Inspection of
Environment, Safety,
and Health Programs
at the

Idaho Cleanup Project

August 2007

HSS
Office of Health, Safety and Security

Office of Environment, Safety, and Health Evaluations
Office of Independent Oversight
Office of Health, Safety and Security
Office of the Secretary of Energy

OVERSIGHT

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Abbreviations Used in This Report

CFR	Code of Federal Regulations
CWI	CH2M Washington Group, Idaho, LCC
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
EM	DOE Office of Environmental Management
EMS	Environmental Management System
ES&H	Environment, Safety, and Health
HSS	Office of Health, Safety and Security
ICP	Idaho Cleanup Project
ID	Idaho Operations Office
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
ISM	Integrated Safety Management
ISO	International Standards Organization
RWMC	Radioactive Waste Management Complex

1.0 Introduction

The U.S. Department of Energy (DOE) Office of Independent Oversight, within the Office of Health, Safety and Security (HSS), inspected environment, safety, and health (ES&H) programs at DOE's Idaho Cleanup Project (ICP) during June and July 2007. HSS reports directly to the Secretary of Energy, and the ES&H inspection was performed by Independent Oversight's Office of Environment, Safety and Health Evaluations. This report discusses the results of the review of ES&H programs as applied to ICP. Concurrently, the HSS Office of Environment, Safety and Health Evaluations also evaluated the ES&H programs applied to the Idaho National Laboratory (INL) Materials and Fuels Complex, and the HSS Office of Emergency Management Evaluations evaluated the Idaho Operations Office (ID) and INL emergency management programs; the results of these inspection activities are discussed in separate reports.

Activities at INTEC

Within DOE, the DOE Headquarters Office of Environmental Management (EM) is responsible for managing the ICP, which addresses waste management and cleanup of facilities and materials at INL. EM coordinates certain sitewide functions with the Office of Nuclear Energy, which has overall line management responsibility for INL. At the site level, line management responsibility for ICP falls under the ID Manager and is implemented primarily by ID's Office of the Deputy Manager for Idaho Cleanup Project. Under contract to ID, the ICP is managed by CH2M Washington Group, Idaho, LCC (CWI), which took over responsibility for the ICP in May 2005.

The ICP mission is to complete environmental cleanup project activities stemming from the site's Cold War legacy and other past activities involving radioactive and hazardous materials. The ICP is treating, storing, and disposing of a variety of waste streams; cleaning up the environment; removing or deactivating unneeded facilities; and moving spent nuclear fuel from wet storage to dry storage.

ICP activities involve various potential hazards that need to be effectively controlled, including exposure to external radiation, radiological contamination, hazardous chemicals, and various industrial hazards associated with decontamination and decommissioning (D&D) activities, such as electrical, noise, and construction-like activities. Significant quantities of fissile and radioactive materials and hazardous chemicals are present in various forms at ICP facilities.

The purpose of this Independent Oversight inspection was to assess the effectiveness of ES&H programs at ICP as implemented by CWI under the direction of ID and EM. Independent Oversight evaluated a sample of activities, including:

- Implementation of the core functions of integrated safety management (ISM), focusing on work planning and control systems at the activity and facility level and their application to cleanup, waste operations, and construction activities at selected activities and facilities within the ICP, including the Idaho Nuclear Technology and Engineering Center (INTEC), Radioactive Waste Management Complex (RWMC), Reactor Technology Complex, Test Area North, and the construction site for the new radioactive waste treatment facility.

- ID and CWI management and implementation of selected aspects of the ES&H program that Independent Oversight has identified as focus areas. These include environmental management system (EMS) implementation and workplace monitoring of non-radiological

hazards. Although these topics are not individually rated, the results of focus area reviews are integrated with or considered in the evaluation of other ISM elements. In examining the focus areas, Independent Oversight focused primarily on the application of institutional programs to ICP.

- CWI feedback and continuous improvement systems.

Sections 2 and 3 discuss the key positive attributes and weaknesses, respectively, identified during this inspection. Section 4 provides a summary assessment of the effectiveness of the major ISM elements that were reviewed. Section 5 provides Independent Oversight's conclusions regarding the overall effectiveness of ID and CWI management of ES&H programs, and Section 6 presents the ratings assigned during this inspection. Detailed results and opportunities for improvement were provided to EM, ID, and CWI for management consideration. Appendix A provides supplemental information, including team composition.

Appendix B presents the findings identified during this Independent Oversight inspection. In accordance with DOE Order 470.2B, *Independent Oversight and Performance Assurance Program*, EM must develop a corrective action plan that addresses each of the findings identified in Appendix B. In most cases, the findings listed in Appendix B were derived from one or more individual deficiencies that have been described in the detailed results provided to the site. EM, ID, and CWI need to ensure that the corrective action plan for the Appendix B findings addresses these individual deficiencies and includes appropriate causal analysis, corrective actions, and recurrence controls. The findings are referenced in Sections 3 and 4 of this report. The weaknesses in Section 3 provide a management-level summary of the findings; the weaknesses do not need to be separately addressed in the EM corrective action plan because the findings encompass the scope of the weaknesses.

2.0 Positive Attributes

Positive attributes were identified in ES&H programs in such areas as the team approach to supporting D&D efforts, the EMS, the analytical laboratory, and management and worker commitment to safety.

CWI's use of its Technical Response Team for D&D work at the Reactor Technology Center is a notably effective practice for supporting D&D supervisors and foremen. The Technical Response Team assists supervisors and foremen in D&D Project areas in determining a course of action when a change in work scope is proposed, or when unanticipated work conditions occur. The Technical Response Team includes members from project management, D&D, maintenance, engineering, radiological control, environmental, and industrial hygiene and provides real-time involvement and integration of health and safety professionals in situations likely to involve new or changing hazards or controls. The Technical Response Team visits each job site daily, remains on call throughout the day to provide assistance in resolving emerging work control issues, provides documented guidance, and tracks actions through completion.

CWI has an effective and well-implemented EMS and an award-winning pollution prevention program. The International Standards Organization (ISO) 14001-certified EMS has been effectively implemented within the contractor's ISM system using deployed project environmental leads and Waste Generator Services support personnel to assist line organizations in implementing environmental considerations in ICP activities. CWI, as the lead for sitewide pollution prevention activities, with active participation by other site contractors, manages an award-winning pollution prevention program that performs pollution prevention opportunity assessments, maintains the INL recycling program, and enhances pollution prevention during chemical acquisition and unneeded-product exchange. Awards include the 2007 *Federal Electronic Reuse and Recycling Campaign* award, a 2006 *White House Closing the Circle Award,* and three DOE Headquarters *Best in Class* awards in 2006.

CWI's analytical laboratory is well-run and maintained and provides a valuable asset to both ICP and INL for onsite industrial hygiene sample analysis. CWI operates and manages an accredited onsite analytical laboratory that both INL and ICP use to analyze workplace air samples collected in support of exposure assessments. The laboratory maintains a number of American Industrial Hygiene Association accreditations for metals, asbestos and bulk asbestos, organic solvents, and diffusive samplers and is particularly well suited for accepting and processing industrial hygiene samples that may be radiologically contaminated. Since October 1, 2006, the analytical laboratory has promptly analyzed 5800 metal samples and 559 asbestos samples, usually within 8 days of receipt.

CWI managers at all levels and in all organizations demonstrate a high level of involvement in improving safety performance.

Facility at RWMC

CWI managers repeatedly demonstrated their commitment to communicating high safety expectations to employees, actively promoting safety performance improvement processes and initiatives, maintaining awareness and providing leadership in identifying and addressing safety issues, and holding subordinates accountable for performance. This level of management involvement has resulted in safe work and a safer work environment. CWI managers effectively address safety performance issues and monitor performance through active participation in the Executive Safety Review Board, Corrective Action Review Boards, and the daily Safety Assessment Center calls.

CWI workers are actively and effectively involved in creating a safer workplace and in improving safety performance. CWI workers have established numerous, robust employee safety teams that are active in promoting safety throughout the project, using a number of processes and activities. Employee safety team members work with supervisors and ES&H subject matter experts in conducting and documenting investigations of injuries and illnesses. Workers conduct numerous behavior-based work observations of their coworkers to promote safe work habits and are active in integrating human performance improvement initiatives into work planning and feedback and improvement processes. Workers have been active and effective participants in pre-job briefings, resulting in identification of problems in work planning and providing valuable communication regarding imminent work activities.

3.0 Weaknesses

Although most aspects of ES&H management are effective, there are weaknesses in ISM programs at ICP, most significantly in the implementation of hazard analysis and control processes and feedback and improvement processes.

CWI's implementation of the hazard analysis process has not always been sufficiently rigorous in the areas of confined spaces, noise hazards, certain electrical hazards, and exposures to hazardous materials. The hazard assessment by Construction Management to reclassify permit-required confined spaces as non-permit confined spaces was not sufficient to verify that all hazards had been eliminated. A Construction Management work package for excavation of buried firewater piping did not identify the potential exposure to diesel exhaust fumes in an excavation. Exposure hazards associated with welding in the ICP Manufacturing and Maintenance Shop were not fully analyzed. Potential generation of hexavalent chromium during unsuccessful drilling and tapping of stainless steel nitric acid lines was not directly evaluated for ongoing D&D work activities. Records of exposure assessments could not always be found. Noise hazards were not fully analyzed in some work areas, and controls were not always sufficiently explicit to ensure that workers wore the required hearing protection. A process is in place for performing the required tests of voltage-rated rubber gloves, but it has not been well understood or implemented. Some electrical panels installed since 2002 were not marked to indicate potential electric arc flash hazards as required by the National Electrical Code. Finally, Industrial Hygiene has not always performed appropriate workplace monitoring. (See Finding #C-1.)

Cleanup Activities at RWMC

CWI has not always implemented some elements of the assurance system with sufficient rigor, hindering efforts to achieve continuous improvement. Process and implementation weaknesses in the CWI feedback and improvement systems evaluated by Independent Oversight have limited CWI's progress in reducing injuries and promoting excellence in performance. Many management assessments, including inspections and surveillances, often lacked sufficient depth and rigor; lacked a focus on work observation, records reviews, and work documents; and often did not provide adequate evaluations of program implementation and effectiveness sufficient to provide management with a full and accurate evaluation of safety program performance. In some cases, issues were not documented in the tracking system, problem descriptions were inadequate, cause determinations and extent-of-condition determinations were incomplete or inadequate, the significance classification process was not always properly applied, and the tracking system was not always used effectively to control and manage the analysis and resolution of issues. Similar weaknesses in processes and the rigor of performance were identified in CWI occupational injuries and illnesses investigations, the lessons-learned program, accident and event investigations, and the CWI employee concerns program. (See Finding #D-1.)

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4.0 Results

The following paragraphs provide a summary assessment of the ICP activities that Independent Oversight evaluated during this inspection.

4.1 Work Planning and Control Processes

Work planning processes at ICP are adequate to ensure that the scope of work to be performed is defined before the work is performed, and most work was well defined. Work definitions are adequate to support hazard identification and analysis for most activities observed during this inspection.

The process for hazard analysis is adequate for most hazards. Planners, supervisors, subject matter experts, and workers work together effectively to identify and analyze most job-related hazards. Facility-related hazards are adequately addressed in facility hazard lists. However, some electrical, noise, inhalation, and exposure hazards were not sufficiently analyzed because of insufficient rigor in implementation of the ICP work control process. (See Finding #C-1.)

In general, engineered, and administrative controls have been used effectively to ensure worker safety. Most work control documents specify appropriate personal protective equipment, and the equipment is worn when required. However, controls for ensuring worker safety could be further enhanced in a few areas, including ensuring the quality of voltage-rated gloves, ensuring timely exposure assessments for individuals who may have worn defective respirators, ensuring that individuals in high noise areas are informed when hearing protection is required, and ensuring that lightning protection controls are optimally used.

Pre-job briefings are effective in focusing attention on hazards to be encountered and controls to be applied. The priority of safety over schedule and good worker involvement in safety planning are evident during these briefings. The observed work was performed safely in accordance with requirements in work control documents.

Overall, CWI has effectively implemented ISM for most work performed by the ICP. The workforce understands management's expectation for work to be performed safely. Management has provided the resources and time for planning and safely performing work, and the workforce demonstrates a high level of safety awareness and care in performing work. Systematic work control processes have been established and implemented. Work is defined in sufficient detail to support hazard analysis, and a tailored hazard analysis approach has been effective in identifying most hazards. With few exceptions, the workforce followed the appropriate controls that were included in work packages for most of the observed work. Continued management attention is needed in the analysis and control of electrical hazards in confined spaces, inhalation hazards, noise hazards, and exposures to hazardous materials.

4.2 Focus Areas

EMS and Pollution Prevention Program. At INL, Independent Oversight evaluated the requirement of DOE Order 450.1, *Environmental Protection Program,* to implement an EMS by inspecting the ID program for management and oversight of EMS activities, the site environmental compliance program, and the implementation of EMS for cleanup, operations, and maintenance activities at the ICP. As a site with legacy waste and adverse impacts to the environment from past operations, INL has received considerable scrutiny from state and Federal regulators, resulting in a mature environmental management program. CWI, as the ICP lead, has continued to maintain this program using an ISO 14001:2004 certified EMS that is implemented effectively within the contractor's ISM system. Assisting in this effective implementation is the deployment of project environmental leads and Waste Generator Services support personnel to line organizations in order to assist in implementing environmental aspects into line organizations. CWI also has the lead for waste management, including supporting pollution prevention for all of INL. The award-

winning pollution prevention program actively supports pollution prevention opportunity assessments, universal waste recycling, and control of chemical purchasing.

Activities at INTEC

Workplace Monitoring. DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, and 10 CFR 851 establish the basis and requirements for an effective workplace monitoring and exposure assessment process. CWI has developed a workplace exposure monitoring architecture through exposure assessment procedures and an electronic database that generally meets the intent of those requirements. The electronic database has evolved over the past ten years into one of the most robust workplace exposure databases in the DOE complex. However, the need for several exposure assessment program enhancements was identified in CWI's program in such areas as exposure assessment reporting for line management, documentation of sampling decisions, development of a technical basis for assessment thresholds, and more precise exposure controls in work documents. CWI exposure assessments and sampling encompass the work activities with the highest exposure potential to workers. However, some CWI exposure assessment implementation issues remain, such as the lack of well defined sampling plans and technical basis documents, and not following exposure assessment procedures. (See Finding #E-1.)

4.3 CWI Feedback and Improvement Systems

CWI has established and implemented the basic feedback and improvement elements described in DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, comprising an assurance system that results in improvement in safety processes and performance. Assessment activities are performed, safety problems are identified, deficiencies are corrected, analysis is conducted and actions are taken when injuries and events occur, lessons learned are identified and applied, and workers have various methods to report and get resolution of safety concerns. Employees are actively engaged in safety improvement through such programs as employee safety teams, targeted inspections and reviews, behavior-based safety observations, and application of human performance improvement techniques. Employee involvement is fully supported and encouraged by CWI management. Recent management changes and a new focus on safety management have resulted in numerous initiatives in the past six months that reflect strengthening of feedback and improvement programs, performance, and accountability.

CWI has adequately defined an appropriate self-assessment program and is planning and conducting independent and management assessments and workplace inspections. Independent assessment reports are well written and appropriately rigorous, and they identify process and performance deficiencies and weaknesses. Less-formal management workplace visits and oversight by line supervision provide a real-time, direct performance assessment function. However, many management assessments, including inspections and surveillances, lack sufficient depth and rigor; lack a focus on work observation, records reviews, and work documents; and often provide inadequate evaluation of program implementation and effectiveness to provide management with a full and accurate picture of safety program performance. CWI has also established and implemented an issues management program that captures and evaluates safety issues, identifies causes, develops corrective actions and recurrence controls, verifies corrective

action completion, and tracks the management of issues to closure. However, this program's effectiveness in driving continuous improvement is hindered by some weaknesses in process and implementation. These problem areas include not documenting issues in the tracking system, inadequate problem descriptions, inadequate or incomplete determinations of cause and extent of condition, weaknesses in the significance classification process, and frequent use of the tracking system only to record already completed actions rather than using the process to control and manage the timely analysis and resolution of issues. In general, CWI occupational injuries and illnesses are investigated in a timely manner, and causes and corrective actions are identified. However, the documentation of some investigations of work process-related injuries is insufficiently detailed and rigorous. In some cases, the specified corrective actions are not sufficient to demonstrate effective analysis and adequate recurrence controls. Occupational injury and illness recordkeeping and reporting have improved since calendar year 2005, and a multi-phase revision of the local database is under development. The new local system should improve collection of complete, timely information from INL Medical and supervisors. (See Finding #D-1.)

CWI has established and implemented a lessons-learned program and appropriately disseminates, generates, and applies lessons learned. However, feedback from subject matter experts on applicability and needed actions is sometimes provided late, or not at all. There are some procedural inconsistencies regarding just-in-time lessons, and the level and method of application of lessons learned are not sufficiently monitored by individual programs and projects or at the institutional level through feedback mechanisms, documentation, or assessment and oversight. (See Finding #D-1.)

CWI has established and implemented adequate processes and procedures for identifying, reporting, classifying, investigating, and establishing corrective actions and recurrence controls and otherwise managing operational events, incidents, and near misses. However, fact-finding and critique meetings are not always implemented with sufficient rigor. (See Finding #D-1.)

Although there have been improvements in the CWI employee concerns program and its implementation, some concerns have not been resolved in a sufficiently rigorous and timely manner. Some concerns have been open since the beginning of the year without sufficient feedback to the concerned individuals on status. In one case, there was insufficient follow-up on a closed case when the concerned individual did not agree with the concern disposition. The concerns office was unaware that concerns had been reported by electronic mail for over five months at the beginning of 2007, so the concerned individuals had not been contacted and their concerns had not been addressed by CWI. Investigations in case files are not documented with sufficient rigor. Delayed or incomplete responses to concerned individuals could undermine the extensive efforts in 2006 to build up worker confidence in the CWI employee concerns program as an effective means to address their safety concerns. (See Finding #D-1.)

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5.0 Conclusions

CWI, with the direction and oversight of ID, has established and is effectively implementing many effective ISM programs. Some aspects of ES&H programs are particularly effective, such as the Technical Response Team for D&D, the EMS, the pollution prevention program, and the analytical laboratory. Feedback and continuous improvement management systems have been implemented, contributing to safer work conditions and driving safer work performance. Management's and workers' commitment to safety is evident and contributes to improvements in many aspects of ES&H safety program. CWI's recent good and improving safety record may be attributable in large measure to the efforts of an engaged and proactive management team and the daily, active participation of the workforce in improving safety performance.

However, process and performance weaknesses are evident in a number of important aspects of the ISM program. These areas of weakness include implementation of hazard analysis processes for certain hazards, workplace monitoring processes, and several aspects of feedback and improvement processes. While a number of weaknesses warrant increased management attention, ID and CWI management have a good understanding of most aspects of the work planning and control weaknesses identified during this Independent Oversight inspection and demonstrated management commitment to improving ES&H processes and performance.

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6.0 Ratings

The ratings reflect the current status of the reviewed elements of ICP ISM programs. The ratings for Work Planning and Control reflect the performance of both ID and CWI.

Work Planning and Control

Core Function #1 – Define the Scope of Work ..... EFFECTIVE PERFORMANCE
Core Function #2 – Analyze the Hazards ..... NEEDS IMPROVEMENT
Core Function #3 – Develop and Implement Controls ..... EFFECTIVE PERFORMANCE
Core Function #4 – Perform Work Within Controls ..... EFFECTIVE PERFORMANCE

Feedback and Continuous Improvement - Core Function #5

CWI Feedback and Continuous Improvement Processes ..... NEEDS IMPROVEMENT

APPENDIX A
SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Planning Visit	May 21-25, 2007
Onsite Inspection Visit	June 4-15, 2007
Report Validation and Closeout	July 10-12, 2007

A.2 Management

Glenn S. Podonsky, Chief Health, Safety and Security Officer
Michael A. Kilpatrick, Deputy Chief for Operations, Office of Health, Safety and Security
Bradley Peterson, Director, Office of Independent Oversight
Thomas Staker, Director, Office of Environment, Safety and Health Evaluations

A.2.1 Quality Review Board

Michael Kilpatrick	Bradley Peterson	Thomas Staker	Steven Simonson
Dean Hickman	Robert Nelson	Bill Sanders	

A.2.2 Review Team

Thomas Staker, Team Leader
Jeff Robertson, Deputy Team Leader

Vic Crawford	Janet Macon	Jim Brown	Robert Compton
Al Gibson	Joe Lischinsky	Jim Lockridge	Gordon Quillin

A.2.3 Administrative Support

Lee Roginski	Tom Davis

A.3 Ratings

The Office of Independent Oversight uses a three-tier rating system that is intended to provide line management with a tool for determining where resources might be applied toward improving environment, safety, and health. It is not intended to provide a relative rating between specific facilities or programs at different sites because of the many differences in missions, hazards, and facility life cycles, and the fact that these reviews use a sampling technique to evaluate management systems and programs. The rating system helps to communicate performance information quickly and simply. The three ratings and the associated management responses are:

- **Significant Weakness (Red):** Indicates that senior management needs to immediately focus attention and resources necessary to resolve management system or programmatic weaknesses identified. A Significant Weakness rating normally reflects a number of significant findings identified within a management system or program that degrade its overall effectiveness and/or that are longstanding deficiencies that have not been adequately addressed. In most cases, a Significant Weakness rating warrants immediate action and compensatory measures as appropriate.

- **Needs Improvement (Yellow):** Indicates a need for improvement and a significant increase in attention to a management system or program. This rating is anticipatory and provides an opportunity for line management to correct and improve performance before it results in a significant weakness.

- **Effective Performance (Green):** Indicates effective overall performance in a management system or program. There may be specific findings or deficiencies that require attention and resolution, but that do not degrade the overall effectiveness of the system or program.

APPENDIX B
SITE-SPECIFIC FINDINGS

Table B-1. Site-Specific Findings Requiring Corrective Action

	FINDING STATEMENTS
C-1	CWI has not implemented the ICP work control processes with sufficient rigor to ensure identification, analysis, and control of health and safety hazards associated with some aspects of confined spaces, noise, exposure to welding fumes, and electric arc flash hazard postings as specified in DOE Policy 450.4, *Safety Management System Policy*.
D-1	CWI has not consistently applied their feedback and improvement management systems to effectively identify and manage through proper resolution environment, safety, and health program and performance deficiencies and drive continuous improvement as required by DOE Order 226.1, *Implementation of Department of Energy Oversight Policy,* and DOE Order 414.1C, *Quality Assurance*.
E-1	In some cases, CWI exposure assessment procedures were not followed, or workplace monitoring and sampling plans and technical bases were not sufficiently documented, to support current sampling practices.