

**Impacts of the American Recovery and Reinvestment Act
on the Ongoing Cleanup of the Idaho National Laboratory Site, Idaho, USA – 10457**

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ABSTRACT

The \$437 million in American Recovery and Reinvestment Act (ARRA) funding for the Idaho Cleanup Project is helping to achieve at the Idaho National Laboratory Site “base” footprint reduction and environmental cleanup that would have been deferred based on competing funding priorities, is accelerating other priority cleanup work, and is providing numerous lessons learned for potential application throughout the U.S. Department of Energy Complex. Notably, CH2M♦WG Idaho, the managing contractor of the Idaho Cleanup Project, was staging in early 2009 to lay off a large number of highly skilled deactivation and decommissioning workers because of funding priorities. But the influx of ARRA funds allowed this skilled workforce to be retained and ultimately resulted in the creation of 550 jobs. ARRA funding also has allowed accelerated disposition of excess, highly contaminated, Site nuclear facilities and radioactive waste; has accelerated processing and shipping off-Site of large quantities of remote-handled transuranic waste and ultimately will double the capacity to characterize and repackage the waste; and has accelerated exhumation and retrieval of additional targeted transuranic buried waste. Most importantly, the ARRA investment at the Department of Energy’s Idaho National Laboratory Site will help reduce overall Site human health and environmental risks.

INTRODUCTION

The U.S. government established the National Reactor Testing Station in 1949 in the high desert of southeastern Idaho, roughly 64 kilometers (40 miles) west of Idaho Falls, Idaho. Now called the Idaho National Laboratory (INL) Site, the remote setting provided an ideal location for the designing, building, and testing of prototype nuclear reactors to achieve energy and military objectives. Over the years, 52 first-of-a-kind reactors were constructed at the INL Site, which comprises a vast 571,000 acres (890 square miles).

During the 1970s, the INL’s mission broadened into other areas such as biotechnology, energy and materials research, and renewable energy. At the end of the Cold War, treating waste and cleaning up previously contaminated sites became a priority.

Today, the INL Site serves two distinct missions: (1) nuclear and energy research, science, and national defense programs directed by the U.S. Department of Energy (DOE) Office of Nuclear Energy (NE); and (2) cleanup programs directed by the DOE Office of Environmental Management (EM). Three major programs operate from the INL Site: the Idaho National Laboratory managed by the Battelle Energy Alliance (BEA), the Idaho Cleanup Project managed by CH2M♦WG Idaho (CWI), and the Advanced Mixed Waste Treatment Project managed by Bechtel BWXT Idaho.

On May 1, 2005, CWI began its seven-year, \$2.4 billion Idaho Cleanup Project contract [1] to clean up the DOE INL Site. By the time the work is completed in 2012, 3,406,871 liters (900,000 gallons) of sodium-bearing waste will have been treated; 11 high-level waste tanks, each with a 1.1 million-liter (300,000-gallon) capacity, will have been grouted and closed under the Resource Conservation and Recovery Act [2]; more than 100 facilities will have been demolished or dispositioned; thousands of containers of buried transuranic waste will have been retrieved; thousands of cubic meters of contact-handled and remote-handled transuranic waste will have been shipped off-Site; almost 200 release sites and voluntary consent order tank systems will have been remediated; and thousands of units of spent nuclear fuel will have been moved from wet to dry storage.

The ARRA scope of work focuses on footprint reduction and cleanup activities performed by CWI in six major geographic areas at the INL Site:

- **Idaho Nuclear Technology and Engineering Center (INTEC)**—Since operations began in 1953 until 1992, the INTEC facility supported the recovery of usable uranium from spent nuclear fuel from government reactors and to store spent nuclear fuel. INTEC’s current mission includes temporary storage of spent nuclear fuel and other radioactive waste, management of legacy and current waste, and D&D activities.
- **Radioactive Waste Management Complex (RWMC)**—Since operations began in 1952, the RWMC has been used to manage, store, and dispose of waste contaminated with radioactive elements generated by national defense and energy programs.
- **Materials and Fuels Complex (MFC)**—Formerly managed by Argonne National Laboratory, since 1949 MFC work has focused on developing innovative solutions for nuclear power technology, including nuclear fuel development, separations development, post-irradiation examination, and fast reactor development.
- **Advanced Test Reactor (ATR) Complex**—Since operations began in 1952, the ATR Complex has served as the focal point in delivering the INL Site’s energy research mission. The Complex houses three major test reactors: the Materials Test Reactor, the Engineering Test Reactor, and the Advanced Test Reactor.
- **Critical Infrastructure Test Range Complex (CITRC)**—Since 1972, the CITRC facility (formerly called the **Power Burst Facility**) has been used to conduct experiments at the INL to help determine safe operating parameters for the commercial nuclear industry and validate Homeland Security technologies to protect the nation’s infrastructure.
- **Test Area North (TAN)**—From 1955 until its D&D in 2009, the TAN facilities were used to support numerous research efforts to advance the country’s nuclear industry from the development of nuclear powered jet engines to operation of reactors that simulated the loss of coolant.

Figure 1 on the following page illustrates the location of these facilities at the INL Site. The ICP ARRA scope of work being conducted at the Site includes:

1. **Deactivation and decommissioning (D&D) of facilities and structures at INTEC, CITRC (PBF), RWMC, the ATR Complex, and MFC**—When complete, 87 DOE structures and facilities will have been demolished or dispositioned under ARRA, resulting in footprint reduction of more than 800,000 square feet.

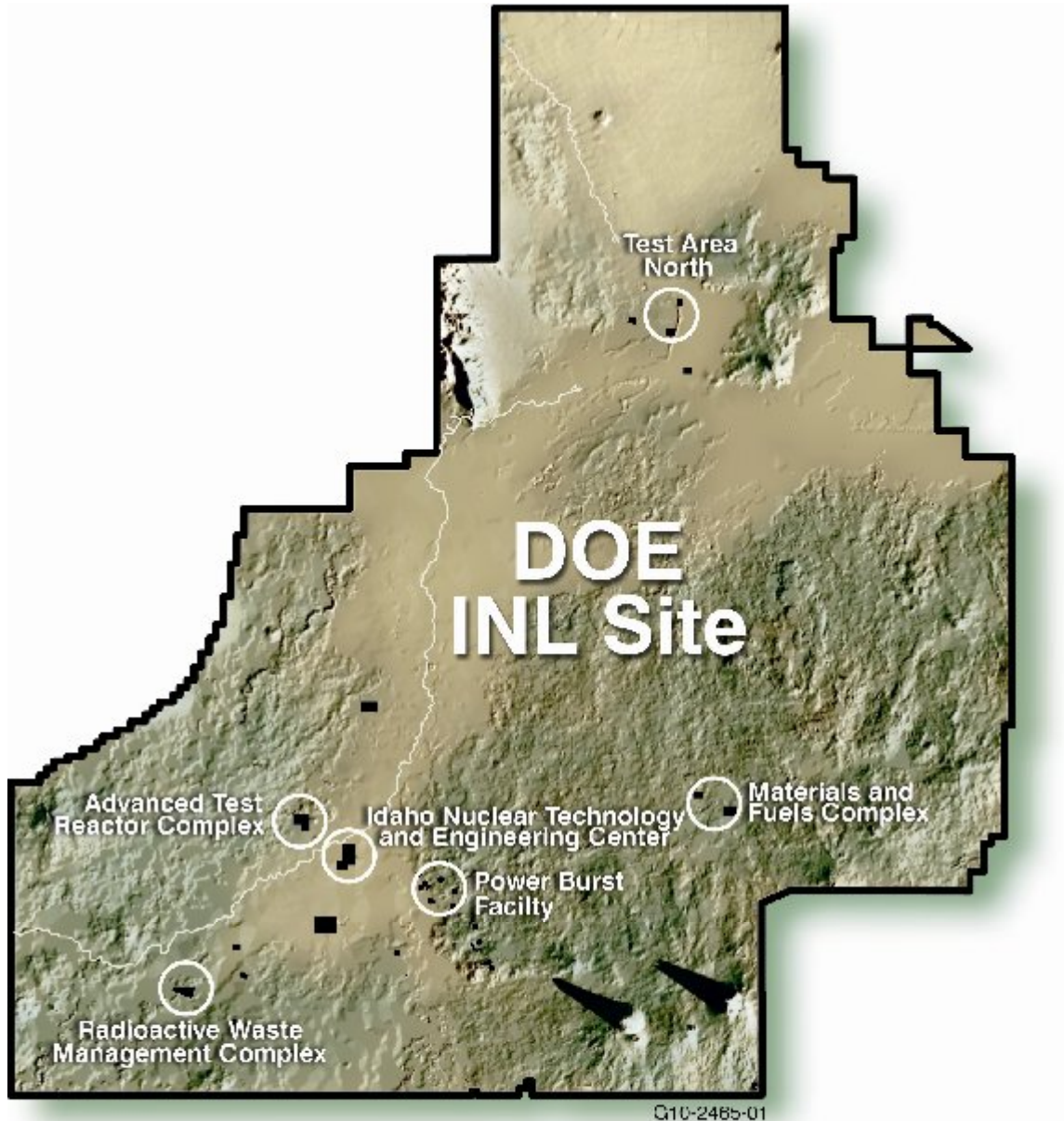


Fig. 1. Location of ARRA cleanup activities at the DOE National Laboratory Site in Idaho.

2. **Remote-handled (RH) transuranic (TRU) waste processing at INTEC**—When finished by the end of September 2011, 161 containers of RH-TRU and mixed RH-TRU waste will have been processed under ARRA, and the majority of these materials will have been shipped to DOE’s Waste Isolation Pilot Plant (WIPP).
3. **Buried waste exhumation from the Subsurface Disposal Area, located at the RWMC**—Additional targeted TRU and other wastes are being exhumed from the Subsurface Disposal Area under ARRA and additional temporary retrieval facilities are being constructed.

To accomplish this undertaking, CWI developed an approach that safely achieves these cleanup objectives on an accelerated schedule. That approach comprises the following key elements:

- Emphasize safety as the foundation of all work
- Effective classroom and hands-on block training to quickly bring new ARRA workers in line with the company's safety expectations.
- Focus the highest attention on critical path and near-critical path activities (i.e., those that will significantly impact project completion if they slip)
- Employ proven technologies and approaches to increase work efficiency and safety.
- Share a substantial portion of the company's fee from ARRA work with employees

ICP ARRA STATUS

The ARRA investment at the Idaho Cleanup Project is accelerating completion of existing environmental protection and INL Site cleanup goals, the disposition of excess nuclear facilities and radioactive waste from the DOE-NE program much earlier than planned, and reduction of environmental threats to the Snake River Plain Aquifer. The entire INL Site, which lies over the sole source aquifer [3], was declared a Superfund site in 1989 [4,5]. The investment supports DOE-EM goals to safely disposition large volumes of nuclear waste and deactivate and decommission hundreds of contaminated facilities no longer needed by the Department to carry on its current mission, and fulfills the Department's commitments to reduce overall health and environmental risks.

Specifically at ICP, ARRA provides for (1) the acceleration of D&D of nuclear and radiological facilities that no longer have a mission, (2) the treatment and repackaging of RH-TRU waste in preparation for final disposition at WIPP, and (3) the acceleration of targeted waste retrievals from the Subsurface Disposal Area in support of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [6] Record of Decision for RWMC [7] and the Agreement to Implement with the state of Idaho to exhume certain buried transuranic waste from the RWMC's Subsurface Disposal Area [8,9].

In early 2009, CWI was staging to demobilize a highly skilled D&D workforce because of higher Site funding priorities. The influx of ARRA funds allowed CWI to retain this skilled work force and continue the accelerated demolition of the INTEC, RWMC, ATR Complex, and CITRC (PBF) facilities that were within the contract scope. The ARRA also increased the D&D contract scope to include additional facilities from the DOE-EM life-cycle baseline and DOE-NE facilities that were transferred to DOE-EM management.

In support of the continued disposition of RH-TRU waste, ARRA funds are providing for the tooling design, facility modifications, retrieval, processing, and packaging of DOE-NE RH-TRU and mixed RH-TRU waste for final disposition to WIPP. When finished, the deployment of ARRA funds will ultimately double CWI's capacity to characterize and repackage RH-TRU waste at INTEC.

In the fall of 2008, DOE, the U.S. Environmental Protection Agency (EPA), and Idaho’s Department of Environmental Quality signed the CERCLA RWMC Record of Decision [7] agreeing to an end state for the RWMC that includes exhuming waste from 5.69 acres of the Subsurface Disposal Area. In support of the early phases of this agreement in 2009, CWI was exhuming waste in the third exhumation facility with plans to start exhumation in a fourth exhumation facility under construction. In addition to waste exhumation, ARRA provides for the design and construction of two additional retrieval facilities, the commencement of exhumation in one of these retrieval facilities and the initial in situ grouting of mobile radionuclide sources within the Subsurface Disposal Area. These new ARRA activities position DOE for early completion of the waste exhumation and radionuclide stabilization in support of the eventual construction of an evapotranspiration barrier over the entire Subsurface Disposal Area.

Within five months of the ARRA contract award, CWI hired and trained more than 280 new ARRA workers and deployed them to the various ARRA projects. By the end of Calendar Year 2009, CWI will have retained or hired approximately 550 workers under ARRA.

Through an effective classroom and hands-on block training program (up to three weeks of training) coupled with deployment of composite crews (comprising new and retained skilled employees), CWI is delivering ARRA scope safely (more than 800,000 hours worked with zero recordable injuries and one first aid), within cost and on schedule. Notable accomplishments in 2009 toward completing the ARRA scope or work are depicted in Figure 2.

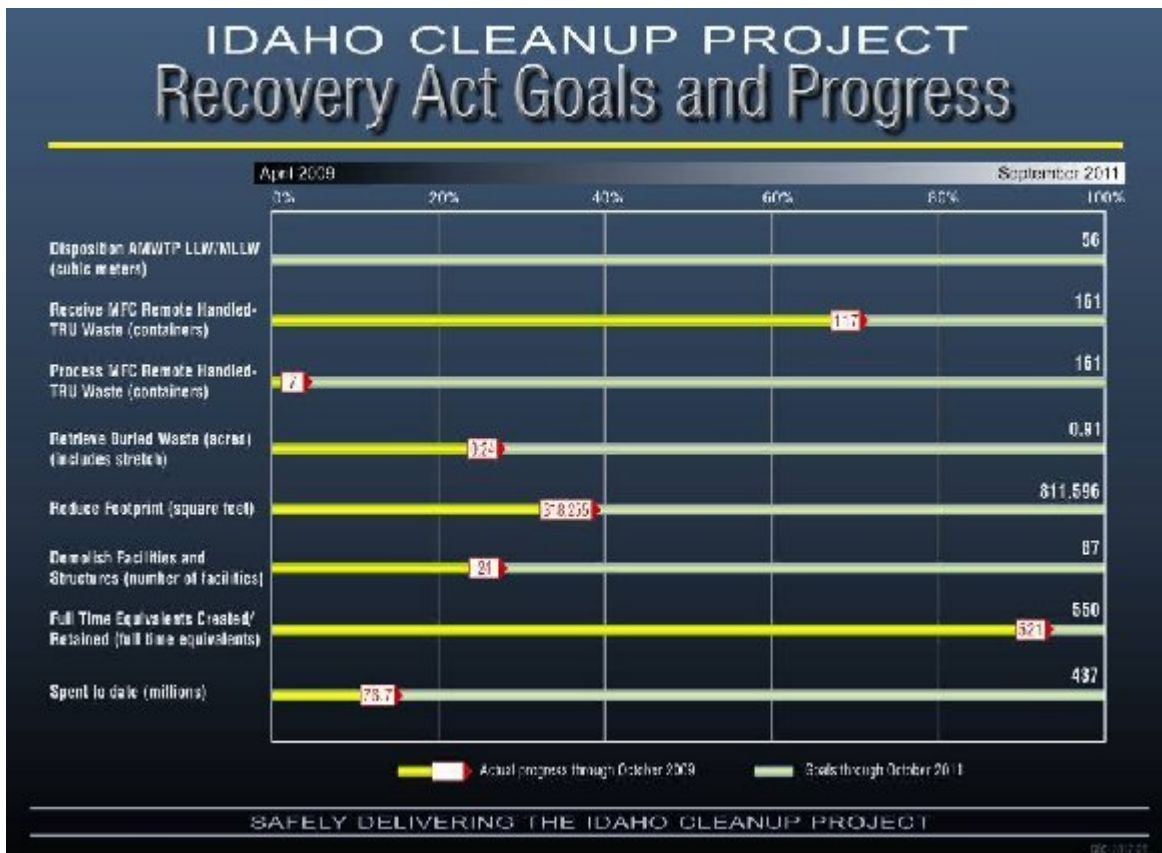


Fig. 2. ARRA project performance metrics that reflect cleanup progress.

CWI continues to make good progress toward accomplishing its ARRA scope of work. Specific project accomplishments are described below.

Deactivation and Decommissioning Progress

Idaho Cleanup Project D&D crews continued work efficiently and safely in 2009 as they surpassed their ARRA Fiscal Year 2009 Performance Milestone by demolishing 320,810 square feet of legacy facilities and structures at the INL Site. The D&D program demolished 29 out of 87 ARRA-funded facilities and structures. Bolstered by ARRA funding in April 2009, the D&D program was able to retain 200 employees and hire an additional 134 people to accelerate D&D work scope.

The D&D of three main structures—the Glovebox Excavator Method Project, Intermediate Level Transuranic Storage Facility, and Waste Experimental Reduction Facility—were included in the performance milestone. Figure 3 captures a moment of the D&D of the Glovebox Excavator Method Project facility (WMF-671) at the RWMC.



Fig. 3. D&D of the Excavator Method Project facility (WMF-671).

Remote-Handled Transuranic Waste

In 2009, CWI began receipt of RH-TRU waste from BEA operations for processing. To date, 114 of 161 containers have been received. Also in 2009, CWI completed construction activities modifying the CPP-666 hot cell (located at INTEC) to accommodate RH-TRU processing, characterization, and repackaging activities. In order to modify the hot cell, CWI had to both remotely and by manned-entry, cleanout a highly contaminated cell and then install among other things, an innovative remote-controlled container cutting tool. To date, 14 drums of ARRA RH-TRU waste have been processed in CPP-659 (a former waste treatment facility also located at INTEC) and await EPA and DOE Carlsbad Field Office approval to ship to WIPP. In addition, seven Hot Fuel Examination Facility (HFEF) -5 containers of RH-TRU waste were successfully repackaged in CPP-659 in preparation for shipment to WIPP. Characterization (real-time radiography [RTR] and dose measurement) and headspace sampling for 10 drums generated from repackaging operations in the facility also have been completed.

Significant accomplishments leading to initiation of waste processing and disposition included preparation and DOE approval of a transport plan for shipment of HFEF-5 containers from BEA to CWI; equipment installation, training, and startup of the CPP-659 production process; and collection, evaluation, and documentation of waste characterization data including acceptable knowledge information.

Buried Waste Exhumation

In support of the Record of Decision for RWMC [7], ARRA funds were used to complete waste exhumation of 0.24 acres from the Accelerated Retrieval Project (ARP) III, Pit 6. More than 1,000 cubic meters of targeted waste were removed. In addition to waste exhumation, CWI completed the design of and began the procurement for a future temporary waste exhumation facility to be constructed in the western portion of Pit 4 (ARP VI). Figure 4 depicts buried waste exhumation operations in ARP III, Pit 6.



Fig. 4. Buried waste exhumation operations in the Accelerated Retrieval Project III, Pit 6.

ICP ARRA LESSONS LEARNED TO DATE

In the course of developing and implementing the suite of ARRA-funded projects at the ICP, a number of lessons have been learned, as described below.

Reporting

- **Establish a Single Control Point for ARRA Reporting**—Although ARRA reporting requirements were generally defined by modifications to the contract between CWI and DOE, the magnitude of guidance changes, clarifications, and numerous requests for data were not anticipated. To control the influx of requests and to maintain uniformity in responses to these requests, CWI created an ARRA Program Office to be the single control point for responding to all data requests. This tactic, at a minimum, established order in addressing the plethora of requests for data from numerous DOE offices, agencies, as well as other INL Site stakeholders.
- **Take a Conservative Position**—Job reporting has been, from the very beginning of ARRA, a significant issue. Teleconferences with other sites indicated that a variety of job reporting approaches were being followed, ranging from counting new hires to applying factors to subcontracted dollars services. Initial guidance for DOE was interpreted

differently by the sites. At the very outset, CWI chose to use the full-time equivalent (FTE) calculation method (total hours billed/productive hours) to determine the number of jobs. This method avoided the issues with how to count 2,000 individual people working one hour on a particular ARRA job versus one person working 2,000 hours on an ARRA job. Do you have 2,000 jobs or one job created? As seen in numerous external articles, this has been a universal problem with all ARRA job reporting in all federal agencies. Recent guidance from DOE has addressed this problem and the FTE method has been adopted [10].

- **Ensure That Reports Are Auditable**—Anticipating that reporting could become prime audit fodder, CWI developed its strategy for responding to audits as one of its first ARRA tasks. In five months, the project has been involved in more than seven ARRA audits or reviews with several still ongoing. Key components to CWI success with these audits were (1) report processes were documented, (2) report data sources were traceable, (3) report accountability was defined in writing, and (4) report record keeping was centrally controlled (both the record copy and electronic files).

Develop and Maintain an ARRA Compliance Matrix

ARRA funding came with a significant number of new contract demands that addressed both reporting and subcontracting requirements. For CWI, an important and practical tool to ensure success was the development and maintenance of the ARRA Contract Compliance Matrix, a sample of which is provided in Table I. The Contract Compliance Matrix identifies the contract requirement, who is accountable for delivery, when the action was completed or continues to be delivered (e.g., weekly or monthly), and the proof document for compliance and link to the most recent transmittal of that document. For several of CWI audits, this matrix has been extremely beneficial in demonstrating compliance and recreates an easy roadmap for the audit team.

Table I. Sample ARRA Contract Compliance Matrix.

ARRA Compliance Matrix 8/22/09		4/13/2009				
#	Full Reporting Requirement	CWI Compliance Methodology	Contractual Due Date	Responsible Party (Contact, Phone, Email)	CWI Delivery Date	Proof Document
1	For ARRA scope related to remote-handled transuranic (RH-TRU) waste, assume the following:					
2	The proposal (cost and schedule) should identify points of contact for Naval Reactors Facility (NRF), Battelle Energy Alliance, LLC, and Waste Isolation Pilot Plant , and identify work responsibilities among the three parties. The cost and schedule should reflect all aspects of the work through final departure from the state of Idaho, or other interim or final disposition of non-TRU waste.	A matrix is being established to identify this information	Completed 7/31/09			
3	The final schedule must include critical path dates for completion of the Acceptable Knowledge Summary Report, Radiological Characterization Technical Report, and Defense Related Waste Determination . Concurrence from the Carlsbad Central Characterization Project contractor on the critical path dates is also required.	Currently coordinating with Carlsbad and working schedules and reports				
4	Provide an estimate only for accelerating the disposal of 25 Naval Reactors Facility (NRF) -owned sludge pan containers (SPCs) currently stored in vaults at NRF. The estimate should assume completion of the work scope by the end of FY 2011. DOE will review the estimate and determine a path forward.	Waste management is currently working these estimates	Completed 7/10/09			Proof Documents\RE Request for Information - NRF Sludge Pans.htm

Staffing

- **Expedited Hiring**—Prior to scope definitization with DOE, CWI mobilized and commenced hiring. Initial estimates of the number of individuals and skills required by subprojects were identified and provided to the Human Resources Department. Although the final hiring number was not yet determined by skill, this early launch allowed jobs to be posted, ads to be placed, job fairs to be held, and résumés to be collected and screened. Candidates were scheduled for interviews within weeks after the contract award, with CWI having completed most of its ARRA staffing within five months thereafter.
- **Block Training and Blended Crews**—CWI deployed block training to allow workers to qualify and also requalify to performance requirements. Block training consists of campaigning an employee or crew through multiple training courses—both classroom and hands-on—over a period of up to three weeks. The courses taken are determined by the specific ARRA project manager based on project requirements. Upon completion of the training, the new employee joins a crew of experienced workers—and mentors. This training technique has proved to be *extremely effective*. Through September 30, 2009, CWI has trained and mentored more than 300 workers.
- **Demobilization**—Every project has an end that will require demobilization of personnel and equipment. Under CWI’s contract with DOE, all ARRA scope must be completed by September 30, 2012. To mitigate some of the impacts of demobilization and eventual work-force restructuring, CWI’s strategy was to hire subcontractors first, when possible; and then, when required by union agreements, hire union employees; and, as a final choice, direct hire. Even with these hiring strategies, some work-force restructuring will be required, commencing in early 2011 and completing by late 2011. CWI is evaluating mitigation strategies to include recognition and use of natural ICP attrition, early retirement incentives (a large number of CWI ICP employees are eligible for retirement), job placement services, and so forth.

Regulatory

A significant amount of the ARRA work to be performed at the INL Site requires some form of regulatory approval by the state of Idaho and the EPA. Early engagement with the regulators and other INL Site stakeholders is absolutely key to enable the work to be approved in an expeditious fashion so that work can commence. Perhaps the best example of successful, early engagement with regulators and stakeholders by CWI has been related to the early preparation and promulgation of the Engineering Evaluation/Cost Analysis (EE/CA) for the D&D of the Experimental Breeder Reactor (EBR) II required by CERCLA to conduct “non-time-critical removal actions.” CWI expects the EE/CA to be approved by the required agencies—DOE, EPA, and the Idaho Department of Environmental Quality—by the end of January 2010.

OUTLOOK FOR SUCCESS IN 2010

Some key ARRA project milestones for 2010 include:

- Commence RH-TRU processing operations in CPP-666 at INTEC
- Commence ARRA RH-TRU shipments to WIPP
- Commence construction of the ARP VI (Pit 4 West) temporary waste exhumation facility at RWMC
- Commence exhumation of ARP IV (Pit 5) at RWMC
- Complete demolition of CPP-601/640 fuel reprocessing facilities at INTEC.

Based on its project performance to date, CWI remains optimistic about achieving all of its ARRA scope by September 30, 2011.

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