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CHPRC-00601-FP
Revision 1

Slightly Irradiated Fuel (SIF) Interim Disposition Project

2010 Project of the Year Submittal

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management
Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company

P.O. Box 1600
Richland, Washington 99352

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Slightly Irradiated Fuel (SIF) Interim Disposition Project

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S. H. Norton, PMP
CH2M HILL Plateau Remediation Company

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J. D. Aardal
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02/23/2010
Date

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Submittal for
2010 Project of the Year

Slightly Irradiated Fuel (SIF) Interim Disposition Project

Outside Storage Unit for Slightly Irradiated Fuel

Submitted by
CH2M HILL Plateau Remediation Company
To: Project Management Institute

Prepared for the U.S. Department of Energy
Richland Operations Office
Under contract DE-AC06-08RL1478

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Checklist for Nomination Package

Thank you for nominating a project for the PMI Project of the Year Award. Note that incomplete nomination packages will not be considered.

Name of Project: Slightly Irradiated Fuel (SIF) Interim Disposition Project

- ☑ Written in English.
- ☑ In 8½" x 11" letter or A4 format and uses font size no smaller than 10 point.
- ☑ Nomination contains no more than twenty-five (25) pages
- ☑ Supporting Documentation contains no more than ten (10) pages.
- ☑ Title Page
- ☑ Table of Contents
- ☑ General Information Sheet
- ☑ Eligibility Confirmation Sheet
- ☑ Addresses each of the project criteria sections listed under Section 6.8. For any category that is not applicable to the Project, there is an explanation why it is not applicable.
- ☑ Owner's Satisfaction Document
- ☑ Written documents providing all necessary clearances, releases, and permissions needed for public release of all submitted materials.
- ☑ Written agreement by relevant stakeholder(s) to provide assistance in preparing a Showcase Project article to be published in a PMI publication should the project be selected as a Finalist.
- ☑ Ten (10) copies plus original nomination package (11 total) are sent by postal mail to PMI Global Operations Center at the following address:

  Project Management Institute
  c/o Public Relations Administrator
  14 Campus Boulevard
  Newtown Square, PA 19073-3299 USA
  Telephone: +1 610 356 4600 ext.7088

The above information is complete and correct to the best of my knowledge. I understand that the nomination package will be considered complete at the time of submission.

Nominator Signature: S H Norton **Date:** 2/22/2010

Please print the following information clearly:

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General Information:

I. Project Name

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200 East Area, Hanford Site
Richland, WA 99352 United States

II. Company Name

CH2MHILL Plateau Remediation Company

III. Project Location

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Eligibility Confirmation Sheet

As Lead Nominator for this nomination package, I verify that this project meets the following eligibility requirements for the PMI Project of the Year Award and that the nomination package contents are accurate to the best of my knowledge:

- The project had an approved scope, schedule, and budget.
- Project was completed on or ahead of schedule, and completed at or below budget.
- The Client/Owner has provided a letter on corporate letterhead that states:
    - The project was essentially complete during the previous calendar year.
    - The project was accepted as complete by the Client/Owner prior to nomination.
    - The project met or exceeded its stated objectives.
    - The Client/Owner has provided consent to nominate the project for the POY Award.
- This project has neither competed for nor won the PMI Distinguished Project Award.
- The nomination package includes all necessary clearances, releases, and permissions needed for public release of all submitted materials.

Name: Steve H. Norton, PMP

Signature: ____________ **Date:** 3/22/2010

Summary of Project

The Project:

CH2M HILL Plateau Remediation Company (CH2M HILL PRC) is proud to submit the Slightly Irradiated Fuel (SIF) Interim Disposition Project for consideration by the Project Management Institute as Project of the Year for 2010. The SIF Project was a set of six interrelated sub-projects that delivered unique stand-alone outcomes, which, when integrated, provided a comprehensive and compliant system for storing high risk special nuclear materials.

The scope of the six sub-projects included the design, construction, testing, and turnover of the facilities and equipment, which would provide safe, secure, and compliant Special Nuclear Material (SNM) storage capabilities for the SIF material.

The project encompassed a broad range of activities, including the following:

- Five buildings/structures removed, relocated, or built
- Two buildings renovated
- Structural barriers, fencing, and heavy gates installed
- New roadways and parking lots built
- Multiple detection and assessment systems installed
- New and expanded communication systems developed
- Multimedia recording devices added
- A new control room to monitor all materials and systems built

Project challenges were numerous and included the following:

- An aggressive 17-month schedule to support the high-profile Plutonium Finishing Plant (PFP) decommissioning
- Company/contractor changeovers that affected each and every project team member
- Project requirements that continually evolved during design and construction due to the performance- and outcome-based nature of the security objectives
- Restrictions imposed on all communications due to the sensitive nature of the projects

In spite of the significant challenges, the project was delivered on schedule and $2 million under budget, which became a special source of pride that bonded the team. For years, the SIF had been stored at the central Hanford PFP. Because of the weapons-grade plutonium produced and stored there, the PFP had some of the tightest security on the Hanford nuclear reservation. Workers had to pass through metal detectors when they arrived at the plant and materials leaving the plant had to be scanned for security reasons. Whereas other high-security nuclear materials were shipped from the PFP to Savannah River, S.C. as part of a Department of Energy (DOE) program to consolidate weapons-grade plutonium, it was determined that the SIF should remain onsite pending disposition to a national repository. Nevertheless, the SIF still requires a high level of security that the PFP complex has always provided.

With the 60-year PFP mission of producing and storing plutonium concluded, the environmental cleanup plans for Hanford call for the demolition of the 63-building PFP complex. Consequently, if the SIF remained at PFP it not only would have interfered with the environmental cleanup plans, but would have required $100 million in facility upgrades to meet increased national security requirements imposed after the 9/11 terrorist attacks. A new smaller and more cost-effective area was needed to store this material, which led to the SIF Project.

Once the SIF project was successfully completed and the SIF was safely removed from PFP, the existing Protected Area at PFP could be removed, and demolition could proceed more quickly without being encumbered by restrictive security requirements that an active Protected Area requires. The lightened PFP security level brought by safely removing and storing the SIF would also yield lowered costs for deactivation and demolition, as well as reduce overall life-cycle costs.

The SIF Project's new construction and existing facility upgrades were divided into six separate sub-projects:

- S-211, Interim Storage Area (ISA) Access Controls
- S-212, ISA Support Facilities
- S-213, Buffer Zone Surveillance and Control
- S-214, SIF Intrusion Detection Systems
- S-215, Patrol Headquarters Reconfiguration
- S-219, Outside Storage Unit (OSU)

S-211, ISA Access Controls, provided design and construction of the infrastructure needed for the remaining projects. This sub-project involved construction of security fencing and personnel gates, heavy equipment access and egress routes, new and widened roadways that included relocating existing utilities, and compacting and graveling grounds in preparation for construction of new storage facilities. In addition, the entire direct-buried maze of rigid conduit that would support the future installation of electronic security systems was installed.

Maze of Conduit

C Fence Posts

- **S-212, ISA Support Facilities**, relocated one mobile office trailer to a new location and demolished two mobile office trailers located within the footprint of the new project. This sub-project also provided operational and security stadium lighting for the storage area and auxiliary power for key new facilities and systems. The largest portion of this sub-project involved remodeling an existing building for Patrol occupancy. The remodeled building provides office space, men and women's restroom and showers, a line-up area, and a Physical Exercise Program (PEP) room for the Hanford Patrol. A new control and monitoring room to accommodate the needs of Hanford Patrol was also added to the building, as well as a robust wall surrounding the facility.

Demo 2701-HV

Robust Wall Concrete Pumper

- **S-213, Buffer Zone Surveillance and Control**, installed concrete vehicle barriers with heavy-duty gates at the storage area and concrete vehicle barriers entirely around the larger facility complex in which the storage area was located.

K-4 Apron Ready to Pour

PPA Vehicle Barrier

K-8 Gate Ready to Pour

- **S-214, Intrusion Detection Systems,** installed the sophisticated security systems used to protect the storage area, as well as the alarm monitoring equipment and facilities. (Due to the sensitive nature of the project, no further discussion on this topic will be provided.)

Working on Camera Towers

Intrusion Detection System Paving

- **S-215, Patrol Headquarter Reconfiguration,** remodeled approximately 35% of the existing Patrol Headquarters to better align the building's functionality with Hanford Patrol's needs for protecting key assets in 200 East Area versus 200 West Area. The scope included kitchen and shower room remodeling to current standards, remodeling the Physical Exercise Program room, reconfiguring office space, and upgrading the control room. Additional security improvements were also made to the exterior of the building, including security fencing and gates, outdoor lighting, new paved parking areas, vehicle barriers, as well as replacing the auxiliary power system for the building.

Exercise Room Remodeling

Auxiliary Generator Placement

- **S-219, Outside Storage Unit (OSU),** was a late scope addition to the program and provided a new protected storage bunker for storage of some of the SIF. During the course of the program, the storage requirements for some types of SIF were changed, which required design and construction of the OSU. This project designed and constructed a first-of-a-kind storage unit for SIF in 10 months. Special storage systems were envisioned from the start of the project and plans included them conceptually as placeholder items. Later in the project, as user requirements were more clearly defined, concept and design of the OSU was developed to meet refined SAS protection specifications while staying within the original planning package budget.

Nearly Finished OSU

The Project Team:

Due to the complexity of the task, the relatively short duration of time available, the involvement of multiple DOE programs, the role of multiple company project organizations, and the needs of numerous stakeholders, the sponsor immediately created an overarching role of a "Program Integration Director." This pivotal role ensured that the many individuals and organizations involved in the multiple projects (SIF Project, PFP Closure Project, and Waste and Fuels Management Project) and supporting ongoing operations were always working in a coordinated manner and for a common purpose.

The key sponsors were Craig Walton, Director Safeguards and Security, and Dave Palmer, Director of Design Basis Threat Implementation. Bob Heineman was appointed Program Integration Director. Steve Norton, PMP (Project Management Professional) and Marie Bachand, PMP were selected to be the Project Managers; John Wright and Tim Huber were hired as Construction Manager and Construction Engineer/Buyer Technical Representative respectively; Angie Southwick was assigned as the lead Project Controls Analyst; and Janice Isdell was assigned as the Project Engineer to lead the design team; and Roger McCormack represented the Spent Nuclear Fuel Program.

Due to the short project duration and the significant complexities involved, two Project Managers were assigned. Each PM was assigned to lead three sub-projects while serving as backup on the other three. This insured that a PM was available and in charge 24 hours a day, 365 days per year. This was especially important in covering absences and proved critical when one PM had required a five month leave of absence.

Initially, all of these individuals were employees of Hanford Prime Contractor Fluor Hanford and affiliate Fluor Government Group. During the project, however, the Hanford Prime contracts were re-competed and CH2M HILL PRC took over much of the key project scope, and Mission Support Alliance (MSA) later took over the remaining scope from the outgoing Fluor Hanford.

The Client Owner:

Representatives of the key client/owners (DOE) included Matthew McCormick, Assistant Manager for the Central Plateau; Gary Loiacono, Director of Security and Emergency Services; Larry Romine, Federal Project Director for Solid Waste Stabilization and Disposition; and Ellen Mattlin, Federal Project Director for PFP.

Project Team Members:

In addition to the preceding individuals, more than 100 craftsmen, engineers, planners, nuclear operators, radiological control technicians, scientists, and other specialists were involved in project execution. For an expanded list of key team members, see the appendix *Supporting Document 1.*

Project Criteria

Delivering the SIF Project on schedule and under budget exemplifies both the vital nature of all project management disciplines and how coordinated implementation contributed to ultimate project success. Were it not for effective application of all project management principles and techniques, the project could not have successfully met or exceeded required project criteria and resulted in the client satisfaction that it did.

The narrative that follows describes how each key project management principle was applied in the project and contributed to project success.

Project Integration Management

Integration management proved to be a critical factor in the successful delivery of the SIF Disposition Project. Integration planning at the outset of the project was important, but even more crucial was adapting and continuously improving management planning and integration over the course of the project. The structure and nature of the integrated project team was understandably complex from the start, but that complexity was magnified and intensified by the dynamically changing state of the Hanford Prime Contracts and the affect that had on the team, scheduling, financing, and other support system conditions. The project was further impacted and complicated by the close tie to national policy decisions that were made and implemented with regard to consolidation of special nuclear material.

Key integration challenges that were successfully surmounted included the following:

- Two contract transitions that transferred DOE program responsibility from a single contractor (Fluor Hanford Inc. [FHI]) to two new and separate contractors (CH2M HILL PRC and MSA) in the course of one year

- Mid-course transition from one company's baseline performance management operating system to another that required complete changeover of resource-loaded schedules, cost accounting and accruals, labor reporting, contract management, performance and variance reporting, and change control processes from one system to another

- Integration management of the efforts of five DOE prime contractors (FHI, CH2M HILL PRC, Washington River Protection Solutions LLC [WRPS], Lockheed Martin [LMSI], and MSA) in carrying out six sub-projects

- Managing and overseeing dispensation of three DOE project baseline summary (PBS) funding sources that involved three types of funding (expense, CENRTC, and General Plant Project) from three DOE program organizations. Each PBS funding source also served separate client interests that required custom status and performance reporting that changed as client affiliations changed.

- Dynamic and continuously changing interfaces, scope, project requirements, funds, schedules, contract requirements, and unforeseen technical issues

- Integration of multiple construction contracts involving multiple general and subcontractors within a small physical area on a fast-track schedule, including shared equipment and operational resources in some instances

- Integration of the needs of the construction forces with the needs of the facility's operational staff to allow uninterrupted operations of the adjacent facility during the 11-month construction period.

Foundational plans for project integration paid dividends over the course of the project. The core project team was established on pre-assignment and began to develop a high-level schedule and budget to support the SIF Project charter. The projects were officially chartered when DOE provided written authorization to proceed in February of 2008. Senior company management named the two Project Managers, confirmed the high-level milestones to complete construction turnover by July 31, 2009 and be prepared to move the SIF by September 30, 2009, and established a limiting budget of approximately $25 million.

The SIF organization structure, showing the relationship of the three PBS funding sources, is included in the appendix, *Supporting Document 2.*

The Project Management Plan (titled "Slightly Irradiated Fuel Interim Disposition Program Plan") was initiated, and development of the plan continued through July 2008 when the initial version was published.

Due to the complexity of equipment, systems, organizations, companies, and funding sources involved, an ownership matrix was developed early in the project to establish which systems, components, and physical structures would be owned by which specific program or organization within the three programs. This also helped to establish the correct Design Authority for later design changes, acceptance testing, and project turnover when complete. At the same time, a detailed testing plan was developed early in the project to gain agreement on what systems and components would be tested, to what degree they would be tested, and which of them would need to be tested as complete systems. Later, this proved to be an invaluable road map for developing test procedures and for developing the detailed working level schedule for test execution logic and sequences.

Monitoring and controlling project work proved to be one of the most challenging processes, but also one of the most successful aspects of the SIF Project. Performance Reports, a key input to monitoring and controlling the project work, were readily available early in the project, but became extremely difficult and complicated to generate due to transition from the Fluor Hanford organizational team to the CH2M HILL PRC and the MSA. What was once a single financial reporting system was separated into two different company systems that did not integrate or roll up together. Approximately 18 new "Work for Others" contract releases had to be put in place to allow Fluor employees to charge to CH2M HILL PRC and vice-versa. Prior to the company transitions, labor reports were a key tool used to investigate one source of cost overages and shortfalls as the Project Managers and Project Controls Analyst could evaluate charging by individual. After transition and implementation of the "Work for Others" contracts, all labor charges were reported as contract dollar charges only, and the ability to investigate charging by name was lost. Innovative methods had to be developed by the Project Controls Analyst to map internal company cost collection systems to new contracts to provide Project Managers new ways to analyze, monitor, and control performance.

While project closeout activities were some of the last activities to be performed, they were also some of the earliest activities to start. Using available company templates, a project files matrix was initiated and small workshops were held to determine the exact records that would be collected during the project and put into the project files at project close out. Decisions were made on the level of detail for project documentation (e.g. all e-mail communications versus key decision communications), the format of final project documentation (e.g. hard copy documentation versus electronic versus a combination of both), the types of records to maintain (e.g. documents by category and name), as well as the process for reviewing all project records for proper security classification.

Planning Process Group

A coordinated, multi-organizational group planned activities for the SIF sub-projects as they were kicked off and continued, in an iterative fashion, through the life of the project. One key to the success of the SIF project was the emphasis put on all planning activities and the understanding that all aspects of the project were affected by the quality of planning and definition of scope. Planning activities were typically performed by the project team in workshop settings to take advantage of the team's broad knowledge base and specific subject matter experts. This also helped to create ownership of the various parts of the project plan and an understanding of how each process related to the next. Activities undertaken included developing the project management plan, working with the many stakeholders to collect project requirements, further defining and refining the scope, creating a work breakdown structure (WBS), breaking down the WBS into schedule activities, sequencing and resource-loading those activities, creating the project and baseline schedule, establishing the time-phased project budget, planning for Human Resource and Communications needs, planning for risk events, and planning the strategies for procurements and contracting.

Each of these is discussed in their specific section, but a few of these planning processes stand out as key to the project success.

- **Collect Requirements**

Requirements were collected by generating a "user requirements" document that was issued by the end user. The Project Managers facilitated numerous workshops with key stakeholders to brainstorm user needs, clarify requirements, and understand the needs behind the requirements. These requirements were especially difficult to finalize since many of them were performance-based, i.e., the result was effective protection of the SIF material. Many combinations of barriers, hardware, detection and assessment systems, and protection force-response strategies could satisfy the security requirements. After the user requirements were initially documented and conceptual designs were developed, additional simulated exercises were performed to evaluate the combined level of protection provided. Frequently these would illuminate shortcomings in design or previously identified requirements, so the user requirements had to be revised. The user requirements document was revised six times during the 17-month design and construction phases of these projects, which was a significant challenge for the project team to meet. Due to the much shorter time frame available for these projects, fast tracking was required, and performing some parts of design in parallel with developing the requirements was required as was initiating some construction prior to completing all design.

- **Plan Procurements**

Due to the magnitude of the overall project scope and the similar nature of scope within some sub-projects, a Construction and Acquisition Plan (Procurement Plan) was written. This plan documented what scope would be performed in-house by local construction forces, what would be competitively bid for fixed-price contracts, what would be procured by the government (the project), and what key items would be procured through contracted purchases. Not only did the plan consider what would be the most cost-effective and schedule efficient method, the plan also took into account the stage of design. Some construction could be started earlier (with very little design complete) by using a time and materials contract with construction forces since there was insufficient information at the time to establish definitive fixed-price contracts. This allowed construction to start approximately three months earlier than waiting for the complete design. The Procurement Plan organized scope and cut across sub-project lines in order to award tasks through proper contract types. This planning resulted in four major fixed-price contracts awarded to local general contractor bidders, in addition to the early infrastructure time and materials contract awarded to local construction forces. The identification of Government Furnished Equipment (GFE) allowed long-lead procurements to be initiated by the project team long before the general contractors were on the project.

Project Scope Management

The evolving scope changes that accompanied design required that a fluid, but rigidly controlled approach to project scope management be taken. Had the team relied on customary project planning, scheduling, and management as a means of fast-tracking design and construction, the resulting project delays, interpersonal conflicts and cost-overruns would have been anticipated and would easily have scuttled the project. Instead, regular and frequent engagement of vested project stakeholders led to reasoned program goals and objectives; endorsement by team members, contractors, and client representatives; and rapid agreement on and recovery from unanticipated conditions.

Requirements were a combination of written standards (for example DOE Orders) and performance requirements. Simply stated, performance requirements stipulated that no envisioned adversary could put storage and security of SIF at Hanford in jeopardy. Specific user requirements for each sub-project were developed with the customer and were modified based on performance criteria, on the iterative modeling, and on "what if" scenarios that helped define the final scope. This task was made even more challenging because of the performance-based nature of the criteria. For instance, the original Safeguards and Security concepts established the initial scope; however, subsequent tabletop exercises or computer modeling by subject matter experts showed that some of the planned attributes did not work as expected or that mock adversaries were able to penetrate security. Accordingly, the scope had to be revised to delete certain items and other items were added as a result. These changes to the user requirements were formally documented and controlled. Six revisions of the user requirements were completed, each with corresponding scope changes.

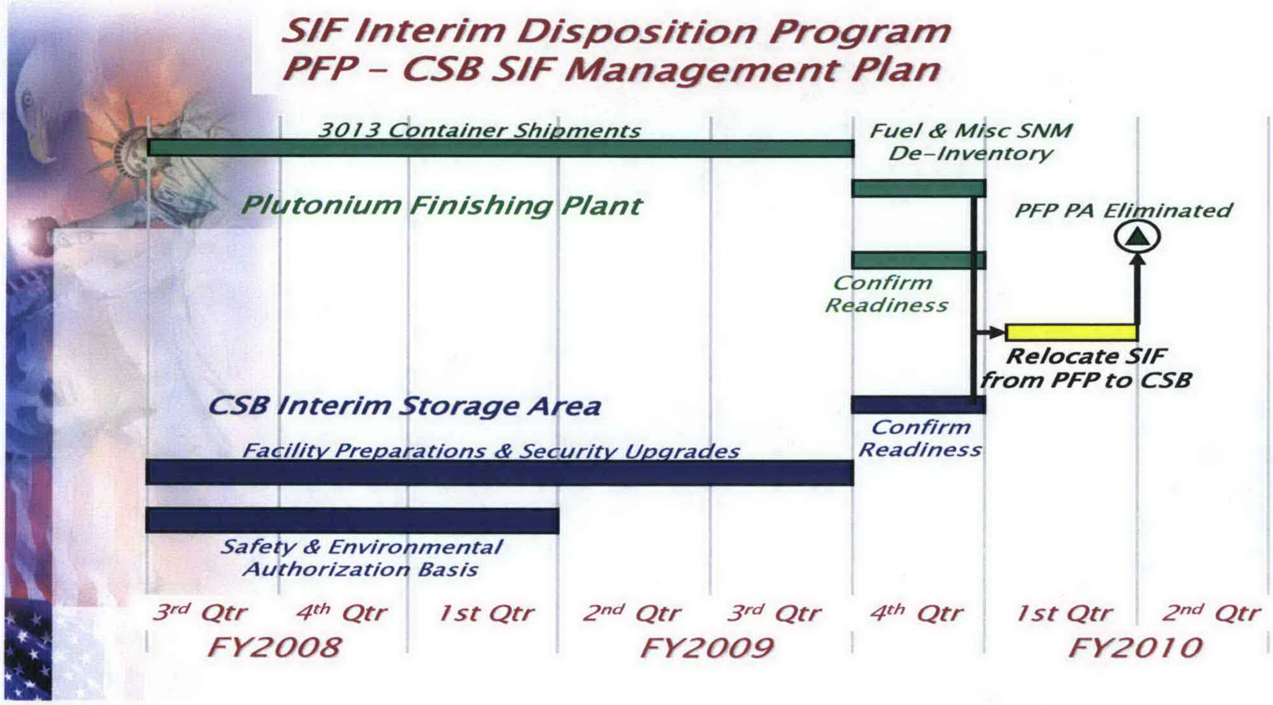
A scoping document was developed to capture the scope statements for each project. These scope statements were used to help develop the WBS and ensure the design contained all approved scope, and were later used to as a tool in verifying scope completion.

To minimize scope change resulting from the performance-based criteria, Functional Design Criteria documents were developed for each project to establish base functionality the project would provide.

Project Time Management

The charter-level schedule was established to align the SIF project within the window of the PFP shipments of material to Savannah River. The goal was to prepare the new storage area in time to allow direct shipment of the SIF immediately following completion of the shipping campaign.

The project start date continued to slip due to the evaluation of national policy options for the consolidation of special nuclear material. However, the project end date remained nearly constant to support the SNM disposition program and the $400 million PFP decommissioning project. The firmness of the end date and the growing delay of the start date compressed the baseline schedule into 17 months to develop the project criteria, perform design, construct buildings and security systems, test individual and integrated systems, and turnover the project to the owners. Therefore, the planning process had to look at creative ways to fit everything within the allotted time frame. Facing the condensed 17-month design/construct timeframe, the SIF project was fast-tracked, which meant that many tasks normally done in series had to be done in parallel with significantly increased risk to cost and schedule. For example, this included initiating design before the user requirements were completed, initiating construction before the design was completed, and testing the systems before construction was completed.



To assemble the project schedule, the project team developed a list of activities by decomposing the lowest level work packages of the WBS into activities that could be assigned to a single individual. Tapping subject matter experts and the experiences of the project team members, logic relationships were developed for the many schedule activities. Much of the logic was developed working right to left to identify only the hard logic that was absolutely necessary to complete a task. While each activity was connected to a predecessor and successor activity, logic ties were kept to a minimum so that the schedule focused on mandatory dependencies. This approach simplified the schedule and minimized the false movement of activities due to discretionary constraints. Expert judgments of the scheduling team, based on lessons learned in recent project activities at the Hanford Site, produced estimates of activity resources and durations that could be reliably counted on for fast-track project scheduling. Bottoms-up estimating techniques were used by the team whenever possible. In addition to general time constraints, the schedule was also frequently constrained by limited resource availability of key disciplines. Additional activities were frequently performed in parallel, and at somewhat elevated risk, in order to make use of resources as they were available. The baseline schedule was rigidly controlled in accordance with the formal change control process.

Because scheduling needed to accommodate constantly changing project requirements, workforce transitions, contract assignments, and policy decisions, program management required flexible fast-track scheduling processes. These focused on time-sensitive aspects of the SIF Project and engaged the client, team members and key stakeholders in the planning process. To accomplish this, scheduling was customarily developed in a workshop environment. Half-day and full-day workshops were regularly conducted in order to bring subject matter experts and project team members together in a shared construction scheduling process via Primavera P6. The process was conducted in a conference room setting and the schedule was projected onto a screen that enabled participants to check logic ties, see impacts of various alternative methods, and perform "what-if" scenarios to the execution plan in real time. This collaborative approach saved significant time in schedule development and produced a superior quality product that created a genuine sense of ownership among all participants. See project summary schedule in the appendix, *Supporting Document 3.*

The comprehensive project baseline schedule was formally controlled and could only be modified through a baseline change request process. Change requests were initiated from many sources and for many reasons. Each was evaluated in accordance with the established process and, if accepted, the baseline was updated accordingly.

To implement the overall program baseline schedule, a supporting working level schedule was developed that provided a more granular-level of detail that supported the baseline activities. Through progressive elaboration, these very detailed schedules were developed for a 60- to 90-day window. This real-time workshop method was repeated every 30 to 60 days to keep the detailed planning current and to ensure a thorough understanding and assignment of critical near-term activities. Project Managers controlled these working-level schedules, and it was the Project Managers who could authorize new activities, revise logic as circumstance changed in the field, or grant activity extensions, if necessary.

As soon as the working level schedule was in place, weekly schedule status meetings were established. In these meetings, project leads reviewed overall and activity-specific progress, identified issues that needed to be resolved, and developed workaround solutions as needed.

Project Cost Management

Managing costs proved to be one of the most challenging, but the most successful aspect of the SIF Project. More than any other facet of the program, project cost management was directly impacted by the comprehensive changes that resulted from contract management transition from the Fluor Hanford organizational team to the CH2M HILL PRC and the MSA. Had these transitions not occurred during the SIF projects, typical cost management would have involved collecting costs at a low level in the WBS and rolling those costs up to an oversight level for monitoring and controlling. Standard financial systems are geared to that customary approach and readily produce labor reports and reports by cost type (e.g., materials, contracts, labor, overhead, etc.). In that approach, financial systems characteristically display contract accruals, accepted contract modifications, and pending contract changes in virtually near- if not real-time. However, the transitions did occur and the project team had to address the gaps that resulted in the cost monitoring and controlling process.

Bridging the gap between the cost accounting systems of the separate organizations was not just a matter of transferring accounting authority between organizations. Nor was it a matter of changing from one approach of tracking and monitoring costs from one organization to another. Bridging the project cost management gap during transition from one company to another was a matter of reconciling separate and autonomous cost accounting data systems. The project team anticipated the upcoming changes, and in a display of exemplary partnership, the two companies were able to work closely together to minimize the effects.

An example of how the two companies worked in the project and the DOE client's best interest is the case of a single Project Controls Analyst allowed to work in both companies' financial reporting systems. This type of cooperation, letting one company's employee into another company's most protected financial systems, was critical to ongoing project success. The Project Controls Analyst was able to develop new reports and assimilate data in ways that minimized the impact of the separate financial systems. Anything short of this would have resulted in significant delays and cost overruns, and severely hampered the Project Manager's ability to monitor and control costs. That the SIF Project continued uninterrupted through contract management transition and met or exceeded all budget and schedule goals is a testament to the tangible value a rigorous cost control process can deliver.

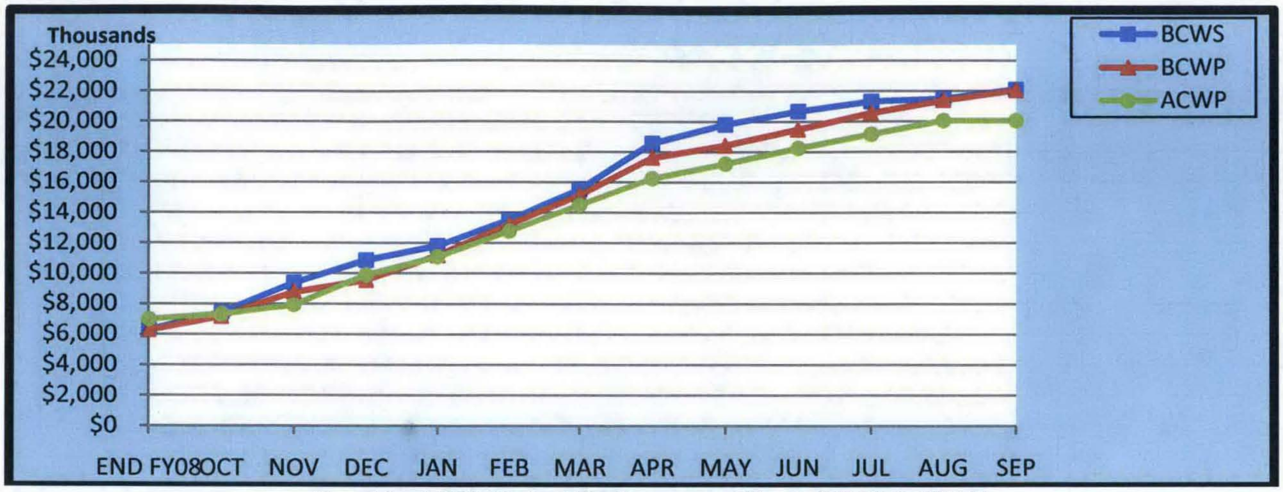
At the time initial budgets were allocated, essentially no design had been completed, the scope was not fully defined, and the project contained substantial risk due to the short duration available for project execution. Because of these factors, approximately 25% of the total budget was set aside to fund a Management Reserve that would be allocated as needed after risk evaluations were complete.

As scope definition developed, a Rough Order of Magnitude (ROM) estimate was compiled for each sub-project. The ROM estimates supported the baseline budget until the design matured enough to develop a more accurate cost estimate. As scope understanding grew and the WBS work packages were decomposed into schedule activities, activity cost estimates were developed. Using the resource-loaded schedules to apply the cost estimates over time, the budget baseline was improved. Once the team completed definitive design, estimates were updated again and the baseline was revised accordingly to reflect final scope.

Over the duration of the project, the team managed project costs by capturing and calculating cumulative cost indices monthly to determine how effectively project money was being spent. Team members also performed variance analyses to determine differences in actual performance compared to plan so that corrective actions could be developed. Project Managers also employed "to complete" indices to determine what effectiveness ratio would be needed to meet the budget at completion.

Another cost management operating practice involved evaluating work in terms of the time-phased budget as well as the type of tasks completed and planned. Managers determined that performance during design would not be the best indicator of the construction work ahead. They also concluded that the spending efficiency index through the planning phase might not be indicative of likely spending efficiency through the construction phase. Instead, Project Managers considered performance-to-date through variances; extrapolated that amount forward, and adjusted for the known and expected differences in the type of work ahead.

Through these challenges, the project team was able to deliver the SIF projects on time and approximately 10% under budget. By creatively combining work scopes into well thought out bid packages, several bids came in under the independent fair cost estimates. Another reason costs were minimized was through the use of formal cost cutting workshops such as was done with the OSU. See appendix, *Supporting Document 4* for project cost and schedule performance.



Combined SIF Project Performance Chart (FY08 & FY09)

Project Quality Management

To make sure that project quality was properly addressed over the full duration of the SIF Project, the Quality Assurance (QA) department was engaged early on. Doing this from the onset established a discriminating Quality Level for the many buildings and systems prior to design, prior to procurement of equipment and materials, and prior to establishing fixed-price contracts with construction contractors. Involving QA in the earliest of stages enabled QA staff to help develop Functional Design Criteria, which established fundamental project requirements for the course of each sub-project.

Based on these criteria, quality assessments were regularly conducted on key processes, such as engineering and design controls, to ensure that processes functioned as expected. Quality planning also established the level and frequency of quality control involvement. These were built into procurement documents in the form of "Quality Inspection Plans" for identified equipment purchases and for fieldwork performed. This enabled the project team to focus more closely on items needing tight fit and interface tolerances.

The Project Managers ensured that requirements were clearly established up front; inspections, programs, and processes functioned as planned; and diligent people in the field led everyday activities. As a result, project quality was maintained throughout the project despite the consequences of evolving scope, in spite of fast-track execution, and regardless of transitions in Site contractor management.

A significant "lesson learned" involved welding inspection plans and the weld inspections themselves. During the quality planning process, Project Managers determined that visual weld examination provided the appropriate level of quality control oversight on a specific sub-project. The quality planning required the contractor to provide the weld inspection reports on project completion. Because of the fast track nature of the sub-project, unless welds were quickly inspected by the contractor, completed welds could be covered up with other construction materials. This situation would then require disassembly to inspect welds that would lead to reconstruction and subsequent project delays. The QA process helped to uncover this flaw early on, which led to real-time inspection and documentation of welds by contractors.

Project Human Resources Management

While ongoing changes of scope, contract transitions, and other factors posed project management challenges on the SIF Project, human resource management was surprisingly one of the more stable conditions over the course of the project. That is not to say that workforce dynamics could be overlooked; however, compared to other aspects of the project, the resilience and steadiness of the team made human resource management less of a concern.

Two factors contributed to workforce stability:

1. The grounded experience of professional and technical staffs who were accustomed to working through Site contractor changes

2. Human resource planning and management that sought workforce engagement, communicated regularly, and placed a value on team achievements

Competing priorities for engineering and estimating made staffing forecasts critical to ensure appropriate staff was available when needed. This became especially important on work that required sensitive security clearances.

Initial human resource management efforts began by pre-assigning a core leadership team that identified project-specific talent needed on the project. Based on these specially identified talent needs, team leaders spoke with functional managers to selectively target and recruit top performers who fit profile resource needs. Most often, targeted recruits were personally contacted and interviewed to determine their level of interest in taking on project assignments. Once a high-performance team was assembled, managers tapped team members to fill additional project team resource needs.

To motivate team members, Project Managers involved the team in planning. A small, original core team composed of the two Project Managers, a program integration director, a project controls specialist, the construction manager, a buyer's technical representative, and the Safeguards and Security sponsor developed the higher-level baseline schedule. As the project team was filled in, team workshops were conducted to further define scope and develop activity lists and schedules were developed that were embraced by the team members. In a rolling wave fashion, Project Managers involved the team in the detailed planning/scheduling. This approach spawned a high-energy team that felt a real sense of investment in the projects, with team members looking for ways to work more effectively and nobody wanting to be a bottleneck. Team members were further motivated by the fact that the project was compellingly interesting because most team members had not been involved in a security project of this type before.

The project team was made up of fulltime personnel assigned in a strong matrix organization structure complemented by part-time personnel who were contracted as needed. For example, a senior electrical engineer was assigned full time from the central engineering organization, but professional estimators were deployed in ad hoc assignments to develop estimates, and then they were released.

Fortunately, contractor transition did not have significant impact on the human resources of the project. The project was already in place at the time of transition and was able to work through the change in Site management. Project controls/EVMS reporting became more complicated after transition, but staffing remained relatively constant.

Over time, staff was added and adjusted to fit project needs. Designers and design engineers joined the team as the project moved into the design phase. Those resources were later reduced to a small group to manage changes during construction. Construction management started with fewer resources involved with design to provide for constructability reviews and contracting strategies. That group grew when actual construction began, and many local crafts people carried out infrastructure work early on before their numbers decreased and more fixed-price contractors were hired.

Building Trades union personnel performed construction work. Plant Forces Work Reviews were done to comply with the Davis Bacon Act to determine whether HAMTC (Metal Trades) or Building Trades construction workers should perform the work, but in either case, union workers completed the work.

Project Team Interpersonal Skills

Several techniques were used to leverage interpersonal interactions that would build a smooth workflow among key project team members. A Responsibility and Accountability Matrix (RAM) Chart was constructed early in the planning stage to list roles and responsibilities for the various work packages. As the project team grew, workshops were held to create working level schedules. The team was continuously involved in the detail planning and scheduling with daily conference calls that included a countdown of working days left to complete the project. Since many issues, minor setbacks, or misunderstandings between project team members could not wait until the weekly schedule meeting to be discussed, the 15-minute conference calls were conducted each morning with the project team leads to review actual versus planned performance on key activities. The calls also focused discussion on new issues that may have developed and needed attention. A concise agenda was followed during each call to ensure that each team member received time-critical updates with minimal time invested. This practice saved many weeks over the life of the project as misunderstandings were immediately cleared up and priority resources could be quickly redirected for the best benefit of the project.

With the various 20+ stakeholders, Project Managers frequently interviewed key stakeholders to obtain a better understanding of their needs and to conduct walk downs to ensure agreement on design direction for the various sub-projects. When issues did arise, attentive listening, soliciting recommendations, posing options, and looking for underlying issues helped move the project along.

By maintaining an issue tracking system called Request for Clarification or Information (RCI), all contractors documented their issues or questions and proposed a solution. These were formally dealt with by the project team and responses to each issue were documented so that open issues did not linger.

The team conducted security briefings any time new members joined the team. Briefings would be followed by reviews of the project-scoping document that made use of annotated aerial photographs of the construction area that pinpointed all security planned barriers and key project outcomes. Attendance at schedule review meetings helped new members quickly get up to speed with project status and issues as well as helping to learn the roles and responsibilities of each team member.

Project Communication Management

Planning and management of communication on the SIF Project focused on leveraging both structural and intuitive communication channels to inform and involve key stakeholders. At the same time, communication had to be managed in a way that would respect and uphold government security restrictions.

Planning began by inventorying key project stakeholders and determining most effective means of communicating with each stakeholder audience. Key stakeholder groups included the following:

- The U.S. DOE Richland Operations
    - Security and Emergency Services
    - PFP Closure Project
    - Solid Waste Stabilization and Disposal Project
- Fluor Hanford
    - Safeguards and Security
    - PFP Closure Project
    - Waste Stabilization and Disposition Project
- CH2M HILL PRC
    - PFP Closure Project
    - Waste and Fuels Management Project
- MSA – Safeguards and Security

In the beginning, Project Managers conducted individual discussions with key stakeholder groups to determine their preferred channels, frequency, and formats for receiving information. Stakeholders were able to choose from a variety of options for keeping updated on project progress. They were able to change their preferences as information became more or less useful to them as the project passed through progressive phases. For example, in the design phase, cost, scheduling, and scope change issues dominated communication flow. As projects moved to construction, communication frequently took the form of progress photos, forward-looking projections of key evolutions and regularly scheduled field walk downs.

Communication technologies deployed on the project included standard written reports, S-curves (performance graphs), digital progress photos, aerial photos, conference calls, meetings, and workshops. Internet postings and project updates were also regularly employed to keep targeted stakeholders updated on project progress.

Using the full range of media, Project Managers presented and sent information to each of the stakeholders on a weekly, bi-weekly, or monthly basis. Bi-weekly face-to-face meetings with the client/customer were the most common way of sharing information, supplemented by spontaneous email correspondence outside of the regularly scheduled meetings. Alternating weekly meetings between client organizations and contractors' project delivery staffs, the core project team maintained an open and honest connection with both the customer and the project team. For the most part, the regular face-to-face meetings led to proactive resolution of potential project conflicts. By the same token, in the event of any contentious issues, the regular face-to-face meetings accommodated thorough listening, problem analysis, and a useful platform for spontaneous conflict resolution.

In addition to the bi-weekly face-to-face sessions, daily 15-minute conference calls were conducted each morning among all project team leads to assess progress status, project issues, and looming support needs. From these meetings and other communication sources, the RCIs were briefed to the project team and input was requested as appropriate. The RCIs allowed contractors to document issues or questions and propose actionable remedies. These RCIs were formally resolved by the project team and became part of the project history.

Aside from these regular communication forums, periodic workshops were conducted as needed to develop detail for approaching project phases. News articles (*Appendix Supporting Documents 6, 7 & 8*) were also published in company newsletters and reported on by the *Tri City Herald* newspaper.

Project Risk Management

To anticipate and adequately document pending risks of the project, Project Managers tapped subject matter and resident expertise from workers who had experience on SIF and similar high-security projects at the Hanford Site. Drawing on this knowledge base, the team established a risk management plan. The plan was shared with the DOE customer, identifying client risks that they controlled.

Risks identified in the plan were documented in a risk register that was subsequently analyzed via qualitative and quantitative risk methods to create a risk response plan. Management Reserve funds were also allocated based on the risk analyses. The risks, as well as the reserve, were reviewed at key points during the life of the project to update risks, risk plans, and the reserves.

Due to the nature of the SIF Project, many of the risks were classified as "moderate" both internally and externally, based on a scale of low, moderate, high, and very high. Managing the internal risks required constant attention to detail to ensure sensitive information was not improperly handled, stored, or communicated. Each meeting for the project had to be held in designated areas, all documentation had to be reviewed by a derivative classifier, and construction photos could not be used in standard reports discussing risk unless they were cleared for public release.

Key project risks included the following:

- Changes and potential impacts of consecutive contract transitions
- Inadequate design prior to start of construction due to fast-track nature of the projects
- Ability to acquire and maintain key resources due to competing priorities
- Ability to acquire long-lead security equipment in time for installation
- Changing requirements due to the performance-based nature of security requirements
- Ability to transport SIF material without repackaging, or acquiring new shipping containers
- Interferences with other ongoing Hanford Site projects and plant operations

To minimize impacts from contract transitions, incoming contractors work closely with the project team to develop transitions plans that identified critical aspects of the transition. As an example, this is where it was determined that a single project contracts analyst would have to be able to work in both company systems to prevent significant delays and loss of cost control.

The project had to be fast-tracked with design overlapping user requirements, construction overlapping design, and testing overlapping construction due to the late authorization and the fixed end date. This introduced risks such as insufficient design prior to beginning construction. A phased construction approach was used to mitigate this risk. As partial design was completed, a time and materials contract was used to initiate infrastructure work. As more design details were locked down, fixed-price contracts could be used for the next phase of construction to minimize risk of cost overruns.

Late into the project, significant American Recovery and Reinvestment Act (ARRA) money was introduced into the local area, which placed exceptional demand on both professional and craft resources. This additional funding created new risks related to loss of construction management personnel due to competing projects; shortage of safety, quality, and environmental personnel to support the fast-track schedule; and an overall competition for key local and national personnel resources. Acquiring and retaining key personnel became a risk factor at this stage, which required a concerted effort to identify project opportunities that would accommodate staff transition to future roles outside the SIF project once projects were completed.

Long-lead times for procurement of security equipment were also an important risk consideration. Early in the project a Construction and Acquisition Plan was developed, in part to determine and document the long lead procurements. These items were then procured and later provided to the construction/installation contractor. This allowed the items to be ordered long before final design was complete and construction contracts were awarded. No delays were experienced due to long-lead procurements items.

Other risk factors came about as requirements changed. For example, as performance-based protection strategies evolved through simulation exercises, Safeguards and Security revised the user requirements six times, directly affecting design and construction. Similarly, a new Design Basis Threat Guidance document was implemented by the DOE, which required a new project be added to the scope (Project S-219, Outside Storage Unit). Real-time coordination and open lines of communication between the project team and the sponsor and client helped to minimize impact.

Another identified risk involved the potential repackaging or the acquisition of suitable shipping containers to transport SIF material. This was addressed early on by developing shipping options and working closely with DOE program and transportation safety personnel to establish pre-approved transportation alternatives.

Schedule delays due to operational restrictions were mitigated to low risk as the project team effectively planned and coordinated activities with the potentially affected facilities. Integrated schedules were developed with the other organizations and companies that were involved or potentially impacted by the SIF Project early in the planning process. Topical meetings were held with stakeholders and mass communications were issued, for example, when project deliverables would result in temporary or major traffic revisions.

Several accepted risks were later realized that required workaround plans. For example, in December 2008/January 2009 the project was at a construction phase of groundwork preparation, trenching, and concrete foundation construction. Winter was the worst time of year to perform this work because of weather risks, but it was the only time available due to the fast-track schedule. With the arrival of a hard arctic freeze and significant snowfall, the project suffered a near four-week delay in planned fieldwork. The original schedule had "tip-up" walls being poured on the building floor slab and then up righted into place; however, the floor could not be poured until after the weather broke. Workarounds included pouring the concrete tip up walls indoors at the contractor's shop and later transporting the walls to install in the field to avoid having to perform the work in series. Overtime was used when beneficial after the weather broke and crews worked 6-day weeks to recover some of the schedule. The project also modified some of contracting strategies to streamline schedule but with acceptable added risk. Rather than two contractors performing their core competencies in series, contracts were revised to put all affected scope with one contractor to reduce even slight mobilization/de-mobilization delays.

Weather Delays

Project Procurement Management

If more time were available for carrying out the SIF Project, standard procurement processes and procedures could have been implemented to complete the projects successfully. However, because of the authorization delay and contractor transitions that occurred, a streamlined procurement process needed to be established that would both expedite procurement and maintain program efficiency and effectiveness. Consequently, in order to achieve the fast-track 17-month program delivery schedule, procurements had to be accelerated to allow for design and construction to proceed along parallel paths.

To guide and prioritize procurement activity, managers developed a Construction and Acquisition Plan (Procurement Management Plan) that categorized and identified what items the government could procure early and provide to fixed-price contractors. The plan also documented decisions on the most effective way to group the many tasks and combine them for contracting purposes. To manage interfacing work activities from different sub-projects at the work site, appropriate and similar tasks were taken from the different sub-projects and bundled to create Statements of Work (and later subcontracts) that would best achieve overall cost, schedule, and quality performance. This approach alleviated interface issues that might otherwise arise and identified critical path activities that enabled local construction forces to start construction ahead of design completion and ahead of the bidding of fixed-price contracts.

To accommodate the condensed design/construction schedule, long-lead items were identified and orders placed long before fixed-price contracts for installation and construction were in place. To ensure that no time was lost waiting for long-lead procurement equipment and materials, government-furnished equipment was provided to contractors, which reduced idle construction periods that might be caused by purchasing and shipping delays. This allowed some work to be completed while sufficient design and construction specifications could be developed to support requests for proposals on fixed-price contracts.

To manage procurement effectively, initial design focused on low-risk components, systems, and infrastructure (e.g. civil engineering infrastructure). For example, conduit was sized to allow extra room for expansion in wiring if needed, and extra conduits were laid to allow room for growth as the design matured. As systems were designed, procurements were made and construction started. This mitigated the risk of design changes for constructed portions of the project and allowed procurements to go forward at reduced risk prior to design completion.

Throughout the course of the SIF Project, quality assurance of procured materials and equipment was managed by relying on Quality Inspection Plans for identified equipment purchases and fieldwork performed.

Most SIF Project construction work was done using fixed-price contracts, which were sent out for bid in accordance with the Federal Acquisition Regulations. The purpose was to shift the risk of cost increases from the government to the contractors. Typically, three to five bids from local contractors were received, and the contractor with the best price and performance was chosen. Proposals considered too high or too low were reviewed with contractors to make sure they correctly understood the scope of work. While low price was certainly an objective, ensuring the contract was fair to both parties was more important in the long run. Contracting strategies yielded lower-than-budgeted bids in some cases, which became invaluable as the work progressed and conditions in the field were found to be different from those anticipated. The unexpected field conditions led to scope changes and construction change orders.

As scope and schedule changes (real or perceived) were identified by fixed-price contractors, the changes were documented on an RCI and submitted to the project for evaluation. These RCIs sometimes drove design changes and sometimes drove change requests to be processed. Proposal/quotes for changes were requested from contractors and evaluated by project management to be "fair and reasonable" or not. Formal contract amendments were made if the change was approved and implemented.

After completion of contract scope, work was verified as complete and correct and contract documentation was reviewed to ensure all contractor submittals had been received and approved, all open claims were negotiated, and contracts were closed out.

The ability to work through the Hanford Prime Contractor transitions was critical to successful procurement strategy and execution. Procurement systems were separated into two different systems and managed by separate companies. Another example that shows how the two companies worked in the project's and the DOE client's best interest is the case of a Project Procurement Specialist, who was allowed to work in both companies' contract management systems. This type of cooperation was critical to the ongoing project success. Anything short of this would likely have resulted in significant delays and cost overruns.

Monitoring and Controlling Process Group

Monitoring and controlling the many facets of the SIF project proved to be uniquely challenging. What started as one company and one performance reporting system later evolved to multiple companies with multiple and separate performance reporting, schedule, and change control databases and processes. The project management team had to track and regulate progress on a project-by-project level, on a company level, and on a multi-company program level. Progress was tracked at a detail-working schedule level, and costs were tracked at a cost-collection level as well as rolled up to the project level. Actual progress was compared to planned performance, and the projects struggled to hold the aggressive schedule. Corrective actions were developed and implemented, such as reassigning contract tasks and increasing the activities performed in parallel to improve schedule performance. The change control process was used to modify the baseline as needed – typically, to add new scope or to move Management Reserve into the project baseline as identified risks were realized.

Much of the area that was under construction was a former project site back in the 1990s that was terminated while in the midst of construction. The as-built drawings and project closeout at that time were not effective. Ground-penetrating radar scans were performed as part of the SIF project along with research of archived information to avoid construction surprises. Nevertheless, many unforeseen obstructions were still encountered. For example, after digging up a 12-inch water main during a planned weekend outage to make a tie-in, it was discovered that the water main was made from a different material than what had been documented. This required an immediate design change for the different type of tie-in, which also required special training to install.

After draining thousands of gallons from the 12-inch water main, a smaller connecting line was cut to make the new type of tie-in. The work crew found yet another surprise. The previous contractor had installed an abnormal pipe size with a different inside diameter from the special parts that had been procured. The project team scrambled once again to modify the design and procure new parts to complete the job successfully during the weekend outage.

Many unplanned situations were encountered including underground obstructions, existing buildings different from documented, and abnormally severe weather conditions. The key to managing them was the immediate identification, formal but expedient evaluation, and a controlled change process.

Project Complexity

In and of itself, design, demolition, and construction of facilities to safely handle, ship, and store highly sensitive and hazardous materials represent an imposing project management challenge. Compound that situation with extraneous factors that compel fast-track scheduling and team re-chartering while working within a rigorous security environment -- and an already commanding challenge becomes a daunting proposition.

- **Compressed schedule:** Originally conceived as a compact and critical project, the SIF project was to be completed within 17 months in the wake of national policy decisions pertaining to consolidation of special nuclear material. Later, the schedule had to be further compressed due to a four-week weather delay during December through January 2009. Consequently, the project had to be fast-tracked, which meant that many tasks normally performed in series had to be performed in parallel with significantly increased risk to cost and schedule. An example of this was completing partial design on sub-project S-211, ISA Access Controls, and immediately beginning construction on Site infrastructure while other design work continued.

- **Integration of multiple stakeholders:** Completing the SIF Project successfully required effective integration of five DOE prime contractors (FHI, CH2M HILL PRC, WRPS, LMSI, and MSA). Integration required detailed and steadfast attention to handling classified communications and documents. Project matters could only be discussed with those holding appropriate clearances (in some cases) and those deemed to have a "need to know." Written communications had to be marked and handled consistent with DOE guidelines and requirements on information protection and clearance. For example, some emails had to be sent using encrypted systems, and every project document had to be reviewed by a Derivative Classifier. Regular bi-weekly meetings were held with the three customer organizations to discuss progress, performance, issues, and upcoming activities. This sometimes generated special requests. If there were any disconnects with project direction, or how the project was addressing issues, they were identified early so Project Managers and stakeholders could work through them.

- **Monitoring and controlling through Hanford Prime contract transitions:** There were two contract transitions during these projects. The first being Fluor Hanford scope, a major part of which transitioned to CH2M HILL PRC in the summer of 2008, the second being the remainder of the scope transitioning to MSA in the summer of 2009. Due to the significant contractor transition, scope changed dramatically and not just for the SIF Project, but also for overall Hanford Site management responsibility. These transitions further complicated project activities as the systems used to manage baseline performance (e.g., resource loaded schedules, cost accounting and accruals, labor reporting, contract management, performance and variance reporting, and change control processes) became different systems for the different companies.

Approximately 18 new contract releases had to be put in place to allow Fluor employees to charge to CH2M HILL PRC and vice-versa. Prior to transition, managers could look at who was charging each cost account charge number by name and the hours charged, now labor contract costs had to be further sorted and scrutinized to determine true project costs.

Due to program refinements, $7 million of project scope was reassigned from one PBS to another in the middle of the project. Sub-projects were now separated by different programs and later by different companies. The ownership of one sub-project, S-212, became split between two companies. Communication and performance reporting faced special challenges as the two companies each tracked performance of their work scope, but were critically dependent on the performance of the other company's sub-projects. The positive outcome required successful and timely completion of all activities.

- **Technical and geographical complexity:** While every effort was made to utilize existing technology to reduce risk, the sheer volume of security hardware/software installation, integration, and testing was staggering. More than 6,000 feet of trenches were dug, 20,000 feet of conduit were installed, and many miles of communications cable were installed to link all of the security equipment with monitoring and controlling equipment. One contractor's installation of conduit and junction boxes led to and constrained the next contractor's installation of detection and assessment equipment. The scheduling logistics of multiple contractors working in the same general areas was challenging, the dependencies between contractors significant, and no room for delays was available

Conclusion

Without early and resolute adherence to guiding project management principles, the SIF Project could not have succeeded. Establishing core project management operating values from the beginning made it possible to achieve project goals in the face of mounting complexities and continuous changes in project scope and organizational structure. That work proceeded without interruption through two prime contract transitions, weather delays, program refinements, and an aggressive fast-track schedule is a testament to all members of the team and their professional commitment to project management.

APPENDIX

Supporting Documentation

1. Team Project Members and Stakeholders
2. CH2M HILL PRC project organizational structure
3. SIF Interim Disposition Program Summary Schedule
4. Final Combined SIF Project Performance Chart FY 08 &09
5. Client Commendation Letter
6. CHPRC On the Plateau News Article
7. Fluor Hanford FYI New Article
8. Tri-City Herald New Article

Additional Required Documents

1. Department of Energy Owner Satisfaction Letter
2. Clearance Release
3. Written Agreement

Team Project Members and Stakeholders

Name/Company	Role
L. Ty Blackford CHPRC	Executive Sponsor
Craig W. Walton MSA	Executive Sponsor
David Palmer MSA	Project Sponsor
Bob E. Heineman, Jr. CHPRC	SIF Program Integration Manager
Steven H. Norton, PMP CHPRC	Project Manager SIF
Marie T. Bachand, PMP CHPRC	Project Manager SIF
Roger McCormack CHPRC	Project Manager, Sitewide SNF
John A. Wright Jr. FGG	Construction Manager
Janice M. Isdell FGG	Project Engineering Lead
Angela M. Southwick FGG	Project Controls Lead
Tim Huber FGG	Buyers Technical Representative
Manny De Leon FGG	Buyers Technical Representative
Ron Chapman FGG	Buyers Technical Representative
Morgan Harding FGG	Field Work Supervisor
Paul Mateo FGG	Field Work Supervisor
Tony Miller FGG	Field Work Supervisor
Jeff Stout MSA	Technical Security Design Authority
Lareina Carpenter MSA	Technical Security Engineer
Gary Greene MSA	SAS Deputy Director Security Operations
Monica Kembel CHPRC	Liquids and Fuels Storage Director
Paul Garello CHPRC	CSB Facility Manager
Bill Evans CHPRC	CSB Operations
Randy O'Poole CHPRC	CSB Shift Operations Manager
Lea McKinnis CHPRC	CSB Shift Operations Manager
Don Moody CHPRC	ISA Design Authority

Name/Company	Role
Ron Davidson FGG	Engineering Manager/ Structural Engineer
Chuck Monosmith FGG	Electrical Engineer
Beth Messinger FGG	Civil Designer
Ron Hollenbeck FGG	Civil Engineer
Bob Redman FGG	Architectural Engineer
Tyrie Bivings FGG	Architectural Engineer
Teresa Ehrhard FGG	Civil/Structural Engineer
Lori Weidner FGG	Electrical Engineer
John Engelke FGG	Lead Electrician
Denise Barbour MSA	SAS Physical Security Rep
Dennis Haskins MSA	SAS Physical Security Manager
Robert Marusich FGG	Nuclear Engineer
Gerry Griffin MSA	SAS Safeguards Directors
Matthew McCormack DOE	Client Sponsor
Larry D. Romine DOE	Client Sponsor
Gary S. Lolacono DOE	Client Sponsor
Ellen M. Mattlin DOE	Client Sponsor
Diane L. Clark DOE	Client
Sen K. Moy DOE	Client
Loren E. Rogers DOE	Client
Glenn R. Konzek DOE	Client
Glenn I. Goldberg DOE	Client
John M. Silko DOE	Client
Firas Shaikh DOE	Client
Vanessa A. Mastren DOE	Client

PFP Closure Project
D. B. Klos
L. F. Perkins

Waste Stab & Disp
D. E. McKenney
Planning & Programs
J. O. Perkins

Safeguards & Security
C. W. Walton
DBT Implementation
D. E. Palmer

SIF Interim Disposition Program
R. E. Heineman, Program Mgr

SIF Project Managers
S.H. Norton, PMP
M.T. Bachand, PMP

A. M. Southwick, Proj Controls
J. M. Isdell, Project Engr
C. M. Monasmith, Elec/I&C Engr
R. W. Davidson, Structural Engr
J. A. Wright, Construction Mgr
D. M. LaRue, Systems Engineer

PBS RL-0011

PFP Interim Storage & De-Inventory
J. T. Lilly, Project Mgr
R. G. Wilbanks, Mgr

WBS 11.04.01.08.01 – "SIF De-Inventory"

PBS RL-0013

SIF Packaging, Transportation & Storage
R. L. McCormack, Project Mgr
D. L. Flyckt, Mgr

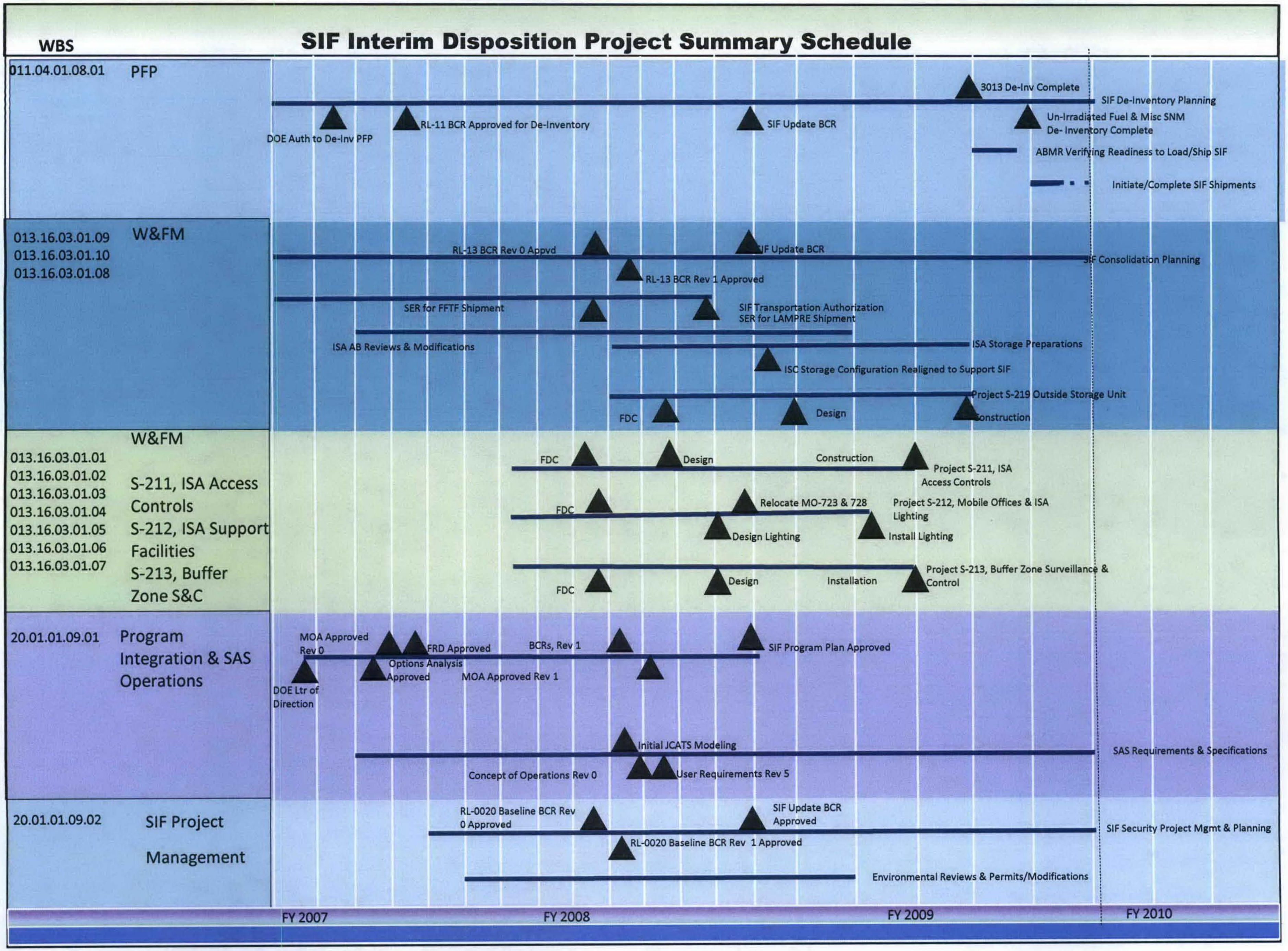
WBS 13.16.03.01 – "Consolidate Slightly Irradiate Fuel at ISA"

PBS RL-0020

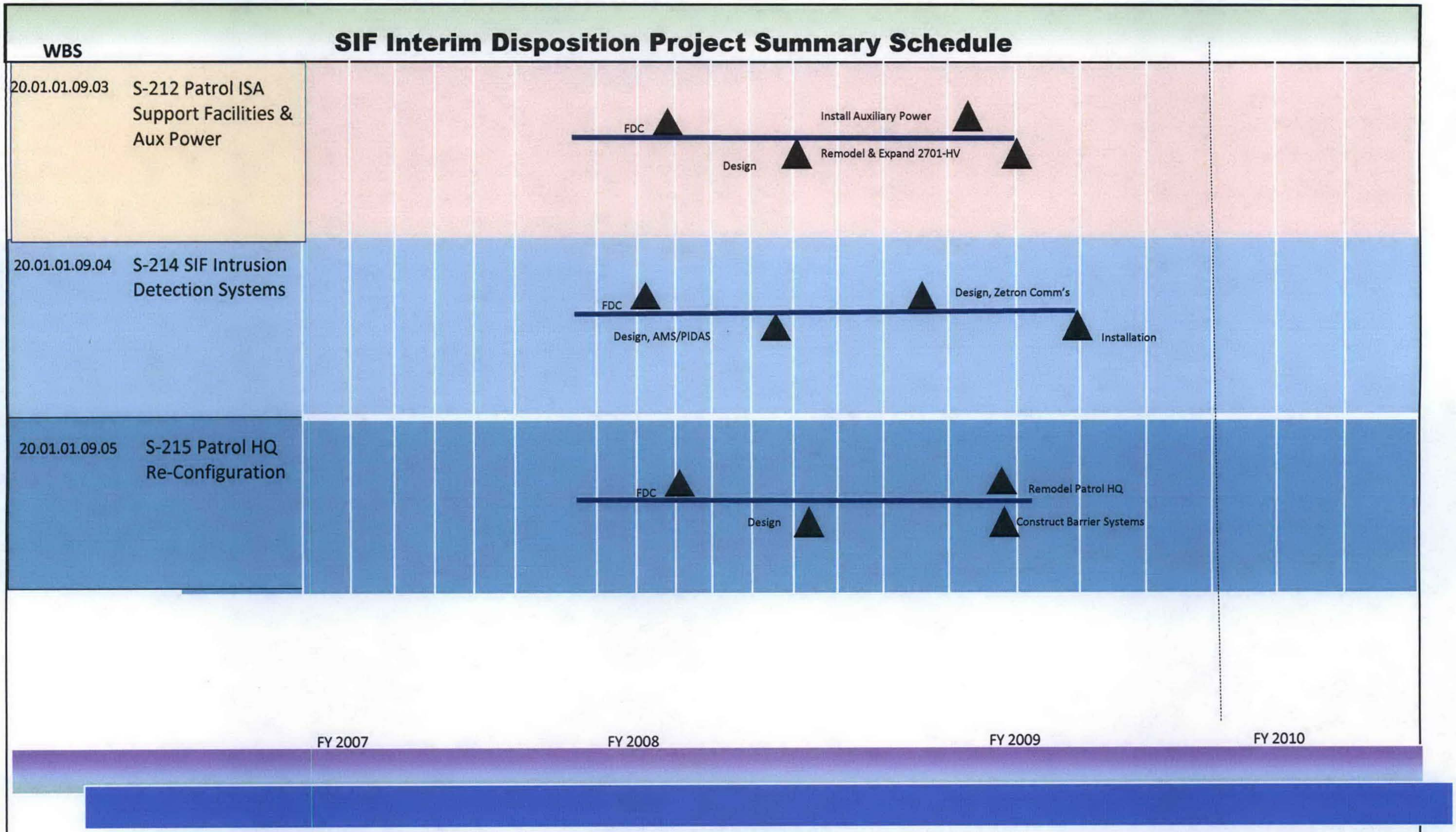
SIF Design Basis Threat Implementation
D. E. Palmer, Project Mgr
Various Line Managers

WBS 20.01.01.09 – "SAS Security Upgrades to SIF"

SIF Interim Disposition Project Summary Schedule

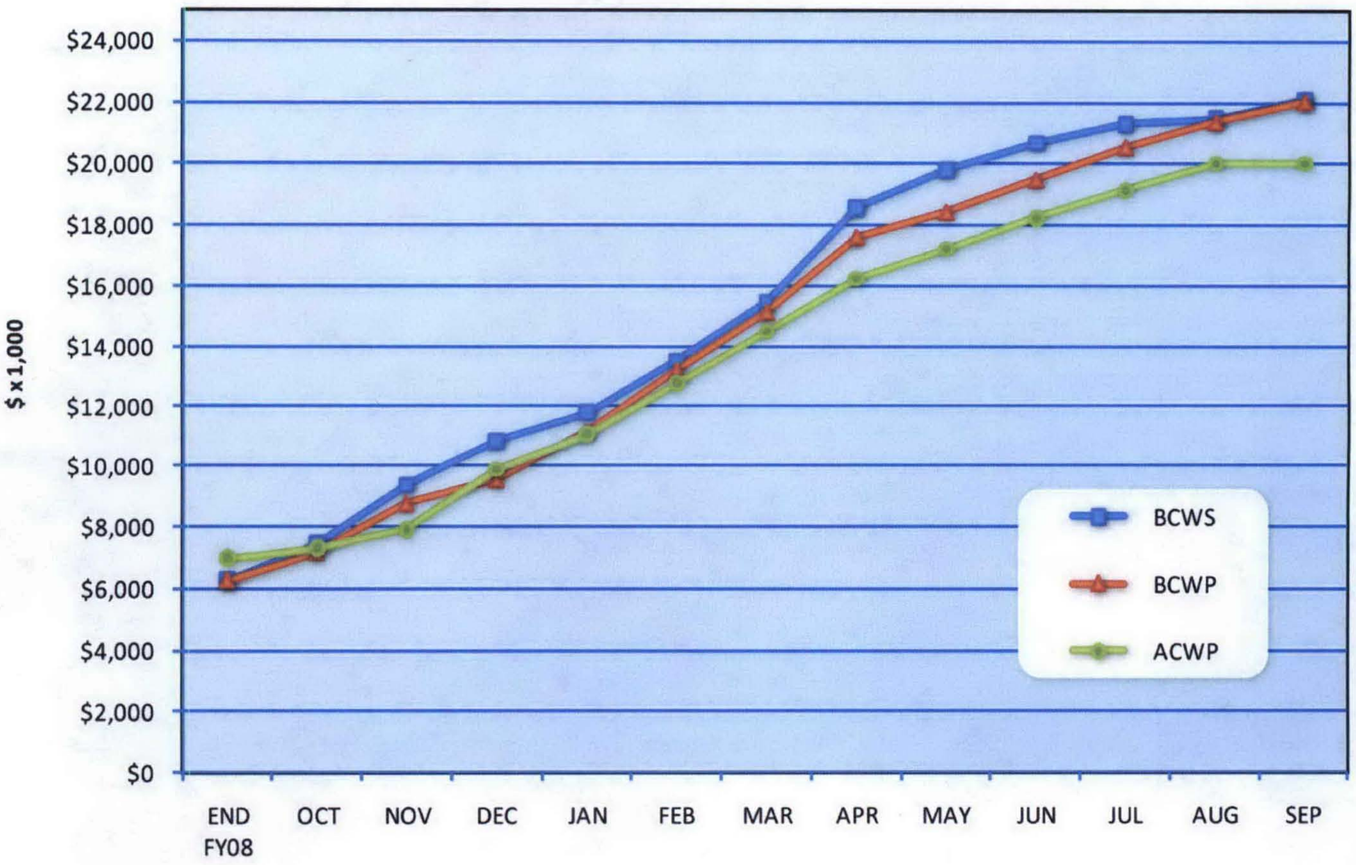


SIF Interim Disposition Project Summary Schedule



CH2MHILL
Plateau Remediation Company

Combined SIF Project Performance Chart (FY08 & FY09)



TOTAL RL-20 / RL-13 SIF Project (cumulative) FY08 & FY09

	END FY08	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
BCWS	$6,274	$7,431	$9,358	$10,848	$11,798	$13,525	$15,486	$18,570	$19,809	$20,667	$21,301	$21,466	$22,082
BCWP	$6,274	$7,166	$8,756	$9,543	$11,161	$13,220	$15,141	$17,627	$18,438	$19,487	$20,553	$21,361	$22,030
ACWP	$6,985	$7,315	$7,913	$9,890	$11,081	$12,779	$14,496	$16,254	$17,226	$18,255	$19,152	$20,035	$20,033
CPI	0.90	0.98	1.11	0.96	1.01	1.03	1.04	1.08	1.07	1.07	1.07	1.07	1.10
SPI	1.00	0.96	0.94	0.88	0.95	0.98	0.98	0.95	0.93	0.94	0.96	1.00	1.00

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

1000051
CHPRC Recd: 01/11/2010

JAN 8 2010

10-AMCP-0051

John
Great Job!

Mr. J. G. Lehew III, President
and Chief Executive Officer
CH2M HILL Plateau Remediation Company
Richland, Washington 99352

Dear Mr. Lehew:

CONTRACT NO. DE-AC06-08RL14788 – OUTSTANDING PERFORMANCE ON THE SLIGHTLY IRRADIATED FUEL CONSTRUCTION PROJECT

The U.S. Department of Energy Richland Operations Office (RL) wishes to commend outstanding performance in the successful completion of the Slightly Irradiated Fuel construction project and its subsequent operation. This project completed two important objectives to enable the Interim Storage Area of the Canister Storage Building Complex to receive high-risk material from the Plutonium Finishing Plant (PFP) as the last step to the PFP de-inventory. Many individuals were involved and interactively worked on this project to successfully manage issues from both construction and operations challenges to meet the budget and schedule. RL wishes to acknowledge the outstanding performances of key individuals on the project team that contributed to its success. Please extend our commendations to the individuals listed on the attachment.

If you have any questions, please contact me, or your staff may contact Matt McCormick, Assistant Manager for the Central Plateau, on (509) 373-9971.

Sincerely,

David A. Brockman
Manager

AMCP:SKM

Attachment

cc w/attach:
M. V. Bang, CHPRC
S. W. Bork, CHPRC
D. B. Cartmell, CHPRC
V. M. Pizzuto, CHPRC

Attachment

Marie T. Bachand

Alvia E. Bridges

Robert D. Carrell

Greg M. Clark

William J. Evans

Paul R. Garello

Aaron M. Greenhalgh

Robert E. Heineman, Jr.

Monica R. Kembel

Robert C. Leonard

Roger L. McCormack

Doris L. McKinnis

Donald A. Moody

Steven H. Norton

Larry L. Nunn

Janice L. Pennock

Randy K. P'Pool

Deyonne M. Southwick

Caroline S. Sutter

Theodore J. Venetz

Wylie L. Walker

John B. Woodbury

Richard G. Wilbanks

Slightly Irradiated Fuel Disposition Program Nears Completion

A smaller, more cost-effective storage location for special nuclear materials will soon be available.

> "This has been a fast-track project [for Engineering, Procurement and Construction] from the moment it was authorized."

An outside storage unit constructed for special nuclear materials is nearly complete.

The materials — slightly irradiated fuel — require a high level of protection and special controls. They are currently stored at the Plutonium Finishing Plant, which is undergoing demolition, so moving them will ease the cost of protecting them.

The effort to move the materials — known as the Slightly Irradiated Fuel Disposition Program — has been underway for more than a year. Work has proceeded smoothly, even though all of the involved organizations have undergone contract changes.

Despite the potential for delay, the project is on track to reach two important milestones:

- Complete facility design, construction and acceptance testing
- Be prepared to ship and receive special nuclear materials.

“This has been a fast-track project from the moment it was authorized,” said Steve Norton, a project manager for Engineering, Procurement and Construction. “The project team has done an incredible job. They began the design while the user requirements were still evolving, began construction before the design was complete and initiated acceptance testing before construction was finished.”

> "... it is a testament to the project team's talent, creativity and work ethic... to move the slightly irradiated fuel within 17 months."

So far, developing an alternative storage location for the special nuclear materials has involved extensive construction and remodeling, including new buildings and barriers, new electrical systems, and new roadways and parking lots.

When the project is complete, the special nuclear materials will not only be protected by increased physical barriers, there will also be multiple detection and assessment systems, a new control room for monitoring the materials and systems, new and expanded communications systems, and multi-media recording devices. In addition, Hanford Patrol personnel will have two facilities, either built or upgraded, to serve their needs well into the future.

“Given the size and complexity of this project, it is a testament to the project team's talent, creativity and work ethic that they successfully completed everything required of them to move the slightly irradiated fuel within 17 months,” said Norton.

To complete their part of the Slightly Irradiated Fuel Disposition Program, Engineering, Procurement and Construction workers:

- **Moved, installed or constructed five buildings**
- **Remodeled or renovated two facilities**
- **Installed more than two miles of structural barriers, 1.5 miles of security fencing, and several special, heavy gates**
- **Installed new power panels**
- **Excavated ~6,000 feet of trench**
- **Installed ~20,000 feet of conduit**
- **Pulled and terminated more than 20 miles of conductors and cabling**
- **Moved earth**
- **Built new roadways and parking lots.**

FYI
Fluor Your Information

In This Issue

Volume 7, No. 19 July 6, 2009

New storage area nears completion, eases cleanup

Fluor Hanford has played a continual yet changing role in a project to construct a safe, secure storage area for special nuclear material (SNM). The Slightly Irradiated Fuel (SIF) Disposition Program has been in the works for more than a year and is on track to reach its milestones. Moving the SNM out of its current location will ease some closure activities and make them more cost effective. In addition, the project provides new work areas for members of the Safeguards and Security team.

The Slightly Irradiated Fuel (SIF) Disposition Program is a coordinated effort by several Hanford programs and multiple Hanford contractors to provide safe, secure, and compliant storage for SNM that requires a higher than normal level of protection. Most of this type material will be consolidated by the Department of Energy at a non-Hanford site, but a few items that require these additional controls will remain at Hanford. While the existing Plutonium Finishing Plant (PFP) is currently storing this type material, the 1950s vintage processing facility is being demolitioned as part of the Hanford Site cleanup and a smaller, more cost-effective storage location is needed. Removing the SNM with its additional controls from PFP is anticipated to make the demolition work significantly easier and less expensive.

Storage location alternatives were evaluated, initial project scoping was completed, and then authorization to begin design was given in February 2008. Design, construction, and acceptance testing were required to be completed within approximately 17 months – by July 31, 2009 – in order for the programs to perform readiness activities and be ready to ship/receive material by Sept. 30, 2009 per the contract performance milestone.

Nine individual projects were originally created, each related but each also providing a specific function for the overall program. Six of these sub-projects were deemed necessary to move the SNM while the remaining three were deferred as improvements to be made at a later time. The SIF Disposition Program involved capital, expense and CENRTC (capital equipment not related to construction) funding. The project involved two DOE Field offices, crossed three DOE program offices, drew participation from four DOE prime contractors, employed five general construction contractors, required eight Statements of Work/fixed price contracts, and garnered participation by several subcontractors and other support contractors and organizations.

Initially, the three primary programs/organizations – Safeguards and Security (SAS), PFP, and the Waste and Fuels Management Project (WFMP) – were all managed by prime contractor Fluor Hanford. Midway through the project, the DOE prime contractor arrangements were changed and the PFP and WFMP organizations transitioned to new Plateau Remediation Contractor, CH2M HILL Plateau Remediation Company. SAS remained with Fluor Hanford, and is currently undergoing transition to the Mission Support Contract that has been awarded to the Mission Support Alliance.

When complete, the SIF Disposition Program will have moved, installed or constructed five buildings; remodeled or renovated two facilities; installed structural barriers, many feet of fencing and specialized, heavy gates; installed new power panels; excavated approximately 6,000 feet of trench; installed 20,000 feet of conduit; pulled and terminated several miles of conductor cabling; moved earth; and built new roadways and parking lots.

When final, the project will provide numerous levels of physical barriers for the SNM, multiple detection and assessment systems, new and expanded communications systems, multi-media recording devices, and a new control room to monitor all material and systems. In addition, the project built or upgraded two facilities to provide patrol personnel with work, office, meeting, and exercise space anticipated to serve the Site's protective forces for many years into the future. ■

Volunteers making plans for backpacks for local students

Volunteers with the Fluor Community Involvement Team (FCIT) are planning to again support the annual Fluor Building Futures Project: Backpack Basics School Supply Drive. School supplies will be collected July 13-31 to fill 100 backpacks for local children who otherwise would not be able to start the school year with new supplies.

A number of locations will be set up as collection points for donated items including the lobbies of 2430 Stevens Center, the Federal Building, HAMMER, and the 3790 Building. School supplies will also be collected at 1979 Snyder, the 2727 East facility, Patrol Training Academy, the 2754 West facility, 2704 Z in the 200 West Area, and the 2721 East facility. Watch for a General Delivery Message with more information when the campaign begins. ■

34

Thursaay, Dec. OJ,2009
Comments (0)

101

Recommend (0)

Plutonium Finishing Plant removes last of high-risk material

By Annette Cary, **Herald staff writer**

HANFORD -The last of the nuclear materials requiring high security has been removed from Hanford's Plutonium Finishing Plant.

"It eliminates the need for special security requirements for deactivation and decommissioning workers at the Plutonium Finishing Plant," said Geoff Tyree, spokesman for the Department of Energy. "It becomes like any other facility at the Hanford Site going through D and D."

Work is under way to clean out and demolish the Plutonium Finishing Plant as part of the environmental cleanup of Hanford, where plutonium was produced for the nation's nuclear weapons program,

But security at the plant in central Hanford has been some of the tightest at the nuclear reservation because of materials stored there, Workers had to pass through metal detectors when they arrived at the plant and materials taken out of the plant had to be scanned for security.

The last high security material to be removed from the plant was irradiated fuel from the Fast Flux Test Facility that had been temporarily stored at the Plutonium Finishing Plant, said Matt McCormick, DOE assistant manager for central Hanford, It was stored there because of the amount of plutonium it contained and level of radiation .

It has been moved to the Canister Storage Building complex at Hanford after $20 million worth of work to prepare for it was completed, DOE's long-term plan for the irradiated fuel has been to store it there until the U,S, has a national repository available, McCormick said.

That likely would have been at Yucca Mountain, Nev" but the Obama administration is reconsidering what to do with DOE's high-level radioactive waste and irradiated nuclear fuel.

To prepare for interim storage of the fuel at Hanford, five buildings have been moved, installed or built at the Canister Storage Building complex. Two facilities have been renovated and structural barriers, fencing and heavy gates have been installed. New roadways and parking lots also were built.

The project has numerous levels of physical barriers, multiple detection and assessment systems, new and expanded communications systems, multimedia recording devices and a new control room to monitor all material and systems, said former DOE contractor Fluor Hanford as it worked on the project earlier this year. The work also included more space for the Hanford Patrol.

Earlier. other high security materials also were stored at the Plutonium Finishing Plant, but they have been shipped to Savannah River, S.C., as part of a DOE program to consolidate weapons-grade plutonium there,

DOE emptied the vaults at the Plutonium Finishing Plant of about 2,300 coffee-can-sized canisters of plutonium and shipped all of them to South Carolina as of April.

While irradiated FFTF fuel remains at Hanford, some unirradiated or "green" fuel from FFTF that was stored at the Plutonium Finishing Plant was sent to South Carolina, Those shipments were completed early this fall.

Hanford continues to ship some additional plutonium in a mixture that includes a type of plutonium not used for weapons to South Carolina. but it is not stored at the Plutonium Finishing Plant. Plutonium 239 is used for weapons and plutonium 238 is used in the nation's space program because it generates heat that can be turned into electricity on journeys deep into space,

If the weapons-grade plutonium had remained at the Plutonium Finishing Plant, it not only would have interfered with environmental cleanup plans, but also would have required $100 million in upgrades at the plant to meet increased national security requirements after the *9/11* terrorist attacks,

The Plutonium Finishing Plant was used to turn plutonium produced at Hanford into metal buttons the size of hockey pucks to be shipped off-site for conversion to weapons use, At the end of the Cold War, enough plutonium was left at the plant to fill about 2,300 canisters,

DOE plans to invite some community leaders and the media to tour the plant and see where plutonium was once stored now that security restrictions have been lifted, It's an area of Hanford that few people besides the workers there have seen because of the previously tight security.

Owner Satisfaction Document

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

JAN 22 2010

10-AMCP-0074

Ms. R. Nissen
Vice President of Marketing
Columbia Basin Chapter Inc.
Project Management Institute
P.O. Box 1781
Richland, Washington 99352

Dear Ms. Nissen:

SUPPORT FOR THE CH2M HILL PLATEAU REMEDIATION COMPANY (CHPRC) APPLICATION FOR 2009 PROJECT OF THE YEAR

This letter is to support the CHPRC's application for the Slightly Irradiated Fuel Project as 2009 Project of the Year. The Slightly Irradiated Fuel Project upgraded the Canister Storage Building Complex to receive and store high-risk nuclear material. The project was completed on schedule to allow the last of the nuclear materials requiring high security to be removed from Hanford's Plutonium Finishing Plant (PFP) and thus eliminates the need to maintain special security requirements for subsequent deactivation and decommissioning.

The U.S. Department of Energy Richland Operations Office (RL) has acknowledged this project completion with a letter to CHPRC for outstanding performance. The project team worked interactively with multiple onsite contractor entities, RL, DOE Headquarters to define, plan, and execute the workscope to minimize cost and schedule risks to meet the PFP material transfer completion date. The project team displayed excellent leadership implementing evolving DOE project requirements while maintaining the schedule during the contract transition period for the Hanford Site prime-contracts.

The two project managers, S. H. Norton and M. T. Bachand, are both PMI Certified Project Management Professionals, effectively implemented the principles and processes contained in the Project Management Body of Knowledge (PMBOK). The completion of this project is due to their application of these project management principles as evident in the planning and execution with vigilant project controls to complete this work in a tight schedule and within the budget. This project is an excellent example of how a disciplined project team can complete complicated work safely with evolving requirements that meet our needs. Therefore, it is my pleasure to support this nomination for project of the year.

If you have any questions, please contact me on (509) 376-4747.

Sincerely,

Larry D. Romine, Federal Project Director
for Solid Waste Stabilization and Disposition

AMCP:SKM

cc: M. T. Bachand, CHPRC
L. T. Blackford, CHPRC
S. H. Norton, CHPRC

Date Received for Clearance Process (MM/DD/YYYY)
02/22/2010

INFORMATION CLEARANCE FORM

A. Information Category

☐ Abstract ☐ Journal Article
☐ Summary ☐ Internet
☐ Visual Aid ☐ Software
☒ Full Paper ☐ Report
☐ Other ____________

B. Document Number
CHPRC-00601-FP Revision 1

C. Title
Slightly Irradiated Fuel (SIF) Interim Disposition Project

D. Internet Address

E. Required Information (MANDATORY)

1. Is document potentially Classified? No

SH NORTON SH Norton 2/22/2010
Manager Required (Print and Sign)

If Yes AE Schilling / AE Schilling 2/22/10
ADC Required (Print and Sign)

2. Official Use Only No Exemption No.
3. Export controlled Information No OUO Exemption No. 3
4. UCNI No
5. Applied Technology No
6. Other (Specify) ____________

7. Does Information Contain the Following:
   a. New or Novel FH (Patentable) Subject Matter ? No
      If "Yes", OUO Exemption No. 3
      If "Yes", Disclosure No.:
   b. Commercial Proprietary Information Received in Confidence, Such as Proprietary and/or Inventions? No
   c. Corporate Privileged Information? No
      If "Yes", OUO Exemption No. 4
   d. Government Privileged Information? No
      If "Yes", Exemption NO. 5
   e. Copyrights? No
   f. Trademarks? No
8. Is Information Requiring submission to OSTI? No
9. Release Level? Public

F. Complete for a Journal Article

1. Title of Journal

G. Complete for a Presentation

1. Title for Conference or Meeting PMI 2010 Project of the Year
2. Group Sponsoring Project Management Institute
3. Date of Conference March 2, 2010
4. City/State Richland, WA
5. Will Information be Published in Proceedings?No
6. Will material be Handed Out?No

H. Information Owner/Author/Requestor

SH Norton SH Norton 2/22/2010
(Print and Sign)

Responsible Manager

SH Norton SH Norton 2/22/2010
(Print and Sign)

Approval by Direct Report to FH President (Speech/Articles Only)

N/A
(Print and Sign)

I. Reviewers	Print	Signature	Public Y/N (If N, complete J)
General Counsel	SJ Bensussen	SJB	[✓ Y]/N
Office of External Affairs	LE Bennett	for 02.22.10	[✓ Y]/N
DOE	LD Romine	2/22/10	[✓ Y]/N
OUO-SME	N/A		Y/N
Clearance	JD Aardal	Janis Aardal	[✓ Y]/N
Other	RL Nelson, CHPRC CIO	Ronald T Nelson 02/22/10	[✓ Y]/N
Other			Y/N

J. Comments

If Additional comments, Please Attach Separate Sheet

Information Clearance Approval

APPROVED FOR RELEASE
OFFICIAL
DATE 02/23/2010

CH2MHILL
Plateau Remediation Company

Written Agreement to Provide Assistance with Showcase Project Article

The relevant stakeholders agree to provide assistance in preparing a Showcase Project article to be published in a PMI publication, should the SIF Interim Disposition Project be selected as a Finalist. Minimum stakeholders include:

Project Manager, Steve Norton, PMP (CHPRRC)

Project Manager, Marie Bachand, PMP (CHPRC)

Sponsor, David Palmer (MSA)

Client, Sen Moy (DOE)

CHPRC Communications, Andre Armstrong