

## **THE HIGHLY SUCCESSFUL SAFE REMEDIATION OF THE FERNALD WASTE PITS UNDERTAKEN UNDER THE PRIVATIZATION MODEL**

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### **ABSTRACT**

Remediation of eight waste pits at the Department of Energy (DOE) Fernald site, located northwest of Cincinnati, Ohio, involves excavating approximately one million tonnes in-situ of low-level waste which were placed in pits during Fernald's production era. This unique project, one of the largest in the history of CERCLA/ Superfund, includes uranium and thorium contaminated waste, soils and sludges. These wet soils and sludges are thermally dried in a processing facility to meet Department of Transportation (DOT) transportation and disposal facility waste acceptance criteria, loaded into railcars and shipped to the Envirocare waste disposal facility at Clive, Utah.

This project is now approximately 60% complete with more than 415,000 tonnes (460,000 tons) of waste material safely shipped in 74 unit trains to Envirocare. Work is scheduled to be completed in early 2005. Success to date demonstrates that a major DOE site remediation project can be safely and successfully executed in partnership with private industry, utilizing proven commercial best practices, existing site labor resources and support of local stakeholders.

In 1997 under the DOE's privatization initiative, Fluor Fernald, Inc. (Fluor Fernald) solicited the services of the remediation industry to design, engineer, procure, construct, own and operate a facility that would undertake the remediation of the waste pits. The resulting procurement was awarded to IT Corporation, currently Shaw Environmental and Infrastructure, Inc. (Shaw). The contractor was required to finance the procurement and construction of its facilities and infrastructure. The contract was performance-based and payment would be made on the successful loadout of the waste from the facility on a per-ton basis meeting the Envirocare waste acceptance criteria.

This paper details the performance to date, the challenges encountered, and the seamless partnering between DOE, the Environmental Protection Agency (EPA), Fluor Fernald, Shaw, labor unions, and the local community in creating and executing a successful project.

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## INTRODUCTION

The Waste Pits Remedial Action Project (WPRAP) is an integral component in the successful accomplishment of the DOE's Fernald Environmental Management Project (FEMP) accelerated cleanup plan. Completion of the WPRAP project has a direct relationship to the FEMP, and the DOE as a whole, achieving the 2006 site cleanup goals. The privatization approach applied to WPRAP not only supports the specific regulatory milestone to complete the waste pits remediation by May 31, 2005, but also supports the efforts of the other FEMP projects in meeting the overall 2006 goals. In addition, implementation of the privatized approach is consistent with other commitments of the 2006 closure including:

- Maintaining compliance with regulatory requirements
- Ensuring health and safety of workers
- Reducing risk to the public and the environment
- Fostering involvement of stakeholders
- Addressing worker transition

The DOE invested considerable effort into ensuring the success of this privatization initiative.

The privatization concept was not an easy sell to the regulators or the stakeholder community. The reservations raised by these groups derived from concerns over schedule for the startup and for completion, quality of performance, protection of the safety and health of the workforce and for the environment, and, for their role in continued involvement.

The USEPA and the Ohio-EPA (OEPA) eventually came to support the privatization approach. The agencies made it very clear that there would be no delay in the execution of the field cleanup work. In response, March 1, 1999, was fixed as the start date for waste removal and shipping activities at the WPRAP. Enforceable regulatory milestones are primary sensitivities associated with agency concerns.

Any appearance of schedule loss in the WPRAP would have been very damaging to the credibility of the cleanup in the eyes of the stakeholders. The perception that DOE is procrastinating on its largest commitment to off-site disposal at Fernald could compromise the acceptance by the regulators to the Balanced Approach for FEMP waste disposal; whereby the relatively smaller volumes of higher contaminated wastes are shipped off-site and the larger volumes of lower contaminated wastes become slated for long term on-site disposal. This could have negatively impacted FEMP's on-site disposal activities.

Furthermore, the privatized contractor utilizes the labor force from the Fernald Atomic Trades and Labor Council (FAT&LC) and the Greater Cincinnati Building and Construction Trades Council (GCBCTC). Activities associated with privatization are performed in accordance with labor agreements between Fluor Fernald with the FAT&LC and Shaw with the GCBCTC. These labor forces are integrated into the privatized operation consistent with established labor agreements and within the boundaries of the privatized contract.

## PROJECT BACKGROUND

When the Atomic Energy Commission, predecessor to the DOE, broke ground at the Fernald site in 1951, winning the Cold War was a national priority. For nearly 37 years, Fernald produced feed materials to support the National Defense Program. The FEMP, formerly known as the Feed Materials Production Center, is owned by the DOE and was operated from 1952 until 1989 when production operations were halted due to a declining defense demand for uranium. In 1991, Fernald became the first DOE site to focus exclusively on cleanup.

The 420-hectare (1,050-acre) site is located in southwestern Ohio approximately 29 kilometers (18 miles) northwest of Cincinnati. The WPRAP is part of Operable Unit 1 (OU1), one of five areas at the FEMP designated by the USEPA as requiring remediation. The WPRAP involves the cleanup of approximately one million tonnes in-situ of waste within a heterogeneous waste matrix of slurred or dry process waste residues (e.g., slags, sludges, precipitates, filter cakes, and debris) from the uranium processing operations.

OU1 is a well-defined, 15 hectare (37.7-acre) area containing eight waste pits in the Waste Storage Area in the northwest quadrant of the FEMP (shown in Figure 1). The individual waste pits range in size from one-half to 2 hectare (one to five acres) and vary in depth from 3 to 12 meters (10 to 40 feet). Various chemical and metallurgical processing operations generated liquid and solid wastes. These wastes were stored or disposed of in the six waste pits and the Clearwell or burned in the Burn Pit. Waste pit materials are low-level radioactive wastes derived from the refining and metallurgical processing of uranium ore concentrates and thorium over a 37-year period.

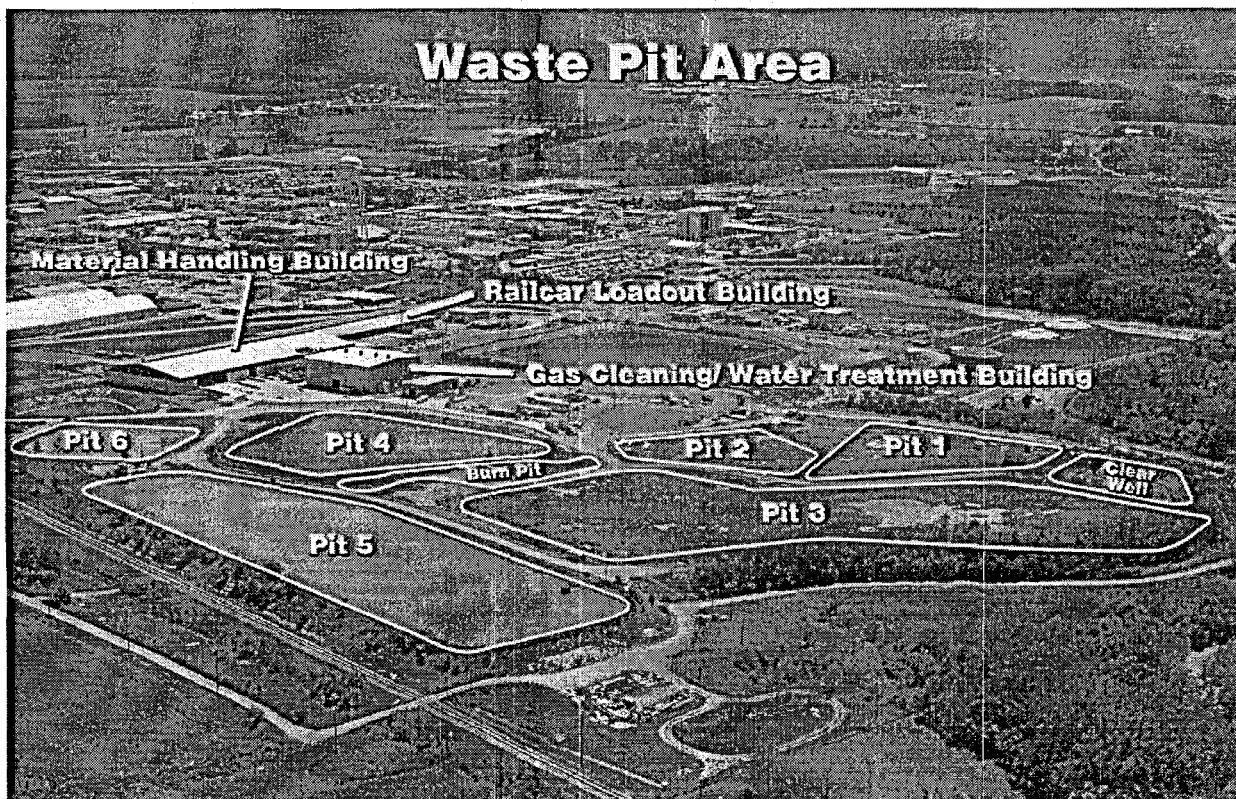


Figure 1 - Fernald's Operable Unit 1 - Waste Pits Remedial Action Project

The waste pits were excavated into native clay lenses. In some cases additional clay and/or synthetic materials were also installed to form liners. Four of the six primary waste pits, along with the Burn pit, were subsequently covered with soil after being taken out of active service. The other two primary waste pits, along with the Clearwell, were maintained with a water cover.

Upon completing the OU1 Remedial Investigation and Feasibility Study, the DOE and the USEPA signed the OU1 Record of Decision (ROD) on March 1, 1995, for the preferred remedial action alternative which included the following major components:

- Construction of waste processing and loading facilities and equipment
- Removal of waste pit contents, caps, liners, and excavation of surrounding contaminated soils
- Pre-treatment (crushing/shredding) of waste
- Treatment of waste by thermal drying as required to meet the waste acceptance criteria for disposal
- Off-site shipment of waste for disposal at a permitted commercial disposal facility (PCDF)

## **CONTRACT EXECUTION STRATEGY - PRIVATIZATION**

The DOE's contracting practices were largely unchanged until contract reform initiatives were introduced in the early 1990's. DOE relied heavily on mechanisms where the government paid essentially all contractor costs, plus a fee, and relieved the contractors of virtually all performance and financial risks. These historical contracting practices provided little incentive for contractors to aggressively identify and institute cost controls and savings, or deliver of high quality performance.

In the mid-1990's, privatization contracting efforts were expanded in the DOE's Environmental Management (EM) office. Privatization was seen as a way to improve performance quality while reducing costs of the DOE's cleanup projects. In formulating the Fiscal Year 1998 budget submittal, DOE reviewed over forty candidate cleanup projects. After evaluating the candidate projects against selection criteria, eleven new privatization proposals were submitted as part of DOE's FY-98 budget request. The Office of Management and Budget endorsed EM's Fiscal Year 1998 privatization efforts by providing earmarked funding for these specific projects.

In October 1997, DOE's cleanup contractor at the FEMP, Fluor Fernald, awarded an eight-year, \$122 million subcontract to IT Corporation (now Shaw) for the remediation of the Fernald waste pits as one of EM's newly selected candidate privatization projects.

The WPRAP contains the characteristics DOE was looking for in privatization, such as:

- Work performance by Shaw is on a fixed price basis. Payment is made on a fixed unit price basis for the end product – i.e. tons of waste loaded into railcars for disposal.
- Shaw financed construction of the required waste processing facilities and equipment up front. The associated cost was then recovered through contractually specified unit pricing for production rates of the end product. Thus, transferring project performance risk to Shaw.
- Shaw produces a specified quantifiable and measurable end product - the tons of processed and treated waste loaded into railcars ready for disposal.
- The project was procured through an open, fixed price competition

Thus, the project approach to implementing Fernald's OU1 ROD was undertaken through the privatization model. The privatized subcontractor's (Shaw's) responsibilities in support of executing the ROD include:

- Excavation of the wastes from the pits (including contaminated soils from beneath the pits)
- Preparation of the wastes (e.g. sorting, crushing, shredding)
- Treatment by thermal drying as necessary to meet the waste acceptance criteria of the disposal facility
- Blending to achieve a uniform product and loadout into railcars ready for transport.

Through privatization, DOE-FEMP, Fluor Fernald and Shaw became jointly responsible for successfully conducting the requirements of the OU1 ROD.

Shaw recognized that its performance guarantee and pledge of parent corporation resources came along with the privatization contract award. With this corporate guarantee, the parent corporation carries the entire burden if its system does not achieve production under the contract. The parent corporation must have a lot of faith in its technology, as well as in the capability of its staff and resources, to sign onto a privatization contract. For WPRAP, the technology to be deployed was proven and already commercialized, giving the DOE an increased level of confidence. However, the challenge still remained in the actual deployment of Shaw's proven commercial technology onto a DOE site.

The program leaders for the DOE-FEMP, Fluor Fernald, and Shaw realized to be successful, given the high level of visibility the privatization projects inherently came with, a defined plan of joint action would need to be developed, specifically targeting:

- The concept of seamless partnering to transcend across the contractual boundaries
- Building credibility with the stakeholders and the regulatory agencies with quick and decisive quality performance
- Becoming visible in the stakeholder community as well as with the regulatory agency
- Aggressively managing to beat, not just meet, project milestones

Within one month of contract award, the respective program leaders and execution team engaged in a series of alignment sessions/meetings. The products from these alignment meetings were the development of a joint DOE, Fluor Fernald, and Shaw mission statement and agreement on key result areas, roles and responsibilities. Key result areas identified were:

- Safety and ALARA (As Low As Reasonably Achievable)
- Performance – Results - Measurements
- Communications and team work
- Cost effectiveness of the operations
- Customer and stakeholder satisfaction

Corporate managers with the privatized contractor, along with Fluor Fernald, established regular meetings with the DOE on a quarterly basis to assess progress and align resources as necessary.

Through these alignment sessions, all parties enrolled in a concept of seamless partnering and established the foundation for WPRAP's multi-year success.

Several factors came into play regarding the relationship with project stakeholders and regulators making it essential to develop a comprehensive alignment strategy to address them also. Some of these factors, which were prevalent at the time throughout the complex, were:

- A history of less than proactive communications with and involvement of stakeholders and regulators that resulted in a lack of trust
- Compressed schedules requiring parallel actions to be developed simultaneously often resulting in confusion and misalignment between partnering organizations
- The possibility of disagreements that could result in major changes in the technical approach to an awarded firm fixed price privatization contract

These three items necessitated building credibility within the stakeholder community and regulatory agencies in a quick and decisive manner. Essentially, the seamless partnering needed to be extended beyond the contractual circles.

The chance to excel in the eyes of the regulatory agencies and the stakeholders came one month after contract award. The Shaw project schedule, identifying regulatory milestones for its performance, was due for submittal. Less than six months later, the privatized contractor's Final Remedial Design Package was successfully completed. Less than four months after that, the privatized contractor's Final Remedial Action Package was successfully completed - all ahead of schedule. From the time of contract award, the privatized contractor had only 16 months to develop two comprehensive detailed Remedial Packages for the regulators to review, comment on and approve, construct the \$25 million remediation facility, complete DOE startup reviews and begin waste loading as required by the ROD.

The WPRAP completed the payback of the privatized capital outlay on schedule. The contract performance requirement called for repayment of the private investment over the first 270,000 tonnes (300,000 tons) of waste processed and loaded. Shaw completed this in October 2001. Full repayment of the privatized contractor's capital outlay was achieved in roughly the first 20 months of operation.

The positive advantages realized by privatizing WPRAP include:

- The DOE experienced a reduced capital outlay
- There was a shorter construction time, capital equipment was off-the-shelf
- More rapid provision of services
- Quick expansion of treatment capacity
- Demolition and demobilization costs are expected to be lower as the vendor may salvage select components for use elsewhere
- Costs were avoided as operating procedures were available, multiple procurements eliminated, and reduced Title III costs, etc.

In summary, three factors stand out as leading to the success of privatization contracting for the WPRAP at the FEMP:

- 1) Fluor Fernald had clearly and completely defined requirements, boundaries, and limitations in the procurement stage. Exceptional attention to detail, including a well thought out strategy for expected performance, as well as contingency performance for known-unknowns and unknown-unknowns, was included in the procurement package. The procurement benefited from the knowledge, skills and abilities of the commercial world by first issuing a call for expressions of interest, followed by sending out the Draft Request for Proposal (RFP) for comment from interested parties. Also, the privatization guidelines established by DOE Headquarters for the candidate project selection and the thorough review and analysis by Headquarters, added value and confidence to the procurement. The Final RFP incorporated all the comment and response interaction and was then available for bid.
- 2) The contractor's initial capital investment and the capital recovery schedule were aligned to ensure that as the contractor performed they recovered their initial investment in a reasonable timeframe. In other words, since the scope of the WPRAP remediation relied on commercially available and proven technologies the up-front cost to the contractor was not exorbitant (approximately \$25 million) and thus did not serve to limit competition on the procurement. As the contractor performed, they were able to recover this investment within the first 20 months of operations providing for a relatively short capital recovery period.
- 3) The dedication of the parent corporation to the success of the privatization contract for the WPRAP only begins to underestimate their key role in the overall project achievement. The persistent visibility of Shaw's corporate team provided a depth of backing and joint commitment to success to the local team's presence. Subcontractor performance within the system typically presents a myriad of frustrations, potential unspecified direction, and seemingly endless changing conditions. The waste pits privatization was not immune to these distractions and there were numerous times where a less than committed or dedicated contractor could have failed.

## **EXECUTION STRATEGY – OPERATIONAL TECHNICAL EXECUTION**

The WPRAP contract included the engineering design, facility construction and operation of the facility. Upon the successful remediation of approximately one million tonnes in-situ of low-level waste and sludge, demolition and demobilization of the facilities will also be required. The project completion milestone is May 30, 2005.

The project team assigned to the project by Shaw had undertaken three major successful remediation projects under the USEPA Superfund Program where approximately 900,000 tonnes (1,000,000 tons) of toxic organic materials, including dioxin, were thermally treated. These projects included the Sikes Pits in Houston, Texas; Times Beach in Missouri and the Bayou Bonfuca in Louisiana. Experience gained on these projects enabled the implementation of a strong execution strategy by the team selected for Fernald to ensure project success.

## Engineering

The design basis required the engineering of a thermal process to remove water from the waste such that it could be transported safely to the disposal facility in Utah, meet both the DOT requirements and the disposal facility waste acceptance criteria, and achieve a production rate that would meet the 2005 completion schedule. The design was to take into consideration the principles of ALARA and be within the Safety Basis for the project as a radiological facility. Thermal drying of the waste was identified in various studies to be the only effective manner to remove the excess water to meet the project requirements. The EPA also mandated that only indirect firing technology could be used in this application. This required that the radioactive soils and sludges could not come in direct contact with a flame during the drying process.

In-situ sampling of the waste in the pits and actual test dig excavations in the 1990s resulted in detailed characterization of the waste materials to be excavated. These investigations formed the basis of the process design.

Upon completion of the design of the thermal process, a design verification test was conducted on actual waste pit material, which resulted in a change to the air pollution control equipment to ensure compliance with air emission standards. The engineered facility design included the following features:

- Two indirect natural gas-fired thermal dryers (shown in Figure 2) have a total evaporative capacity of eight tons of water per hour, firing 15,000 kilowatts (50 million BTU) per hour, with a combined feed rate of sludge of 18 tonnes (20 tons) per hour. Two automated infeed and outfeed systems.

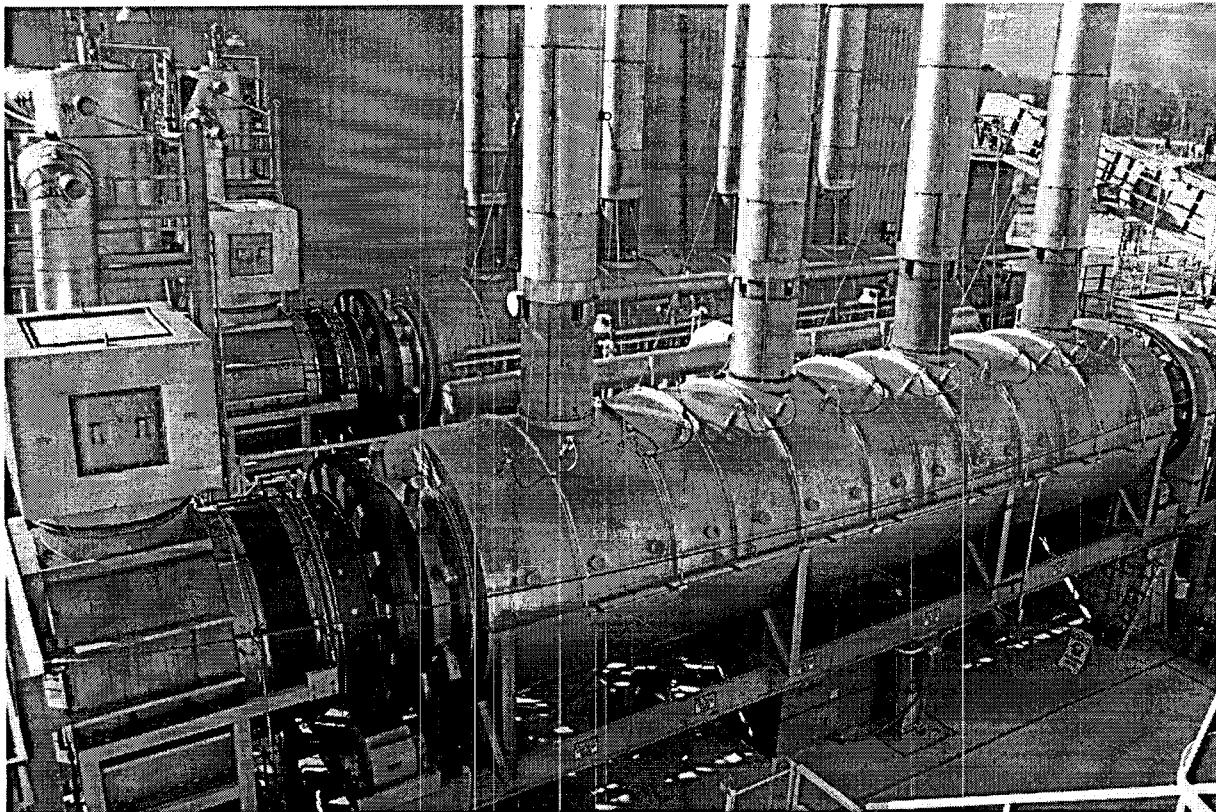


Figure 2 - Key Waste Processing Equipment - Two Dryers

- One off gas cleaning system within an enclosed building which includes wet scrubbing of the particulate in the off gas, subcooling of the condensate, electrostatic precipitation of the fine particulate, HEPA filtration of the exhaust gas stream and final thermal oxidation polishing of the discharge stream.
- Real time isokinetic sampling of the exhaust stack including measurements for radon and radionucleides. Additional monitoring of the process for oxygen, carbon monoxide and hydrocarbon emissions.
- A water treatment facility to treat the wet system blowdown, at a capacity of 760 liters (200 gallons) per minute, to support the processing rate of the waste. Treatment includes metals precipitation, suspended solids removal and absorption of uranium with resin beds.
- A railcar loadout facility enclosed in a 3,150 square meter (35,000 square foot) building, with waste material holding bins for characterized waste, loading platforms, railcar weigh scale, overhead crane for railcar lidding and delidding operations and railcar decontamination equipment.
- A central control room for the facility to monitor and maintain control of all operations in a safe and efficient manner.
- 5,850 square meter (65,000 square foot) Material Handling Building

Ancillary support facilities include maintenance, laundry, respirator wash facilities, warehousing, on-site laboratory, worker locker room and showers, and administration facilities. Remote real time cameras in the process areas provide the control room operators with a visual overview of all areas in the controlled operations at all times. The overall waste processing facility is displayed in Figure 3.



Figure 3 - Shaw's Waste Pit Material Processing Facility

Approximately 2,000 drawings supported construction of the facilities along with volumes of safety basis calculations, work plans and equipment operations and maintenance documentation.

## **Facility Construction**

Upon the approval of the facility design by the DOE, USEPA, OEPA and Fluor Fernald, construction of the facilities commenced in August 1998. This left only eight months to complete key component construction, train the labor workforce, and begin waste processing and railcar loadout to satisfy the March 1, 1999, regulatory milestone.

Construction work involved approximately 120 craft labor from the GCBCTC over a total construction period of almost 15 months. Each employee completed two weeks of site and project-specific training prior to working in the field. This ensured that all personnel were familiar with both the site and project-specific safe work plans and practices. Emphasis was placed on identification and mitigation of hazards, isolation of hazardous energy, hoisting and rigging, excavation and trenching, hot work, and operation of aerial lifts and heavy equipment. Major emphasis was placed on crane operations and the isolation of hazardous energy.

Approximately 6,840 cubic meters (9,000 cubic yards) of concrete were poured for foundation pads and floor slabs. The initial focus was to construct the required infrastructure and utilities to support loadout of waste materials prior to the milestone date of March 1, 1999. Approximately 9,000 square meters (100,000 square feet) of pre-engineered building was erected. This was accomplished in the winter months along with the fabrication off-site of the major components.

Both dryers were shipped, newly fabricated by the manufacturer, from Kansas and were set in December 1998. Each dryer weighed 77 tonnes (170,000 pounds) and the shipping rig was over 60 meters (200 feet) in length to support the one-piece intact transportation configuration.

Due to the dedication of the entire project team and a successful DOE Standard Startup Review, railcar loadout of waste material meeting the disposal facility waste acceptance criteria occurred on February 23, 1999, ahead of the EPA regulatory milestone. The first unit train loaded with project waste left the FEMP on April 26, 1999, bound for the Envirocare facility at Clive, Utah.

Most importantly, facility construction was completed without a lost time injury.

## **Facility Maintenance**

Facility maintenance is conducted in-house with a joint Fluor Fernald and Shaw work team who support project operations with around-the-clock, dedicated maintenance. Worker classifications include Millwrights, Pipefitters, Electricians, Heavy Equipment Mechanics, Instrument Technicians, Carpenters, and Oilers. A preventative maintenance program is in place to ensure maximum availability of both the rolling stock and the process equipment.

Material handling equipment places the most extensive demand on the maintenance team due to the tough service that the equipment encounters. Lessons Learned and the experience gained in processing over 360,000 tonnes (400,000 tons) over the first three plus years of the project, have enabled the team to become familiar in undertaking the maintenance evolutions safely.

Maintenance evolutions are supported with documented work planning, warehoused spare parts, a comprehensive energy isolation program and worker involvement in the planning stage by walkdowns of the tasks to be undertaken. These have proven to be effective.

## Operations

During the construction period, a major emphasis was placed on training of workforce personnel from the Fernald site labor pool in compliance with the FAT&LC bargaining agreement. This hosted many challenges as skill level varied due to the fact that production operations at the site ceased 10 years previously and 13 worker classifications were identified to support operations and maintenance of the facility.

A training program in Facility Operations was developed and personnel were trained over a six-month period. Chemical Operator Training was the most extensive as it covered basic engineering principles along with project-specific operating procedures. Shaw startup engineers provided additional mentoring to the operations team through over-the-shoulder technical assistance until the personnel were qualified in their positions. The Chemical Operators gained good, solid operations experience during the startup phase of the project and the skill level and proficiency increased quickly. A simulator, modeling control room operations, was developed and found to be a useful tool in the training program. Upon the conclusion of Construction Acceptance Testing, System Operability Testing and a Standard Startup Review, a strong team with good core competency was in place.

Training was also conducted in all worker classifications. Heavy equipment operators were given training in front end loader operation, excavator and off road truck operation. Maintenance personnel were trained on project-specific process equipment. A total of 120 Operating and Maintenance personnel received training to support facility operations.

Waste materials are excavated from the pits using conventional excavators and haulers. The wastes are hauled to the Material Handling Building where they are segregated for feed into the dryers. Sorting, shredding and screening is then performed, as required, to homogenize the waste mixture as much as possible prior to drying. The dried wastes are carried to the railcar loading bins by front end loaders. This dryer product material may be further blended with other waste materials to achieve compliance with the waste acceptance criteria for disposal. The railcar loading bins provide a hold point for sampling and analysis prior to filling railcars with the waste material. Process water, stormwater and pit wastewater are captured and treated prior to discharge to the FEMP's wastewater management system. The waste pit material process flow (Figure 4) follows this typical path from excavation to railcar loading.

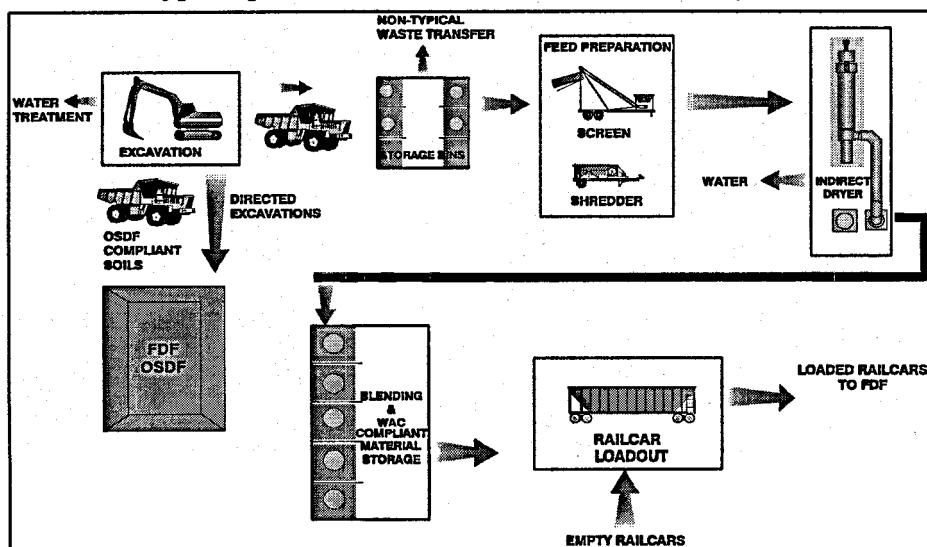


Figure 4 - Waste Pit Material Processing Flow Scheme

Waste dryer operations are conducted on a three shift, 7 days per week, 24-hour basis. To support the dryers, waste excavation occurs on a five day, one shift basis. Railcar loading is scheduled on a four or five day, one shift basis, as required.

The project has met all production goals through each operating year. With increased funding made available in 2002, the project achieved 130% of the contract loadout goal. The project has loaded out 415,000 tonnes (460,000 tons) of waste at the end of FY 2002. 74 Unit Trains transporting over 4,200 railcars have made the 6,400 kilometer (4,000 mile) round-trip journey safely from the FEMP to the Envirocare facility in Utah. With site closure now scheduled to be accomplished in 2006, the WPRAP is faced with the challenge to loadout approximately 162,000 tonnes (180,000 tons) per year for the next two years – representing a 75% production rate increase over the contract design basis operations.

## PERFORMANCE

The project was initiated under an aggressive schedule for the design, construction, and processing of the one million tons. Specifically, the project had two enforceable milestones:

- Initiation of operations (i.e., loading of waste) by March 1, 1999
- Completion of operations (including above-grade demolition and demobilization) by May 31, 2005

The project effectively met the first regulatory milestone by beginning waste loadout operations on February 23, 1999. To ensure that the completion milestone is met, the project has set an accelerated completion target for waste processing operations of September 30, 2004. The project is currently tracking to achieve the accelerated completion goal.

Since contract award, through construction and plant operations, the WPRAP team has demonstrated its ability to adapt to changing conditions while staying within strict schedule and cost constraints. In less than a year and a half, a \$25M remediation facility was designed, constructed, staffed, and started, with extensive stakeholder and regulatory involvement.

With an estimated loadout quantity of 563,850 tonnes (626,499 tons) (after drying), and an operational period of 5½ years, the project established a yearly production goal of 100,934 tonnes (112,149 tons). The project surpassed this goal in each of the first three full years of operation. In the latest Fiscal Year, the project was able to load 127,410 tonnes (141,567) tons of waste material.

Not only does the project consistently surpass its production goals, it does so safely. Over the five years since inception, the project has worked a total of over two million hours. This included a concentrated construction effort and an operation that involved approximately 200 individuals, many working in inherently dangerous environments (e.g., around heavy equipment and rail operations) in full-face respirators and double sets of anticontamination clothing. Over that time, however, the project has maintained an OSHA recordable incident rate of 1.34 (number of OSHA recordables per 100,000 hours worked). Not only is this accomplishment noteworthy in terms of the types of work performed, it is well below the industry average (from

the Bureau of Labor Statistics) OSHA recordable incident rate of 6.7, and is less than half of the DOE average of 2.9.

From the standpoint of transportation and disposal, the project has also demonstrated its success. Seventy-four unit trains transporting over 4,200 railcars of waste have safely been shipped from the FEMP to Envirocare. In addition, Envirocare has recognized the project for its ability to maintain compliance in meeting both disposal requirements and in the documentation supporting this disposal.

Through the design, construction, and over three years of operation, the project has also managed to minimize growth in the cost for performance of the work. Specifically, the total contract amount has increased from approximately \$122M to \$131M. This represents an increase of approximately \$9M, or less than 7.5%. A large portion of this increase relates to scope changes such as adding medical monitoring for beryllium exposure. Considering the magnitude of the work performed, the complexities of working with multiple workforces and performing within established FEMP work practices, etc., the ability to keep this increase down to this level is significant.

This performance is a testament to the partnering arrangement brought about through this privatization effort, and the flexibility/adaptability that each of the partners brings to the project. With the extensive experience and expertise in project execution and commitment to performance that each of the partners brings to the work, the project is able to quickly and effectively respond to change. For example, with DOE leading an effort to increase disposal options with Envirocare, the WRAP team has been successful in working with Envirocare technical staff to accelerate waste shipments. Considering the dynamic nature and complexity of the work, the overall success of the project is due to the partners pulling together, when necessary, to react to upset conditions and to proactively plan for necessary changes, to ensure continued high performance.

Recently, the project has re-evaluated the estimate of tonnage to be loaded and concluded that the final tonnage will be about 147,000 tonnes (163,000 tons) greater than originally estimated, or about 711,000 total tonnes (790,000 tons) loaded. In that completion of waste processing by the project continues to be a key to achieving the 2006 site cleanup goals, the project's annual loadout goals have been changed to ensure that processing can still be completed by September 30, 2004. Specifically, even with the gains made by the project to date, the tonnage goals for FY 03 and FY 04 have been increased to 162,000 tonnes/year (180,000 tons/year).

As it has consistently done in the past, however, the project is adapting to meet these new goals. Operations have been modified to provide for dryer operations 24 hours per day, 7 days per week (an increase in the drying capability of over 50%).

## SUMMARY

The first unit train loaded with waste from the Waste Pits Remedial Action Project shipped from the DOE Fernald Environmental Management Project on April 26, 1999. Since then, the FEMP has shipped a unit train on an average frequency of once every 20 days. To be in synch with Fernald's 2006 cleanup goal, the WPRAP must shave 4 days from this turnaround time and accelerate unit train shipments to once every 16 days starting in Fiscal Year 2003.

One of the principal benefits the privatization of the excavation, processing and railcar loadout activities of the WPRAP provides is the capability for more rapid provision of services. Specifically suited to this required expansion of treatment capacity, the privatized contractor, Shaw, mobilizes quickly, expanding treatment capability, and avoiding timely consuming procurements.

The WPRAP completed full repayment of Shaw's capital outlay in roughly the first 20 months of operation in connection to the contract's results-oriented performance objective of 270,000 tonnes (300,000 tons) of waste processed and loaded.

The key components for success of the privatization contracting for the WPRAP at the FEMP were Fluor Fernald Inc.'s development of a strong procurement package, setting a reasonable capital outlay along with a reasonable recovery timeframe, utilizing demonstrated commercialized technology, and the dedication to success displayed by Shaw as the parent corporation of the privatization contract for the WPRAP.

At the close of Fiscal Year 2002, the project loaded out 414,000 tonnes (460,000 tons) of waste. Seventy-four unit trains transporting over 4,200 total railcars safely completed the 6,400 kilometer (4,000 mile) round-trip journey from the FEMP to the Envirocare facility in Utah. The WPRAP has surpassed all production expectations through each operating year. In Fiscal Year 2002 the project achieved 130% of the contract loadout goal. In Fiscal Year 2003, the WPRAP is faced with the challenge to loadout approximately 162,000 (180,000 tons) per year for the next two years – representing a production rate of 175% over the contract design basis operations.

The WPRAP has been a resounding success undertaking the privatization model of contracting.

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