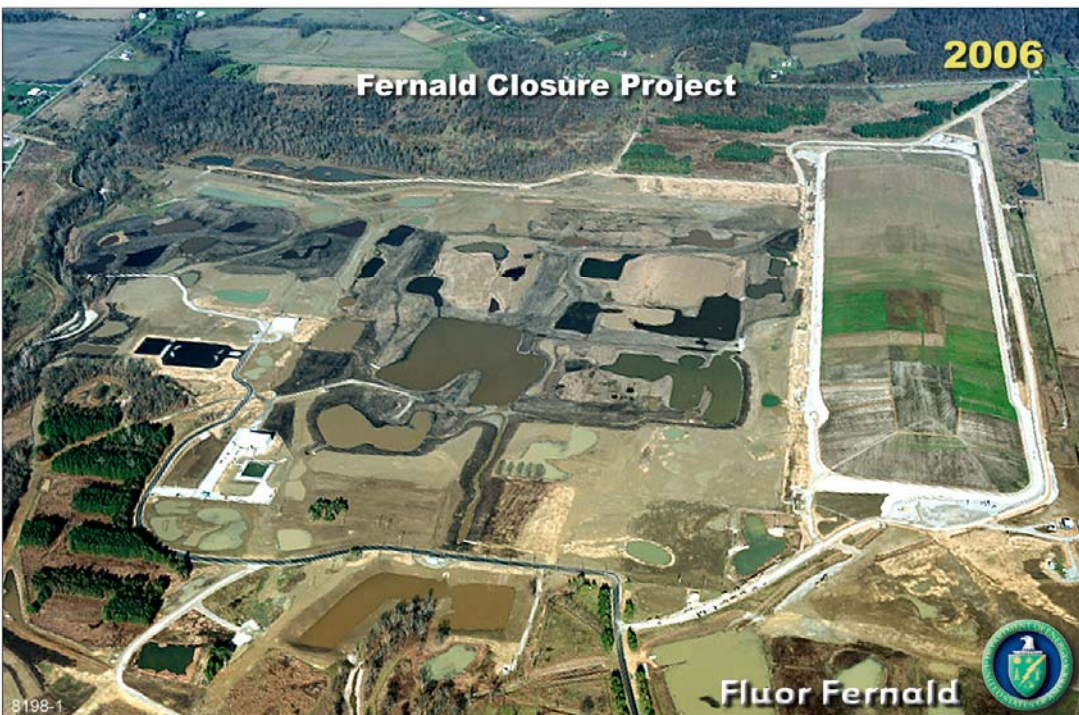


FLUOR GOVERNMENT GROUP
Fluor Fernald, Inc.

Project Management Institute

2007 Project of the Year Submittal

FERNALD CLOSURE PROJECT



7998.13

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I. GENERAL INFORMATION AND PROJECT TEAM

A. PROJECT SPECIFICS

Project Name: Fernald Closure Project

Location: The Fernald Site was built on 1,050 acres/1.6 square miles, with a 136-acre production area, in rural southwest Ohio. It is located 18 miles northwest of downtown Cincinnati, OH.

Owner: US Department of Energy
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B. PROJECT TEAM MEMBERS

The Fernald Environmental Restoration Management Corporation (FERMCO), a wholly owned subsidiary of Fluor Enterprises, Inc., which is wholly owned by Fluor Corp., managed site cleanup and closure from December 1, 1992 through October 29, 2006 under two contracts: an environmental restoration management contract from 1992 through 2000, and a closure contract from 2000 through 2006. FERMCO was later renamed Fluor Fernald, Inc. (Since this submittal covers the entire scope of the contract, the term Fluor will be used throughout the document to represent either FERMCO or Fluor Fernald, Inc.).

The Fluor closure management team combined the resources of Fluor Corp. with those of Jacobs Engineering Group, Nuclear Fuel Services, Duratek Federal Services (formerly Waste Management Federal Services and now Energy Solutions), and other subcontractors.

The Fluor management approach established projects, managed by project directors, which accomplished the remediation activities necessary to fulfill the contract requirements to reach site closure. The approach also established programs, which supported and/or provided oversight to the projects.

In addition, Fluor requirements were managed through functional areas (FAs). Functional Area Managers (FAMs) developed overarching, sitewide systems to perform work safely at the required quality level, and in accordance with the site requirements. Attachment 1 contains the Fluor Closure Leadership Team organization chart. (Attachment 2) contains a description of the management structure.

II. PROJECT PERFORMANCE

A. SUMMARY OF PROJECT

Project Overview: For nearly 37 years, Fernald produced high-purity, low-enriched uranium for the U.S. Defense Program, generating over 6 million tons of liquid and solid wastes while accomplishing its Cold War mission. Before 1984, Fernald deposited solid and slurried wastes from its production processes in an on-property Waste Storage Area located west of the former production area. As concerns about Fernald operations and other weapons complex facilities raised national consciousness about long-term environmental

effects of nuclear operations, Fernald began containerizing newly generated wastes in the mid-1980s for eventual shipment to off-site disposal facilities. Contaminants from material processing were released into the environment through air emissions, wastewater discharges, storm water runoff, leaks and spills.

When Fernald's production operations ceased in 1989, the site contained the following waste inventory: 6.4 million cubic feet of containerized low-level waste; 186,000 gallons of low-level liquid mixed waste; 31 million net pounds of nuclear product; 255 process-related and administrative structures; three concrete silos containing 13,990 cubic yards of low-level radioactive waste; six waste pits containing more than 1 million tons of waste; 400 acres containing 2.4 million cubic yards of contaminated soil, and approximately 223 acres of a contamination plume in the sole-source aquifer beneath the site. As cleanup progressed, the scope of Fernald's contamination sources (i.e., facilities, soil, groundwater plume, etc.) changed to reflect the incorporation of new technologies, construction of waste treatment facilities and adjustments to cleanup levels. As an example, the total number of facilities increased to 323 to include new waste treatment, processing and support structures.

Cleanup Mission. In December 1989, Fernald was added to the National Priorities List of Superfund sites most in need of cleanup. DOE announced its intention to end the production mission in February 1991, and Congress formally approved the end of Fernald's production mission in June 1991. In total, the FMPC generated 1.5 billion pounds of radioactive waste during its operation.

Cleanup Operations. In 1992, DOE selected Fluor to conduct environmental studies of the former Fernald uranium-processing complex, identify and quantify contamination, develop and negotiate cleanup remedies and perform remediation. Under Fluor's original 1992 Environmental Restoration Management Contract—a first-of-its-kind contract within the DOE complex focused exclusively on environmental remediation—Fluor was responsible for completing cleanup of Fernald, including Safe Shutdown and D&D of facilities, waste management, environmental monitoring and utilities operations. Eight years later, in November 2000, DOE awarded Fluor the Fernald Closure Contract, a Cost-Plus-Incentive Fee Contract, to complete remediation and closure and transition the site to the DOE Legacy Management Program.

2001 Closure Baseline. In 2001, Fluor refined the 1996 baseline to focus resources on critical-path and high-risk projects, further accelerating the schedule by three years and reducing overall project costs. By incorporating ongoing process improvements into the closure strategy and receiving a modest increase in annual funding, Fluor accelerated the target completion date from December 2009 to December 2006 and further lowered the total project cost.

In 2002, DOE renegotiated Fluor's contract with an emphasis on completing the cleanup by December 2006. To achieve these results, DOE linked fee with cost and schedule performance and provided significant monetary incentives to accelerate the closure schedule while at the same time minimize costs. Fluor modified the closure contract again in 2003 to place greater emphasis on accelerating the schedule, receiving a modest increase in annual funding.

Fluor's success in maximizing project performance at Fernald is reflected in the fees it earned during its contracts. Fluor declared closure of the Fernald site on October 29, 2006.

B. SPECIAL MANAGEMENT METHODS

13-Part Closure Strategy. In response to these closure challenges, Fluor developed a 13-part strategy (detailed in the *Project Integration Management* section) to safely accelerate work and more efficiently utilize the available funding. Implementation of this strategy required a dramatic culture change at Fernald—from a "government job" mindset to an entrepreneurial/commercial model. Each area provided an opportunity to

plan or manage the work more effectively, accelerate the schedule and minimize the total cost. The combination of these improvements placed Fluor on track for closure in 2006 and provided the following benefits:

- Focused Fernald workforce on cleanup and positioned Fluor to achieve 2006 closure.
- Accelerated the Fernald cleanup and closure schedule by years and save millions of dollars.
- Received full support from Fernald stakeholders and regulators—the end was in reach.
- Created a closure mentality throughout the site population that prepared the workforce to accept closure and begin preparing for future employment.

Problem/Issue: When Fluor assumed management of Fernald cleanup in 1992, the site contained widespread contamination primarily through soil and groundwater pathways after nearly 37 years of operation for the U.S. Defense Program. The social and political environment surrounding the site was contentious following Fernald’s 1991 mission change to remediation:

- Extensive news coverage of Fernald’s contamination created a high-level of local and national attention from state and federal regulators and elected officials;
- DOE was operating under enforcement orders by regulators;
- Citizens did not trust management and demanded an active voice in cleanup decisions, and
- Labor unions voiced concerns about safety and their future role in site cleanup.
- As the new environmental remediation contractor, Fluor needed to demonstrate visible signs of cleanup progress to all stakeholders and improve the site’s safety performance.

Accomplishment: In 1993, DOE and Fluor created a new public participation strategy to engage citizens and interested stakeholder groups in the decision-making process by opening communications channels with site leadership, technical staff and regulators. The strategy combined a strong public information program with two-way communications between management and the community, engaging stakeholder participation early in the decision-making process. Fluor’s public participation strategy exceeded the “check-the-box” approach common within the nuclear weapons complex.

Problem/Issue: Original projections estimated Fernald cleanup would take 30 years, until 2025, and cost \$12 billion, creating a long-term burden to taxpayers and increasing the potential for safety and environmental hazards associated with Fernald’s aging waste structures.

Accomplishment: In 1996, Fluor developed one of the first original closure baselines (called the “10-Year Plan”) within the DOE complex that proposed completing Fernald cleanup by 2010, based on funding availability. Following DOE’s award of the Fernald Closure Contract in 2000, Fluor further refined the baseline by incorporating ongoing process improvements into the closure strategy, and negotiated contract modifications with DOE to accelerate the closure schedule and reduce project costs. In total, Fluor cost and schedule acceleration plans have saved \$7.8 billion and 12 years compared to early projections.

Features:

1996 Accelerated Cleanup Baseline. In 1996, Fluor developed an accelerated baseline (called the “10-Year Plan”) with input from stakeholders and regulators that focused on streamlining cleanup. The primary components of the plan involved:

- Organizing all site operations, waste management and closure activities into projects;
- Integrating conflicting drivers (e.g., regulatory, consent decrees, funding restrictions);
- Assigning non-project personnel to support the cleanup organizations; and
- Defining the what, how, when and who for Fluor’s work scope.

2000 Final Closure Contract. In November 2000, DOE awarded a \$2.4 billion, 10-year cost-reimbursable closure contract to Fluor that provided incentives to reduce the cost and schedule of the cleanup. The contract established a target schedule (December 2010) and cost for site completion and provided incentives to earn maximum fee if Fluor completed cleanup by December 2009. The closure contract target fee was \$120 million, although Fluor's actual fee earned was determined by cost and schedule performance.

Under the closure contract, Fluor was required to complete the following activities to achieve site closure:

- Physical completion of the work defined in the RODs in a phased approach to minimize remaining authorizations of physical completion.
- Restoration of the site in accordance with the 2002 *Natural Resources Restoration Plan*.
- Installation of the long-term stewardship infrastructure.
- Closure strategy is submitted to DOE in the final ROD documentation in phased turnovers and approaches.

Accelerated Cleanup and Closure. *Fernald was the first site in the DOE complex to pursue an accelerated cleanup plan, proving that incentive-based contracts for DOE closure sites work.*

- Fluor developed the original closure baseline in the DOE Complex focused on further accelerating closure and reducing costs.
- By incorporating ongoing process improvements into its closure strategy, Fluor declared physical completion of Fernald on October 29, 2006, two months ahead of the target schedule and \$65 million below the target cost. On November 17, DOE concurred that Fluor's declaration was reasonable and entered a 60-day review and acceptance period.
- Fluor saved more than 12 years and \$7.8 billion compared to the original, DOE-approved 1992 plan through a series of schedule accelerations, improved project integration, technical innovations and safe field performance.
- Fluor reduced indirect costs as a percentage of total project costs from over 45 percent to less than 15 percent, saving more than \$600 million since 2000.

Project Management. *Fluor planned and executed more work in a given year than funded, providing the federal government, and ultimately taxpayers, with "more for less."*

- Fluor developed and refined a fully integrated suite of project management systems (Fernald Toolbox) that transformed the conventional O&M model into discreet projects better suited for a closure site, and helped significantly reduce risk of cost increases and schedule slips by early detection of issues and identification of mitigation measures.
- Fluor's project management system had a 10-year track record for the site's \$1.915 billion closure baseline with a cost variance of less than 1 percent.
- Fluor developed and integrated a site-wide cleanup baseline with over 17,000 activities.
- Fluor created a unique funding flexibility approach that allowed Fluor to defer a significant portion of its provisional fee until contract completion, creating a pool of funds to accelerate critical-path closure activities such as OSDF construction and waste pit shipments. In FY2004, this innovative approach generated \$15.8 million to accelerate closure of projects.
- To build flexibility into Fernald's Closure Execution Plan, Fluor developed an active list of ready-to-execute projects should supplemental funding become available. For example, EPA pre-approved demolition of 30 small structures if/when funding became available.
- Fluor developed an Austerity Program where the senior manager of Closure Planning reviewed every site purchase request to ensure that only purchases essential to closure are approved. During a three-year period (FY02 – FY04 baselines), the program produced \$12 to 15 million in annual savings.

- To expedite work scope using innovative solutions combined with programmatic efficiencies, manpower reductions and the austerity process, Fluor baselined \$36 million more work than DOE funded in 2004. As a result, Fluor achieved a 3-month acceleration of Cell 3 cap, a 2-month acceleration of Cell 8 liner installation, a 6-month acceleration of Area 4B soil excavation, and D&D of various small structures by at least 12 months.

Problem/Issue: When Fluor assumed management of Fernald in 1992, the workforce sustained on average 17 lost-time injuries per year. Years later, the push for accelerated closure presented several other safety challenges for Fluor:

- Remediation fieldwork was difficult, requiring heavy equipment movement and multiple demolition and construction project activities occurring within an aging infrastructure and a shrinking site footprint.
- An influx of nearly 800 construction personnel and heavy equipment operators in 2002 and 2003 created a challenge to train the new workers to embrace Fluor’s safety culture before they were allowed to work.

Accomplishment: Fluor created a 24-hour Safety First culture at Fernald that established safety performance goals and emphasized employee accountability for safety, resulting in a dramatic decline in injuries despite a significant increase in field work and an influx of new construction workers, and a safety performance exceeding DOE and national construction industry averages.

Features: Fernald’s transformed the safety culture at Fernald through the introduction of its Safety First Program, the implementation and verification of a single, site-wide Integrated Safety Management System (ISMS), and the involvement of workers in all phases of work planning and execution.

Safety First Initiative. To change workers’ “traditional” mindset of safety, whereby management is ultimately responsible for safety, Fluor instituted a new Safety First initiative that emphasized workers’ responsibility and accountability for his or her own safety. Fluor concentrated its efforts on this single safety vision and committed to provide the leadership and resources necessary to achieve a zero accidents, best-in-class safety performance through closure. The features of the Safety First initiative included:

- Streamlining the site’s safety committee structure.
- Continuing emphasis on worker involvement and enhanced work planning.
- Assigning each employee to a Safety Work Group and empowering the work groups and their safety advocates to take charge of safety.
- Communicating safety expectations and emphasizing a site-wide focus on 24-hour safety—not just safety during business hours.
- Treating first aid cases as importantly as recordable incidents as the first line of defense.
- Granting employees the authority to stop work if necessary to address safety concerns.
- Educating workers on the guiding principles and core functions of Integrated Safety Management and implementation of Fernald ISMS.
- Sharing management’s responsibility for safety with individual employees and work teams.
- Communicating accidents and their causes throughout the site, the corporation and the DOE complex to mitigate repeat incidents.

Safety Work Groups. The tenets of Integrated Safety Management (ISM) have been present at Fernald since the inception of the Safety First initiative and the formation of Safety Work Groups in 1994. As part of its Safety First Program, Fluor assigned all employees (salaried, labor, Building Trades, and subcontractors) to

Safety Work Groups. Through these groups workers could discuss potential safety concerns and areas for improvement during the work-planning phase. Each Safety Work Group was assigned a safety advocate to ensure issues raised by the group were resolved and to alert leadership of potential safety trends or concerns that required management attention. DOE-Fernald project representatives also participated in the safety-planning phase with their Fluor counterparts.

C. OWNER'S SATISFACTION

Fluor declared closure of the Fernald site on October 29, 2006. The satisfaction of the US Department of Energy is evidenced by the attached letter from the DOE Project Director (Attachment 3), attached quotes from DOE personnel (Attachment 4), and attached DOE award listing (Attachment 5).

III. PROJECT INTEGRATION MANAGEMENT

Problem/Issue: To achieve accelerated closure of Fernald, Fluor managed the site as a single project rather than multiple projects. This required incorporating all work scope activities and processes into a single, integrated project management system.

Accomplishment: To meet the accelerated cleanup schedule and maximize fee, Fluor developed a 13-part strategy to safely accelerate work through cost efficiencies utilizing available funding. The strategy involved creating an integrated suite of project management systems to execute the complex work scope under an accelerated schedule and achieve the final end state in 2006. Fluor's ability to plan and execute the entire project and its rigor to measure and react to the earned value of work helped position Fluor for achieving 2006 closure.

Features: Fluor's 13-part project management strategy involved the following components:

- 1) **Project Controls/Estimating.** To control budgeting and funding allocation, authorize and control work, and assess project performance, Fluor integrated Fernald's procedures, business systems, project planning and execution, and site-wide safety and quality assurance requirements into a comprehensive management tool called the "Fernald Toolbox." The toolbox comprised integrated systems that allowed the Fernald team to perform needs assessments, manage resources and evaluate the impact of proposed changes on a real-time basis. It interfaced directly with the site's accounting and human resources systems, promoting work efficiency by managing project inter-relationships, resource demands and complex day-to-day logistics. This innovative approach allowed Fluor to manage a \$1.911 billion baseline with less than a two percent cost variance. Four key systems are noted below:
 - **Earned Value Management System (EVMS).** Fluor implemented an EVMS for design, construction, and startup of remediation projects to assure schedule and budget performance. The EVMS was used for all new construction, D&D, waste pits excavation, landfill excavation, soils excavation, the OSDF and site restoration projects.
 - **Quantity Measurement System (QMS).** To determine percent complete, Fluor implemented a QMS to measure the quantity completed compared to the quantity projected. This figure is integrated with the cost and schedule systems to determine cost and schedule performance. The QMS is used to create metrics that track actual unit rate performance versus estimated rates. On large, complex projects such as nuclear facilities (e.g. Silos Treatment facilities), a cable/conduit tracking system, a mechanical/piping system, and a Construction Acceptance Verification system were used to track system component installation which was then fed into the QMS.
 - **Integrated Management System (IMS).** Fluor established an IMS for disciplined baseline planning, control, forecasting, reporting, accounting, human resources and procurement, and developed a graded approach to standardize construction contracts for large and small work scope, with site ISM requirements and safe work practices embedded within the contract template.
 - **IPEX.** In 1994, Fluor implemented IPEX, a state-of-the-art fully integrated financial, schedule, labor, and performance measurement tool that automatically generates reports, eliminates duplicate information entries, and allows real-time electronic, visual interface to financial information. IPEX

provides managers with resources and tools needed to control their remediation projects in order to achieve site closure.

- 2) **Funding.** As part of the closure contract, DOE provided a consistent funding level of \$324 million per year to allow greater certainty in the planning of future work. Fluor developed and oversaw the funds management process that allocated the available funds to various ongoing site projects, providing funding priority to critical-path projects to meet the target schedule for closure. To review and monitor projected funding forecasts, Fluor conducted monthly project meetings and developed and maintained a prioritized “Wish List” of field work that could be quickly executed if new funding sources were allocated. As an example, in 2004 Fluor baselined \$36 million more work than DOE funded to expedite work scope using innovative solutions combined with programmatic efficiencies, manpower reductions and an austerity process. As a result, Fluor achieved a 3-month acceleration of Cell 3 cap, a 12-month acceleration of Cell 8 liner installation, a 6-month acceleration of Area 4B soil excavation, and D&D of various small structures by at least 12 months. As a result of these efforts:
 - Fluor’s project management system had a 10-year track record, a \$1.915 billion cumulative baseline budget and cost variance under 1 percent.
 - Fluor created a unique funding flexibility approach that allowed Fluor to defer a significant portion of its provisional fee until contract completion, creating a pool of funds for accelerating critical path closure activities. In FY2004, this innovative approach generated \$15.8 million to accelerate closure of several critical, path projects.
 - Fluor developed an active list of ready-to-execute projects if supplemental funding became available, which built flexibility into the Fernald’s Closure Execution Plan. For example, EPA pre-approved demolition of 30 small structures if/when funding was available.
 - In 1997, Fluor’s Enhanced Work Planning Team received the “Hammer Award” from the Clinton Administration National Performance Review Committee for efforts to put stakeholders first, cut red tape and complete more work with fewer resources. to put stakeholders first, cut red tape and complete more work with fewer resources.
- 3) **Austerity Program.** Fluor implemented an austerity program that established a single point of contact (senior manager of Closure Planning) for all site purchases and expenditures. This contact had the authority to scrutinize all requisitions to separate needs versus luxuries and disapprove expenditures that did not directly contribute to the safe, least-cost, accelerated closure of the site. As a result, Fluor accelerated \$36.6 million of work in 2004 that it had scheduled for performance in Fiscal Year 2005. The program produced \$12-15 million in annual savings during a three-year period (FY2002, -03, -04 baselines).
- 4) **Risk Management** (see *Risk Management* section)
- 5) **Manpower Planning/Forecasting Tool.** If any Fernald employees were still in denial of Fernald’s eventual closure, DOE’s award of the Closure Contract in 2000 confirmed that all site employees were working themselves out of a job. The challenge to Fluor was maintaining the right number and skills mix to complete the job while reducing the size of the workforce. To address this challenge, Fluor developed a manpower-planning methodology customized for a closure project that allowed project managers, Human Resources, Project Controls and space management to forecast long-term project requirements, identify specific skills mix to accomplish the work through closure, and assign specific end dates to each team member. The project input was then rolled up to Human Resources and used to manage organization changes and employee reductions and track planned versus actual headcounts. Fluor saved \$27 million over 19 months of the project by revising Fernald’s manpower plan through closure and reallocating resources to field activities.

- 6) **War Room.** To oversee implementation of Fernald’s Closure Plan and achieve the end state goals for cost and schedule, Fluor formed a *Closure Management Team*, a small group of senior managers that were tasked with strategic planning, integrating major cross-cutting initiatives, acting as project managers’ “Watch Dog” to assure project performance, and performing workarounds as necessary to maintain end state targets. To maximize accountability for performance, the team met bi-weekly in a War Room, a central location that contained the latest cost and schedule information displayed on walls so that any interested person, including the client, could walk through the room and review the latest project data. The Closure Management Team used the room to facilitate information sharing and communication with project managers, address safety, cost, schedule, manpower, risk and other issues impacting cleanup projects, monitor project managers’ accountability and performance, and direct or redirect resources as needed to achieve site closure. The War Room was an effective management tool that helped Fluor accomplish the following objectives:
- Implement a highly disciplined project management culture that emphasized accountability.
 - Measure cost, schedule and physical progress to determine performance.
 - Identify the sequence of activities and interfaces between projects.
 - Identify the detailed plan for each project to meet closure and provide short-term implementation plans to assure that work is performed on time and within schedule.
- 7) **Work Authorization.** To control spending and accelerate schedule, Fluor needed to tightly control the authorization of work. Fluor initiated this process by developing a fiscal year work plan that outlined the work planned for the year, the associated costs, the schedule and the applicable milestone deadlines. Fluor then used this plan to decide what work would be authorized for that fiscal year. Activities that did not receive work authorization were put on a prioritized “Wish List” so authorization could be quickly granted if additional funding becomes available. The status of authorized work versus available funding was reviewed monthly through the Funds Utilization Report.
- 8) **Claims Management.** Strict adherence to the closure contract was vital to accelerating closure and earning fee. As part of the change from a government culture to an entrepreneurial/commercial model, Fluor conducted special training sessions to brief managers at all levels on the details of the closure contract and how the day-to-day work would have to change to complete the contract successfully. Fluor developed a claims management process to help managers analyze the cost and schedule impacts of directed changes, notify DOE in a timely fashion when they were impacting the contractual scope, insure that Fluor was compensated adequately for scope changes, modify cost and/or schedule targets as appropriate, and generally assist management in avoiding unrecognized scope creep and fee leakage.
- 9) **Exit/Transition Planning.** At closure, Fluor had to be prepared to handover all remaining functions, systems, procedures and requirements to DOE. In order to ensure that the transition was smooth, Fluor developed an end-state site *Closure Plan* that: 1.) defined all activities required to complete site remediation in 10 years; 2.) integrated conflicting drivers (e.g., regulatory, consent degrees, funding restrictions) into the most cost-effective plan; 3.) defined the what, how, when and who of the work scope; and 4.) provided a detailed critical path schedule and definitive budget. Fluor also prepared individualized “Going-Out-of-Business Plans” for projects and support functions that defined manpower requirements, potential outsourcing opportunities, and disposition of property, equipment and records to achieve 2006 closure, and a long-term stewardship plan that included legacy management and post-closure institutional controls.
- 10) **Footprint Reduction.** Reducing the size of the Fernald footprint decreased infrastructure costs and allowed general cleanup and disposition of miscellaneous debris that accumulated during the life of the site. To reduce the footprint, Fluor accelerated demobilization and D&D of miscellaneous structures (including vacated office trailers).

- 11) **Space Management.** To complete soil remediation at Fernald, all office trailers had to be vacated, decontaminated, demolished and dispositioned. Fluor aggressively moved all non-field related staff to off-site locations, dispersing employees to separate office buildings in different parts of the city at a time when communication and cooperation were essential to perform work safely and efficiently. To mitigate the physical distance between employees or groups, Fluor relied on the War Room to integrate functions and facilitate communications.
- 12) **Property Disposition.** Because the federal government owned much of the property at Fernald, there were strict procedures that Fluor followed for reuse and disposition of everything from large equipment to desktop computers. Fluor streamlined this process to expedite the identification and disposition of excess property in order to ensure that it met site closure objectives. When new property was purchased, Fluor implemented a site property management system (including property control, accountability, disposition, and compliance with applicable orders, regulation and procedures) at acquisition and continued until the property was dispositioned. This process allowed Fluor to record accurate data on the amount and status of property and plan for disposition to avoid delaying closure.
- 13) **Records Disposition.** Like property disposition, records disposition is subject to Federal government and environmental regulations and record retention requirements. Fluor ensured compliance with these requirements while meeting the accelerated closure target through the following actions: maintaining a site-wide Record Inventory database; assigning a liaison to coordinate between Record Management Services and the projects and/or programs; managing an off-site record center; and maintaining an on-site CERCLA Administrative Record, post-Record of Decision files, and a DOE public reading room.

IV. PROJECT SCOPE MANAGEMENT

Fluor operated under a Cost-Plus-Incentive Fee (CPIF) closure contract that included cost and schedule performance incentives. The purpose of the contract was to safely close the site, meet regulatory requirements and establish long-term stewardship planning and infrastructure.

In order to achieve Site Closure, the completion of the following activities were required:

- All of the work required by the five approved Records of Decision (RODs) including approved changes.
- Restoration of the site.
- Installation of the infrastructure and development of the necessary plans that establish the specific Legacy Management activities required for the Fernald site.
- All documentation required by the site RODs shall be submitted to and accepted by the Department of Energy (DOE) for submission to the appropriate regulatory agencies.

The objectives of Fluor's Project Management System was to assure that all project work was identified, planned, monitored, and managed. These objectives were focused towards the establishment of a "Good Business Practice" approach in setting forth those management processes required to manage project work. These processes included:

- Defining and organizing the technical work scope
- Identifying and estimating resource requirements
- Establishing budgets
- Establishing schedules
- Authorizing the work
- Developing an austerity program
- Accumulating and assimilating cost and schedule performance information
- Managing funds

- Reviewing and reporting progress and forecasts to the customer

V. PROJECT TIME/SCHEDULE MANAGEMENT

The original projections estimated Fernald cleanup would take 30 years, be completed around 2025, and cost \$12 billion. In 1996, Fluor developed one of the first closure baselines (called the “10-Year Plan”) within the DOE complex that proposed completing Fernald cleanup by 2010, based on funding availability. Following DOE’s award of the Fernald Closure Contract in 2000, Fluor further refined the baseline by incorporating ongoing process improvements into the closure strategy, and negotiated contract modifications with DOE to accelerate the closure schedule and further reduce project costs. Fluor’s cost and schedule acceleration plans combined saved \$7.8 billion and 12 years compared to early projections.

The “10-Year Plan” involved organizing all site operations, waste management and closure activities into projects; integrating conflicting drivers (e.g., regulatory, consent decrees, funding restrictions); assigning non-project personnel to support the cleanup organizations; and defining the what, how, when and who for Fluor’s work scope. Based on funding availability, the plan proposed to remediate the site in 14 years (by 2010). This schedule cut 9 years from the 1992 DOE baseline schedule and saved an estimated \$7.9 billion. The site-wide baseline covered five operable units and over 54,000 activities, and was comprised of more than 7,000 pages and 18 volumes. The planning and baseline effort took four months to complete and was approved by DOE on its first submittal.

In November 2000, DOE awarded a \$2.4 billion, 10-year cost-reimbursable closure contract to Fluor that provided incentives to reduce the cost and schedule of the cleanup. The contract established a target schedule (December 2010) and cost for site completion and provided incentives to earn maximum fee if Fluor completed cleanup by December 2009.

By incorporating ongoing process improvements into the closure strategy and receiving a modest increase in annual funding (\$34 million per year), Fluor accelerated the target completion date in May 2003 from December 2009 to December 31, 2006 and lowered the baseline by an additional \$501 million. One year later in May 2004, Fluor accelerated the target completion date from December 31, 2006 to March 31, 2006 and lowered the baseline by an additional \$42.1 million.

To oversee implementation of Fernald’s Closure Plan and achieve the end state goals for cost and schedule Fluor formed a Closure Management Team tasked with the strategic planning, integrating major cross-cutting initiatives, acting as a “watch dog” for project managers to assure project performance, and performing workarounds as necessary to maintain end state targets. To maximize accountability for performance, the team met bi-weekly (daily towards the end of the project) in a central location that contained the latest cost and schedule information displayed on walls so any interested person, including the client, could walk through and review the latest project data.

By using a work breakdown structure as the foundation for data reporting and analyses provided a common link between components of the systems and ensured consistency in reporting (an industry standard in Earned Value Management).

Project Milestone Performance

	<u>Original Date</u>	<u>Actual Date</u>
Commencement Date:	December 1, 1992	December 1, 1992
Project Defined:	October 1, 1993	October 1, 1993
Client Approval:	October 1, 1993	October 1, 1993
Project Closeout:	September 30, 2025	October 29, 2006

VI. PROJECT COST/RESOURCE MANAGEMENT

Facility Closure. *Fluor developed a three-phase approach (i.e., Safe Shutdown, utility disconnection and closure, and D&D) to safely dismantle and disposition 323 production-era and remediation facilities.*

- Fluor developed a phased closure process to safely isolate and close unnecessary utility systems and de-energize each vacated area. Prior to soil excavation or demolition work, workers established a safe closure zone by deep trenching around the perimeter of each building complex to ensure no live utilities existed. By prioritizing maintenance, porter services, demolition and soil excavation work around geographical areas, Fluor reduced the site operating footprint by 20 percent and eliminated 40,000 annual surveillance and maintenance (S&M) hours. This phased process saved \$3 million, reduced the schedule by 6 months, and resulted in an energy safe environment for demolition and excavation teams.
- By October 2006, Fluor demolished 323 production-era and remediation facilities, including the 10 former uranium production complexes. By decommissioning the complexes two years early to remove uranium from production lines, Fluor saved \$7 million.
- Fluor developed the first DOE interim action ROD to decouple dismantlement decisions from final waste disposal decisions, allowing Fluor to accelerate building demolition by 3 ½ years, eliminate contamination sources and save \$356 million in maintenance and disposal costs.
- Fluor executed D&D using various contractual approaches, including self-performing the work, managing D&D contractors to performance-based specifications, and overseeing a small business labor-hour contractor in the performance of 661 task orders, valued at \$42 million, for a variety of small construction projects.
- By applying commercial demolition techniques to contaminated facilities, Fluor saved \$1 billion.
- Fluor identified \$15 million in site-wide efficiencies to reduce base operations costs and applied the saving to critical projects.
- Fluor modified its maintenance approach to support the site's transition to closure by scaling back preventative maintenance on less-critical items or redundant systems to run-to-failure mode, resulting in \$500,000 per year savings.
- To demonstrate its commitment to cleanup and closure to the workforce, regulators and community, Fluor expedited D&D of Fernald's tallest production plant (Plant 7) and shutdown the site's cafeteria—two visible that Fernald was a closure site.

Waste Stabilization, Handling and Treatment. *Since 1992, Fluor has managed the remediation and disposition of over 6.2 million tons of low-level radioactive, hazardous and mixed wastes generated during Fernald's production and cleanup operations.*

- Fluor safely treated and shipped 1.2 million tons of radioactive waste, equivalent to the weight of 18 battleships, from three concrete silos, six waste pits, a 12-acre concrete waste pad and a thorium warehouse.
- During a 10-year period (1995–2005), Fluor shipped 6.6 million cubic feet of low-level waste to the Nevada Test Site (NTS); 174,912 gallons of low-level liquid mixed waste offsite for incineration; and 59,147 cubic feet of low-level liquid mixed waste off site for treatment.
- Fluor expedited the shipment of 31 million net pounds of nuclear material through transfer to other DOE sites, sale to the private sector or off-site burial. This downgraded Fernald's nuclear hazard rating status, reducing S&M cost by \$1.7 million per year and freeing \$69 million to expedite cleanup.
- Fluor executed the largest low-level waste shipping campaign in DOE's history by shipping 9,100 railcars containing 979,000 tons of material from Fernald's six waste pits to Envirocare—more than 41 million miles without a safety incident. The project involved treating 350,000 tons of waste pit material to meet Envirocare's waste acceptance criteria. Fluor also shipped waste by truck an additional 31 million miles without safety incident.

- DOE and Fluor developed a balanced waste management strategy that saved \$800 million in disposal/transportation costs by constructing an On-Site Disposal Facility (OSDF) to hold 77 percent of the site's contaminated soil and demolition debris, enough to fill two Empire State Buildings.
- Fluor constructed a new Radon Control System that reduced radon gas concentrations from Silos 1 & 2 headspaces by 95 percent to protect workers during waste retrieval operations.
- Fluor completed repackaging of 5,600 deteriorated drums of thorium into more secure containers 10 months ahead of schedule and \$400,000 under budget, and shipped the containers to NTS for disposition.
- Fluor removed 15 underground storage tanks containing 40,000 gallons of petroleum products and other hazardous wastes.
- Fluor managed over 30 environmental, analytical and industrial hygiene laboratory subcontractors and executed the collection, analysis and data management on over 450,000 samples since 1992.
- To support closure, Fluor established an innovative 5-year contract with a commercial laboratory that moved on-site analytical infrastructure, including equipment and personnel) to the off-site lab contractor to provide organic analyses and supplemental analytical services during peak demands.
- Fluor constructed over \$216 million in new infrastructure to support site remediation, including three new facilities with 15 waste processing systems to treat, package and handle waste pit material and silos waste; relocating transformers to support continued waste operations; installing 7 new haul roads to connect soil excavation areas and the OSDF; installing 3 miles of rails, four off-site trestles and a switchyard for rail shipments; and constructing a wastewater treatment system.
- Fluor completed remediation of two concrete waste silos, considered the largest contained accumulation of concentrated radon gas in the world. The project involved retrieval and remote transfer of 8,900 cubic yards of waste into temporary storage tanks and treatment, packaging and shipment of 3,776 waste containers to the disposal site. Fluor constructed a system that reduced radon concentrations in the silos' headspaces by 98 percent.

Soil Remediation. *Fluor executed a massive soil remediation project to meet EPA health-protective cleanup levels.*

- Fluor and DOE worked closely with regulators and the Fernald Citizens Advisory Board to create a health protective remedy that reduced soil excavation quantities from 11 square miles to 1.8 square miles, saving \$165.6 million in costs.
- Fluor completed excavation of 396,439 cubic yards of contaminated soil from a 26-acre area and placed the material in the OSDF, eliminating a potential source of groundwater contamination.
- Fluor completed remediation of 288,838 tons of contaminated soil and debris from staging areas known as Soil Piles 7 and 8. The project involved loading 2,731 railcars of material exceeding waste acceptance levels for on-site disposal and shipping 47 unit trains over 44 million miles to the disposal facility.
- Fluor successfully treated, by soil venting, 1,000 cubic yards of contaminated soil from a RCRA soil area to remove TCE and PCE concentrations and placed the treated soil in the OSDF. Fluor also chemically treated 45 cubic yards of lead-contaminated soil from the former firing and trap range that exceeded RCRA TCLP levels and placed the treated soil in the OSDF, saving \$350,000 in transportation and disposal costs.
- Fluor expanded the original size of the OSDF to increase its capacity from 2.5 million to 3 million cubic yards to house greater volumes of contaminated soil.
- In October 2006, Fluor received EPA certification that the 1,050-acre site met regulatory mandated cleanup levels.

Groundwater Restoration. *Fluor is restoring the contaminated portion of an underlying aquifer to reduce uranium concentration levels to meet EPA drinking water standards.*

- Fluor designed and operated the largest ion-exchange water treatment facility in the world for removing uranium from groundwater to meet EPA drinking water standards, pumping more than 19 billion gallons of water and removing more than 7,300 pounds of uranium.
- Fluor was recognized by DOE for an innovative, cost-saving approach that involved downsizing Fernald's existing water treatment plant to meet long-term restoration of a sole-source drinking water aquifer, saving \$5.4 million.

Ecological Restoration. *Fluor transformed the former uranium processing facility into an ecologically restored area that will be an asset to the surrounding communities.*

- Fluor obtained DOE and regulatory approval of *Fernald's Natural Resource Restoration Plan* and *Final Land Use Plan* to restore over 900 acres of the site to an undeveloped park, fully integrated with remediation.
- Fluor created 81 acres of wetlands and more than 300 acres of prairie to re-establish populations of native fish, birds, reptiles, amphibians and mammals, and planted more than 67,000 trees, shrubs and seedlings, representing 100 native species.
- With stakeholder and regulatory input, DOE and Fluor developed post-remediation plans to prepare for closure, including *Fernald's Comprehensive Legacy Management and Institutional Controls Plan* defining the post-closure S&M program, and the *Comprehensive Exit/Transition Plan* detailing DOE's and Fluor's approach to close Fernald and transition required operations to DOE-LM.

Technology. *Fernald deployed new innovative remediation technologies throughout the DOE complex, as well as universities and labor unions around the country.*

- Since 1992, the DOE Office of Science and Technology has provided over \$22 million to fund the evaluation, demonstration and deployment of new technologies at Fernald.
- Fluor deployed over 20 new technologies in the field and evaluated many others. The DOE Office of Science and Technology estimated that these deployments saved Fernald and other DOE sites more than \$100 million while demonstrating significant improvements in worker safety and efficiency, labor reduction project acceleration.

Silos Projects. Remediation of Silos 1, 2, and 3 was Fluor's largest design effort at Fernald. Fluor performed design, construction management, testing, startup and readiness on all the Silo's facility construction contracts using a combination of fixed price and labor broker contracts. All facilities were designed and constructed as Category 3 nuclear facilities.

- \$98.4 million Accelerated Waste Retrieval Project that involved a five-story Transfer Tank Area facility containing four 750,000-gallon tanks to hold the K-65 material.
- \$12.2 million Radon Control Facility that contained a filter house and four carbon beds to remove 98 percent of the radon emissions.
- \$78 million full-scale Silos Remediation Facility that contained a fully automated slurry receipt system, a clarification process, a chemical stabilization process and a system to containerize the stabilized material.
- \$26.5 million Silo 3 Treatment Facility that included a remote-handled pneumatic and mechanical retrieval system for the powdery residues, a moisture additive and a liquid-binding agent system for reduced material dispersability and metals mobility, and an automated packaging system

On-Site Disposal Facility (OSDF). Fluor managed the engineering design and self-performed the construction of the \$200 million OSDF. The OSDF is an above-grade, double lined and capped facility measuring 100-acres, 65-foot high, 3,700-foot long and 1,000-foot wide. It is designed to hold approximately

2.9 million cubic yards of contaminated soil and debris. For more information, refer to the *On-Site Disposal of Low-Level Radioactive Waste* section.

Waste Pits Project. Fluor performed project management for the design and construction of a \$30 million Waste Pits Treatment processing, drying, and loading facility. This complex was comprised of two 80-ton indirect fired rotary dryers, a blending facility, an off-gas treatment system, a water treatment plant, a laboratory, and a railcar load out facility. A 100,000 ft² building complex was constructed to support the project. Approximately 9,000 yd³ of concrete were placed. A 50 million Btu/hr gas line and a 13.8 kilovolt electrical line were routed to the site to power the thermal dryers. In total, more than 300,000 craft manhours were expended constructing the processing facility. For more information, refer to the *Waste Stabilization, Handling and Treatment, Waste Pits Project* section.

Aquifer Restoration Project. Fluor performed project management for the design and construction of a \$33.4 million Aquifer Treatment complex to restore approximately 200 acres of an underlying sole-source aquifer that were contaminated by Fernald operations. The Aquifer Treatment complex consists of high-capacity automated extraction wells pumping at combined rates in excess of 4,000 gallons per minute (gpm), reinjection wells, monitoring wells, and a 2,900-gpm advanced ion-exchange treatment plant (the world's largest) dedicated to removing dissolved uranium from process wastewater. To control this complex remediation effort, Fluor implemented multiple design-build projects in phases for the collection, conveyance and treatment of groundwater. This approach allowed Fluor to install infrastructure systems while groundwater modeling verified they were operating efficiently and achieving remediation goals. For early projects, Fluor managed the design and construction of the facilities through subcontracts with A/E firms and construction companies. Under its Closure Contract, Fluor conducts in-house engineering and design of later phases of aquifer remediation systems, and provides management oversight of subcontracted construction crews. For more information about Fernald's Aquifer Treatment complex systems and facilities, refer to the *Groundwater Remediation/Wastewater Treatment* section.

VII. PROJECT QUALITY MANAGEMENT

Fluor developed and implements a multi-faceted assessment program that provides managers and supervisors with valuable feedback on the overall compliance and efficiency of their processes and projects. The cornerstone of this oversight program is the Self Assessment process, comprised of both department self-assessments (performed by personnel directly involved with the work being assessed) and management assessments (performed with participation and input from management personnel responsible for the work). Fluor streamlined Fernald's assessment program to better utilize the resources allocated to the oversight functions and meet the changing needs of the projects. These self-assessments encompass all aspects of the Fernald mission, from administrative matters such as timesheet compliance to more traditional assessment areas such as occupational safety and compliance with written guidance documents. The self assessments were performed by personnel from all Fernald projects. During a 17-month period (January 1, 2004 to June 6, 2005), Fernald personnel performed a total of 414 department self-assessments, and management performed 57 management assessments.

The second part of Fluor's assessment program is the Independent Assessment function, performed primarily by Quality Assurance/Quality Control and Occupational Safety & Health personnel. These assessments serve to augment and validate the results of the Self Assessment process, and to provide the necessary level of independent oversight. The independent assessment process was comprised of surveillances and internal audits conducted by trained personnel. Surveillances were typically focused on a single function or activity and were performed more frequently, while independent audits focused on an entire project or program and were performed less frequently. During the period of January 1, 2004 to June 6, 2005, Fluor personnel performed a total of 461 surveillances and six independent audits.

The third and final part of Fluor’s assessment program was inspections performed by Quality Control personnel assigned to the projects. Inspections were the most frequently performed assessment type and were intended to verify the acceptability of materials and services provided by vendors and to document acceptance of installed components. By their nature, inspections were project-specific and typically were not relevant outside the project in which they are performed, although the inspection results were monitored to ensure timely identification of any developing trends. During the period of January 1, 2004 to June 6, 2005, Fluor Quality Control personnel performed a total of 4,403 Inspections.

VIII. PROJECT HUMAN RESOURCE MANAGEMENT

Human Resources. *Fluor changed the traditional “M&O” workforce mentality from “production and long-term career minded” to “cleanup and closure minded.”*

- Fluor worked to change the traditional “M&O” workforce mentality from “production and long-term career minded” to “cleanup and closure minded”. Fluor performed two successful workforce transitions during 13 years at Fernald—transitioning and retraining a production operations workforce to execute the site’s new cleanup mission and later transitioning the workforce to accept and support site closure.
- In 1998, Fluor negotiated a five-year collective bargaining agreement dedicated to environmental remediation with the Fernald Atomic Trades & Labor Council (FAT&LC), which historically had represented 13 local maintenance, operations and service craft unions.
- In 2003, Fluor also negotiated the first closure-based collective bargaining agreements in the DOE complex with FAT&LC and the International Guards Union of America (IGUA).
- To help prepare the workforce for “Life after Fernald,” Fluor provided \$20 million in tuition reimbursement and educational courses to retrain workers, equip them with new skills to sustain closure work and prepare them for future employment opportunities.

Problem/Issue: In 1992, Fluor assumed existing production-era labor contracts with the in-house operations/maintenance/service and guard unions as the new Fernald environmental remediation management contractor. Site workers were skilled, experienced operators and professionals who proudly supported the site’s Cold War mission, but they were not trained to support an environmental remediation mission. As a result, early management and union relations were strained as Fluor management focused on assessing the workforce’s capabilities to perform cleanup and what training would be required to prepare the workers, as well as updating work rules to support the safe early completion of cleanup, while union leaders were focused on retaining long-term employment. In addition, Fluor negotiated the first Project Labor Agreement with the Greater Cincinnati Building and Construction Trades Council (GCB&CTC) to support the significant construction needs required by remediation. This introduced a new union on site for the first time in 50 years.

Accomplishment: The relationship between management and labor began to change in 1996, when Fluor’s leadership made Labor Relations a top priority. Through weekly meetings with union leaders to address issues and concerns, Fluor’s leadership opened communication channels and earned the unions’ support. As a result, Fluor brought a multi-disciplined workforce together to achieve site cleanup and closure.

Features: At the onset of Fluor’s work at Fernald, nearly 2,000 employees were on site, including 1,400 Fluor engineering, professional, administrative and management staff, 500 members of the Fernald Atomic Trades and Labor Council (FAT&LC), an in-house operations, maintenance and service union representing 13 craft local unions, and 30 members of the International Guards Union of America (IGUA). Fluor was responsible for transitioning Fernald from an M&O site to DOE’s first environmental remediation site, which involved reassigning/ realigning Fernald’s incumbent workforce to meet the site’s environmental remediation mission, assuming existing union agreements, and negotiating a Project Labor Agreement and three major subcontracts.

To facilitate this realignment, Fluor drew over 100 key and essential personnel from its worldwide resources as well as from its teaming partner companies to bring needed leadership and technical skills to the site. Fluor augmented the existing workforce with nearly 300 subcontractor personnel who possessed a wide variety of skills needed to support the cleanup work. To support the construction, demolition and remediation work necessary to close Fernald, Fluor also negotiated a Project Labor Agreement with the Greater Cincinnati Building and Construction Trades Council, representing 20 local crafts. At various times, as many as 700 skilled construction craftsmen were brought to the project to support this effort. In 2002, the Building Trades workers achieved 10 years and 5 million safe work hours without a lost-time accident or injury.

During the first few years of Fluor's remediation contract, the majority of the workforce believed that site closure—if it happened at all—would occur after most had retired. In order to create a team focused on closure, Fluor changed this perception with the introduction of the Accelerated Cleanup Plan. Not only was closure a reality, it was near-term. This realization required a fundamental change in the way the workforce thought about and planned for the future. In 1998, FAT&LC accepted a five-year collective bargaining agreement, the first five-year contract within the DOE complex dedicated to remediation.

To encourage union involvement in mitigating the effect of site closure on represented employees, Fluor worked collaboratively with labor unions, aligning national labor organizations with closure goals, educating local union leaders on new priorities focused on the future, and managing change through the collective bargaining process to integrate project closure, retraining, and workforce transition into labor contracts. Fluor management established strong relationships with union leadership and earned the unions' support of the Accelerated Cleanup Plan – a critical step in the path to closure. Fluor's commitment to employee involvement, development, and rewards has allowed the workforce to focus on the difficult work of site closure.

Under Fluor's leadership, highly skilled, seasoned FAT&LC-represented workers stepped up to meet safety objectives and keep the project on schedule. These workers were responsible for maintenance, heavy equipment operations, silos waste processing operations, waste packaging and rail shipping operations, aquifer treatment and infrastructure support.

Specifically for union-represented workers, Fluor offered an annual incentive plan that set goals for safely accomplishing significant project work throughout the year and rewarded workers for accomplishing these goals. The plan ensured the alignment of the union workforce with the current schedule and requirements for success within a given year. Fluor worked with all three unions on the project to design a program that ensured the continual focus of this workforce.

Fluor's dramatic progress in improving labor relations at Fernald was demonstrated in its negotiation of the first closure-based collective bargaining agreements within the DOE complex with both FAT&LC and IGUA. Both agreements addressed labors' concerns and the projects' needs while focusing on achieving closure. FAT&LC-represented workers had a zero OSHA recordable rate in 2004 and Fernald achieved DOE's Voluntary Protection Program STAR status for its outstanding safety program. Fluor credits the project's success, as recognized by DOE, to labors' hard work and commitment to safety

- Since 1992, FATL&C Metal Trades workers have been responsible for maintenance; heavy equipment operations; waste processing, treatment and shipment operations; aquifer treatment; and infrastructure support. Projects included:
- Verified more than 100,000 gallons of liquid mixed waste and over 100,000 containers of low-level radioactive waste were accurately labeled and checked for good physical condition and off-site shipping suitability, which required packaging thousands of old deteriorating drums. Today, the 12-acre pad where these containers were stored is gone along with the handful of other structures used to store legacy waste.
- Completed a three-year campaign to remove 31 million pounds of uranium product.

- Excavated nearly 1 million tons of radioactive waste from six waste pits and completed the last and most challenging project, the Silos Project.
- All work was completed with an outstanding safety record to complete what will be DOE's signature closure project at Fernald.

Problem/Issue: During Fluor's 13-year environmental management/closure contracts at Fernald, the site's workforce had to adapt to two major mission changes, learn new skills and trades, and accept that they were working themselves out of a job.

Accomplishment: As Fernald moved through the various phases of remediation—remedial investigation/characterization, design, and field implementation—to project closure, Fluor changed the organization structure to effectively manage the site's workforce and ensure that each project had the resources and skills it needed to complete the project safely and in compliance with regulations. Fluor developed a team focused on closure by first creating a "closure mentality" that changed the way the workforce planned for the future.

Fluor worked within target funding to provide more than \$20 million to retrain workers, equip them with new skills to sustain closure work and to prepare them for future jobs. Fluor encouraged degree and vocational skill training pursuits by reimbursing employees for tuition costs when successfully completing online and local college degree work, vocational skill improvements classes, and completing professional certification requirements. Site leadership worked with local universities to establish deferred tuition payment plans so workers would not need to invest their own money up front to begin retraining.

Fluor collaborated with the University of Findlay in central Ohio to establish and certify undergraduate and graduate degree coursework in Environmental Waste Management and encouraged interested employees, both salaried and union-represented, to complete specific courses towards degrees. During a snapshot period in 2000, over 270 employees were actively pursuing various Associates, Bachelors or Masters degrees.

To further support the retraining and skill development of the workforce, but especially focused on the union-represented workforce, Fluor provided several on-site, after-hours training sessions, including:

- Certified truck driver and fork lift operation training;
- Craft training to update skills in the use of new technology employed by craft workers in the commercial arena;
- Locomotive engineer training program with CSX Railroad that resulted in potential employment with CSX.

Fluor also worked together with the Greater Cincinnati Building and Construction Trades Council and the International Chemical Workers Union to encourage workers to take advantage of craft apprenticeship programs and hazardous material handler training to enhance their ability to find new jobs after Fernald. As the needs of the workforce changed during the latter part of the project, Fluor modified its transition efforts to respond. A manpower planning system was designed and incorporated. Functional groups were identified as manpower classifications with work scope assigned. Managers would plan the needed full time equivalents (FTE) to accomplish the work scope. The actual headcount would be balanced to the manpower planning resulting identifying needs or reductions.

Fluor worked with Mercer, a globally known human resources consultant, to put together a defensible process that would fairly and objectively identify the human resources that needed to be retained and those identified for release. This process included several checks and balances. In addition, a self-select process was in place that allowed employees within reducing classifications to request to be laid off within thirty days of planned layoff date. Management reserved the right to deny such requests.

Outplacement services were offered to employees as they left the project, that included seminars targeting specific job search skills, resume review, and access to proprietary Internet sites with a focus on local jobs. The Ohio Job and Family Services department was brought on board to provide information regarding One-Stop Centers and training opportunities. Workforce Services staff remaining on the project through closure continued to provide personalized service with resume review, job opening listings, and assisted personnel in developing a professional network within Fluor Corporation world-wide to place personnel who are interested in those opportunities.

As Fernald neared completion, Fluor also coordinated a job fair held close to the site with local companies to provide employment opportunities for employees. Fluor Corporation participated in this job fair and played an active role in the identification of job assignment opportunities within Fluor's global network of projects and offices.

Outsourcing. Fluor employed a couple of outsourcing strategies at Fernald. One was designed to provide longer-term employment opportunities for employees. Fluor worked with providers that supplied needed resources and support to Fernald in addition to other companies to employ Fernald employees. In this way incumbent workers were employed and available to meet project needs at Fernald, but they were also provided with sound and continuing employment opportunities beyond Fernald. Fluor utilized this strategy in such areas as Radiological Control and Information Management. By focusing on the future employment opportunities afforded by outsourcing, Fluor was able to make such efforts constructive and beneficial. When certain skills or expertise were required on a short-term basis to help project managers problem solve or trouble-shoot issues, Fluor augmented Fernald staff with corporate and/or industry experts who had specialized skills to provide additional expertise at all levels of the organization.

Fluor also identified processes that could be outsourced to third parties thus removing the work from job scope. A successful outsource was for the benefit programs. Third party administrators were contracted to administer the pension plan, the 401(k) plan and the health/welfare plans. This strategy provided competent expertise and personnel to become familiar with the plan participants and the plan designs so when Fluor declared closure, the DOE had transferable contracts in place in order to continue a seamless transition of ongoing administration of the benefit plans that would not be terminated and need to be kept in place.

Incentives and Retention. As the project neared closure, motivating the workforce and retaining key personnel was critical to meeting Fernald's aggressive closure schedule. Fluor learned to balance keeping employees focused and energized on the task at hand while closing down the project without disrupting progress and losing valuable resources.

To motivate workers to perform work safely and on schedule and retain key personnel who are critical to meet the closure schedule, Fluor utilized several employee performance incentives throughout Fernald. Programs included both sharing fee earned by Fluor on the contract and cost reimbursable incentives through the contract. Fluor used a mature, proven fee-sharing program developed through Fluor Corporate's incentive system to focus the salaried workforce on closure and incentivize safe productivity, balanced with the use of annual incentive plans for union-represented workers focused on safe accomplishment of project milestones. Fluor will share 25 percent of the incentive fee earned above its Target Fee on the project with staff, the range could be from \$3 to \$14 million to employees at closure, a powerful example of sharing corporate success with individuals.

Specifically for union personnel, Fluor offered a package that identified specific accomplishments throughout a given year that would result in financial incentives if completed safely and on schedule. The near-term nature of the payment was a choice by the union and ensured the continual focus and alignment of the workforce on the safe performance of project milestones.

Fluor also recognized the need to balance retaining key skills and employees necessary to complete work with encouraging employees to make the decision to move to their next career. Fluor made judicious use of retention programs to keep critical skills and personnel needed for project closure, providing incentives to key and essential individuals to remain with the project through the use of completion bonuses ranging from 5–25% of their base salary.

Conclusion

Fluor has demonstrated that it understands closure, worker safety, and teamwork with stakeholders—and does each better than any company we know in the cleanup business. Fluor’s commitment to worker safety and protection, efficient operations, partnership with organized labor, teamwork, and respect for workers and their input clearly can accelerate clients’ success on projects as demonstrated by the safe and final closure of Fernald by 2006.

IX. PROJECT COMMUNICATIONS MANAGEMENT

DOE-OECM commissioned review of Fernald’s Closure Contract Baseline approach concluded: “It describes a well-ordered approach to risk management and provides a guide to the project personnel on how to collect and assess risk impacts.”

Stakeholder Relations. *Fluor’s open public participation strategy resulted in stakeholder consensus of five remedial action plans that directed Fernald cleanup.*

- Fluor established a public participation program at Fernald that emphasized a shared-decision making process and abandoned the government’s traditional, non-participatory “Decide, Announce, Defend” approach. Fernald’s program became a model within the DOE complex for effective public participation.
- Fluor led the formation of DOE’s first site-specific advisory board dedicated to remediation and closure. The board was successful at building consensus on critical issues affecting long-term site remediation, such as cleanup levels, waste disposal and final land use.
- Fluor created innovative public outreach tools, such as “Cleanopoly,” based on the Monopoly game, to help illustrate complex concepts, including risk levels, remediation techniques, and associated costs to the public and regulators. Through these innovative tools, DOE and Fluor gained stakeholder consensus on all cleanup plans.
- Fluor enriched neighboring communities by investing in educational and humanitarian projects, contributing nearly \$2 million to communities in southwestern Ohio, Kentucky and Indiana through United Way, scholarships and the Fluor Foundation.
- To help offset the economic impact to neighboring communities resulting from Fernald’s declining workforce and closure in 2006, DOE and Fluor promoted economic development in the region by donating excess equipment and property to local schools and townships.

Regulatory Decision Making. *Fluor achieved alignment among DOE, regulators, the workforce, union leadership and multiple community groups to complete the Fernald Closure Project.*

- Fluor worked closely with Federal and state regulators to gain approval of a waiver allowing construction of a disposal facility over the sole-source Great Miami Aquifer, and resolved all regulatory issues necessary to begin construction of the facility. This approach will save over \$800 million in disposal-related costs.
- Fluor developed CERCLA-regulated cleanup documents associated with five Records of Decision (ROD) and initiated 29 removal actions to accelerate risk management in the field.
- Fluor obtained regulatory and stakeholder consensus of a “balanced approach” to waste disposal that combined off-site disposition of low volume, higher contaminated material and on-site disposition of high volume, lower risk contaminated material.

- Fluor’s effective negotiations with regulators and stakeholders led to a health-protective remedy that reduced soil excavation quantities from 11 million cubic yards to 1.8 million cubic yards, saving \$165.6 million in field remediation costs.
- Fluor and DOE collaborated with regulators to streamline the environmental standards governing Fernald cleanup. Through these deliberations, regulators agreed that Fluor could integrate RCRA and NEPA requirements into the CERCLA process, allowing Fluor to close 23 RCRA units under CERCLA and eliminate unnecessary duplication of regulatory driven documents, including a site-wide ROD that would have required 18 months to prepare a risk assessment. Additionally, by integrating NEPA requirements into the CERCLA process led to an integrated RI/FS-EIS evaluation, an integrated ROD for remediating the silos, and multiple integrated EE/CA evaluations for the remaining four operable units.
- Fluor realigned day-to-day regulatory compliance requirements originally suitable for an operating facility to a smaller subset specific to site closure under CERCLA, RCRA and NEPA. As part of this initiative, routine and annual regulatory reporting was reduced to the minimum necessary, consistent with the RODs and accompanying applicable or relevant and appropriate requirements (ARARs) selected for Fernald.
- Fluor’s regulatory compliance track record, reported annually in environmental reports to the agencies and public, is 99 percent (or better) in compliance with all requirements over the life of the project. Throughout the CERCLA cleanup, Fluor has met all of its milestones either directly, or through renegotiation and/or extension of the milestone ahead of time, on behalf of our client. This level of performance is exemplary—one of the best in the DOE complex.
- Fluor negotiated with regulators to approve a groundwater cleanup standard that expedited the groundwater cleanup schedule by 5 years while fully complying with safe drinking water concentrations.
- With input from regulators, Fluor developed the first DOE-approved Risk-Based End State decision that was judged best in complex out of 28 participating sites. The RBES decision involved downsizing Fernald’s Wastewater Treatment Facility while still retaining adequate treatment capacity, allowing demolition crews to clear 90 percent of the existing footprint and dispose of building debris and contaminated soil on site. This action saved \$35 million in disposal and transportation costs and avoided a costly future large-scale plant demolition.
- Fluor introduced an “umbrella” regulatory decision approach and standardized design templates that significantly streamlined document preparation and approval, gained broader decisions and reduced regulatory review cycles by 2 to 3 months. This approach was used to group D&D of over 300 buildings into 20 design packages and group 2.2 million cubic yards of soil, waste site and burial ground excavation activities into 9 remediation areas.
- Fluor negotiated a Dispute Resolution Agreement with regulators for remediation of the silos (OU4), working closely during the conceptual phases of the remedy re-evaluation process to ensure support and approval. This alignment proved critical in obtaining public acceptance of the new chemical stabilization remedy.

X. PROJECT RISK MANAGEMENT

The leadership team at Fluor initiated an effort, through the development of a Risk Management Plan, to help manage and reduce project risk at Fernald. The Risk Management Plan provides a disciplined approach to identify, analyze and quantify the various internal and external risks to achieving the project baseline and assists in determining if the risks identified are avoidable and/or manageable. Project risk is defined as any unplanned, negative deviation from the baseline schedule or cost, which can result from sources of a technical nature, as well as from sources involving regulations, regulators, external stakeholders, the DOE customer, funding and/or legal matters. Additionally, the Risk Management Plan will analyze possible alternatives to address or handle risks, select and define specific alternatives including cost and implementation schedules for each alternative, and provide for routine reporting and updating of the plan, at least quarterly.

Identified risks were monitored in the Quarterly Critical Analysis reviews and annually the risks was re-assessed and plans modified as necessary.

The objective of the Risk Management Plan is to document the approach that will be used to manage risk through the closure of the project. In addition to documenting the specific risks, a responsible party was identified to manage each area of risk. The plan documents the initial identification and quantification of risk, how the risk will be handled, and how the risk estimate was developed.

A risk simulation is conducted on the project schedule, using Primavera's Monte Carlo, to forecast schedule risk which will be incorporated into the cost risk estimate. Primavera's Monte Carlo simulation creates a "Date Probability Graph". The Date Probability Graph represents the percentage probability that the project will complete by a particular date. This graphic shows the date versus the risk percentage within the specific timeframe for the project.

A "Crystal Ball" Monte Carlo simulation is ran for each control account, utilizing the risk estimate data identified. The simulation generates an estimate at various levels of confidence for accomplishing the scope of the control account being evaluated. The risk estimate is determined by using a predetermined confidence level from the Monte Carlo simulation (confidence level estimate – base estimate = risk estimate). Each control account's estimated risk is rolled up to the PBS level. The PBS' are totaled providing a site-wide risk estimate as well as identifying the individual PBS percentage of total site risk. This process will produce a technical/programmatic risk estimate at a pre-determined confidence level that will be used to establish the Risk Based Contingency for the Fernald site.

Fluor identified mitigation measures for \$9.5 million in potential impacts and created opportunities that saved \$51.2 million in project costs as illustrated in the examples in Attachment 6.

- Expanded Fernald's closure project risk management model to include positive risk opportunities. Fluor implemented nine risk opportunities saving \$10 million. (RC).
- Expanded the risk process to evaluate regulatory risks, external source risks (e.g., closing NTS), and high-return opportunities for improving cost and schedule performance, identifying 49 external risks for a total cost impact of \$144 million and 9 opportunities valued at \$10 million. (RC).

Safety. *Fluor established a Safety First culture at Fernald founded on the principle that all accidents are avoidable and unacceptable.*

- Fluor created a 24-hour Safety First culture at Fernald that emphasized employee accountability for his or her own safety at all levels, resulting in a reduction in workplace recordable injuries by more than 80 percent since 1992.
- Fluor has consistently maintained an OSHA-recordable injury rate at Fernald that is eight times better than the average for the U.S. construction industry.
- Fluor reduced the OSHA Total Recordable Case (TRC) rate for Fluor's workforce at Fernald from 3.83 in 1992 to 0.8 in 2005—7 times better than the 5.9 U.S. construction industry average—during a period of heavy field work and construction.
- Fluor achieved a Lost Work Day Case Rate of 0.05, 52 times better than the U.S. construction industry average.
- Fluor's Recordable Case Incidence Rate of 0.45 was 16 times better than the construction industry national average of 7.3, per the U.S. Department of Labor, Bureau of Labor Statistics.
- Fernald construction craft set new safety records for the site, recording more than 10 million safe work hours and 11 years without a lost workday injury.
- Fluor is recognized for working safely, obtaining DOE Integrated Safety Management System (ISMS) validation of Fernald in 1999, nine months ahead of schedule. DOE designated Fernald a Voluntary Protection Program (VPP) Star Site in January 2001, and recertified its Star status in November 2004, making Fernald the first DOE closure site to be re-certified.

- Fluor’s safety performance at Fernald earned recognition and numerous awards from the Greater Hamilton Safety Council and the Ohio Bureau of Worker Compensation.

XI. PROJECT CONTRACT/PROCUREMENT MANAGEMENT

Innovative Contracting. *Fluor used innovative contract structures at Fernald that categorized and assigned risk to clients and contractors, established measurable performance criteria and defined a risk and reward strategy.*

- Since 1992, Fluor exceeded its small business goals every year, averaging 43 percent of subcontracted scope to small businesses.
- In 1994, DOE selected Fluor to participate in its Pilot Mentor-Protégé Program, and Fluor became the first DOE contractor to graduate protégés from the program. Five protégé firms participated at Fernald, and the Small Business Administration recognized two of the firms for Outstanding National Minority Entrepreneur of the Year and the Small Business Person of the Year.

Closure Contract. In November 2000, DOE awarded Fluor a Cost Plus Incentive Fee (CPIF) closure contract valued at \$2,130,459,575¹, with a target fee of \$120 million. The closure contract was effective from December 2000 through December 2010 (or earlier). DOE included incentives for Fluor to accelerate cleanup without compromising safety. In 2001, DOE and Fluor developed a 2006 closure execution plan to complete site cleanup three years earlier than projected by focusing resources on critical path and high risk projects. Fernald’s 2006-closure vision was to remove, treat and safely dispose of all contaminated sources and contain groundwater contamination, with long-term treatment and monitoring in place. The Fluor closure management team combined the resources of Fluor Corp. with those of Jacobs Engineering Group, Nuclear Fuel Services, and Duratek Federal Services (formerly Waste Management Federal Services and now Energy Solutions).

Cost of Cleanup. The combined total of both Fluor contracts is: \$4,301,268,566.

Problem/Issue: In 1992, Fernald’s business systems supported a traditional government M&O contract structure used for the site’s nuclear production mission. These systems did not support the needs or requirements of Fluor’s new environmental management contract.

Accomplishment: Fluor reinvented Fernald’s business management structure to streamline functions and support a fast-pace cleanup and closure schedule.

Features

Financial Management. Fluor’s accounting and labor systems at Fernald were audited and accepted by the Defense Contract Audit Agency (DCAA). Fluor had a rigorous payroll system that executed payroll for up to 2,287 employees in multiple types of labor classifications (wage, exempt, non exempt). Ernst & Young, the independent registered public accounting firm that audited the consolidated financial statements of Fluor Corporation, attested that Fluor Corporation maintained in all material respects effective internal control over financial reporting as of December 31, 2004, based on the Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission. Fluor was included in the scope Ernst & Young’s audit effort

- **\$449 million Waste Pits Project (OU1).**

The total actual cost includes construction of facilities, excavation of pit residues, processing (and drying) to meet the disposal facility’s Waste Acceptance Criteria (WAC), rail shipments, backfilling the waste pit area, constructing a cover system and long-term operation and maintenance of the cover system. When compared to the 2006 escalated adjusted ROD estimate of \$658 million to include bulk shipping of other containerized waste streams through the project’s facilities, the cost savings is \$209 million, or a 47

percent saving. The primary reason for the cost difference is actual shipping and disposal costs (\$200/ton) over the life of the project were about half the estimated shipping and disposal rate reflected in the ROD cost estimate (\$410/ton). With shipping and disposal costs representing over half of OU1 remediation costs, this rate difference represents approximately 82 percent of the cost differential (i.e., savings). Another factor that contributed to the cost savings was the lower than expected tonnage (Fluor shipped approximately 228,200 tons less than anticipated in the ROD estimate).

- **\$33.6 million Other Waste Units (OU2).**

The total actual cost includes remediation (excavation, hauling, characterization, site preparation/haul road construction, monitoring and limited restoration) of six individual waste disposal sites, termed “other waste units.” Excluded costs are OSDF design, construction and operation and shipping above-WAC soil off site, etc. When compared to the OU2 adjusted ROD estimate of \$42.3 million, the costs savings is approximately \$9 million, or 27 percent.

- **\$577.2 million Decontamination and Demolition Project (OU3).**

The total actual cost includes above-grade D&D of 323 facilities, three removal actions, the Safe Shutdown Project and the Waste Management Project scope (including nuclear material disposition). The cost excludes debris placement in the OSDF.

- **\$588.3 million Silos Project, including remediation of Silos 1, 2 and 3 (OU4).**

The total actual cost includes direct and capital costs, indirect costs, and operation and maintenance costs associated with the retrieval, processing, packaging and shipping Silos 1, 2 and 3 materials, but it does not include D&D costs of the silos structures and waste processing facilities or the remediation of underlying soils within the project boundary. Summarized by project, the total actual cost for the Silos 1 & 2 Project was \$488.6 million, and the total actual cost for the Silo 3 Project was \$99.7 million.

The \$588.3 million actual project cost exceeded the original OU4 ROD estimate of \$96.7 million for the following reasons: Unsuccessful effort to design and operate a vitrification process resulted in a remedy change for Silos 1 & 2 (chemical stabilization) and Silo 3 (conditioning process). Separation of Silos 1 & 2 from Silo 3 remediation required separate remediation processing infrastructure. The original cost estimate assumed common costs for processing, packaging and transportation facilities. Decision to add interim storage of Silos 1 & 2 material via the Advanced Waste Retrieval (AWR) Project. Unsuccessful attempts at fixed price/performance-based contracts for the AWR and Silo 3 projects.

- **\$714.6 million Environmental Media (OU5).**

The total actual cost for OU5 encompasses three projects: the construction of the On-Site Disposal Facility (OSDF) and waste placement; excavation of contaminated soil and sediment; and restoration of storm water, Fernald-generated wastewater and contaminated groundwater in the Great Miami Aquifer.

- **\$224.2 million OSDF (includes construction and waste placement costs).**

This is a 30 percent cost savings compared to the ROD budget estimate due to process enhancements that reduced production rates and cost of the OSDF.

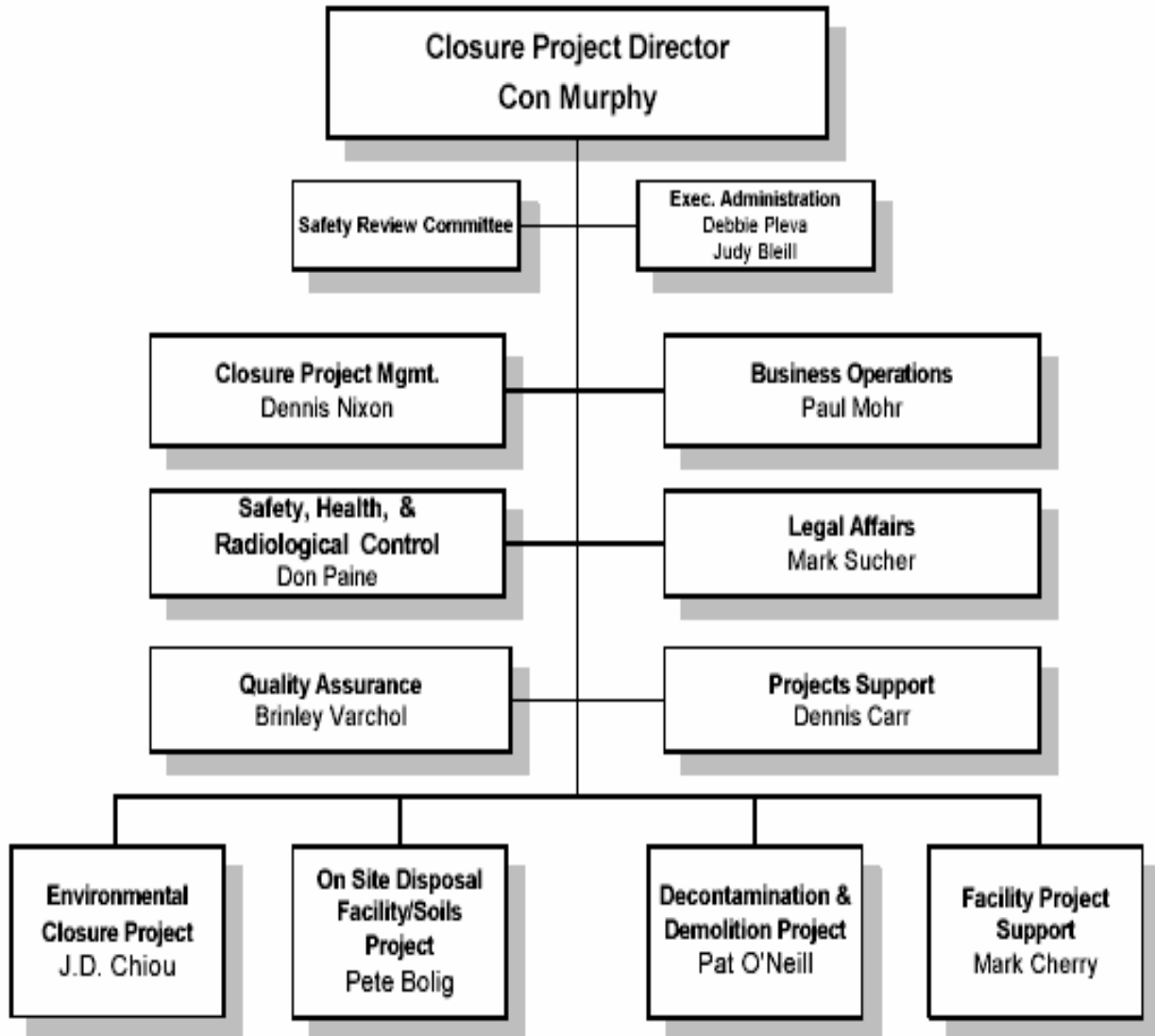
- **\$271.8 million Soil and Sediment (includes soil cleanup, D&D below grade and off-site disposal of non-compliant OSDF waste).**

- **\$218.6 million Aquifer Restoration.**

Attachment 1

Fluor Fernald Closure Leadership Team

Signature on File 6/13/06
Con Murphy Date Approved



Attachment 2

THE FLUOR FERNALD, INC. ORGANIZATION

FLUOR FERNALD, INC. MANAGEMENT APPROACH

The Fluor Fernald Inc. (Fluor Fernald) management approach establishes projects, managed by project directors, which will accomplish the remediation activities necessary to fulfill the contract requirements to reach site closure. The approach also establishes programs, which support and/or provide oversight to the projects.

In addition, Fluor Fernald requirements are managed through functional areas (FAs). Functional Area Managers (FAMs) develop overarching, sitewide systems to perform work safely at the required quality level, and in accordance with the site requirements.

The principles and core functions of Integrated Safety Management (ISM) are instituted by the President/Executive Project Director and implementation is developed at each lower organizational-level resulting in application by Fluor Fernald and subcontractor workers to accomplish work.

FLUOR FERNALD MANAGEMENT STRUCTURE

➤ **President/Closure Project Director**

The Fluor Fernald President/Closure Project Director provides executive leadership at the FCP to ensure attainment of the project mission and goals, promote safety and health, and enhance productivity, environmental sensitivity, equity, and integrity in operations.

The President/Closure Project Director establishes and communicates guidelines for signatory approval of documents that reflect Fluor Fernald's corporate value on quality, customer focus, and teamwork. In order to enhance the efficiency of signature authority in the Fluor Fernald organization, signature authority is given by leadership level. The President/Executive Project Director is designated as leadership Level 0; directors who report to the President/Executive Project Director are designated as leadership Level 1. Organizational leaders who report to a director are designated as leadership Level 2.

➤ **Closure Project Management**

The Director of Closure Project Management reports to the President/Closure Project Director. And has full authority over the Fluor Fernald project team and full accountability to DOE in the absence or unavailability of the President/Closure Project Director and in turn, exercises full responsibility for assigned Fluor Fernald organizations.

➤ **Directors**

Directors exercise full responsibility for their assigned Fluor Fernald organizations to ensure work is proceeding according to plan and to support the President/Executive Project Director, Senior Director of Projects and the Director of Projects.

➤ **Functional Area Managers (FAMs)**

FAMs are appointed by the President/ Executive Project Director to develop plans, requirement manuals, and site procedures to implement the S/RID and ensure all projects comply with the S/RID. The Functional Area Program is addressed in Section 3 of this document.

➤ **Project Managers**

Projects are managed by Project Managers who are appointed by a Director. Project managers are empowered and have the authority and responsibility for planning, organizing, directing, safely executing the project within the scope, schedule, and budget.

Projects are endeavors that have a defined scope and budget, and a definite beginning and end.

Project managers align the project team to review FCP functional area requirements and related documents, and plan and execute work in support of the FCP mission, values, requirements, and management systems. Project teams also develop training plans, safety plans, work instructions, and permits.

➤ **Program Managers**

Programs are managed by program managers who are appointed by a Director. Program managers have the authority and responsibility to perform their assigned functions safely and within their annual budgets.

Programs are ongoing endeavors with defined functions and without a definite beginning or end. Programs provide services and/or oversight to the projects.

PROJECT AND PROGRAM STRUCTURES

All projects and programs are expected to perform basic activities to ensure safe, efficient, and effective accomplishment of their scope. The following is included in each project and program, as applicable.

- Ensures safety for workers and the environment in all project/program activities.
- Defines, understands, communicates, and meets stakeholders requirements.
- Identifies and manages opportunities for work enhancement, efficiency, risk management and cost savings.
- Maintains a skilled team required to complete the project.
- Provides training and qualification standards for project/program personnel.
- Partners with the client to increase understanding and support of projects.
- Solicits and shares feedback for successful methods, lessons learned, and problem-solving strategies among organizations to enhance corporate knowledge and achieve project excellence.
- Uses an integrated approach to planning and implementing work, viewing assigned work within the context of the entire project, program, and Fluor Fernald scope.
- Incorporates ISM Guiding Principles into work practices and execution at all levels to protect the public, workers, and the environment.

- Provides for the implementation of ISM Guiding Principles related to authorizing work and the resultant core functions where the work is defined, hazards are analyzed, controls are developed and implemented, work is performed, and methods are established for feedback.
- Provides planning, scheduling, cost control, change proposal preparation, monthly performance reporting, baseline management forecasts, estimates to complete, actual cost of work performed accruals, and funding requirements and reports.
- Ensures that project planning, design, and execution are performed in compliance with applicable QA and safety and health requirements and Fluor Fernald policies and procedures with a balanced approach.
- Coordinates independent QA assessments and QC inspections and surveillances of project or program activities. Provides certification/qualification/training of QA personnel and QA review/approval of document submittals and Title III inspection of construction projects.
- Provides administrative, human resources, contracts and acquisitions, records management, space coordination, and commitment tracking support to the project or program.
- Manages construction subcontractors and technical issues, as applicable.
- Coordinates subcontractor cost and schedule activities with Project Controls, as applicable.
- Provides pre-construction planning and reviews, as applicable.
- Develops construction bid packages for projects, as applicable.
- Participates in readiness activities.

➤ **Safety, Health and Quality Organizations**

The Safety and Health, and Quality Assurance Organizations report as Directors and are responsible for project and program oversight. They are the key support organization in assuring the compliance is maintained with a broad range of regulatory and contract requirements. Their functions include:

- Manages Emergency Services for the site.
- Establishes Quality Assurance Program requirements and objectives.
- Establishes Operations Assurance Program requirements and objectives including maintaining the sitewide Lessons Learned Program.
- Manages SH&Q program requirements and provides oversight of program implementation including, Radiological Control Program, OS&H, Nuclear & Systems Safety and Medical.
- Ensures implementation of Safety First Initiative, Safety Work Groups, ISM, and the Voluntary Protection Program (VPP).
- Establishes Safety and Health, including System and Nuclear Criticality safety analysis compliance program requirements and objectives; independently reviews and approves safety basis and nuclear criticality safety analysis documentation for the site.
- Manages Quality Control Operations.
- Manages SH&Q/Rad Operations.

Letter from our Client

Attachment 4

Quotes

“As a project, nobody in the DOE complex has moved greater volumes of material by truck or rail and done it as safely.”

--Bill Taylor, DOE Ohio Field Office Manager

DOE Press Release, Completion of Silos 1 and 2 Waste Shipments, May 26, 2006

“People need to appreciate what a significant accomplishment this is. A great deal of planning, design and regulatory/public interaction was required. All the people involved in this effort can be very proud of their accomplishments,”

--Johnny Reising, Director DOE-Fernald

DOE Press Release – Contaminated Soil Removal Complete Under former Production Area, January 23, 2006

“The project, in review, was a huge undertaking with a lot of political and social pressures based upon the problems that this project has created over the years.”

“The original estimates were for \$2 billion, \$2.4 billion to complete this project in the year 2010. Fluor committed to knocking off several years from that schedule, committed, under contract, to complete the project by December of 2006, for a cost of \$1.911 billion. So as you can see, they greatly enhanced the schedule while significantly cutting cost.”

“They (Fluor) brought expertise from the corporate resources as well as putting together an expert team, from their senior managers all the way down to their craftsman that they bring in.”

--Bill Taylor, Manager DOE Ohio Field Office

On-camera interview “Fernald-Heading for Home” video, winter 2005

“Despite the challenges and all of the unknowns you face when taking down a 40 year old plant, the workers were committed to safety. They refused to accept that getting hurt was part of the job. The results were outstanding.”

--Bill Taylor, Manager DOE Ohio Field Office

DOE Press Release – Fernald Topples Last Uranium Production Building, April 29, 2004

“The Waste Management team is a great example of how Fernald is aligned to complete closure by 2006. Workers have eliminated Fernald’s nuclear material product inventory, reduced the site’s waste volume by 98 percent and cleared the way for the other cleanup projects.”

--Glenn Griffiths, DOE Fernald acting Closure Project Director, September 2002.

“I’m proud of our accomplishments here at Fernald. Site cleanup is moving along and even though we’re operating under an accelerated schedule, we still have an exemplary safety record.”

-- Steve McCracken, Director of DOE-Fernald, December 2001

“Fernald has developed a reputation as a leader in environmental restoration. You’re out front in key areas that make a difference in restoring America and America’s land to its original state including safety, working together with organized labor, regulators and stakeholders, to plan and implement successful performance and thirdly, getting the actual work done in the field. And you are doing so through example, making outstanding progress and creating a safe workplace.”

--Bill Richardson, Secretary of Energy, Safe Shutdown Celebration, March 3, 1999.

Attachment 5

Awards

1997: Fluor's Enhanced Work Planning Team received the "Hammer Award" from the Clinton Administration National Performance Review Committee for efforts to put stakeholders first, cut red tape and complete more work with fewer resources.

1998: Fluor won the "Mentor-Protégé Program of the Year" award presented by DOE's Director of the Office of Economic Impact and Diversity.

1998: DOE and Fluor developed an award-winning strategy for public participation in the cleanup process. In 1993, DOE and Fluor formed the Fernald Citizens Advisory Board, which became the national model for effective public participation. In a 1998 presidential report titled Putting Customers First '97: Standards for Serving the American People, The Fernald Citizens Advisory Board was recognized for its decision-making guidance.

1999: Secretary of Energy Bill Richardson accepts Fluor Daniel's Award of Excellence on behalf of the Fernald Environmental Management Project.

1999: DOE Pollution Prevention Award - for recycling 1,340 tons of contaminated copper. Fluor worked with DOE and a commercial company to develop an innovative recycling alternative to disposal that saved \$1.5 million. In addition to the savings in disposal and cleanup costs, the project accelerated cleanup and led to the establishment of a permanent metals treatment facility at Oak Ridge.

2000: Fluor received the White House "Closing the Circle" Award for efforts that significantly benefit the environment. This award was also for the scrap copper recycle project.

2000: Fluor received an award for its outstanding implementation of the Small and Disadvantaged Business Utilization Program at the Fernald site. The Department of Energy recognizes and supports this effort in addressing the concerns of small certified disadvantaged and women-owned businesses.

2000: Fluor received special recognition by the Small Business Administration for hosting the U.S. Small Business Administration Certification Workshop in September 2000 and for providing numerous avenues of success for the small business community. Robert Murphy, Area Director, Office of Government Contracting, presented the award.

2001: Fernald Closure Project named DOE Voluntary Protection Program STAR site

2004: Fernald Closure Project recertified as DOE Voluntary Protection Program Star Site.

2005: DOE Pollution Prevention Award – BEST IN CLASS. Life-cycle Assessment Decision Making for Post-Closure Water Treatment Facility. Reduced disposal, transportation and infrastructure risks, significantly minimized waste generation and achieved cost savings in excess of \$17 million.

2006: DOE Pollution Prevention Award – BEST IN CLASS Award for innovative reuse of on-site used equipment, which was scheduled for demolition and reworked into a treatment facility to remove radium from silos wash water at a cost savings of \$1.5 million.

Attachment 6

Fernald Closure Project Project Impact and Savings Major Issues, Mitigation, and Outcomes

Impacts

Description	Risk vs. Opportunity	Impact/Savings	Mitigation Measures	Outcome
Delays in equipment deliveries impact Silos 1 & 2 construction schedule.	Internal Risk	Critical path delay and \$1M impact	Expedite procurement of critical equipment components to ensure timely delivery to support construction. Develop early procurement packages in parallel with detailed designs.	Essentially all equipment has been fabricated and/or been delivered to the site on schedule.
Cost growth due to increases in unit cost disposal fee at the Nevada Test Site	External Risk	\$7M impact	Notify DOE of the concern and maintain close working relationship with the Nevada Test Site prime contractor.	Through negotiations and upfront funding of disposal cell construction, the unit cost for disposal will be reduced from the planned level of \$10/ft ³ to 4.5/ft ³ .
Negotiated the installation of the converted AWWT facility	External Risk	\$1.5M impact	Open discussions with regulators, DOE, and the public	Eliminated the need for additional process improvements required to meet EPA requirements.

Savings

Description	Risk vs. Opportunity	Impact/Savings	Mitigation Measures	Outcome
Negotiate a revised groundwater cleanup standard for uranium	Opportunity	Up to \$25M savings	N/A	Revised standard to increase cleanup level from 20 to 30 ppb consistent with drinking water standards, expediting cleanup schedule.
Negotiate regulatory approval to process other waste streams through the Waste Pit Project's treatment facilities	Opportunity	\$1.2M savings	N/A	Eliminated over 6,000 containers of low-level radioactive waste from the site inventory, avoided DOT repackaging costs and minimized worker exposure
DOE-approved RBES initiative to reduce capacity of groundwater treatment facility	Opportunity	\$20M savings	N/A	Facility operates at 62% of the original capacity
Regulators approved Fluor's proposal to leave Silos treatment facility foundation	Opportunity	\$5M savings	NA	Ongoing

