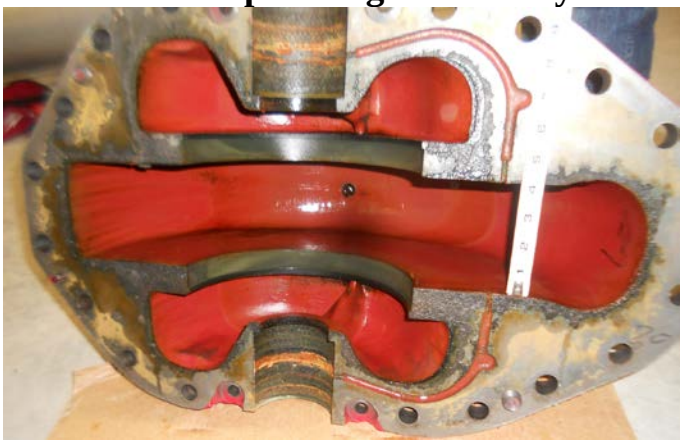
Week of November 30, 2015:

New Diesel Firewater Pump

Communications Infrastructure in Old Pump House

Firewater Pump Impeller – February 2016

Firewater Pump Casing – February 2016



Appendix C,

Master Budget Log

Master Budget Log – MFC Firewater Project

Project Authorization -- IWAD No. = C.J.PP.16.JG | **(PBB = UB + ∑ CAs + ∑ SLPPs + MR + AUW)**

Log No.	Date	Project Budget Base (PBB) Total	PBB Change	Undistributed Budget (UB) Subtotal	UB Change	Control Accounts (CA) Subtotal	CA Change	Summary Level Planning Packages (SLPP) Subtotal	SLPP Change	Management Reserve (MR) Subtotal	MR Change	Authorized Unpriced Work (AUW) Subtotal	AUW Change	Remarks / Comments	BCP No. or Other Direction	WBS
1	24-Jul-13	$200,000	$200,000	$0	$0	$200,000	$200,000	$0	$0	$0	$0	$0	$0	Repalcement (FWR) IGPP. DOE-ID has identified this project a priority due to the growth experienced at MFC and the need for an adequate and reliable fire water supply system. The Executive Council (EC) approved $150K and Campus Development Office (CDO) authorized $50K of indirect funds to initiate the project's furmulation documents.	IN-13-163	C.J.PP.16.JG
	.	$200,000	$200,000	$0	$0	$200,000	$200,000	$0	$0	$0	$0	$0	$0	Project Initiation Activities (i.e. F&Ors, Conceptual Design, Davis Bacon and Funding Determinations, EA checklist, Conceptual Cost Estimate)	IN-13-163	C.J.PP.16.JG.01
2	10-Mar-14	$10,353,825	$10,153,825	$0	$0	$933,323	$733,323	$7,164,752	$7,164,752	$2,255,750	$2,255,750	$0	$0	BCP authorizes the MFC FWR to complete Title Design, procure materials to buy down FY 2015 scope. The Executive Council approved $1.0M of FY 2014 Indirect funds on 5/13/14 to complete this scope. The BCP also establishes the Planning Baseline.	IN-14-132	C.J.PP.16.JG
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-14-132	C.J.PP.16.JG.01
		$4,469,734	$4,469,734	$0	$0	$381,218	$381,218	$3,096,192	$3,096,192	$992,324	$992,324	$0	$0	Activities associated with the MFC Fire Water System (FWS) (i.e. Title Design, Construction, Closeout, BEA Support) (45% MR)	IN-14-132	C.J.PP.16.JG.02
		$4,400,799	$4,400,799	$0	$0	$211,140	$211,140	$3,219,386	$3,219,386	$970,273	$970,273	$0	$0	Activities associated with the TREAT Fire Water Lines (FWL) (i.e. Title Design, Construction, Closeout, BEA Support) (44%)	IN-14-132	C.J.PP.16.JG.03
		$489,775	$489,775	$0	$0	$73,505	$73,505	$283,960	$283,960	$132,310	$132,310	$0	$0	Activities associated with the Defueling and Decommissioning (D&D) Fuel Oil Tank (FOT) (i.e. Title Design, Construction, Closeout, BEA Support) (6% MR)	IN-14-132	C.J.PP.16.JG.04
		$617,478	$617,478	$0	$0	$67,460	$67,460	$439,760	$439,760	$110,258	$110,258	$0	$0	Activities associated with the Project Management (PM) (i.e. Title Design, Construction, Closeout) (5% MR)	IN-14-132	C.J.PP.16.JG.05
		$176,039	$176,039	$0	$0	$0	$0	$125,454	$125,454	$50,585	$50,585	$0	$0	Activities associated with the Readiness & Closeout (i.e. System Operation (SO) Testing and Turnover) (OPC MR)	IN-14-132	C.J.PP.16.JG.06
3	14-Jul-14	$10,353,825	$0	$0	$0	$933,323	$0	$7,164,752	$0	$2,255,750	$0	$0	$0	BCP reflects the shift of the AFC Package for Purchase Materials (C.J.PP.16.03) activity that currently resides in a Planning Packages (PP) that is Planned in the current reporting month.	IN-14-159	C.J.PP.16.JG
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-14-159	C.J.PP.16.JG.01
		$4,469,734	$0	$0	$0	$381,218	$0	$3,096,192	$0	$992,324	$0	$0	$0	MFC FWS CA - No change.	IN-14-159	C.J.PP.16.JG.02
		$4,400,799	$0	$0	$0	$211,140	$0	$3,219,386	$0	$970,273	$0	$0	$0	MFC FWL CA - Activity A9971 that resides in PP was shifted out to August.	IN-14-159	C.J.PP.16.JG.03
		$489,775	$0	$0	$0	$73,505	$0	$283,960	$0	$132,310	$0	$0	$0	FOT CA - No change.	IN-14-159	C.J.PP.16.JG.04
		$617,478	$0	$0	$0	$67,460	$0	$439,760	$0	$110,258	$0	$0	$0	PM CA - No change.	IN-14-159	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	IN-14-159	C.J.PP.16.JG.06
4	14-Aug-14	$10,353,825	$0	$0	$0	$2,231,061	$1,297,738	$5,867,014	($1,297,738)	$2,255,750	$0	$0	$0	BCP establishes the baseline for the execution scope of the D&D of the FOT (C.J.PP.16.JG.04) and the purchase of the material buy-down: 1) piping in support of the FWL (C.J.PP.16.JG.03), and 2) the fabrication of the 400,000 gallon water tank in support of the FWS (C.J.PP.16.JG.02). This scope aligns to the EC approval of $1.0M of FY 2014 Indirect funds.	IN-14-161	C.J.PP.16.JG
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-14-161	C.J.PP.16.JG.01

Master Budget Log – MFC Firewater Project

Log No.	Date	Project Budget Base (PBB) Total	Project Budget Base (PBB) Change	Undistributed Budget (UB) Subtotal	Undistributed Budget (UB) Change	Control Accounts (CA) Subtotal	Control Accounts (CA) Change	Summary Level Planning Packages (SLPP) Subtotal	Summary Level Planning Packages (SLPP) Change	Management Reserve (MR) Subtotal	Management Reserve (MR) Change	Authorized Unpriced Work (AUW) Subtotal	Authorized Unpriced Work (AUW) Change	Remarks / Comments	BCP No. or Other Direction	WBS
		$4,327,638	($142,096)	$0	$0	$617,371	$236,153	$2,717,943	($378,249)	$992,324	$0	$0	$0	MFC FWS CA - Decreased by $142,095 when the PP were converted to execution packages and aligned to the contractor's bid to fabrication the 400,000 gallon water tank.	IN-14-161	C.J.PP.16.JG.02
		$4,298,589	($102,210)	$0	$0	$655,860	$444,720	$2,672,456	($546,930)	$970,273	$0	$0	$0	MFC FWL CA -Decreased by $102,211 when the PPs were converted to execution packages and aligned to the purchase price for the piping and the pricing of BEA support resources (ie. CM, ESH&Q, Ops Support).	IN-14-161	C.J.PP.16.JG.03
		$734,081	$244,306	$0	$0	$597,476	$523,971	$4,295	($279,665)	$132,310	$0	$0	$0	FOT CA - Increased by $244,307 when the PP were aligned to the contractor's bid. BEA support (ie. CM, ESH&Q, Ops Support) were also converted from PP.	IN-14-161	C.J.PP.16.JG.04
		$617,478	$0	$0	$0	$160,354	$92,894	$346,866	($92,894)	$110,258	$0	$0	$0	PM CA - Converted PP in support of the FOT and procurements of piping and fabrication of water tank. Net change was $0.0.	IN-14-161	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	IN-14-161	C.J.PP.16.JG.06
5	14-Oct-14	**$10,427,666**	**$73,841**	**$0**	**$0**	**$2,235,356**	**$4,295**	**$5,862,719**	**($4,295)**	**$2,329,591**	**$73,841**	**$0**	**$0**	**BCP incorporates multiple cost model and accounting changes being implemented by INL in FY 2015. Collectively these changes represent a substantial departure from the existing cost and accounting model and will significantly impact how planned and actual costs are allocated to work scope, including previously established multi-year project budget baselines. Reference D.M.Storms' letter to S.J.Olson, Contract No. DE-AC07-05ID14517 - Submittal of Indirect Rates and High-Level Planning Assumptions, CDRLD.17, September 2, 2014, CCN 233878. The impact was no change to the overall budget within each CA with the exception of the FOT Closeout Work Package was converted from a PP. Also, the value of MR was adjusted due to the reevaluation of the cost estimate.**	**IN-15-003**	**C.J.PP.16.JG**
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	CJ-15-003	C.J.PP.16.JG.01
		$4,363,082	$35,444	$0	$0	$617,371	$0	$2,717,943	$0	$1,027,768	$35,444	$0	$0	MFC FWS CA - No change.	CJ-15-003	C.J.PP.16.JG.02
		$4,333,293	$34,704	$0	$0	$655,859	($1)	$2,672,456	$0	$1,004,978	$34,705	$0	$0	MFC FWL CA - No change.	CJ-15-003	C.J.PP.16.JG.03
		$734,083	$2	$0	$0	$601,773	$4,297	$0	($4,295)	$132,310	$0	$0	$0	FOT CA - Closeout PP was converted to an execution Work Package. No change.	CJ-15-003	C.J.PP.16.JG.04
		$621,169	$3,691	$0	$0	$160,353	($1)	$346,866	$0	$113,950	$3,692	$0	$0	PM CA - No change.	CJ-15-003	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	CJ-15-003	C.J.PP.16.JG.06
6	5-Nov-14	**$10,427,666**	**$0**	**$0**	**$0**	**$2,235,356**	**$0**	**$5,862,719**	**$0**	**$2,329,591**	**$0**	**$0**	**$0**	**BCP reflects the shift of the AFC Package for MFC FWS (C.J.PP.16.02), the Closeout Package for the FOT (C.J.PP and the PM Support activity that currently resides in a Planning Packages (PP) that is Planned in the current reporting month.**	**IN-15-036**	**C.J.PP.16.JG**
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-15-036	C.J.PP.16.JG.01
		$4,363,082	$0	$0	$0	$617,371	$0	$2,717,943	$0	$1,027,768	$0	$0	$0	MFC FWS CA - Activity A9930 that resides in PP was slipped to February start date.	IN-15-036	C.J.PP.16.JG.02
		$4,333,293	$0	$0	$0	$655,859	$0	$2,672,456	$0	$1,004,978	$0	$0	$0	MFC FWL CA - No change.	IN-15-036	C.J.PP.16.JG.03
		$734,083	$0	$0	$0	$601,773	$0	$0	$0	$132,310	$0	$0	$0	FOT CA - No change.	IN-15-036	C.J.PP.16.JG.04
		$621,169	$0	$0	$0	$160,353	$0	$346,866	$0	$113,950	$0	$0	$0	PM CA - Activities A10080 and A10100 were slipped to a January start date. No change.	IN-15-036	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - Activity A10110 was shifted to January start date. No change.	IN-15-036	C.J.PP.16.JG.06

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Log No.	Date	Project Budget Base (PBB) Total	Project Budget Base (PBB) Change	Undistributed Budget (UB) Subtotal	Undistributed Budget (UB) Change	Control Accounts (CA) Subtotal	Control Accounts (CA) Change	Summary Level Planning Packages (SLPP) Subtotal	Summary Level Planning Packages (SLPP) Change	Management Reserve (MR) Subtotal	Management Reserve (MR) Change	Authorized Unpriced Work (AUW) Subtotal	Authorized Unpriced Work (AUW) Change	Remarks / Comments	BCP No. or Other Direction	WBS
7	**11-Feb-15**	**$10,427,666**	**$0**	**$0**	**$0**	**$2,220,188**	**($15,168)**	**$5,872,400**	**$9,681**	**$2,335,078**	**$5,487**	**$0**	**$0**	**BCP initiates the activities for the AFC Package for MFC FWS (C.J.PP.16.02), the MFC FWL (C.J.PP.16.03), and the PM Support for the development of the AFC Packages that currently resides in a Planning Packages (PP). The Construction Subcontract PPs have also been pushed to May when the Construction-Provided Management (CPM) schedule will be provided by the awarded subcontractor. A BCP will be prepared then to convert these PPs to execution packages that will become the performance Measurement Baseline (PMB).**	**IN-15-084**	**C.J.PP.16.JG**
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-15-084	C.J.PP.16.JG.01
		$4,363,108	$26	$0	$0	$625,846	$8,475	$2,709,494	($8,449)	$1,027,768	$0	$0	$0	MFC FWS CA - Activity A9930 was converted from a PP to an execution package.	IN-15-084	C.J.PP.16.JG.02
		$4,333,291	($2)	$0	$0	$660,465	$4,606	$2,667,848	($4,608)	$1,004,978	$0	$0	$0	MFC FWL CA - Activity A9970 was converted from a PP to an execution package.	IN-15-084	C.J.PP.16.JG.03
		$734,083	$0	$0	$0	$601,773	$0	$0	$0	$132,310	$0	$0	$0	FOT CA - No change.	IN-15-084	C.J.PP.16.JG.04
		$621,145	($24)	$0	$0	$132,104	($28,249)	$369,604	$22,738	$119,437	$5,487	$0	$0	PM CA - Activity A10080 was converted from a PP to an exeuction package.	IN-15-084	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	IN-15-084	C.J.PP.16.JG.06
8	**7-May-15**	**$10,427,666**	**$0**	**$0**	**$0**	**$2,220,188**	**$0**	**$5,872,400**	**$0**	**$2,335,078**	**$0**	**$0**	**$0**	**BCP reflects the shift of one month for the Construction Subcontract PPs for MFC FWS (C.J.PP.16.02), the MFC FWL (C.J.PP.16.03) until the the Contractor's Requirements are finalized.**	**IN-15-147**	**C.J.PP.16.JG**
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-15-147	C.J.PP.16.JG.01
		$4,363,108	$0	$0	$0	$625,846	$0	$2,709,494	$0	$1,027,768	$0	$0	$0	MFC FWS CA -Slipped 4 activities in PPS from May to June reporting; No budget change	IN-15-147	C.J.PP.16.JG.02
		$4,333,291	$0	$0	$0	$660,465	$0	$2,667,848	$0	$1,004,978	$0	$0	$0	MFC FWL CA -Slipped 4 activities in PPS from May to June reporting; No budget change	IN-15-147	C.J.PP.16.JG.03
		$734,083	$0	$0	$0	$601,773	$0	$0	$0	$132,310	$0	$0	$0	FOT CA - No change;scope is complete.	IN-15-147	C.J.PP.16.JG.04
		$621,145	$0	$0	$0	$132,104	$0	$369,604	$0	$119,437	$0	$0	$0	PM CA - Slipped one activity in PP from May to June reporting; No change.	IN-15-147	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	IN-15-147	C.J.PP.16.JG.06
9	**4-Jun-15**	**$10,427,666**	**$0**	**$0**	**$0**	**$2,220,188**	**$0**	**$5,872,400**	**$0**	**$2,335,078**	**$0**	**$0**	**$0**	**BCP was cancelled.**	**IN-15-165**	**C.J.PP.16.JG**
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-15-165	C.J.PP.16.JG.01
		$4,363,108	$0	$0	$0	$625,846	$0	$2,709,494	$0	$1,027,768	$0	$0	$0	MFC FWS CA - No change.	IN-15-165	C.J.PP.16.JG.02
		$4,333,291	$0	$0	$0	$660,465	$0	$2,667,848	$0	$1,004,978	$0	$0	$0	MFC FWL CA - No change.	IN-15-165	C.J.PP.16.JG.03
		$734,083	$0	$0	$0	$601,773	$0	$0	$0	$132,310	$0	$0	$0	FOT CA - No change;scope is complete.	IN-15-165	C.J.PP.16.JG.04
		$621,145	$0	$0	$0	$132,104	$0	$369,604	$0	$119,437	$0	$0	$0	PM CA - No change.	IN-15-165	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	IN-15-165	C.J.PP.16.JG.06
10	**18-Jun-15**	**$10,427,666**	**$0**	**$0**	**$0**	**$2,220,188**	**$0**	**$5,872,400**	**$0**	**$2,335,078**	**$0**	**$0**	**$0**	**BCP reflects the shift of one two months (June to August) for the Construction Subcontract PPs for MFC FWS (C.J.PP.16.02), the MFC FWL (C.J.PP.16.03) and PM (C.J.PP.16.JG.05) until the the Critical Decision 2/3 Equivalent (CDE) has been authorized by DOE-ID.**	**IN-15-185**	**C.J.PP.16.JG**
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-15-185	C.J.PP.16.JG.01
		$4,363,108	$0	$0	$0	$625,846	$0	$2,709,494	$0	$1,027,768	$0	$0	$0	MFC FWS CA -Slipped 4 activities in PPS from May to June reporting; No budget change	IN-15-185	C.J.PP.16.JG.02
		$4,333,291	$0	$0	$0	$660,465	$0	$2,667,848	$0	$1,004,978	$0	$0	$0	MFC FWL CA -Slipped 4 activities in PPS from May to June reporting; No budget change	IN-15-185	C.J.PP.16.JG.03
		$734,083	$0	$0	$0	$601,773	$0	$0	$0	$132,310	$0	$0	$0	FOT CA - No change; scope is complete.	IN-15-185	C.J.PP.16.JG.04
		$621,145	$0	$0	$0	$132,104	$0	$369,604	$0	$119,437	$0	$0	$0	PM CA - Slipped one activity in PP from May to June reporting; No change.	IN-15-185	C.J.PP.16.JG.05
		$176,039	$0	$0	$0	$0	$0	$125,454	$0	$50,585	$0	$0	$0	Readiness & Closeout CA - No change.	IN-15-185	C.J.PP.16.JG.06

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Log No.	Date	Project Budget Base (PBB) Total	Project Budget Base (PBB) Change	Undistributed Budget (UB) Subtotal	Undistributed Budget (UB) Change	Control Accounts (CA) Subtotal	Control Accounts (CA) Change	Summary Level Planning Packages (SLPP) Subtotal	Summary Level Planning Packages (SLPP) Change	Management Reserve (MR) Subtotal	Management Reserve (MR) Change	Authorized Unpriced Work (AUW) Subtotal	Authorized Unpriced Work (AUW) Change	Remarks / Comments	BCP No. or Other Direction	WBS
11	6-Jul-15	$9,232,622	($1,195,044)	$0	$0	$8,383,215	$6,163,027	$160,640	($5,711,760)	$688,767	($1,646,311)	$0	$0	On May 18, 2015, BEA was approved to proceed with construction activities for the project (IFM-15-014) and directed to develop and submit a CDE-2/3 package prior to implementation of the Performance Measurement Baseline (PMB). This BCP, submitted in conjunction with the CDE-2/3 package, converts the planning packages (PPs) for construction and associated BEA support into work packages (WPs). Upon approval, it will establish the PMB for post-CDE-2/3 activities in the MFC Firewater Replacement Project through construction. MR was also reduced to the amount reflected on the risk register.	IN-15-186	C.J.PP.16.JG
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-15-186	C.J.PP.16.JG.01
		$4,948,289	$585,181	$0	$0	$4,529,830	$3,903,984	$12,886	($2,696,608)	$405,573	($622,195)	$0	$0	MFC FWS CA -Conversion of the PPs to WPs in this BCP is based on the schedule of values (SOVs) contained in a construction contract (CONTRACT NO. 154606) awarded to North Wind Services' on 04/21/15.	IN-15-186	C.J.PP.16.JG.02
		$2,922,269	($1,411,022)	$0	$0	$2,673,336	$2,012,871	$10,739	($2,657,109)	$238,194	($766,784)	$0	$0	MFC FWL CA -Conversion of the PPs to WPs in this BCP is based on the schedule of values (SOVs) contained in a construction contract (CONTRACT NO. 154606) awarded to North Wind Services' on 04/21/15.	IN-15-186	C.J.PP.16.JG.03
		$601,773	($132,310)	$0	$0	$601,773	$0	$0	$0	($0)	($132,310)	$0	$0	FOT CA - No change; scope is complete.	IN-15-186	C.J.PP.16.JG.04
		$389,837	($231,308)	$0	$0	$378,276	$246,172	$11,561	($358,043)	$0	($119,437)	$0	$0	PM CA - PMB contains the BEA activities and associated resources necessary to complete that work.	IN-15-186	C.J.PP.16.JG.05
		$170,454	($5,585)	$0	$0	$0	$0	$125,454	$0	$45,000	($5,585)	$0	$0	Readiness & Closeout CA - No change.	IN-15-186	C.J.PP.16.JG.06
12	14-Oct-15	$9,232,623	$1	$0	$0	$8,543,856	$160,641	$0	($160,640)	$688,767	$0	$0	$0	This BCP converted all the Project Closeout and PM Closeout planning packages (PPs) into work packages (WPs). These activities will be planned to a lower level of detail and allow the testing, turnover, and closeout scope to start earlier than originally planned (October rather than December). This will make the transfer of the project to operations more effective. The overall budget and schedule did not change. DOE-ID approved the PeP that identified a "Post Critican Decision Equivalant (CDE) -4, "Approve Start of Operations or Project Completion", therefore this BCP is internal.	IN-16-002	C.J.PP.16.JG
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-16-002	C.J.PP.16.JG.01
		$4,940,804	($7,485)	$0	$0	$4,535,231	$5,401	$0	($12,886)	$405,573	$0	$0	$0	MFC FWS CA -Conversion of the Closeout PPs to WPs in this BCP.	IN-16-002	C.J.PP.16.JG.02
		$2,927,391	$5,122	$0	$0	$2,689,197	$15,861	$0	($10,739)	$238,194	$0	$0	$0	MFC FWL CA -Conversion of the Closeout PPs to WPs in this BCP.	IN-16-002	C.J.PP.16.JG.03
		$601,773	$0	$0	$0	$601,773	$0	$0	$0	($0)	$0	$0	$0	FOT CA - No change; scope is complete.	IN-16-002	C.J.PP.16.JG.04
		$412,958	$23,121	$0	$0	$412,958	$34,682	$0	($11,561)	$0	$0	$0	$0	PM CA -Conversion of the Closeout PPs to WPs in this BCP.	IN-16-002	C.J.PP.16.JG.05
		$149,697	($20,757)	$0	$0	$104,697	$104,697	$0	($125,454)	$45,000	$0	$0	$0	Readiness & Closeout CA - Conversion of the Closeout PPs to WPs in this BCP (testing, turnover, and closeout).	IN-16-002	C.J.PP.16.JG.06

Master Budget Log – MFC Firewater Project

Log No.	Date	Project Budget Base (PBB) Total	Project Budget Base (PBB) Change	Undistributed Budget (UB) Subtotal	Undistributed Budget (UB) Change	Control Accounts (CA) Subtotal	Control Accounts (CA) Change	Summary Level Planning Packages (SLPP) Subtotal	Summary Level Planning Packages (SLPP) Change	Management Reserve (MR) Subtotal	Management Reserve (MR) Change	Authorized Unpriced Work (AUW) Subtotal	Authorized Unpriced Work (AUW) Change	Remarks / Comments	BCP No. or Other Direction	WBS
13	11-Nov-15	$9,232,623	$0	$0	$0	$8,763,856	$220,000	$0	$0	$468,767	($220,000)	$0	$0	BCP IN-16-050 utilized management reserve (MR) and schedule reserve (SR) and distributed it to the appropriate activities/control accounts within the PMB (Performance Measurement Baseline) to account for the realization and mitigation of risks. The following impacts were encountered: 1) The configuration of the piping inside the TREAT area was different than the planning assumptions that were used. Two feet of additional lava rock must be trenched in order to maintain adequate cover for freeze protection. This item was identified under risk #2 of the project risk register. 2) Various construction field problems were identified in the operability configuration of the pump house controls. The subcontractor has filed claim for additional time due to the impacts of these changes. This has been identified as the largest risk to the project identified under risk #1 of the project risk register. 3) Due to delays from the items above, the manufacturers of the pump and miox systems cannot support the start-up of the equipment until the first week of December. The manufacturers are not part of the subcontractor's sub-tiers and their schedule availability is an external influence to the project schedule.		
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-16-050	C.J.PP.16.JG.01
		$4,940,804	$0	$0	$0	$4,755,231	$220,000	$0	$0	$185,573	($220,000)	$0	$0	MFC FWS CA -utilized MR and SR.	IN-16-050	C.J.PP.16.JG.02
		$2,927,391	$0	$0	$0	$2,689,197	$0	$0	$0	$238,194		$0	$0	MFC FWL CA -No change.	IN-16-050	C.J.PP.16.JG.03
		$601,773	$0	$0	$0	$601,773	$0	$0	$0	($0)	$0	$0	$0	FOT CA - No change; scope is complete.	IN-16-050	C.J.PP.16.JG.04
		$412,958	$0	$0	$0	$412,958	$0	$0	$0	$0	$0	$0	$0	PM CA -No change.	IN-16-050	C.J.PP.16.JG.05
		$149,697	$0	$0	$0	$104,697	$0	$0	$0	$45,000	$0	$0	$0	Readiness & Closeout CA - No change.	IN-16-050	C.J.PP.16.JG.06
14	14-Jan-16	$9,232,623	$0	$0	$0	$9,044,190	$280,334	$0	$0	$188,433	($280,334)	$0	$0	The purpose of this BCP is to utilize management reserve and distribute it to the appropriate activities/control accounts within the PMB (Performance Measurement Baseline) to account for the realization of risks. The following risks were encountered: 1) Unknown configuration of the existing equipment required a rewrite of the controls and subsequently additional hardware installation to support the required system inputs. The current pump control configuration was identified as item #1 on the project risk register. The impact of realizing this risk is $29,707, not including BEA support costs summarized below. 2) Underground interferences resulted in changes to the routing of the 6" ductile iron piping on the West side of TREAT. Encountering underground interferences is identified as item #6 on the risk register. The impact of realizing this risk includes not only the rerouting of the 6" ductile iron piping but additional rental fees on the convenience station and heaters at TREAT. While rental fees have been carried as a variance up until this point, the additional rental fees are the result of encountering the risk. The impact of realizing this risk is $38,711, not including BEA support costs summarized below. 3) Various construction field problems were identified as a result of design errors and omissions. Subcontract change orders due to design errors or omissions was identified as item #8 on the project risk register. The impact of realizing this risk is $111,915, not including BEA support costs summarized below. Additionally, the risks identified above have extended the BEA construction support an additional month. The impact is an additional $100K of BEA support costs ($25K per week). This BCP will also address concerns with BCP IN-16-002 by 1) correcting the way that schedule reserve was portrayed and reduces the baseline duration of the schedule reserve activity to zero, 2) discussing nomenclature changes that were not discussed in BCP IN-16-002, and 3) discussing schedule changes that occurred in BCP IN-16-002 at the activity level. Per the Project Execution Plan and agreement with the Federal Project Director on January 7, 2016, this BCP is internal.		
		$200,000	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$0	Project Initiation Activities - No change; scope is complete. No MR	IN-16-089	C.J.PP.16.JG.01
		$4,996,854	$56,050	$0	$0	$4,996,854	$241,623	$0	$0	($0)	($185,573)	$0	$0	MFC FWS CA -Conversion of the Closeout PPs to WPs in this BCP.	IN-16-089	C.J.PP.16.JG.02
		$2,871,341	($56,050)	$0	$0	$2,727,908	$38,711	$0	$0	$143,433	($94,761)	$0	$0	MFC FWL CA -Conversion of the Closeout PPs to WPs in this BCP.	IN-16-089	C.J.PP.16.JG.03
		$601,773	$0	$0	$0	$601,773	$0	$0	$0	($0)	$0	$0	$0	FOT CA - No change; scope is complete.	IN-16-089	C.J.PP.16.JG.04
		$412,958	$0	$0	$0	$412,958	$0	$0	$0	$0	$0	$0	$0	PM CA -Conversion of the Closeout PPs to WPs in this BCP.	IN-16-089	C.J.PP.16.JG.05
		$149,697	$0	$0	$0	$104,697	$0	$0	$0	$45,000	$0	$0	$0	Readiness & Closeout CA - Conversion of the Closeout PPs to WPs in this BCP (testing, turnover, and closeout).	IN-16-089	C.J.PP.16.JG.06

Appendix D,

Project Deficiency Punchlist

432.A36
08/30/2005
Rev. 00

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
1.	Complete conduit and panel labels in 1740	G. Smith	NW	3-7-16 / K. Cathey
2.	Complete piping labels in 1740 (Accept per E. Hallgren email)	E. Hallgren	NW	3-16-16 / E. Hallgren
3.	Fire pump crank case is vented to room (CFP-213)	D. Diaz	BEA/NW	2-15-16 / R.Lee
4.	Packing on fire pump is leaking more than it should (repair)	B. Jorgensen	NW	2-4-16 / R.Lee
5.	Adjust manual tank level gage to read the same as the auto gage	B. Jorgensen	NW	2-25-16 / Z. Mickelsen
6.	Remove blind flange from distribution piping	D. Clark	NW	4-5-16 / R. Lee
7.	Install a cover on the fire pump batteries (Accept per E. Hallgren email)	E. Hallgren	NW	4-5-16 / E. Hallgren
8.	Number one service water pump is squealing (repair)	B. Jorgensen	NW	2-4-16 / R.Lee
9.	Diesel fuel tank has a fill issue that needs resolved (Facility agreed to remove filter and accept as is)	B. Jorgensen	NW	4-20-16 / R. Lee
10.	Install cover on roll up door motor (Deleted per CFP-205)	R. Carbiener	NW	2-4-16 / R.Lee
11.	Fire Alarm panel needs programed so all fire pump monitoring is a supervisory signal	D. Clark	NW	2-4-16 / R.Lee
12.	Install plastic covers on bollards by 788,754,721 & 720	R. Lee	NW	2-17-16 / R. Lee
13.	Install screen on 1740 tank overflow pipe (CFP-212)	E. Hallgren	NW/BEA	3-9-16 / R. Lee
14.	Insulate miox injection pipe by south east unit heater (CFP-202)	R. Heyrend	NW/BEA	2-15-16 / R. Lee
15.	Install support on miox injection pipe by south unit heater (CFP-202)	R. Heyrend	NW	2-15-16 / R. Lee
16.	Repair ground wire north of 756 pump house	D. Kelly	NW	2-4-16 / R.Lee
17.	Repair Ground ring at 723	D. Kelly	NW	2-4-16 / R.Lee
18.	Repair ground ring and tie in ground wire south of 720	D. Kelly	NW	2-4-16 / R.Lee
19.	Replace wire in perimeter lighting in TREAT	D. Kelly	NW	2-17-16 / R. Lee
20.	Replace fence post in TREAT south leg	D. Kelly	NW	2-4-16 / R.Lee
21.	Finish conduit in 720	D. Kelly	NW	3-7-16 / K. Cathey
22.	Pull fiber and coax into 720,721 & 724	D. Kelly	NW	3-7-16 / K. Cathey

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
23.	Install heat trace in 723	D. Kelly	NW	2-4-16 / R.Lee
24.	Install heat trace in 720 drain line	D. Kelly	NW	2-4-16 / R.Lee
25.	Finish isolating 723 line	D. Kelly	NW	2-4-16 / R.Lee
26.	Complete backfill at 723	D. Kelly	NW	2-4-16 / R.Lee
27.	Insulate Fire Pump exhaust muffler per CFP-169(CFP-213)	R. Heyrend	NW	2-15-16 / R. Lee
28.	Diesel fuel tank needs final painting, I checked the spec, Section 09 9000 requires all items that are primed and not factory finished to be painted.	R. Heyrend	NW	2-4-16 / R.Lee
29.	Complete pressure testing and in-service testing on piping systems	B. Killian	NW	5-12-16 / B. Killian
30.	Provide splash blocks for tank overflow. (min 36" square for tank overflow per spec.)	B. Killian	NW	2-24-16 / B. Killian
31.	Complete Inspection plans	B. Killian	BEA	5/24/16 / B. Killian
32.	Engineers verify distance between anchors meets minimum acceptable criteria from manufacturer. Ref. CFP-109, item 1. Center to Center distance as installed is approximately 2 ¼". Also evaluate acceptability of supports with (2) anchors per support. (same CFP) (CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
33.	Complete labeling and identification per drawings, cfp's and specifications.	B. Killian	NW	5-19-16 / B. Killian
34.	Complete painting.	B. Killian	NW	5-12-16 / B. Killian
35.	Adjust rain cap on diesel exhaust line so it does not hang open. (Accept per R. Heyrend email)	B. Killian	NW	4-5-16 / B. Killian
36.	Engineering evaluate if diesel tank vent piping is adequately supported. CFP-124(CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
37.	Install strainers on engine cooling piping per CFP-137 R1. Note that this CFP work is not completed but it appears that strainers were omitted. Were strainers deleted by subsequent CFP? (CFP-213)	B. Killian	NW	2-15-16 / B. Killian
38.	Provide red line drawings including dwg. 789571, note 3.(VDR-530691)	B. Killian	NW	3-15-16 / B. Killian
39.	Complete final grading per drawings and specifications	B. Killian	NW	4-19-16 / B. Killian
40.	Verify all hydrant-PIV heights	B. Killian	NW	4-19-16 / B. Killian
41.	Complete paving (CFP-119)	B. Killian	NW	2-15-16 / B. Killian
42.	Complete hand hole, manhole installation, including covers and sealing with mastic. Ref. dwg. 789602, note 2.	B. Killian	NW	3-7-16 / B. Killian

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
43.	Verify all vendor data has been approved for concrete testing results	B. Killian	NW	4-18-16 / B. Killian
44	Re-install any signage per dwg's 789781, note 11, 789784, note 9 and 789802, note 8.(No signage was removed that needed replaced.)	B. Killian	NW	4-18-16 / B. Killian
45	Complete testing of installed mechanical and piping systems.	B. Killian	NW	5-12-16 / B. Killian
46	Complete jacket per dwg. 789785, section A.	B. Killian	NW	2-4-16 / B. Killian
47	Water relief pipe, MIOX pipe, exhaust fans and diesel pipe penetrations not sealed as indicated. Ref. dwg. 789790, 789800 detail 30.(CFP-222)	B. Killian	NW	4-18-16 / B. Killian
48	Verify roof thimbles installed per dwg. 789790. "South Elevation"	B. Killian	NW	2-23-16 / B. Killian
49	Provide access to roof for final QA Inspection of roof and penetrations.	B. Killian	NW	3-7-16 / B. Killian
50	Complete demo and re-work of items shown on the following drawings. 789802, 789803, 789804, 789805, 789812, 789813, 789814.	B. Killian	NW	5-16-16 / B. Killian
51	Insulate and paint outside CPVC vent piping per dwg. 789807, note 10.	B. Killian	NW	4-4-16 / B. Killian
52	QA perform final verification of piping supports and components per as-built drawings.	B. Killian	BEA/QA	5-16-16 / B. Killian
53	Complete exhaust thimble installation per dwg. 789815. Note 2. Including sealant.	B. Killian	NW	2-23-16 / B. Killian
54	Ref. dwg. 789816, section A. Does MIOX vent piping need to 90 down outside building? (CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
55	Complete MIOX piping system installation and testing	B. Killian	NW	5-12-16 / B. Killian
56	Is a bird screen needed or desired on the 10" vent pipe and the tank over-flow pipe? Engineering evaluate. Ref. dwg. 789816, section A. (CFP-212)	B. Killian	BEA	3-7-16 / B. Killian
57	Dwg. 789820, note 2 states "Do not insulate valves or connections. Valves on the recirculation system have been insulated. Note that the handles are exposed to allow operation. (CFP-213)	B. Killian	NW	2-15-16 / B. Killian
58	What is the CFP number for deletion of the valve on the pump suction line. FW-HV-205. Ref. dwg. 789809 and 789815. (CFP-213)	B. Killian	NW	2-15-16 / B. Killian
59	1" WR line is tied in up-stream of FW-MOV-210 as shown on P&ID 789809. Dwg. 789815 indicates this tie-in downstream of MOV-210. Engineering evaluate if installed location is acceptable. (CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
60	Detail for PS-6 support on dwg. 789822 seems to indicate double nuts top and bottom. Engineering clarify number of nuts required. (CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
61	Verify anchor details per dwg. 789823, detail 2. (anchor type/embedment) (CFP-213)	B. Killian	NW	2-15-16 / B. Killian
62	Complete and submit weld history and other required vendor data including red-line drawings.	B. Killian	NW	5-16-16 / B. Killian
63	Engineering clarify what tests are required to satisfy SPC-1850, 05 1200 3.04 A. (CFP-222)	B. Killian	BEA	4-18-16 / B. Killian
64	Demonstrate operation of roll up door to verify smooth and noiseless operation. (note that this is subjective criteria) SPC-1850 08-3323 3.02	B. Killian	NW	2-24-16 / B. Killian

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
65	AHJ and Engineering review test reports to verify adequate flushing flows and duration. SPC 1850 21 1101 3.02 (R. Heyrend email)	B. Killian	BEA	5-3-16 / B. Killian
66	Perform valve function test with QA witness per SPC-1850, 21 1101 3.02 C.	B. Killian	NW	2-4-16 / B. Killian
67	QA review approved wet pipe Firewater as-built drawings to verify installed configuration matches drawings.	B. Killian	BEA	4-16-16 / B. Killian
68	Flushing and flow tests per SPC-1850, 21 1301, 3.02 must be completed.	B. Killian	NW	4-4-16 / B. Killian
69	Complete testing and flushing per SPC-1850, 21 3000 3.02.	B. Killian	NW	5-12-16 / B. Killian
70	SPC-1850, 22 1005, 2.03 requires all diesel fuel and vent systems to be A53 galvanized pipe. S/C has installed plain black pipe and fittings. If b lack is approved for use, is painting of exposed exterior black pipe and fittings required? (CFP-213)	B. Killian	NW	2-15-16 / B. Killian
71	Bacterial test of systems per SPC-1850, 22 1005, 3.03 D.2.	B. Killian	BEA	5-12-16 / B. Killian
72	Verify Vendor data approved for equipment under SPC-1850, 22 3000. (Confirmed per VDS & Z. Mickelsen Email)	B. Killian	NW	3-15-16 / B. Killian
73	Complete Test and Balance per SPC-1850, 23 0593	B. Killian	NW	2-23-16 / B. Killian
74	Weld maps for tank installation and other data required per SPC-1850, 33 1613, 1.04.	B. Killian	NW	4-29-16 / B. Killian
75	Verify hydrant lockable per SPC-1837, 33 1100, 2.05 B.(acceptable per R. Heyrend email)	B. Killian	NW	3-16-16 / B. Killian
76	Provide operating wrenches per SPC-1837, 33 1100, 2.07.	B. Killian	NW	4-29-16 / B. Killian
77	Do we have a CFP for SPC-1837, 33 1100, 3.02 C.? Drawings show numerous flanges underground. (CFP-213)	B. Killian	NW	2-15-16 / B. Killian
78	Complete sealing on tanks around the ladders.	B. Killian	NW	3-7-16 / B. Killian
79	Complete flashing and sealing of roof penetrations on old tank.	B. Killian	NW	3-7-16 / B. Killian
80	Complete crimping of joints, especially behind ladder on old tank. Also need to determine adequate fastening for insulation panel behind this ladder.	B. Killian	NW	2-23-16 / B. Killian
81	Complete flashing/sealing and panel attachment at tank to building interfaces. Ensure panels are securely fastened at this interface.	B. Killian	NW	3-7-16 / B. Killian
82	QA will need access by manlift once the contractor believes the building to roof interfaces are flashed and sealed to allow for final Inspection.(Acceptable per D. Covert email)	B. Killian	NW	3-7-16 / B. Killian
83	Engineering provide CFP for drain line installed from Fire Pump Controller sensing line to waste drain. This drain was temporarily installed per verbal direction form facility supervisor. Indic ate materials to be used, testing requirements and support requirements. (CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
84	Engineering determine if valves and fittings for the Fire Pump controller sensing line need to be “Lead Free”.	B. Killian	BEA	2-4-16 / B. Killian
85	Engineering determine if “dampened” gauges need to be installed at the fire pump inlet and outlet. Gauges currently installed may fail due to erratic needle deflection during pump operation. (CFP-213)	B. Killian	BEA	2-15-16 / B. Killian

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
86	Seal conduit penetration in North wall of new pump house. (CFP-222)	B. Killian	NW	4-18-16 / B. Killian
87	Complete installation of fueling platform concrete anchors.	B. Killian	NW	2-23-16 / B. Killian
88	Engineering evaluate thread engagement of concrete anchor nuts and nut type on floor support installed per CFP-145 R-1. Some nuts do not have complete thread engagement(CFP-213)	B. Killian	BEA	2-15-16 / B. Killian
89	Verify work complete for CFP numbers above 160. (CFP-169 Accepted per Z. Mickelsen email)	B. Killian	NW	5-12-16 / B. Killian
90	List of CFP's (number 160 and lower) for which work is not completed: 39, 74, 82, 88, 114, 116, 137 R-1, 147 R-1, and 160	B. Killian	NW	5-12-16 / B. Killian
91	Chemical Inventory - Final Report – VDS-3 Schedule# 484738	R. Lee	NW	5-31-16 / R. Lee
92	Summary of Work - As-Built Redlines – VDS-4 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
93	Affirmative Procurement Requirements - Recovered Materials Report – VDS-5 Schedule# 484738	R. Lee	NW	5-11-16 / R. Lee
94	Altitude Control Valves – VDS-32 Schedule# 484738	R. Lee	NW	5-11-16 / R. Lee
95	Hydrostatic Test Report – VDS-35 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
96	Valve Functional Test Rpt. – VDS-37 Schedule# 484738	R. Lee	NW	3-15-16 / R.Lee
97	Wet-Pipe Fire Suppression - C of C – VDS-44 Schedule# 484738	R. Lee	NW	3-7-16 / R. Lee
98	Wet-Pipe Fire Suppression - Electronic As-built Drawings – VDS-46 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
99	Catalog Data – VDS-47 Schedule# 484738	R. Lee	NW	5-11-16 / R. Lee
100	Pressure Test Rpt. – VDS-59 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
101	Weld Records – VDS-62 Schedule# 484738	R. Lee	NW	2-17-16 / R. Lee
102	TAB - TAB Report – VDS-73 Schedule# 484738	R. Lee	NW	2-24-16 / R. Lee
103	I&C Devices for HVAC/PLUMBING - Product Data – VDS-75 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
104	I&C Devices for HVAC/PLUMGING - Shop Drawings – VDS-76 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
105	I&C Devices for HVAC/PLUMBING - Installation Instructions – VDS-77 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
106	I&C Devices for HVAC/PLUMPING - Electronic As-Built Autocad Drawings – VDS-78 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
107	I&C Devices for HVAC/PLUMBING- O&M – VDS-79 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
108	I&C Devices for HVAC/PLUMBING - Warranty – VDS-80 Schedule# 484738	R. Lee	NW	5-17-16 / R. Lee
109	I & C SUBMITTAL PACKAGE 3 – VDS-83 Schedule# 484738	R. Lee	NW	5-31-16 / R. Lee
110	I & C SUBMITTAL PACKAGE 4– VDS-84 Schedule# 484738	R. Lee	NW	5-31-16 / R. Lee

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
111	I & C SUBMITTAL PACKAGE 5 – VDS-85 Schedule# 484738	R. Lee	NW	5-31-16 / R. Lee
112	I & C SUBMITTAL PACKAGE 6 – VDS-86 Schedule# 484738	R. Lee	NW	5-24-16 / R. Lee
113	I & C SUBMITTAL PACKAGE 7 – VDS-87 Schedule# 484738	R. Lee	NW	5-24-16 / R. Lee
114	I & C SUBMITTAL PACKAGE 8 – VDS-88 Schedule# 484738	R. Lee	NW	5-31-16 / R. Lee
115	I & C SUBMITTAL PACKAGE 9 – VDS-89 Schedule# 484738	R. Lee	NW	5-31-16 / R. Lee
116	Cable, Wire & Connectors - Cable Pull Sheets – VDS-90 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
117	Cable, Wire & Connectors - Cable Pulling Procedure for SR Cable – VDS-91 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
118	Cable, Wire & Connectors - Pull-by Schedule – VDS-92 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
119	Cable, Wire & Connectors - Megger Test Results – VDS-94 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
120	Cable, Wire & Connectors - Continuity Test Results – VDS-96 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
121	Grounding - Test Results – VDS-99 Schedule# 484738	R. Lee	NW	3-15-16 / R.Lee
122	Low-Voltage Transformers -Warranty– VDS-102 Schedule# 484738	R. Lee	NW	2-17-16 / R. Lee
123	Panelboards and Circuit Breakers - O&M– VDS-106 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
124	Wiring Devices - Product Data– VDS-107 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
125	Wiring Devices - Installation Instructions– VDS-108 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
126	Wiring Devices - O&M– VDS-109 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
127	Interior Lighting - Warranty– VDS-112 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
128	Interior Lighting - O&M– VDS-113 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
129	Fire Detection and Alarm - Inspection and Test Report– VDS-119 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
130	Fire Detection and Alarm - O&M– VDS-120 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
131	Fire Detection and Alarm - Electronic Autocad As-built Drawings– VDS-121 Schedule# 484738	R. Lee	NW	3-15-16 / R.Lee
132	Fire Detection and Alarm - Closeout Documents– VDS-122 Schedule# 484738	R. Lee	NW	3-22-16 / R. Lee
133	Fire Detection and Alarm - Maintenance Materials – VDS-123 Schedule# 484738	R. Lee	NW	2-13-16 / R. Lee
134	Above Ground Water Tanks - Disinfection Test Report – VDS-130 Schedule# 484738	R. Lee	NW	5-12-16 / R. Lee
135	Above Ground Water Tanks - Testing Agency Qualifications – VDS-131 Schedule# 484738	R. Lee	NW	5-12-16 / R. Lee
136	Above Ground Water Tanks - Painting and Coating Product Data – VDS-132 Schedule# 484738	R. Lee	NW	5-11-16 / R. Lee

INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
137	Fiber Optic Cable - Certifications – VDS-134 Schedule# 484738	R. Lee	NW	2-4-16 / R.Lee
138	Fiber Optic Cable - Test Procedure – VDS-135 Schedule# 484738	R. Lee	NW	3-7-16 / R. Lee
139	Fiber Optic Cable - Test Results – VDS-136 Schedule# 484738	R. Lee	NW	5-11-16 / R. Lee
140	As-Built Construction Documents – VDS-1 Schedule# 484881	R. Lee	NW	5-16-16 / R. Lee
141	Affirmative Procurement Requirements – VDS-2 Schedule# 484881	R. Lee	NW	5-12-16 / R. Lee
142	As-built Survey Data – VDS-3 Schedule# 484881	R. Lee	NW	5-16-16 / R. Lee
143	Recycled Materials Data – VDS-4 Schedule# 484881	R. Lee	NW	5-12-16 / R. Lee
144	Recycled Materials Data – VDS-7 Schedule# 484881	R. Lee	NW	5-17-16 / R. Lee
145	Product Data – VDS-14 Schedule# 484881	R. Lee	NW	5-17-16 / R. Lee
146	Installation Instructions – VDS-15 Schedule# 484881	R. Lee	NW	5-17-16 / R. Lee
147	Product Data – VDS-16 Schedule# 484881	R. Lee	NW	5-16-16 / R. Lee
148	Material Safety Data Sheets (MSDS) – VDS-17 Schedule# 484881	R. Lee	NW	5-12-16 / R. Lee
149	Grounding Exothermic Welding Procedure (if used) – VDS-18 Schedule# 484881	R. Lee	NW	2-4-16 / R.Lee
150	Grounding Exothermic Welder Certifications (if used) – VDS-19 Schedule# 484881	R. Lee	NW	2-4-16 / R.Lee
151	Fiber Optic Cable Label Sample – VDS-20 Schedule# 484881	R. Lee	NW	2-4-16 / R.Lee
152	Fiber Optic Cable Label Sample – VDS-22 Schedule# 484881	R. Lee	NW	3-7-16 / R. Lee
153	Fiber Optic Cable Test Procedure – VDS-23 Schedule# 484881	R. Lee	NW	5-11-16 / R. Lee
154	Fiber Optic Cable Test Reports - After Installation – VDS-24 Schedule# 484881	R. Lee	NW	5-11-16 / R. Lee
155	Fiber Optic Splicer Qualification Record – VDS-25 Schedule# 484881	R. Lee	NW	3-7-16 / R. Lee
156	Product Data – VDS-29 Schedule# 484881	R. Lee	NW	5-16-16 / R. Lee
157	Red-lined As-Built Drawings– VDS-31 Schedule# 484881	R. Lee	NW	5-17-16 / R. Lee
158	Material and Test Certification – VDS-36 Schedule# 484881	R. Lee	NW	2-13-16 / R. Lee
159	Chemical Inventory List - Final– VDS-43 Schedule# 484881	R. Lee	NW	5-11-16 / R. Lee
160	Finish all duct banks on print E-3 and install fiber and terminate and Test. outside of the fence	K. Cathey	NW	5-3-16 / K. Cathey
161	Fix the duct bank on back of MFC-724 or write a cfp to except as is installed. Reference CFP-35. outside of the fence	K. Cathey	NW	2-19-16 / K. Cathey
162	On print E-4 bond all conduits pull in fiber and cat-5 cable. Install J-boxes. outside of the fence	K. Cathey	NW	3-7-16 / K. Cathey

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INL CONSTRUCTION PUNCH LIST

Contract Number: 154606 (Project# 31780) Project Title: MFC Fire Water Upgrade

Contractor: North Wind Date: 5/31/16

Item No.	Description	Generated By	Action By	Date/Initial Complete
163	On print E-5 install fiber and test. outside of the fence	K. Cathey	NW	5-3-16 / K. Cathey
164	On print E-6 install and terminate fiber in MFC-1728. outside of the fence	K. Cathey	NW	5-3-16 / K. Cathey
165	Print E-2 finish conduit, duct bank and install fiber to MFC-754 terminate and test. inside of the fence	K. Cathey	NW	5-11-16 / K. Cathey
166	Print E-3 Finish all wiring inside of new pump house 1740. Then test all equipment. inside of the fence	K. Cathey	NW	2-19-16 / K. Cathey
167	Print E-4 install fiber rack and install fiber terminate and test. inside of the fence	K. Cathey	NW	2-19-16 / K. Cathey
168	Print E-5 none of this work has even been started. So all of this print needs to be done. inside of the fence	K. Cathey	NW	5-11-16 / K. Cathey
169	Print E-8 Have ATS terminate all of the controls for multiple equipment and test. inside of the fence	K. Cathey	NW	5-11-16 / K. Cathey
170	On prints IN-1 thru IN-7 have ATS install and test all equipment. inside of the fence	K. Cathey	NW	3-7-16 / K. Cathey
171	On prints FA-1 and 2 install all wiring and equipment then test Fire Alarm. inside of the fence	K. Cathey	NW	2-19-16 / K. Cathey
172	Finish conduit run from manhole outside 720 to inside 720.	K. Cathey	NW	3-7-16 / K. Cathey
173	Pull fiber inside 720 and test.	K. Cathey	NW	5-3-16 / K. Cathey
174	Install fiber inside 720 above I and C area.	K. Cathey	NW	3-7-16 / K. Cathey
175	Install ground plate behind 721.	K. Cathey	NW	4-14-16 / K. Cathey
176	Terminate and Test all fiber in 720,721,724,Dial room.	K. Cathey	NW	5-3-16 / K. Cathey
177	Pull new conductors for lighting behind 720.	K. Cathey	NW	2-17-16 / K. Cathey
178	Finish all electrical work in HFEF and 754.	K. Cathey	NW	5-12-16 / K. Cathey
179	Fix fuses for exhaust fans, there are 30 amp fuses on number 12 wire from fan motor to first disconnect.	K. Cathey	NW	2-24-16 / K. Cathey
180	Complete all electrical work in MFC-707	K. Cathey	NW	5-17-16 / K. Cathey

Appendix E,

Project Risk Register

Item #	Description	Probability	Impact ($)	MR Account ($)	Comments	Mitigations	MR Balance
1	Pump control configurations	Medium	$45,000	$45,000	Our current design with the 5 new pumps system would be considered a custom system, which also needs to be interlocked with the existing pump system controls.	Incorporated the interface pump control requirements into the project design documents for the subcontractor to perform the pump control design.	$45,000 (TEC)
2	Encountering lava rock	High	$40,000	$40,000	Rock probing inside the fence areas at MFC and TREAT was not part of the planning stage of this project and we could encounter approx. 300 feet of additional rock excavation than estimated. The associated costs are prorated from the subcontractor's schedule of values on this activity.	We stated in the design documents that rock would be encountered and the bids shall include this item.	$40,000 (TEC)
3	Encountering hazardous waste oil at MFC-755	Medium	$125,000	$125,000	DD &D has been completed and we did not encounter any spills in the area of the old waste oil tanks and pump house.		-$125,000 (TEC)
4	Encountering radiological contamination	Medium	$100,000	$100,000	It's unknown at this time if there's any contamination within the CERCLA areas. However, the location of the existing and new fire water lines will be located in areas where possible contamination could be encountered.	Expanded the limits of the radiological and CERCLA sites in the design documents to allow for spread and leaching conditions. We also evaluated existing sampling results and we will be performing additional sampling during the excavation process.	$100,000 (TEC)
5	Encountering deteriorated water lines, which requires connecting the old/new lines together	Medium	$30,000	$30,000	The condition of the old lines that are to be connected to the new lines is not known at this time. Facilities have had problems with the existing lines leaking in the past. We are assuming that we will encounter approx. 200 feet of old lines that will require replacement. The associated costs are prorated from the subcontractor's schedule of values on this activity.	Utilized MFC plant SMEs input on the existing mains that will require new tie-in points. During maintenance and repair activities over the past 10 years, we have determined that the existing mains are in good condition.	$30,000 (TEC)

Item #	Description	Probability	Impact ($)	MR Account ($)	Comments	Mitigations	MR Balance
6	Encountering underground interferences	High	$50,000	$50,000	The subsurface investigation will identify some of the interferences. However, with the congested areas it will be difficult if not impossible to identify all of the underground utilities and we will have to assume that only 75% of the utilities will be detected by the subsurface investigation process.	Conducted subsurface evaluations during the design, which include facility configuration control documents. Additionally, will perform subsurface evaluations prior to excavation.	$50,000 (TEC)
7	Encountering hazardous materials (lead paint, heavy metals) on the 60,000, and 100,000 gallon fuel tanks and 200,000 gallon water tank during demolition.	Medium	$80,000	$80,000	Sampling has been performed and determined that the materials from the tanks can be mass-balanced, which will meet the requirements for excess materials.		-$80,000 (TEC)
8	Subcontract change orders for design errors and omissions	Medium	$378,767	$378,767	It's assumed that the project will encounter unknowns during the construction time frame, which could impact the project schedule. This amount was reduced by $487K that was put in the baseline for change orders.	BEA made allowances for added project management personnel during the execution phase to minimize time impacts of resolving subcontractor identified field problems.	$378,767 (TEC)
9	CERCLA Soil sampling and possible construction delay (unknown change) impacts requiring additional non-dedicated operational support personnel.	Medium	$45,000	$45,000		Expanded the limits of the radiological and CERCLA sites on design documents to allow for spread and leaching conditions. Also evaluated existing sample results and perform additional sampling during excavation.	$45,000 (OPC)
			Total MR	**$1,315,768 (TEC)** **$45,000 (OPC)**			**$643,767 (TEC)** **$45,000 (OPC)**
10	Contingency	Unknown	Unknown	0	$250,000 identified for unknown impact(s) of event(s) outside the project's control, such as an external event causing shutdown of MFC and stopping all construction work.		

Appendix F,

Lessons Learned Report

PROJECT TITLE	MFC Firewater Project	**PROJECT NUMBER**	31780

1. PROJECT JOURNAL - During each project team meeting discuss what strategies contributed to success as well as areas of potential improvement. Enter your conclusions in the table below (insert rows as needed).

STRATEGIES AND PROCESSES THAT LED TO SUCCESS

Number	Date	Prepared By	Description
1	2/18/16	Lessons Learned Meeting	The decision to resolicit the RFP and expand the bidders list to include big businesses resulted in numerous benefits: • The contract was awarded for an amount that was significantly more in line with project estimates than the 1st solicitation. In addition to the savings of the base bid, the pricing of change orders was more reasonable than would have been expected with standard contractors and BEA support costs were likely lower as a result of the subcontractor's performance. The project team believes that over $3.1M was saved as a result of awarding the contract to Northwind Services. • Northwind did a better job of managing their subtiers than has been demonstrated by other contractors. • Northwind provided more professional and efficient office staff than what has been experienced using other contractors. This resulted in fewer vendor data resubmittals, quick responses to change orders, better developed schedules and Gantt charts, etc. • The number one concern of the Construction Field Manager was the extensive excavation in an area with challenging configuration management. Northwind did not hit anything underground. This was the result of using methods and equipment that the standard subcontractors have either chosen not to use or could not use because of the cost. Projects with large excavation should consider using a hydrovac method as opposed to the standard dryvac excavation method. • As a larger business, the contractor had access to other methods and equipment that the standard small business subcontractors have not. Northwind elected to use rock saw trenchers. In the beginning production rates were not a high as they expected and so the subcontractor brought in a second rock saw trencher. • Northwind chose to use a subtier from outside of the region, Chicago Bridge and Iron (CBI), to erect the tank. It was very apparent that quality and speed of their work was better than had been seen in the regional Iron Work Contractors. As a business that has offices across the United States, Northwind has access to more options. • A significant difference that was observed by using a contractor that does not have a permanent presence at INL is that they were focused on getting the work done and moving on. They proactively identified issues and tried to get resolutions before the issue impacted them. Other contractors that "live" at INL have been observed to wait until the moment of impact to bring up an issue in order to maximize their claim. **Lesson Learned: The decision to include big businesses in the acquisition strategy provided numerous benefits.**
2	2/18/16	Lessons Learned Meeting	The project did an excellent job of managing long lead procurements and matching the procurements to the funding profile. **Lesson Learned: The early management of long lead procurements prevented schedule delays and accommodated the funding cycles.**

3	2/18/16	Lessons Learned Meeting	In some ways the project was broken into smaller sub projects such as the fuel oil tank demolition, fabrication of the new tank, procurement of the 14" HDPE piping, etc. It was beneficial to break up some of the work into the smaller components and complete them early on before the significant effort ensued. **Lesson Learned: Executing the work in smaller sub-projects was an effective method to manage the large amount of scope.**
4	2/18/16	S Lee	The project effectively involved key players in the conceptual design process. **Lesson Learned: Involvement of key players in the early stages of the project development allows for more effective team integration throughout the project.**
5	2/18/16	Lessons Learned Meeting	The team effort and collaboration of all parties was noteworthy. There was no "us" vs "them" when it came to operations, construction management, project management, subcontractor, engineering, ES&H, etc. All worked well to help mitigate impacts and help make the other players successful as well. Examples include: • Lock Out Tag Outs were worked collaboratively • The subcontractor proceeded at risk on a majority of the CFP's in order to avoid schedule impacts that would have been costly to both Northwind and BEA. • The subcontractors proactively identified issues and provided recommended solutions. • The subcontractors (particularly L&L Mechanical) stated on multiple occasions that we didn't just hire them to perform the identified work, but we hired them to manage the work. They had a mindset that they were providing both a product and a service. • There was considerable pressure to influence the project to manage the Northwind subcontract with "an iron fist." The project did hold the contractor accountable to contractual requirements but the relationship management proved to be far more important than the contract management. **Lesson Learned: Relationship management heavily contributes to project success.**
6	2/18/16	Lessons Learned Meeting	The weekly construction meetings were effective and well attended by the key players. The CFR should be commended for his role in organizing and leading this effort. **Lesson Learned: Effective weekly construction meetings are essential to successful execution.**
7	6/18/16	Lyle LaBonte	Early on in the project it was believed that the Subcontractor Requirements Manual directed the subcontractor to maintain all subsurface investigation markings. Upon realization that the requirement was not part of the contractual documents, Construction Management implemented the lesson learned and started including a statement in all excavation permits to require the subcontractor to maintain the marks. **Lesson Learned: Excavation permits should require the subcontractor to maintain subsurface investigation markings.**
8	6/18/16	Lyle LaBonte	The environmental checklist failed to identify Industrial Waste Ditch C (PER-138) and thus excavation tailings were placed in the ditch. This was noticed by an MFC Environmental Support person during a daily facility inspection. As a result, the project was able to stop the action, make appropriate notifications and remediation of the area and no violations were noted with Idaho DEQ. This highlights the importance of ES&H field observations as an important piece of the ISMS program, specifically Guiding Principle 3 Competence Commensurate with Responsibilities and the Defense in Depth Model. **Lesson Learned: Environmental Field Observations are a critical component of ISMS (specifically Defense in Depth) and help to ensure project success.**
AREAS OF POTENTIAL IMPROVEMENT			
Number	**Date**	**Prepared By**	**Description**
9	10/1/15	B Miklos	The project should have had more regular risk management meetings. **Lesson Learned: Risk management meetings throughout the project stages should be scheduled up front as a regularly occurring meeting.**

10	10/1/15	S Jensen	The project needed to have a co-located project manager and project engineer at the job site. Many of the day-to-day technical questions should have been handled between the project engineer and the CFR. **Lesson Learned: Co-location of project team members creates an environment that allows the project to respond to day-to-day issues more effectively.**
11	10/1/15	Z Mickelsen	A lower level of detailed planning (both project planning and engineering design) needed to occur where the work interfaces between the subcontractor and BEA. Particular areas include interfaces and work performed by Life Safety, Information Management, and SEECS. These are common lessons learned from other projects. **Lesson Learned: Interfaces between subcontractor and BEA (Life Safety, Information Management, and SEECS) are difficult and should be mitigated through a more detailed level of planning.**
12	10/1/15	Z Mickelsen	**Lesson Learned:** Management reserve needs to be funded on IGPP projects (or held in a pool available for use). ALL construction projects will use some level of management reserve as they only use 90% designs.
13	10/1/15	Z Mickelsen	Various aspects of the project plan/schedule would have benefitted from more detailed planning including: finalization of construction, transition to operations plan, closeout. This was impacted because of the decision to go out for resolicitation (which saved millions of dollars). **Lesson Learned: Scope that is impacted by influences external to that scope can benefit from more rigorous planning.**
14	10/1/15	Z Mickelsen	The schedule and baseline included costs for change orders but did not account for the time delays associated with processing change orders. Just as a project plans for a certain level of change orders because there is a greater than 50% probability, the schedule should take that into account as well. The PMB matched the construction schedule with the subcontractor's CPM schedule. The PMB should have accounted for expected delays. **Lesson Learned: Schedule reserve should account for delays experienced not only from the issues encountered but the processing of CFP's to resolve those issues.**
15	10/1/15	Z Mickelsen	The project EV Plan used the apportioned method to take performance on construction change orders. CFP's lag the construction schedule so a direct relationship for taking performance based on the contract performance is inappropriate. The result was that the project performance reflects positive cost variances early in the construction phase. On most construction projects, the majority of CFP's will occur toward the middle or end of the base contract scope. **Lesson Learned: The apportioned method is not an ideal EV method for CFP's.**
16	10/1/15	Z Mickelsen	The project status was called into question because a couple of months after a particular activity had been reported as completed, a punch list item was being addressed. Absent of performing a partial turnover on each activity in the PMB schedule, punch list items will be encountered. **Lesson Learned: A more defined and communicated activity dictionary could help to improve understanding of activity scope and rationale for taking earned value.**
17	10/1/15	Z Mickelsen	Small nuances in the project schedule ended up having a tremendous effect on the interpretation of the activities. The following should be considered when developing a schedule: • Substantial construction complete vs construction complete • Activities that occur before and after the substantial construction complete milestone such as remaining work activities, punch list items, etc. • Partial turnover milestones should have partial turnover activities prior to the milestone. **Lesson Learned: Care should be taken when naming activities to ensure specific meaning. The meanings can be clarified in an activity dictionary.**
18	10/1/15	Z Mickelsen	The project requested to hire key resources in order to mitigate some of the items identified in the lessons learned but did not receive support to do so. Due to the project being insufficiently staffed, resources were stretched thin. This was compounded by working a 6X10 schedule. **Lesson Learned: Appropriate project staffing is critical to project success.**

19	2/18/16	Lessons Learned Meeting / S Jensen	In the project formulation process, the project did not fully utilize the F&OR and the Code of Record. During design reviews people tend to focus only on the output/project and ignore the inputs/driving requirements. **Lesson Learned: Utilize the F&OR and the Code of Record extensively during design reviews.**
20	2/18/16	Lessons Learned Meeting	In general, projects can do a better job at identifying the IPT. The design reviewers should be defined up front. A corrective action from years past resulted in a defined design review team. **Lesson Learned: Ensure IPT members are appropriately identified at the project conception.**
21	2/18/16	Lessons Learned Meeting	Changing IPT members, changes in project sponsors and reorganizations, uncertain funding profiles, etc. can all contribute to a lack of continuity. Things that help maintain continuity are: System Description Documents, code of record, and clear and rigorous processes for transition of responsibilities. **Lesson Learned: There are many less than optimal circumstances encountered during the project. Utilize tools that help mitigate the impacts.**
22	2/18/16	Lessons Learned Meeting	The eCR system is cumbersome, inefficient, and sometimes bypassed with emails, etc. When design review comments are provided via email, some comments can be overlooked and does not give the approving engineering manager the ability to evaluate the questions asked. **Lesson Learned: Design reviewers need to utilize the eCR system regardless of the ease of use.**
23	2/18/16	S Jensen	The role of project engineer is not consistently employed in every project. **Lesson Learned: Ensure there are clear roles and responsibilities agreed to between work and home organizations.**
24	2/18/16	B Miklos	The project could have benefited from better definition of the roles and responsibilities in the project initiation documents. **Lesson Learned: Ensure there are clear roles and responsibilities agreed to between work and home organizations.**
25	2/18/16	Lessons Learned Meeting	In order to mitigate risk and protect the tank from rust during the period of delivery and fabrication, the project had the tank primed. The primer was ineffective in providing adequate protection and the tank ended up having to be sanded and re-primed. **Lesson Learned: Tank construction designs should plan for sanding and priming work to be performed after the tank is erected.**
26	2/18/16	Lessons Learned Meeting	Numerous CFP's were issued related to either design omissions or the absence of operational requirements in the F&OR. There is a void that occurs during the F&OR development because it is hard to conceptualize what will be designed. The following can help: • During the F&OR development, think about what the acceptance testing would look like. • Physical observation of operators and processes, review of current Operating Instructions, etc. may help identify needed information. **Lesson Leaned: Utilize strategies such as defining acceptance testing during the F&OR development process.**
27	2/18/16	Lessons Learned Meeting	Funding uncertainty and the continual stop-go effect of indirect funding processes contributed to less than optimal design processes (on and off again, varying team members, etc.). A way to mitigate the effects would be to come up with a funding mechanism that would allow indirect funding to be carried over. Options include actual balance sheet entries or recognition of the commitment in the next fiscal year. Funding mechanics for construction projects need to recognize the issues arise the make schedules (and associated costs) ebb and flow throughout the project. The project has the responsibility to mitigate impacts but it is not uncommon or improper for individual work activities to shift slightly. For example, there was a 2 week schedule difference between the schedule profile developed in the spring of FY15 and actual schedule progress as of September 30, 2015. The indirect funding process created a scenario that would not allow the project to get ahead of schedule because it would run out of funds and have to shut down, but the 2 week schedule difference shifted $600K of costs from FY15 to FY16. The lab perception is that the $600K cost shift is an overrun in FY16 when in reality the project is projecting to finish ahead of schedule, with a positive cost variance, and significantly lower

			than the project budget base. The Lab indirect funding process relies on a project to have a 1.0 SPI and CPI at fiscal year-end. This is an unrealistic and cost prohibitive expectation that will result in disappointment and perceived failure almost every time. **Lesson Learned: Indirect funding processes create life cycle project inefficiencies which are avoidable through balance sheet entries.**
28	3/7/16	Various	The approved design separated the requirements associated with potable water systems from requirements of firewater systems which resulted in the firewater pump containing internal components that were not lead free as required by the potable water standards. The project ultimately decided to replace the components with lead free to ensure safe drinking water. However, these were custom made components and industry practices, products, and industry accepted design specifications all contradict the replacement of the components. **Lessons learned: Regulations are often created in "stove-pipes" rather than holistically and can contradict each other. Future designs should evaluate whether regulations and even specification sections work congruently or against each other.**
29	6/18/16	Gerardo Islas-Rivera	The project encountered some delays associated with being able to backfill the trenches because scope that was added to the contract but was outside of the project (placing coax in the trench) was delayed. **Lessons Learned: Upon addition of scope to a contract, the risk register should be updated to adequately reflect potential risks that may affect the project and include mitigation strategies if possible.**

2. PROJECT CLOSE-OUT DISCUSSION - At the end of your project, gather all stakeholders for a Lessons-Learned meeting; focus on Lessons Learned that will help in future projects (insert rows as needed).

LIST THIS PROJECT'S THREE BIGGEST SUCCESSES
The main subcontract was awarded at a price that was more in line with project estimates by using big businesses in the acquisition strategy.
The project avoided costly delays by effectively managing long lead GFE procurements.
Many of the project's successes were rooted in effective relationship management.
LIST OTHER SUCCESSES THAT THE PROJECT TEAM WOULD LIKE HIGHLIGHTED
The project has always remained within the acceptable variance criteria and is projecting to complete ahead of schedule and with a positive schedule variance.
All work was completed safely and without reportable injury.
LIST AREAS OF POTENTIAL IMPROVEMENT ALONG WITH HIGH-IMPACT IMPROVEMENT STRATEGIES
Improvements in the F&OR Development would reduce the number of CFP's.
Improved and routine risk management meetings would help to identify and mitigate future impacts.
Well defined, integrated, and co-located IPT enables successful project execution.
OTHER COMMENTS
N/A

PROJECT LESSONS-LEARNED DOCUMENT / SIGNATURES - I have reviewed the information contained in this Project Lessons Learned Document and agree

Zane Mickelsen	*Zane Mickelsen*	**3/7/16 & 6/18/16**
Project Manager (printed name)	**Signature**	**Date**

Appendix G,

Final Project Transfer

INSPECTION AND PROJECT TRANSFER

☐ Partial
☒ Final
31780 Project Number

INSPECTION

PROJECT TITLE: MFC Fire Water Upgrade Project

as constructed by North Wind
(Name of Subcontractor or Direct Hire)

154606
(Subcontract No.) (Funding No./Req. No.)

The project (or portion of the project) was found by the Project Team (signatures as shown below) to be complete in accordance with the contractual documents except for such deficiencies specifically noted below. The project (or portion of the project) is ready for testing and start-up activities.

Deficiencies (attach list if necessary):
None See attached signed off punch list.

Comments:
Includes all scope associated with the original work scope and CFP-001 through CFP-231.

PROJECT TEAM APPROVAL

Ron Carbiener Quality Engineer Print/Type Name	Ron Carbiener per telecom. RL Quality Engineer Signature	5-31-16 Date
Zane Mickelsen Project Manager Print/Type Name	Mickelsen, Zane L (MICKZL) Digitally signed by Mickelsen, Zane L (MICKZL) DN: cn=Mickelsen, Zane L (MICKZL), email=Zane.Mickelsen@inl.gov Date: 2016.05.31 14:59:26 -06'00' Project Manager Signature	Date
Wes Beck Field Superintendent (Sub)Contractor Print/Type Name	Wes Beck per telecom. RL Field Superintendent (Sub)Contractor Signature	5-31-16 Date
Richard Lee Construction Manager Representative Print/Type Name	Richard Lee Construction Manager Representative Signature	5/31/16 Date
Jim Roeder Safety Representative Print/Type Name	Safety Representative Signature	05/31/16 Date
Jim Wojciechowski Other Print/Type Name & Job Title	Other Signature	5/31/16 Date

INSPECTION AND PROJECT TRANSFER

PARTIAL PROJECT TRANSFER TO FACILITY MANAGER

I certify that our personnel have monitored the design, fabrication, and installation of the project (or portion of the project) and, to the best of my knowledge, the work has been completed in accordance with the plans and technical specifications, including all approved changes. The project (or portion of the project) is hereby ready to be turned over to the Facility Manager for system operational testing and other activities in preparation for final project transfer.

Project Manager Print/Type Name	Project Manager Signature	Date

The _____ Facility Organization hereby accepts total responsibility for maintenance and custody of the project (or portion of the project) and for coordination of remaining testing and activities required to prepare for final project transfer.

Facility Manager or Representative Print/Type Name	Facility Manager or Representative Signature	Date

INTERIM DISTRIBUTION

Signatories, Land/Facility Operations, and Project File. For capital-funded projects include Property Accounting and Property Management.

WORK COMPLETION

SUBCONTRACTOR/DIRECT HIRE:

I certify on behalf of North Wind subject to the penalties provided under 18 U.S.C., Section 1001, that our personnel have accomplished the contract work and, to the best of my knowledge, the work was performed or accomplished in accordance with the contractual documents, including all approved changes.

Subcontractor Authorized Representative Print/Type Name	Subcontractor Authorized Representative Signature	Date
Wes Beck	RL Wes Beck per telecom.	5/31/16

I certify that the administration of the contract for the above named project is, to the best of my knowledge, complete to the extent required for this Project Transfer and/or close out of the contract

Procurement Agent / Construction Manager Representative Print/Type Name	Procurement Agent / Construction Manager Representative Signature	Date
Albert Wilcox / Richard Lee	Digitally signed by Bennett, Zachary A (BENNZA) DN: cn=Bennett, Zachary A (BENNZA), email=Zachary.Bennett@inl.gov Date: 2016.05.31 16:03:24 -06'00' / Richard Lee	5/31/16

INSPECTION AND PROJECT TRANSFER

I certify completion of final testing and project review to ensure project requirements have been met in accordance with the Turnover and Acceptance Plan. The project (or portion of the project) is hereby ready to be turned over to the Facility Manager for acceptance.

Zane Mickelsen	Mickelsen, Zane L (MICKZL) Digitally signed by Mickelsen, Zane L (MICKZL) DN: cn=Mickelsen, Zane L (MICKZL), email=Zane.Mickelsen@inl.gov Date: 2016.05.31 15:00:42 -06'00'	
Project Manager Print/Type Name	Project Manager Signature	Date

The project (or portion of the project) is hereby accepted for the Government.

Jim Wojciechowski		5/31/16
Facility Manager or Representative Print/Type Name	Facility Manager or Representative Signature	Date

FINAL DISTRIBUTION

Signatories, plus DOE-ID Project Manager, Project File, and Land/Facility Operations. For capital-funded projects, include Property Accounting, Property Management, and Financial Construction Coordinator.

INSTRUCTIONS

In accordance with MCP-2869, "Project Turnover and Acceptance," this form documents the final inspection between the subcontractor/ direct hire and the Facility Manager, and effects partial and final transfers of the project (or portion of the project) to the Facility Manager.

INSPECTION

1. The "Inspection" section is to be used for both partial and final project transfers. In general, a partial project transfer occurs when the contract or a specific and definable portion of the project has been completed and is to be turned over to the Facility Manager for custody and maintenance. Items such as SO Testing, Life Safety System tie-ins, terminations, and final project documentation still remain to be accomplished.

2. The description needs to be detailed and clear on what is being transferred (e.g., reference drawing list, equipment list).

3. Deficiencies should only be allowed for partial transfers. If possible, include planned completion date for each deficiency.

4. Quality Engineer signs for quality significant projects, Field Engineer signs for Consumer Grade projects, or both sign for projects that are combined activities.

PARTIAL PROJECT TRANSFER APPROVAL

1. The "Partial Project Transfer to Facility Manager" section is to be filled out for partial project transfer of the project (or portion of the project) from the subcontractor/direct hire to the Facility Manager after review by the Project Turnover Review Committee demonstrates that the project (or portion of the project) is safe and ready for occupancy and SO Testing activities.

WORK COMPLETION

1. The "Work Completion" section is to be filled out to certify contract work is complete. This is to be done in conjunction with the Final Project Transfer.

FINAL PROJECT TRANSFER APPROVAL

1. The "Final Project Transfer" section is to be filled out after final testing (such as SO testing), completion of all remaining project activities, and review by the Project Turnover Review Committee demonstrate that the project (or portion of the project) is ready for acceptance by the Facility Manager/user organization.

2. Use of this form does not constitute start-up approval of the project or portion thereof.

Appendix H,

Project Acceptance/Turnover Plan

ACCEPTANCE/TURNOVER PLAN

Project: 31780

MFC FIRE WATER REPLACEMENT PROJECT

Project File No. 31780

Approved by

Terry C. Jorgensen
Project Manager — Date: 8-27-14

Richard B. Lee
MFC ~~Dial Room~~ Construction Field Representative — Date: 8/28/14

Randy R. Heyrend
Facility Engineering — Date: 8-27-14

Larry W. Duncan
Mechanical System Engineer — Date: 8-27-2014

Thomas M. Hipp
Electrical System Engineer — Date: 8/27/14

Thomas S. Bakes
Electrical System Engineer — Date: 8/28/14

Brian K. Jorgensen
MFC Balance of Plant — Date: 8/27/14

James K. Wojciechowski
MFC Balance of Plant
Manager — Date: 8/29/14

Ronald E. Carbiener
Quality Engineering — Date: 8/24/14

L. Art Clemons
Safety Engineering — 8-27-14 Date

Nancy G. Makey
MFC Fire Marshall — 9/3/14 Date

Brion R. Pearson
Fire Engineer — 8/28/14 Date

David K. Young
Fire Engineer — 28 Aug 2014 Date

Paul L. Nelson
Radiological Controls — 8/28/14 Date

Bradley K. Griffith
Regulatory Compliance Environmental — 9/3/14 Date

Brian L. Wartchow
Safeguards, PSO & Persec — 9-2-14 Date

Brandon L. Moon
TREAT Facility Engineering — 9/3/14 Date

John A. Krause
MFC Facility Engineering — 9/3/14 Date

Jeff Riedesel
MFC Nuclear Facility — 8/27/2014 Date

David Rowsell
MFC Engineering — 8/28/2014 Date

Purpose:

This document defines the process that will ensure that the requirements are met for transfer of Materials and Fuels Complex (MFC) Fire Water Replacement Project from Projects to MFC Balance of Plant (BOP). The testing and turnover process will utilize a partial transfer of the project to the end users. The acceptance and turnover process is initiated upon substantial completion of construction. The process begins with completion of partial transfer of select systems to MFC BOP once the system operability (SO) testing and review of project related documents takes place. Upon satisfactory completion of the remaining SO tests and project document, final transfer is executed. The methodology is detailed in this document and upon issuance of the final transfer, the facility (MFC BOP) will take ownership of the facility/systems operation and maintenance.

Applicability:

This document is applicable to the construction of the new MFC Fire Water Replacement (Project No. 31780) construction specifications and drawings.

The new MFC Fire Water Replacement Project will not be turned over for operation until all documentation required herein is complete and accepted by the project team.

Project Team:

The project team is comprised of individuals from several organizations. The project team will identify all documentation required for turnover of the facility for operations. The team will review all documentation for content and acceptability. Each team member is required to approve this plan and sign the approval page. The individuals, organizations, and individual functions are identified below:

Individual	Organization	Function
Lisa A. Sehlke	Program Manager	Program Manager
Kyle S. Vogel	DOE-ID Project Manager	Project Manager
Terry C. Jorgensen	Project Management	Project Manager
Linda L. Hergesheimer	Planning & Controls	Planning & Controls
Richard B. Lee	Project & Construction	MFC Dial Room CFR
Randy R. Heyrend	Facility Engineering	Project Engineer
Larry W. Duncan	Facility Engineering	Mechanical System Engineer
Thomas S. Bakes	Facility Engineering	Electrical System Engineer
Thomas M. Hipp	Facility Engineering	Electrical System Engineer
James K. Wojciechowski	Balance of Plant	MFC Facility Manager
Brian K. Jorgensen	Balance of Plant	MFC Project Integration
Ronald E. Carbiener	QA Program Support	Quality Engineering
L. Art Clemons	ES&H Facility Support	Safety Engineer
John A. Krause	MFC Facility Engineer	Facility Engineer
Brandon L. Moon	TREAT Facility Engineer	Facility Engineer
Nancy G. Makey	Safety & Health	Fire Marshall
Brion R. Pearson	Fire Protection	MFC Fire Safety
David K. Young	Fire Protection	MFC Fire Safety

Paul L. Nelson	Radiological Controls Regulatory Compliance	Radiological Engineering Manager
Bradley K. Griffith	Environmental Regulatory Compliance	Environmental Coordinator
John W. Gill	Environmental	Environmental
Brian L. Wartchow	Safeguards, PSO & Persec	Security
Jeff Riedesel	Nuclear Facility	Nuclear Facility
David Rowsell	Engineering	MFC Engineering

Methodology:

Readiness for turnover will be determined based on the status of project documents that identify current status of systems and equipment for the construction subcontract activities. The following documents and/or items below are available during partial and/or final project turnover.

1. Documents
   a. Unreviewed safety questions (USQ) screening for impacts to MFC
   b. Work order completion and close-out
   c. Maintenance procedures and other related documents
   d. Technical and functional requirements (T&FRs)
   e. Safety and Environmental documents (APAD Air Permit & Environmental Checklist)
   f. Training for the new fire pump system
   g. Vendor data available in EDMS
   h. Test reports
   i. Heating, Ventilating, and Air Conditioning (HVAC) test and balance reports
   j. Voice/data test reports
   k. Telecommunications test reports
   l. Completed inspection plans
   m. Partial and final punch lists
   n. Operation and maintenance manuals
2. Evidence that the performance and acceptance criteria in the T&FRs is satisfied.
3. Test reports for required acceptance tests [Construction Component (CC) tests, System Operability (SO) tests, and system tests required by project specifications and manufacturers].
4. Essential and master as-built drawings will be identified by BOP Operations.
5. Telecommunication Operations will perform the as-built configurations of the new MFC information technology equipment modifications.
6. Construction drawings red-line as-built.
7. Partial and final turnover documentation (attached checklist for partial and final turnover).
8. Safety walk downs have been completed.
9. Security walk downs have been completed.
10. Fire department pre-incident plans.
11. MFC fire water pump system installation, commissioning, configurations, testing, and acceptance completed.
12. MFC IT system installation, commissioning, configurations, testing, and acceptance completed.
13. Configuration management completed EJN-1604 for MFC-755 D & D Activities and EJN-1608 for the remainder of the project.

Partial Transfer

- Construction of the new MFC Fire Water Replacement Project, which includes a 400,000 gallon tank, pumps, new fire water piping, and all associated systems.

The following readiness checklist will document readiness for partial project transfer when completed.

Deliverable or Activity	Completed		
	Yes	No	NA
1. Final inspection walkthrough. **Note:** The walkthrough ensures that all physical work required by documentation such as systems red-line drawings, equipment identification, specifications, develop final punch lists, nonconformance reports, and change control documents, has been completed.			
2. Coordinate the new fire water line tie-in in order to minimize the associated impacts to the nuclear facilities.			
3. Project documentation required for partial project transfer [e.g., quality records, CC test results, vendor data, red-line drawings].			
4. Punch list items on Form 432.68, "Project Deficiency Status Report."			
5. Construction site cleaned up.			
6. Applicable regulatory certifications/notifications.			
7. List of deficiencies to be corrected before and after partial project transfer, as listed on Form 432.04, "Inspection and Project Transfer."			
8. System and systems red-line as-built drawings.			
9. List of remaining project activities to be performed after the partial project transfer [e.g., SO testing, life safety tie-ins, voice/data tie-ins/cut-over, as-building, etc.] to prepare for final project transfer.			
10. The installation, commissioning, configuration, testing, and acceptance of the telecommunication equipment will utilize the original equipment manufacturer (OEM) test and acceptance procedures. Testing shall be completed and accepted prior to cut-over of services.			
11. Occupancy Safety Review (can be part of partial and final inspection walkthrough) conducted before SO testing or other remaining project activities. Safety related items necessary for temporary occupancy have been determined.			

Final Facility Transfer

- Construction of the new MFC Fire Water Replacement Project, which includes a 400,000 gallon tank, pumps, new fire water piping, and all associated systems.

The following readiness checklist will document readiness for final project transfer when completed.

Deliverable or Activity	Completed		
	Yes	No	NA
1. SO testing performed and test results approved: A. HVAC equipment i.e., air conditioning, air handler, building management system, (HVAC), test and balance (TAB) and integrated auto control system testing. B. Fire alarm system. C. Paging and evacuation systems. D. Fire water pump controls. E. Water tank level controls. F. Fire suppression system. G. Electrical commissioning tests. H. Lighting control system. Note: The SO testing may be performed concurrently with the subcontractors CC testing.			
2. Updated safety documentation: A. Hazard assessment if applicable. B. Emergency preparedness plan. C. Notification to the MFC fire protection engineer (FPE) that, upon turnover (final transfer), the fire safety assessment (FSA) will need to be developed within one year of the project turnover. D. Pre-incident plans.			
3. Remaining red-line as-built drawings.			
4. BOP will determine which key/one-line essential drawings shall be developed from the project red-lines prior to the final turnover.			
5. Submittal of project documents needed for operation (vendor data, spare parts, preventative maintenance, etc.) to the system engineer's organization.			

6. Occupancy requirements completed such as: • Signs. • Access restrictions. • Equipment labeling. • Equipment lists.			
7. Life safety systems requirements are complete, which include as-built drawings and applicable PMs per LRD-14403.			
8. All repairs, corrections, and/or work items required by the partial project turnover are completed.			
9. Punch-list items (as listed in the "deficiencies" section of Form 432.04) have been completed or transferred to a deficiency tracking system.			
10. Inspection documents completed and closed.			
11. Validate completion of EJN-1604 & 1608 documentation.			
12. Environmental permits/regulatory notifications/documentation completed.			
13. Nonconformance Reports (NCRs) for deficiencies on Form 432.04, "Inspection and Project Transfer," and Form 432.68, "Project Deficiency Status Report," per LWP-13830, "Control of Nonconforming Items."			
14. Change control documents completed.			
15. Approved and issued operating and maintenance procedures.			
16. Personnel training requirements established including system configuration for Operations personnel.			
17. Personnel training plans developed.			
18. Personnel training completed.			
19. Notification to plant shift supervisors on the configuration and operational changes being implemented.			
20. Notification to fire department and Fire Alarm Center of project turnover.			
21. Notification to facility manager of any abandoned energy sources that cannot be removed.			
22. Property Management IDs for new equipment.			

Appendix I,

Executed Transition to Operations Final Turnover Checklist

Deliverable or Activity	Completed			
	Yes	No	NA	Comments
1. SO testing performed and test results approved: A. HVAC equipment i.e., air conditioning, air handler, building management system, (HVAC), test and balance (TAB) and integrated auto control system testing. B. Fire alarm system. C. Paging and evacuation systems. D. Fire water pump controls. E. Water tank level controls. F. Fire suppression system. G. Electrical commissioning tests. H. Lighting control system. Note: The SO testing may be performed concurrently with the subcontractors CC testing.	A B D E F G		C H	A) VDR 532017 B) VDR 528906 C) N/A – There were no paging or evacuation systems as part of this project. D) VDR 547420 E) VDR 547420 F) VDR 523731 G) VDR 528254, 542792 H) N/A – There was no lighting control system as part of this project.
2. Updated safety documentation: A. Hazard assessment if applicable. B. Emergency preparedness plan. C. Notification to the MFC fire protection engineer (FPE) that, upon turnover (final transfer), the fire safety assessment (FSA) will need to be developed within one year of the project turnover. D. Pre-incident plans.	C D		A B	A) Not Applicable B) Not Applicable C) Email was sent to Brion Pearson and Bruce Hendrix (MFC FPE) on 5/18/16. D) Fire Department does not maintain pre-incident plans for Low Risk

					Facilities. Instead, they maintain Quick Access Plans which has been completed.
3.	Remaining red-line as-built drawings.	X			VDR-530703, 545247
4.	BOP will determine which key/one-line essential drawings shall be developed from the project red-lines prior to the final turnover.	X			Drawings released into EDMS; via eCR 639484 on 3/30/16. via eCR's 639156, 639157, 639158, & 639159 on 5/18/16.
5.	Submittal of project documents needed for operation (vendor data, spare parts, preventative maintenance, etc.) to the system engineer's organization.	X			See O&M Manual INL/EXT-16-38510.
6.	Occupancy requirements completed such as: • Signs. • Access restrictions. • Equipment labeling. • Equipment lists.	X			Walk-down conducted with Operations on February 4, 2016, and April 7, 2016. Acceptance documented in the Final Transfer.
7.	Life safety systems requirements are complete, which include as-built drawings and applicable PMs per LRD-14403.	X			MWO 228412 (PM) VDR-523608 (As-built drawings)
8.	All repairs, corrections, and/or work items required by the partial project turnover are completed.	X			Completed. Documented by the Final Transfer.
9.	Punch-list items (as listed in the "deficiencies" section of Form 432.04) have been completed or transferred to a deficiency tracking system.				Completed. Documented by the Final Transfer.
10.	Inspection documents completed and closed.	X			QA has signed off on the Inspection Plans.
11.	Validate completion of EJN-XXX documentation.	X			1604 and 1608 have been completed through Final Transfer.

12.	Environmental permits/regulatory notifications/documentation completed.	X			See CCN 238230.
13.	Nonconformance Reports (NCRs) for deficiencies on Form 432.04, “Inspection and Project Transfer,” and Form 432.68, “Project Deficiency Status Report,” per LWP-13830, “Control of Nonconforming Items.”			X	There were no NCRs.
14.	Change control documents completed.	X			All CFP’s have been finalized. No BCPs are in progress.
15.	Approved and issued operating and maintenance procedures.	X			See O&M Manual INL/EXT-16-38510.
16.	Personnel training requirements established including system configuration for Operations personnel.	X			Training has been completed. Documented in TRAIN (qualification QNMFCNBS Rev 2).
17.	Personnel training plans developed.	X			Training has been completed. Documented in TRAIN (qualification QNMFCNBS Rev 2).
18.	Personnel training completed.	X			Training has been completed. Documented in TRAIN (training roster AFBSO0001).
19.	Notification to plant shift supervisors on the configuration and operational changes being implemented.	X			Plant shift supervisor was part of each partial and final turnover walk-down and the Facility Manager signed the partial and final transfers.
20.	Notification to fire department and Fire Alarm Center of project turnover.	X			Fire Department representatives participated in the walk-down. Notifications were sent via email to the Fire Department Battalion Chief and the Fire Alarm Center on May 23, 2016.

21. Notification to facility manager of any abandoned energy sources that cannot be removed.			X	N/A – There were no abandoned energy sources.
22. Property Management IDs for new equipment.			X	N/A – There were no property management ID's required new equipment. All items were real property.

Appendix J,

Idaho Department of Environmental Quality Final Project Approval

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

CCN 238230

900 North Skyline Drive, Suite B • Idaho Falls, ID 83402 • (208) 528-2650

C. L. "Butch" Otter, Governor
John H. Tippets, Director

May 4, 2016

Scott Lee, Manager
Idaho National Laboratory
Regulatory and Monitoring Services
PO Box 1625
Idaho Falls, ID 83415

Re: TREAT Water Line Extension and New MIOX Treatment System and Storage Tank for PWS# 6060036, Drinking Water, DEQ# 15-01-12

Dear Mr. Lee:

We have reviewed the as-built plans and specifications along with the O&M manual for the **TREAT Water Line Extension and New MIOX Treatment System and Storage Tank for PWS# 6060036.** The plans and specifications meet State standards and the system appears to be operating as intended. This submission satisfies the requirements set forth in Idaho Code Section 39-118.

The submitted as-built plans and specifications will be kept on file at this office. Please reference **DEQ No 15-01-12** when submitting any future correspondence related to this project. If you have any questions regarding this letter or if we can be of further assistance, please call me at (208) 528-2650.

Sincerely,

Carlin Feisthamel, P.E.
Water Quality Engineer
Idaho Falls Regional Office

c: Greg Eager, Regional Engineering Manager, DEQ-Idaho Falls
Rochelle Mason, Drinking Water Analyst, DEQ-Idaho Falls