

## **“OUTSIDE OF THE WAG” THINKING AT THE INEEL CERCLA DISPOSAL FACILITY**

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### **ABSTRACT**

Remedial strategies at the Idaho National Engineering and Environmental Laboratory (INEEL) have typically compartmentalized restoration activities at the site's ten waste area groups (WAGs). While this segregation proved successful in identifying and directing actions specific to each WAG during the 1990s, the Department of Energy (DOE) recognized that integrated, “best value” approaches were needed to transition the clean-up philosophy from past WAG-specific risk management to future site-wide risk reduction. Recently, in a departure from previous practices, the INEEL Management and Operations contractor, Bechtel BWXT, LLC (BBWI), awarded the operation and Phase 2 construction of the INEEL CERCLA Disposal Facility to the team of S.M. Stoller Corporation, CH2M HILL, Phenix of Idaho, Inc., and Envirocon, on a “cradle to grave” subcontract that applies commercial, site-wide solutions to INEEL waste management. This paper presents the Stoller team's approach to delivering facility operation, management, and construction services that “think outside the WAG” to contribute to DOE's goals to reduce risk and complete cleanup work from past INEEL missions by 2012.

### **INTRODUCTION**

#### **The “WAG-Focused” Approach**

The U.S. Environmental Protection Agency (EPA) placed the Idaho National Engineering and Environmental Laboratory (INEEL) on the 1989 National Priorities List as a facility site requiring action within the context of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Under the CERCLA requirements, the Department of Energy (DOE) became responsible for assessing, characterizing, and remediating contaminated INEEL areas that posed risks to human health or the environment—a daunting task, considering that the site encompasses 890 square miles of semi-desert land in southeast Idaho.

In an effort to break the site work into smaller, more manageable activities, the 1991 Federal Facility Agreement and Consent Order (FFA/CO) between the DOE, the EPA, and the State of Idaho, subdivided the INEEL into 10 waste area groups (WAGs). By partitioning the site by WAG, the FFA/CO could set legally enforceable milestones and provide the rules and framework for response actions taken for the numerous releases or potential releases at the site.

As the CERCLA-driven assessments and characterization activities began and continued at the INEEL throughout the 1990s, this WAG-focused approach made it possible for each WAG to seek remedial decisions unique to that site and, in some cases, with minimal interface with the other WAGs. Due to the

fact that ongoing actions, schedules, and budgets were WAG-specific and that the nature of remediation varied across the WAGs, communication and integration across the sites were somewhat limited.

However, as characterization was completed and remedial action decisions were being developed, the WAGs had two issues in common: 1). all need to safely remove, store, and dispose of the CERCLA waste generated; and 2). the options available to implement this work were limited and costly.

After evaluating the space limitations, waste acceptance criteria, costs, and transportation issues inherent to off-site disposal of the waste, the DOE, the EPA, and the State of Idaho agreed that an on-site disposal facility was the safest and most cost-effective solution for much of the CERCLA waste at the INEEL. Records of Decisions (RODs) began to include this future facility as part of their selected remedies, and the INEEL began the search for a subcontractor to build it. The construction of the INEEL CERCLA Disposal Facility, known as the ICDF was launched in July 2001.

### **The ICDF Complex**

The ICDF Complex is a 40-acre engineered disposal facility designed to accept and consolidate the low-level CERCLA waste generated by ongoing remedial actions at different WAGs, thereby significantly reducing the overall footprint of contamination at the site. With the construction of a second landfill cell soon to be completed by the Stoller Team, the complex currently includes the Phase 1 landfill, evaporation ponds, and centralized receiving, inspection, administration, storage/staging, and treatment areas.

Notably, the ICDF Complex is a highly visible project, and the need for exhaustive documentation reflects the extreme prudence with which the DOE, the EPA, and the State of Idaho approached the facility's design and construction. Specified by multiple RODs as an essential element of selected remedial actions, the ICDF Complex has become crucial to the INEEL's ability to meet the numerous milestones outlined by the FFA/CO, but is the only major CERCLA facility built at the INEEL for site-wide purposes. Unlike the WAGs, which have traditionally been managed as independent units, the ICDF Complex demands management approaches to operations and maintenance that merge site-wide needs with an aggressive schedule that requires the use of standard commercial practices.

### **The Transition to New Clean-Up Approaches at the INEEL**

With the BBWI restructuring of scope at the INEEL and through award of the contract for the ICDF operations and maintenance to the S.M. Stoller Corporation (Stoller), CH2M HILL, Phenix of Idaho, Inc., and Envirocon team (Stoller team), the INEEL signaled a break with WAG-focused tradition and began the transition to site-wide management approaches. As recently as two years ago, the ongoing ICDF construction, operation, and management work most likely would have been subcontracted piecemeal to numerous firms, opening the door for high procurement costs, disassociated end-goals, and disjointed processes. Currently, with the CERCLA remedial work at the INEEL moving toward the removal, storage, and final disposal of contaminated waste streams, DOE is seeking experienced turn-key subcontractors who can offer cradle to grave, commercial management practices to reducing risk and completing cleanup work from past INEEL missions by 2012.

Stoller's inclusive subcontract for the ICDF Complex marks the beginning of innovative subcontracting approaches in the DOE arena: approaches that encourage small business competition, establish performance goals, streamline processes, reduce duplicative efforts, coordinate systems and procedures,

and curb scope creep—approaches that, in short, accelerate risk reduction and lower costs. The following sections present the Stoller teams Management/Teaming strategy, execution of work, the initial results of implementation, and the benefits to this approach.

## **TEAMING STRATEGY**

The DOE's need for turnkey services in excavation, packaging, transportation, and landfill expansion and operations was the driving factor behind Stoller's partnering strategy with CH2M HILL, Phenix of Idaho, and Envirocon. The collective credentials of these firms demonstrated a depth and breadth of capabilities that presented a dynamic coalition of advantages:

- DOE experience in excavating, packaging, and transporting radioactive and hazardous waste
- Recognized success in CERCLA landfill operations for the DOE and other clients
- Direct ICDF engineering and construction background, laced with a strong working knowledge of INEEL operating procedures, remediation requirements, waste management practices, quality control, and health and safety measures
- Superior intra-team relationships established and seasoned during previous long term project work at Rocky Flats Environmental Testing Site
- Local offices capable of promptly responding to project needs for both short-term and long-term professional personnel and heavy equipment.

Each firm offered outstanding qualifications and experience, but to reduce risk and complete the ICDF Complex Implementation Project in the most cost efficient manner, the partnering firms also needed to function as an organized unit with converging roles and overlapping communications, not as isolated entities operating in a vacuum. Stoller framed this intra-organization by starting with an overall team structure that leveraged each firm's core capabilities, then rigorously defined and synthesized each firm's project responsibilities, fully delineating accountability, yet tightly networking the combined resources. Stoller retained ultimate authority for overarching management tasks as the prime contractor, serving as the administrative and managerial focal point for the three partnering firms and ensuring the smooth coordination of the myriad tasks comprising the scope of work.

As shown in Figure 1, Stoller is responsible for Project Management, ESH&Q, Project Controls, Project Schedule, Waste Acceptance, Waste Tracking, and Remediation Oversight. In addition to running the complex—managing excavation, transportation, and disposal of the soils—the Stoller team is also responsible for constructing the second landfill cell planned for 2004 through 2005. Phenix of Idaho will perform the complete earthwork package for the Cell 2 construction, as well as build the cell's liner system. This second cell construction effort will be managed and supported by CH2M HILL. The safe and compliant transportation of waste from the excavation site to the ICDF, and day to day management and operations of the ICDF Complex, will be performed by Envirocon. In addition, the Stoller team handpicked several specialized local contractors with INEEL experience to assist in select tasks that will arise as the project progresses.

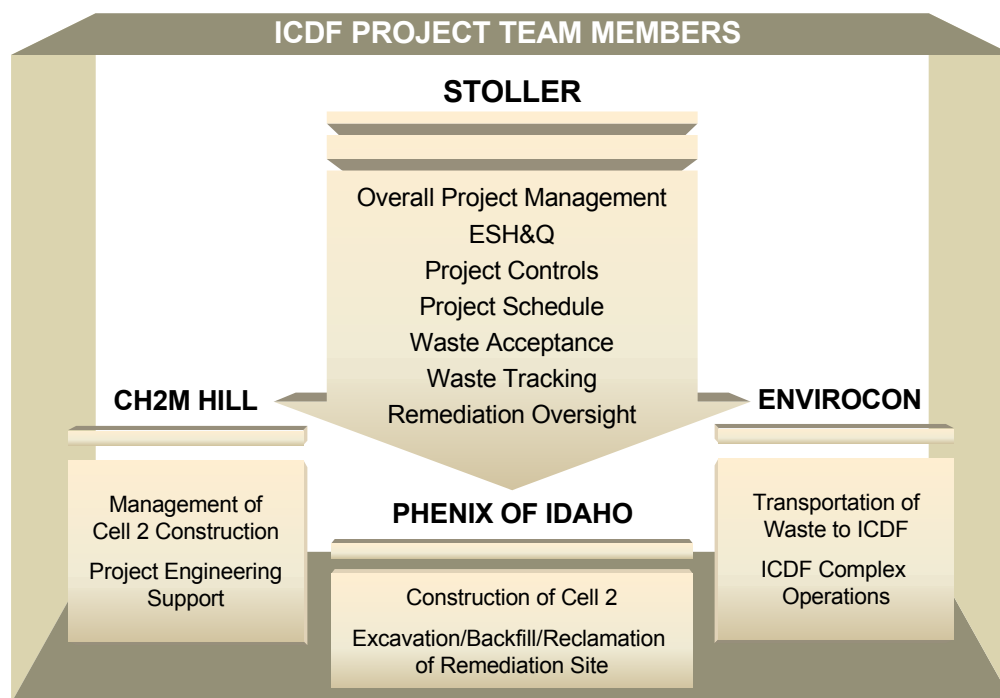


Fig. 1 The ICDF complex team

Each company on the Stoller team demonstrates specialized expertise in the areas of excavation, packaging, and transportation of radioactive and hazardous wastes, and the team's cumulative knowledge is significantly enhanced by lessons-learned and experience gained at the INEEL and other DOE sites. However, of equal importance is the unique cross-firm combination of sub-teams assigned to key parts of the execution, as discussed in the Management Strategies section below.

## MANAGEMENT STRATEGIES

The concept for the scope of work included four pivotal categories—resource allocation, project management, work execution, and cross-cutting management functions. While this paper emphasizes the cross-cutting management functions the Stoller team is implementing throughout the project, an overview of the three other categories begins to illustrate the project-wide benefits offered by the team's extensive experience and tightly-knit structure.

### Resource Allocation

Recognizing the many different managerial, technical, and construction interfaces required by the project, Stoller anticipated the need for short-term personnel and equipment, and thus partnered with firms capable of mobilizing quickly from national and local offices. Stoller and CH2M HILL, while maintaining local offices, can also draw upon their national pools of experts whenever the need arises, and Stoller additionally pre-selected several key subcontractors to perform periodic short-term work. Phenix provides construction equipment and operators from its Idaho Falls base. As a national remediation contractor, Envirocon not only can provide the personnel for operations, but also possesses a large fleet of company-owned equipment that can be temporarily matrixed into the project to augment the Phenix equipment when needed. This interconnection of each company's resources contributes to the Stoller team's ability to meet contractual commitments and satisfy project milestones.

## Project Management

Basing the team’s management approach on the model currently in place at the INEEL, Stoller assigned multi-functional roles and responsibilities to the team members. As detailed in Figure 2, the core functions are supported by cross-functional management of other key project responsibilities, with the skills of each partnering firm on the Stoller team combined across the tasks.

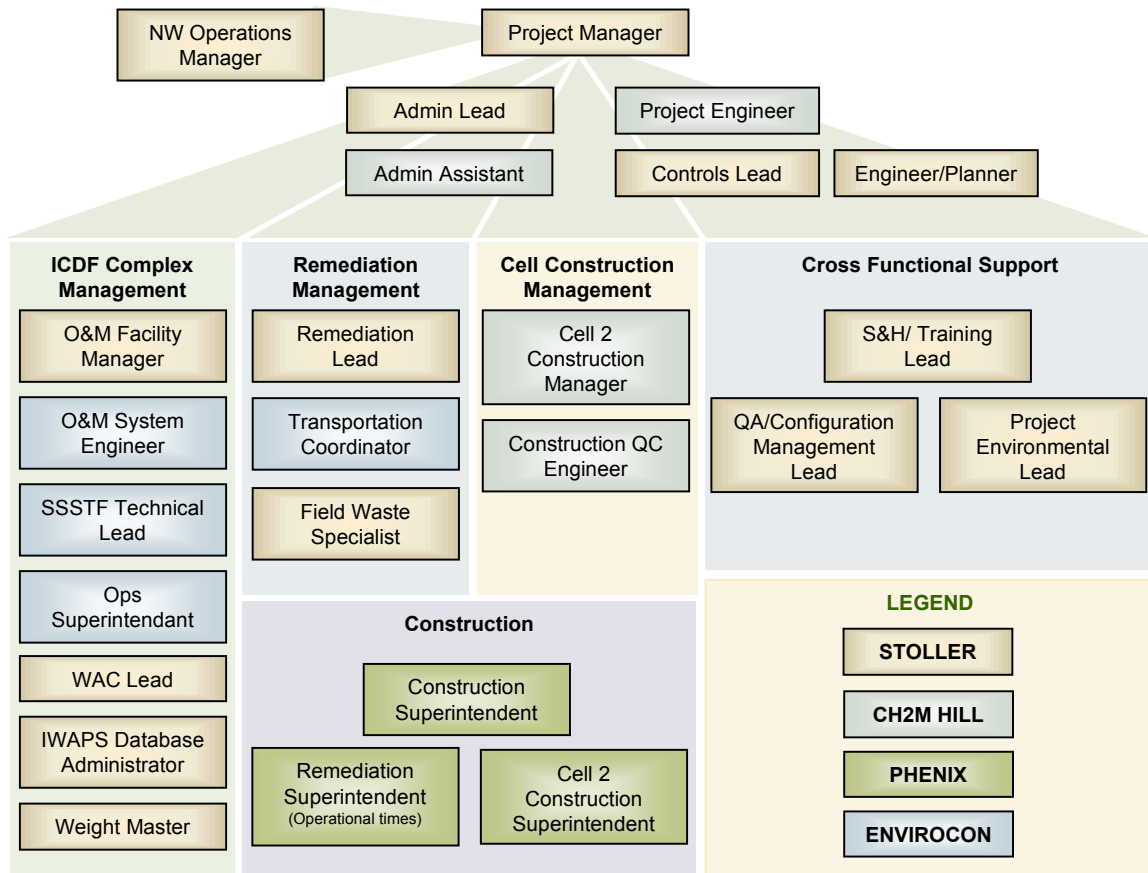


Fig. 2 The ICDF complex team cross-functional organization

This management approach not only leveraged each firm’s strongest assets, but also immediately began to set the stage for future interaction within the Stoller team and for provider-client interfaces throughout the duration of the project. Strong communications would be a critical element of the execution of work, as discussed in the following section.

## EXECUTION OF WORK

The Stoller team’s approach to executing the work involved in the ICDF Complex Implementation Project encompassed three primary components: Cell 2 construction, remediation of the various sites, and ICDF operations and maintenance (O&M), which will include landfill operations, waste placement, operation of the evaporation ponds, and operations of the Staging, Storage, Sizing, and Treatment Facility (SSSTF). For the construction, the team is providing all labor, supervision, materials, supplies,

tools, equipment, facilities, technical and professional services, quality control testing, and documentation—again, drawing on the multidisciplinary pool of the teaming partners. For the waste produced during the ongoing remediation at different areas at the INEEL, the team applied their extensive collective INEEL and DOE knowledge to design a flow process for safely and efficiently excavating, removing, and transporting CERCLA waste to the complex. Guided by the ICDF Complex’s O&M Plan, the Stoller team will bring a new level of site-wide interfaces between BBWI and the operations and maintenance of the Complex. Figure 3 offers an overview of the project components and the planned provider-client interfaces that will streamline the detailed and complex tasks involved.

<b>Stoller Cell 2 Construction</b>	<b>Team</b>	<b>Stoller Remediation</b>	<b>Team</b>	<b>Stoller ICDF Complex O&amp;M</b>	<b>Team</b>
Construction Schedule		Safety Meetings		Transportation and RO/RO Handling	
Site Access and Temporary Facilities		Equipment		Equipment	
Excavation and Screening Operations		Operations - General		Material Handling for Transport	
Cell 2 Liner Construction		Facilities - General		Traffic Safety	
Soil Bentonite Liner		Record Keeping - General		Spill Prevention and Response	
Geosynthetic System and Leachate Collection		Remediation H&S		Waste Tracking	
Installation of Landfill Components				Landfill Operations and Waste Placement	
Cell 2 Construction H&S				Evaporation Pond Operations	
				SSSTF Operations	
				ICDF Complex H&S	
				ICDF Complex Compliance	
				ICDF Complex O&M Sampling	
<b>Client Interfaces</b>		<b>Client Interfaces</b>		<b>Client Interfaces</b>	
BBWI Program/Facility		BBWI Dig Site Facility		BBWI Facility Management	
ER Program		BBWI ER		ICDF Users	
WAG 3 Manager				BBWI Resources	
ICDF Facility Manager				BBWI Safeguards and Security	
BBWI Construction Management				BBWI Maintenance	
				BBWI Emergency Response	
				BBWI Engineering/CM	
				ES&H/Rad Control	
				Monitoring	

Fig. 3 Components of work and associated Stoller-BBWI interfaces

The delineation of the provider-client interfaces for each primary component of the work, combined with the previous establishment of cross-functioning team members, allowed the Stoller team to institute communication channels that would directly support cross-cutting management functions. As discussed in the following section, these functions are applicable throughout the life of the project, and are considered critical to its success.

## **CROSS-CUTTING MANAGEMENT FUNCTIONS**

Given the substantial resource pool generated through its partnering strategy, the Stoller team was able to propose a matrix management approach to supporting the cross-cutting functions of the project, which include:

- Acquisition and Procurement Strategies
- Project Performance Baseline and Project Controls
- Risk Assessment and Mitigation
- Environmental Safety and Health
- Quality Control.

One of Stoller team's challenges was to immediately "ramp up" the project and execute the scope of work within an aggressive schedule, which formed the core of their acquisition and procurement strategy. Working closely with BBWI, the team developed a credible baseline for the project that identified milestones and integrated directly with BBWI's program schedule. This baseline, which serves as a primary management tool, allows the Stoller team to rigorously monitor progress, assess potential internal and external schedule requirements, and plan future activities, resources, and cash flow throughout the project.

In conjunction with the baseline, Stoller implemented project controls, defining reporting requirements, frequencies, content, distribution, change control systems and risk mitigation through the strengths of each team member. The Stoller Team is experienced with INEEL and DOE safety programs, such as the Integrated Safety Management System and the Voluntary Protection Program, and specifically knowledgeable of waste management strategies already in place for the ICDF Complex, the Stoller team's approach to Environmental Safety and Health integrates smoothly with BBWI's current programs and ensures that ongoing work is conducted in accordance with all safety regulations and compliance documents.

However, the platform for the cross-cutting success of these management functions is the critical and continuous flow of communications between the Stoller team and the BBWI management. As shown in Figure 4, the ICDF management draws upon site-wide programs administered by BBWI as well as the project-specific management tasks performed by Stoller. This regular and responsive interaction between the client and the Stoller team, in addition to ensuring the smooth execution of tasks, reinforces the concept of INEEL management approaches that move away from the WAG-focus to encompass site-wide needs.

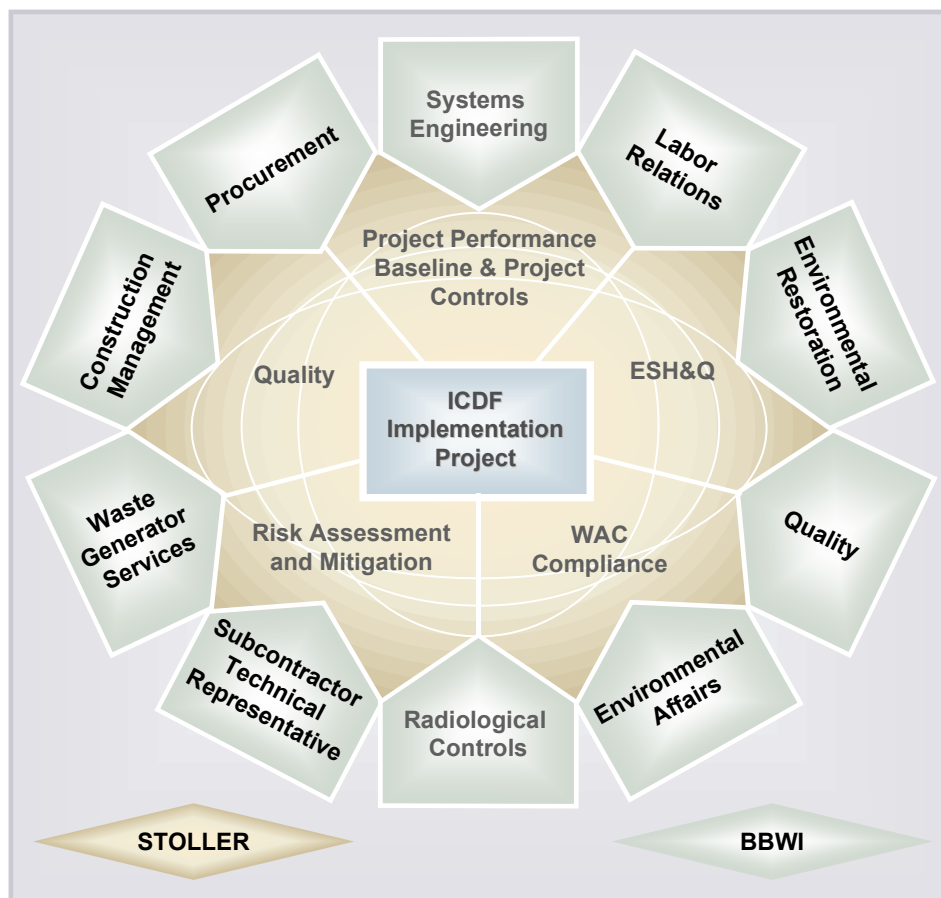


Fig. 4 BBWI and Stoller ICDF project team schematic.

## INITIAL IMPLEMENTATION AND RESULTS

As an on-site facility for CERCLA-generated waste, the ICDF Complex allows the INEEL to reduce off-site shipments and minimize WAG-specific waste management costs, which further allows each WAG to refocus on the urgent mission of risk reduction and cleanup. By operating the ICDF as a complete, site-wide waste management system, the Stoller team is demonstrating the effectiveness of cross-cutting WAG waste management to speed these remedial actions. Since contract award, the Stoller team has launched efficient operations at the ICDF that are incorporating the needs of CERCLA waste-generating WAGs to expedite the management of waste from its point of origin to its final disposition. As a result of the team's management strategies, waste placement at the ICDF Complex began less than 90 days from contract award. Through highly organized, structured and inter-operable processes, the Stoller team has already begun to dramatically influence the way the ICDF Complex will "do business."

For example, one of the first major tasks in the ICDF Implementation Project Schedule was the development of standard operating procedures (SOPs) for the many varied tasks involved in the ICDF daily operations. Working with key BBWI program representatives, the Stoller team initially created draft SOPs and job safety analyses for the ICDF equipment and facilities, leveraging team specialists to ensure consistency and compliance across the documents. Then, the Stoller team "field tested" the draft SOPs by employing them as manuals during extensive, hands-on training sessions for the staff responsible for ICDF operations. As the staff worked through the different procedures, the draft SOPs



remained living documents, undergoing revisions as disconnects, ambiguities, or technical details became evident over the course of the training sessions. By addressing the SOP revisions within this workshop atmosphere, the Stoller team ensured that the final documents were exceptionally clear and written specifically to the needs of the ICDF operators and personnel. Conversely, Stoller's encouraging the training staff to test the draft SOPs under true field conditions reinforced the staff's overall understanding of proper procedures, compliance issues, and health and safety regulations. Thus, when the first cell of the ICDF landfill became available for use on September 15, 2003, a highly trained staff had been instituted to begin immediate operations.

The first several months of the ICDF operations have been most notable for their lack of delays and absence of problems. Although the SSSTF is not yet in service, the landfill and evaporation ponds are fully online and currently accepting CERCLA waste from different INEEL locations. In the first two months of operation, all of the CERCLA waste from WAG 4 has been appropriately disposed to the ICDF Complex. CERCLA waste from WAG 1 and WAG 5 sites has also begun to arrive at the facility. As summarized in the list below, Stoller's integrated operations and management approaches have served to streamline and facilitate the day-to-day details of running of the ICDF complex to fully support WAG remedial actions:

- Beginning remedial activities at the WAG 4 Central Facilities Area (CFA-04) on September 15, 2003, the team removed 1,225 cubic yards of toxicity characteristic leaching procedure (TCLP) mercury contaminated soil, 5,193 cubic yards of mercury contaminated soil, and 410 cubic yards of asbestos material. The excavation of contaminated soil from the Central Facilities Area marks the last of the physical cleanup work at the facility, and the Stoller team has backfilled the site and reclaimed the area.
- Beginning remedial activities at the WAG 5 Auxiliary Reactor Area (ARA-23) on October 16, 2003, the team has remediated over 5,500 cubic yards of radiological contaminated soil as of November 20, 2003.
- Beginning remedial activities at the WAG 1 Test Area North (Technical Support Facility-06, and Technical Support Facility -26) on October 27, 2003, the team has remediated/stockpiled over 1,500 cubic yards of radioactive contaminated soil.
- To date, the team has disposed of 78,079 gallons of liquid waste generated from sampling monitoring wells around the WAG 3 Idaho Nuclear Technology and Engineering Center in the ICDF evaporation ponds.

The Stoller team's experience, attention to detail, and vigorous interaction with BBWI management is further preventing project "surprises" from becoming project risks. Recently, when waste constituents not included in the Design Inventory were unexpectedly identified, the Stoller team was able to respond quickly and appropriately. Their resolution involved working with waste acceptance criteria (WAC) experts from both BBWI and Stoller to conduct additional modeling for contaminants not identified in the WAC documents, confirm that such contaminants would not affect the ICDF liner system, and ensure that the identified constituents complied with all National Emission Standards for Hazardous Air Pollutants (NESHAP) and Idaho Administrative Procedures Act (IDAPA) standards. Additionally, the Stoller team is currently working cooperatively with waste generators to support characterization / verification sampling and help prepare waste profiles, ensuring that the waste profile information sent by the generating sites is accurate and consistent and that all waste is pre-approved before leaving a site. The team's rapid actions to resolve this WAC issue prevented potential delays to the project schedule, which remains on target.

The safe construction of the second cell has begun and is both on schedule and on budget. In addition, DOE has found that the Stoller team's ability to offer local comprehensive services and resources makes it possible for the team to accept additional scope and incorporate that new work easily into ongoing tasks.

The Stoller team's experience and site-knowledge has provided a turnkey product for the customer that is gaining rapid recognition for its high quality. Recently, the INEEL Mission Excellence Program rated the ICDF Complex a 10.0 — making the ICDF Complex one of the few facilities ever given a 10.0 ranking.

## **SUMMARY/CONCLUSION**

The Stoller team's performance to date has begun to establish a site-wide and, in some cases, commercial approach to the operations of the ICDF Complex that will apply to waste management over the lifetime of this project and will be applicable at similar site throughout the DOE arena. Combining astute teaming and management strategies with broad experience and highly interactive client-provider teamwork, the Stoller team is demonstrating the advantages of transitioning to cross-WAG waste management approaches that immediately reduce duplicative efforts and increase performance. Already, the team has streamlined processes, coordinated systems and procedures, and managed regulations and orders, thereby enabling the ICDF Complex to launch operations without the snags and delays typically associated with new facilities. With CERCLA waste arriving on schedule from a variety of INEEL sites.

Having carefully established performance goals early on in the project with BBWI, the Stoller team defined schedules, milestones, and standards that have prevented and will continue to prevent scope creep and avoid or quickly mitigate project risks that may arise. Most importantly, the Stoller team's local, accessible, and highly experienced professionals offer the DOE a "one-stop shopping" advantage that opens the door for additional work, performed with the same high quality and commitment to safety. As federal sites throughout the DOE prepare to make the shift from WAG-focused actions to site-wide waste management approaches, the Stoller team is proving that "thinking outside of the WAG" puts the INEEL on the fast track to achieving its goals for 2012.