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Campbell Award: Sample Winning Case Study

**Managing the Western Hemisphere's
Largest Environmental Cleanup Project**

Submitted by:

Fluor Hanford
2008 Award Winner - Category I
(More than 1000 employees)

"Safety work is today recognized as an economic necessity, and one of the most constructive movements that has ever come into our National life. It is the study of the right way to do things and is ... one of the greatest aids to shop efficiency and economy."

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**2008 WINNER - CATEGORY I:
FLUOR HANFORD**

**“Managing the Western
Hemisphere’s Largest
Environmental Cleanup Project”**

Award-Winning Case Study, unedited

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ACRONYMS

AJHA	Automated Job Hazard Analysis System
ANSI	American National Standards Institute
CEO	Chief Executive Officer
D&D	Deactivation and Decommissioning
DAWG	Data Analysis Working Group
DOE	(U.S.) Department of Energy
EHS*	Environment, Health, and Safety

* *EHS is used for consistency throughout the Fluor Case Study.*

The following organizational synonyms appear in the Case Study and Appendices:

Fluor Corporation:

HSE Health, Safety, and Environment

FLUOR HANFORD:

ESH&Q Environment, Safety, Health, and Quality Department

OS&H Occupational Safety and Health Group

EJTA	Employee Job Task Analysis
EMR	Experience Modification Rate
FY	Fiscal Year
FYI	<i>Fluor Your Information</i>
HAMTC	Hanford Atomic Metal Trades Council
HGET	Hanford General Employee Training
HILLS	Hanford Information Lessons Learned Share
HPI	Human Performance Initiative
ISIC	International Standard Industrial Code
ISMS	Integrated Environment, Safety, and Health Management System
ISO	International Standards Organization
MIER	Monthly Incident Experience Report
NAIC	North American Industry Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PHMC	Project Hanford Management Contract
PI	Performance Incentive
PZAC	Presidents' Zero Accidents Council
SITE	Safety, Integrity, Teamwork, and Excellence
VPP	Voluntary Protection Program

THE ROBERT W. CAMPBELL AWARD - 2008 CASE STUDY SUBMITTAL
FLUOR HANFORD
Managing the Western Hemisphere's Largest Environmental Cleanup Project

EXECUTIVE SUMMARY



FLUOR HANFORD, a business unit of Fluor Corporation, has a contract with the United States Department of Energy (DOE) to manage and perform environmental-remediation work at the Hanford Site in southeastern Washington State, near Richland. Fluor Corporation, consistently rated as one of the world's safest engineering, procurement, and construction contractors, has a global workforce of more than 41,000, spread across offices in 25 countries on six continents. The company's contract at Hanford is valued at more than \$9 billion and represents slightly over a third of the annual budget of \$2.1 billion allocated for all work done on the Site, which includes projects managed by other prime contractors.

Safety is the first word in Fluor's business values: Safety, Integrity, Teamwork and Excellence (SITE). The Corporation operates on the basic premise that work must be done without adversely affecting the safety and health of employees, subcontractors, local communities, and the environment. As Fluor's Chairman Alan Boeckmann puts it, "We hold sacred the well-being of people – employees, customers, and communities in which we live and work...Global stewardship is a responsibility, our privilege."

Fluor's work at Hanford is grounded in the Corporation's safety culture of Zero Incidents™ that includes ISO 14000 and ISO 9000-validated programs. This case study focuses on FLUOR HANFORD's environment, health, and safety (EHS) programs that tailor the corporate programs for practical application in the field at Hanford.

FLUOR HANFORD's 3,600 employees and subcontractors have a vested interest in environment, health, and safety as they are working at what is known as the most contaminated place in the Western Hemisphere. For more than 40 years, at Hanford, the government produced two-thirds of the nation's plutonium for nuclear weapons – helping to win the Cold War but leaving a legacy of chemical and

radiological contamination. Our employees work with the depth – and breadth – of the most complex industrial, chemical, and radiological hazards; in and around new and aging facilities.

At 586 square miles, Hanford is roughly half the size of Rhode Island and borders one of the country's largest rivers, the Columbia. The quarter-of-a-million residents in the four communities flanking Hanford (Richland, Pasco, Kennewick, and West Richland) and the two million people downriver look to us and our employees to be conscientious stewards for their health and safety, and the environment of the Pacific Northwest. We take that responsibility seriously. The OSHA Recordable Rate have improve by over 80% since Fluor signed a contract with the DOE in 1996 to clean up a major portion of the Hanford Site, with the majority of that dramatic improvement occurring during the past five years. This change did not happen overnight, nor was it “by accident.” It was through a focused and collaborative effort by management and workers standing side-by-side, working toward a common goal.

Our safety record at Hanford results from integrating Fluor's corporate safety programs with extensive planning before starting work, robust safety programs rooted in employee ownership; and comprehensive environment, health, and safety training programs; as well as using leading indicators to track performance and adjust accordingly. Nine Fluor projects at Hanford have earned Star status recognition in the DOE's Voluntary Protection Program (VPP), modeled after OSHA's program.

By involving employees and subcontractors at every stage of the cleanup work, actively participating in VPP, building worker trust via our union safety-representative program, and giving employees the responsibility of looking out for one another every day, we have purposefully instilled, and continue to build, a strong safety culture. That culture transcends compliance and aspires to protect the environment and completely eliminate workplace injuries and incidents.

For us, just “showing up” to do the work is not enough. It's all about performance. Our employees and subcontractors understand that our contract with the DOE stipulates meeting very specific milestones on time and safely. Our collective success, technically and financially, and our viability for other opportunities depends on it.



1.0 BUSINESS PROFILE

FLUOR HANFORD, a business unit of Fluor Corporation (NYSE: FLR), is a special-purpose company set up in 1996 to manage environmental-remediation activities at Hanford as a prime contractor to the Department of Energy (DOE). The contract is called the Project Hanford Management Contract. Established as part of the Manhattan Project in the 1940s, Hanford produced two-thirds of the country's plutonium for nuclear weapons through the late 1980s. The Hanford Site spans 586 square miles in southeastern Washington State and is about half the size of Rhode Island. The site is bordered by the Columbia River, the largest river by volume flowing into the Pacific from the Western Hemisphere. Producing plutonium for national defense for 40 years left a huge legacy of chemical and radiological contamination: 270 billion gallons of groundwater contaminated above drinking-water standards covering a swath of 100 square miles; 2,300 tons of used nuclear fuel stored underwater in two massive basins next to the Columbia River; 20 tons of material laced with plutonium; and 500 contaminated facilities.

FLUOR HANFORD (International Standard Industrial Code - 9000 / North American International Standard Industrial Code - 5629) has 3,600 employees working to remediate and close the site: dismantling former nuclear-processing facilities; cleaning up contaminated groundwater; retrieving and processing radioactive and chemical waste; and maintaining the site's infrastructure.

1.1 Business description

The site's total annual budget is about \$2.1 billion, with FLUOR HANFORD's work scope commanding between \$650 and \$800 million each year. DOE and its contractors are committed to ensuring the public is protected from the potential effects of the hazardous and radioactive material at Hanford and restoring the environment as much as possible. Removing that material without incident means that every day FLUOR HANFORD's workers are protecting communities along 200-plus miles of the Columbia River shoreline and the two million people living downriver.

FLUOR HANFORD is a business unit of the Fluor Corporation. Fluor has 41,000 employees worldwide who provide services in engineering, procurement, construction, operations, maintenance, and environment, health and safety project management. The company has a diverse business profile: 50 percent Oil & Gas; 20 percent Industrial & Infrastructure; 15 percent Global Services; 8 percent Government; and 7 percent Power. Headquartered in Irving, Texas, Fluor is a FORTUNE 500 company with revenues that have doubled in the past five years: growing from \$8 billion in 2003 to \$16.6 billion in 2007.

1.2 EHS and business challenges

With projects literally scattered around the world – each with its own unique hazards – Fluor has developed a detailed process to help ensure consistent and uniform implementation when it comes to Environment, Health, and Safety (EHS) activities. Each Fluor project develops a site-specific Environment, Health, and Safety Plan using a Corporate Management System (Section 2.2) as a template. The project also integrates client requirements and other applicable local, state, federal, and in-country standards into the Site-Specific Plan. When a Site-Specific Environment, Health, and Safety Plan deviates significantly from the Corporate System, the site conducts a comparative “gap analysis.” The results are transmitted through the Business Group’s EHS Director to the Corporate EHS Board for review/approval. The document that governs safety and health at FLUOR HANFORD is the Project Hanford Management Contract Worker Safety and Health Program Description (**Appendix 2**) that complies with the applicable Code of Federal Regulations (Title 10 Code of Federal Regulations Part 851). This plan addresses Hanford’s numerous radiological and chemical material hazards. At Hanford, EHS activities are directly tied to Fluor’s business results through contractual Performance Incentives (**Appendix 3**). Safety drives performance, and as our safety record has improved, so have our earnings. In fact, during the past five years, we have increased our earnings from an average of 73 percent of available fee to more than 90 percent, a direct correlation to more than an 80 percent improvement in our safety performance (**Appendix 4**).

2.0 LEADERSHIP

2.1 Organizational leadership

FLUOR HANFORD and its parent company, Fluor, adhere to the Fluor Environment, Health, Safety Management System Commitment and Policies as directed by Fluor senior management. At Hanford, FLUOR HANFORD President Con Murphy sets the strategic direction and policy for environment, health, and safety programs. Mr. Murphy brings international experience to Hanford. Mr. Murphy, along with his staff and the company's union safety representatives (**Appendix 5**), actively set the safety culture by being visible in the field, and they set site-wide safety and health goals. FLUOR HANFORD senior management and union members routinely attend monthly meetings of the Presidents' Zero Accident Council to openly discuss environment, health, and safety issues and enhancements. The senior management team's participation in the field and their personal dedication/commitment to safety is highly visible to the workforce. This in-field presence strengthens the working relationship for all concerned and places EHS issues as the highest priority of the day both at work and at home.

2.1 Commitment to EHS goals

FLUOR HANFORD's commitment to EHS goals is owned by every employee and subcontractor. Environment, safety and health performance goals grow from our Fluor Corporate Value of Safety, Integrity, Teamwork and Execution (SITE). Each fiscal year, the DOE establishes environmental cleanup goals and objectives and converts them into Performance Incentives within our contract. The ESH performance goals are based on continuous improvement and establish an expectation of safety and compliance for completing the work in the contract. Performance goals for EHS are set for every Fluor project, as well as functional organizations, such as Procurement, Quality Assurance, Occupational Safety & Health, and Accounting. Management utilizes a "Dashboard" to review these goals each month to ensure progress is made and safety programs, such as Electrical Safety and Environmental/Chemical Management, are being infused into the work-planning and performance activities (**Appendix 6**).

2.3 Corporate culture/climate

The Senior Vice President of Fluor EHS, Garry Flowers, reports directly to Fluor's Chairman and

CEO, Alan Boeckmann. Each Business Group has an EHS Lead, responsible for consistently implementing and maintaining the environment, health, and safety programs. This Business Group Lead reports to the Business Group President, with an additional dotted line to the Senior Vice President of EHS. The Business Group President for Hanford is John Hopkins, and Con Murphy reports to Mr. Hopkins. This structure links local and corporate senior management to ensure accountability within each organization that provides leadership and support to the Hanford workforce. The FLUOR HANFORD senior staff begins the work week with an early morning walk-through of field projects, interfacing with the workforce and subcontractors and setting a high standard of safety. This in-field presence creates a culture of “obtainable and approachable management” and creates opportunities for the workforce to openly discuss environment health and safety issues and concerns.

2.4 Corporate citizenship & responsibility

FLUOR HANFORD plays an active role in the local communities as a corporate citizen. Our senior management team participates in local community interest boards, such as the United Way and Columbia Industries. The company’s employees contribute more than 2,500 volunteer hours each year to more than 20 community projects. (**Appendix 7**).

Regarding EHS stewardship, the corporation and company are active in the Occupational Safety and Health Administration and DOE Voluntary Protection Programs (VPP). FLUOR HANFORD actively mentors other DOE contractors and local commercial industries in their efforts to install an EHS management system that meets the high expectations of VPP Star Status. FLUOR HANFORD provides volunteers to act as VPP mentors, maintains employees as Special Government Employees (SGE) to assist OSHA in onsite evaluations, and supports the service of several executives and professionals on regional and national EHS committees, such as the Voluntary Protection Program Participants Association and ANSI.

3.0 INTEGRATED EHS MANAGEMENT SYSTEM

FLUOR HANFORD manages and administers a comprehensive environment, health, and safety management system. The system includes a set of Fluor Corporate EHS annual goals and objectives and embodies the Fluor Corporate Governance Principles in FLUOR HANFORD Environment, Health, and Safety (**Appendix 8**). At FLUOR HANFORD, the Integrated Safety and Management Systems (ISMS) program is a cornerstone of the management system. The principles of ISMS (**Appendix 9 and 10**) are supported by senior management for the protection of the workforce, subcontractors, and the environment. Environmental project milestones are listed in a regulatory agreement between the DOE, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology – the Tri-Party Agreement (**Appendix 11**). Our ISMS combines the duty to protect people and the environment and completing the DOE regulatory milestones throughout the work planning and execution process. The ISMS is not a typical collection of “stovepiped” functional area programs, but a management tool that integrate EHS in to the design, planning, and execution of work.

3.1 Management leadership and commitment

FLUOR HANFORD is committed to protecting the environment and the overall well-being of all of the company’s stakeholders, including employees, clients, subcontractors, and communities. We identify potential risks associated with our activities and reduce them to the lowest practical levels. Our goal is to minimize impact to the environment and prevent harm to employees, clients, communities, and all others who could be affected by those activities. Management takes a proactive approach toward creating safe work environments for all employees and is accountable for promoting continued safety education and training for all employees (29,745 student hours in FY2007), continuously reviewing project results through a management assessment process to identify potential areas of improvement, and ensuring all safety or work events are fully evaluated and corrective actions completed.

3.2 Organizational communications and systems documentations

Fluor has many avenues to convey EHS policy and share company information with the workforce. Globally, the EHS Weekly Newsletter provides Fluor corporate safety and health information. Fluor’s

Web-based Knowledge Online program is available worldwide, allowing employees access to numerous subjects such as program status, as well as engineering, environmental, safety, health, and quality ideas. Knowledge Online is especially valuable in terms of sharing new initiatives that have been implemented in the field that may be applied elsewhere in the world (**Appendix 12**). FLUOR HANFORD publishes a weekly electronic newsletter, *Fluor Your Information*, which delivers important company information (**Appendix 13**). Environmental milestones are reported regularly during Monthly Project Performance Reports. In conjunction with the organizational communications system, documentation is an important part of doing business at Hanford. The FLUOR HANFORD Project Records Index applies to all employees and subcontractors (**Appendix 14**). The system is audited each year and is critical to tracking important records that must be kept until they can be transferred to a U.S. Government Records Repository.

3.3 Assessments, audits, evaluations, and continuous improvement

The FLUOR HANFORD Integrated Evaluation Plan – a key database – is used to track an average of over 1,000 internal and external assessments each year. Our annual Internal Assessment Plan ensures that all facets of EHS requirements and performance are reviewed on a three-year rotating schedule. Internal self-assessments include both management and independent assessments. Management assessments are performed to identify weaknesses and good practices. Independent assessments are conducted by trained individuals qualified either as quality assurance or subject-matter experts not responsible for the work being assessed. Approximately 400 management assessments are performed annually, from the President’s Office down through each project and functional organization. In conjunction with the assessment programs, approximately 200 assessments/evaluations are performed annually by external organizations, including our local DOE office, DOE headquarters, Fluor Corporate EHS entities, state and federal regulatory agencies, and special interest groups. All documented assessment reports are entered into a Correction Action Management system (**Appendix 15**) for evaluation, identification of corrective actions, and tracking. Trend, root, and apparent cause codes are assigned to identify assessment issues on a graded approach. Attached charts show the improvements in overall Issues, Occurrence Reporting

criteria and some specific areas related directly to environment, health, and safety. The completed assessments for 2007 are listed in **Appendix 16**.

3.4 Hazard recognition, evaluation, and control

The key process within the FLUOR HANFORD ISMS for providing protections from hazards to the workforce and environment is the Automated Job Hazard Analysis system (AJHA) (**Appendix 17 and 18**). The baseline hazard and control configuration represented in the AJHA application is based on facility/system design safety analyses, OSHA general industry and construction standards, National Fire Protection Association codes, American National Standards Institute standards, state and local occupational safety requirements, and Fluor good business practices. The AJHA also provides for the identification and analysis of any unique or first-time hazards. This configuration is continuously evaluated and updated as requirements and circumstances evolve. By using AJHA, all hazards are given consideration and identified, inventoried, and/or determined not to be relevant to each specific job that is analyzed. When hazards are determined to be relevant to a job, AJHA triggers the involvement of subject-matter experts to perform detailed hazard analysis focused on the specific characteristics of the job being analyzed. Additionally the AJHA System has an important Feedback Module to enhance continuous process improvement in the workplace. The Feedback Module integrates lessons learned and formal post-job reviews (feedback) from all organizational elements, and provides powerful search/query capabilities to find relevant feedback from previous jobs that can be used while planning future activities.

3.5 Workplace design and engineering

Two significant challenges exist at Hanford: the inherent hazards of handling radioactive and hazardous materials; and old facilities that were built in the 1940s, '50s and '60s. FLUOR HANFORD engineering uses a phased process of system design and procurement that includes EHS in conceptual design, alternative study, procurement, pilot phase and installation. In Hanford's K Basin Closure Project, employees dressed in two layers of protective clothing worked with long-handled tools to reach 20 feet down into water-filled basins to move millions of pounds of used nuclear fuel a few pieces at a time. Much of the uranium-based fuel and its other metal components had degraded, leaving behind very

fine residue that was stirred up every time a tool was put into the pool. In fact, the water became so cloudy that workers had to use underwater cameras to see what they were doing. The work was repetitive and the workers' positions were awkward. Workers were straining and spraining muscles, and injuries climbed to 10 per 100 workers per year. By collaborating with an ergonomics professional, we were able to reduce the number of injuries to fewer than 1 per 100 workers per year. This approach won FLUOR HANFORD a workplace safety award from Washington State's Chamber of Commerce.

We also integrate the physical requirements with the psychological elements of workplace design utilizing two key concepts, the AJHA Application Process (**Appendix 18**), and applying Human Performance Improvement techniques (**Appendix 19**).

3.6 Operational EHS programs

FLUOR HANFORD has written environment, health, and safety programs and practices which are all incorporated into the Integrated Environment, Safety, and Health Management System (ISMS) as noted in Section 3.0. ISMS uses linked programs to ensure requirements are followed when work is conducted to protect workers, the public, and the environment. The system provides mechanisms for increasing worker involvement in work planning, including hazard and environmental impact identification, analysis, and control; work execution; and feedback/improvement processes. The system is applied to all work activities and involves employees in every part of the work process. Some of the implementing programs include:

Employee Job Task Analysis (EJTA): This computer-based program identifies the hazards employees may encounter in the course of routine work assignments and requires a quantitative assessment of exposure risk. The information is used by the Hanford Site occupational medical contractor to better tailor medical surveillance and health care to the individual worker.

Automated Job Hazard Analysis (AJHA): See Section 3.4.

Safety Improvement Plans: Each facility/project develops an annual plan directed at continuously improving safety, based on the experience and hazards of each facility, and annually establishes

performance goals. Workers and the facilities' Safety Councils, called Employee Zero Accident Councils, develop the plans that are approved and supported by facility management (**Appendix 20**).

Occurrence Reporting System: Records safety-related near misses and incidents across the site.

Employee Concerns Program: Provides employees with another avenue to address issues relative to protecting the environment, health and safety. The Employee Concerns Program is not an advocacy program for either employees or management. Issues and concerns are reviewed, investigated, and resolved to support a safe and productive workplace for everyone.

ISMS implementation has been greatly enhanced by pursuing and earning DOE-Voluntary Protection Program (VPP) recognition. ISMS is a systematic and structured approach to integrating safety and health and environment into planning and doing work, while VPP promotes excellence in occupational safety and health.

Fluor, in cooperation with our DOE customer, is committed to assist other countries and nations to achieve safety in their work and community environments. Fluor, through the DOE's mentoring programs, provided senior managers and safety professionals internationally in support of Chernobyl Ukraine's "Building a job hazard analysis program" and Ignalina Nuclear Power Plant Training Center, near Visaginas, Lithuania, providing "Hazard Control Training for Decommissioning Activities".

3.7 Employee empowerment and involvement

FLUOR HANFORD fosters an atmosphere where employees feel comfortable coming forward to report an accident or injury without fear of retaliation. Some of the programs that clearly demonstrate employee empowerment and involvement are listed below.

Union Safety Representative Program: Safety representatives are assigned to each major project and work directly with the employees and all levels of management to resolve safety issues and concerns. These Union members are a trusted conduit for communication between the "front-line" craft workers encountering the majority of the hazards and managers (**Appendix 5**).

Voluntary Protection Program: Nine Fluor-managed projects have passed a rigorous on-site review and been awarded "Star" recognition – the highest level of safety recognition under the DOE program.

To participate in the Voluntary Protection Program, a company's safety and health programs must exceed OSHA safety requirements and pass a rigorous third-party review. The company must also demonstrate a healthy partnership among management, workers, and regulatory agencies.

Safety Councils: There are more than 50 employee *Employee Zero Accident Councils*. In these safety councils, employees take ownership of and identify safety concerns, issues, and opportunities for safety improvement. Operating according to written charters, the councils are responsible for reducing hazards and preventing accidents (**Appendix 21**).

Right to Participate: Job planning, hazard analysis, pre-job briefings, stop work responsibility, and feedback/critique after the job are but a few guaranteed rights of employees listed in our *PHMC Worker Safety and Health Program Description* (**Appendix 2**).

A significant component of the success of the integrated safety system is a "Stop Work" policy. Any time work is being performed, any person who has a concern about whether the job is being performed in a safe manner has the authority and responsibility to stop the work immediately. However, where OSHA and the DOE require "Stop Work" authority for *imminent hazards*, FLUOR HANFORD's policy goes beyond requirements. Any employee may issue a "Stop Work" for *any hazard* that is causing a concern. In addition, that employee is then involved in finding solutions to performing the work more safely (**Appendix 22**).

Annual performance evaluation/appraisal: Performance evaluations for each employee – including the president, managers, and non-union employees – have one or more criteria for safety performance. The contribution to the company's safety culture is appraised on an even footing with production-oriented criteria.

Strong alliances have been developed with local unions to encourage craft workers to participate in an effective and efficient way, bringing their hands-on knowledge of the worksite to the planning and job-hazard analysis activities. Craft workers recognize and have become emphatic that their involvement in the planning process provides them with opportunity to influence the safety measures that will ultimately protect them when they perform the work.

3.8 Motivation, behavior, and attitude

FLUOR HANFORD empowers its employees through its employee safety councils, as well as through the work-planning and hazard-analysis processes. This involvement and recognition has motivated employees to go beyond existing programs and look for new ways to be involved - at work and in the community.

A good example is the “Safety Matters 24/7” program initiated by an employee. The program provides a Web site for employees to share off-the-job safety concerns and solutions. These discussions improve the workplace safety culture and encourage safety off the worksite.

Individual awards, called “Spot Awards” (typically valued at \$10-\$25), are also given to employees to recognize safe practices. Others choose barbeques or picnics for the entire work group at lunch time. This immediate recognition has been effective in raising the awareness, support, and commitment to safety in the workplace. We also recognize employees for being “good Samaritans” and saving lives – on and off the job – with our Heroic and Life-Saving Awards.

FLUOR HANFORD started an Environmental Stewardship Award Program in 2001. This award was the first of its kind at more than 140 sites that were once part of the DOE’s defense-production complex. The award recognizes projects and activities that foster environmental stewardship by protecting the environment and meeting commitments to DOE and state and federal regulatory agencies.

3.9 Employee competency building

FLUOR HANFORD conducts a variety of annual supervisor safety and leadership training. Performance appraisals specify training that can be taken both on and off the site. Many of our employees take classes to maintain their professional certifications and meet requirements for specific job categories, such as health-physics technicians, radiological control technicians, welders, project managers and industrial hygienists.

A unique aspect of our training, however, is a special facility that provides a hands-on experience for Hanford workers that is “as real as it gets.” FLUOR HANFORD operates the Volpentest HAMMER Training & Education Center (**Appendix 23**). While some training is provided to outside agencies,

including the Department of Defense, 80 percent of the training is for Hanford workers. HAMMER uses a novel way to prepare workers for their job functions. In the worker-trainer program, people who work in the field cleaning up the Hanford Site teach their fellow workers in a classroom or laboratory setting. Because of their dual roles, these worker-trainers are considered highly credible subject-matter experts by their peers. In the classroom, they communicate well through personalized delivery of training.

Appendix 24 shows the depth and breadth of training provided at HAMMER.

3.10 Impact of EHS on employees on and off the job

FLUOR HANFORD encourages a 24/7 safety culture that brings safety home to families and community. For 14 years, Hanford has held the Hanford Safety and Health Exposition, which is the largest community outreach effort in our region. This years' attendance established a new record of over 62,000 attendees. We also recognize employees for being "Good Samaritans" and saving lives – on and off the job – with our Heroic and Life-Saving Awards. Since 1998 more than 76 Good Samaritan awards have been presented to the workforce.

FLUOR HANFORD participates in numerous community events sponsoring safety and health messages. Senior members of management present a "Safety Minute" message on a local radio station reaching the surrounding communities and select locations in Idaho and Oregon.

Since Fluor came to Hanford in 1996, employees have contributed \$8.7 million to the local United Way (includes 50 percent corporate match), and Fluor Community Involvement Team members have volunteered more than 30,000 hours of community service to 250 projects (**Appendix 7**).

This demonstrates Fluor's belief that an effective safety culture must go beyond employees and subcontractors – it must reach out to employees' immediate and extended families and the entire community.

4.0 PERFORMANCE MEASUREMENTS AND INFORMATION MANAGEMENT

4.1 Quality and appropriateness of measurements, data collection and recordkeeping systems, analytical methodologies, evaluation, and use of information

The Fluor Corporation and FLUOR HANFORD use world-class methodologies (See Section 6.6) for collecting performance measurements and managing information to make key decisions. Our systems are audited annually both internally and externally (**Appendix 26**) and interface well with the values of the DOE Voluntary Protection Program and the Integrated Safety Management Systems.

4.2 Validity

At Hanford, leading and trailing performance measures (first-aid case rate, reportable events and non-reportable issues, near misses, safety inspection results, Pareto charts of injury, body part, age), are a source of data that are entered into databases. This data is reviewed daily, weekly, and monthly by FLUOR HANFORD management and union management for trends and improvement actions. The Presidents' Zero Accident Council reviews results (**Appendix 27**) and provides safety improvements for both trends and lessons learned from individual events such as an injury while using a "Snoopy" instrument (**Appendix 28 and 29**). These results improve safety/health working environment for our workforce.

4.3 Reliability

Fluor utilizes statistical process control for monitoring and analyzing performance metrics. Reliability of data analysis for areas like injury trending is very high as local DOE safety professionals review injury-case determinations on a quarterly basis. The reviews resulted in very few challenges to the original classification. This demonstrates consistency and validity of trending results as determined through repeated trials.

Other groups are involved in the identification, use, and analysis of performance measurements. The Data Analysis Working Group (DAWG) relies heavily on performance metrics and analysis in order to identify areas that are either trending in a non-improving direction or are stable but in need of improvement (**Appendix 30**). The DAWG, consisting of 13 individuals from various organizations and

projects, analyzes information collected from a multitude of sources (e.g., performance metrics generated from the Corrective Action Management process) evaluates the information, and assigns a risk value. The DAWG identifies and assigns risk values to multiple focus areas on a quarterly basis for management attention. The second group, the Functional Area Manager Forum (**Appendix 31**), reviews reportable and non-reportable event-related performance metrics to analyze and identify recurring events requiring action for a quarterly Performance Analysis Report (**Appendix 32**).

Evidence of the success of these two functions is best stated in a recent DOE-Headquarters review by the DOE Office of Independent Oversight:

Noteworthy Practice - FLUOR HANFORD has established and implemented a robust and effective performance monitoring program. Quality assurance and safety and health personnel and functional area managers conduct routine formal analysis of event/incident and non-event performance data and metrics that identify reportable recurring events, adverse safety trends, and emerging issues that require further monitoring or evaluation or directed corrective or preventive actions. Results of this iterative process of data collection and analysis are documented in quarterly performance analysis reports, and newly identified issues and actions are managed through the FLUOR HANFORD corrective action management system. This process is an effective means to identify and address declining performance and proactively address emerging potential safety issues.

Other groups are also involved in analyzing performance information such as the Presidents' Zero Accident Council, mentioned in Section 4.2, and our DOE customer.

4.4 Feasibility

FLUOR HANFORD uses performance measures (metrics) developed principally using statistical process control (**Appendix 33**). This process assesses changes and improvement initiatives and has been consistent for approximately five years with all assessments being entered into the Corrective Action Management System. This system tracks hundreds of action items with consistency for field-level, in-process improvements. There is an established and effective performance monitoring program. Results of this iterative process of data collection and analysis are documented in quarterly Performance Analysis

Reports (**Appendix 32**), and newly identified issues and actions are managed through the Corrective Action Management System. This process is an effective way to identify and address declining performance and proactively address emerging, potential safety issues.

4.5 Accessibility

FLUOR HANFORD uses the traditional OSHA performance measures including case rates, severity rates, event rates, and workers' compensation data. Measures such as environmental releases and the Building Energy Consumption Index focus on the environmental aspect. These measures are all analyzed using statistical process control and distributed to appropriate parties through a variety of methods. Periodic assessments and validations are performed to ensure integrity of the data from the initial reporting through the final charts produced for each user (**Appendix 33**).

4.6 Comparability

The Data Analysis Working Group (DAWG) and Functional Area Managers Forum are most concerned with the consistency and comparability of accumulated data. Root cause, apparent cause, and trend codes are applied according to the significance of the issue. These codes are assigned by the responsible management with the support of our Corrective Action Management organization in order to ensure a high degree of consistency.

4.7 Utility

Our results compare favorably with our peers in the DOE and with other U.S. corporations in our North American Industrial Code. The FLUOR HANFORD OSHA Case Rate (including subcontractors) for Calendar Year 2008 was 0.83, placing FLUOR HANFORD and the overall DOE Hanford Site second in a ranking of nine comparable DOE sites.

5.0 EHS RESULTS

5.1 Continuous EHS performance improvement or sustained excellence

Fluor strives for continuous performance improvement and excellence in its operations by setting stretch targets for its entire business worldwide (**Appendix 34**). FLUOR HANFORD extends its environmental stewardship and improvement to the local community and disadvantaged businesses through environment, health, and safety goals for the workforce and subcontractors. Fluor has established and implemented a formal review processes for performance metrics and for monitoring and analysis of the resulting performance metrics. Several groups are principally involved in identification, use, and analysis of environment, health, safety, and quality performance measurements. See Section 4.3 for a discussion of safety professionals' analyses of injury cases and trends; Functional Area Forum analyses of the cumulative effect of issues, events, or deficiencies that may not be recognizable within a specific project or functional area; and the Data Analysis Working Group's search for trends that are non-improving or are stable but in need of improvement.

5.2 The use of key leading indicators

Leading indicators were chosen due to their correlation with the lagging indicators in use. FLUOR HANFORD uses the Systems Thinking theories of Dr. Russell Ackoff in its selection of leading indicators. The use of leading indicators identified a 30 percent reduction in the OSHA case rate over 18 months (June 2003 to February 2005), following a three-year period of relatively stable injury rates. Our leading indicators include the following:

1. Employee safety and health concerns, results of annual employee surveys on the company's safety culture, the first-aid case rate, near misses (incidents that could have been more serious), and incidents of radiological contamination on the skin. Sub-unit measures include: Pareto charts of injury, body part, age, time of day, day of week, occupation, and cause; safety inspection detail; safety attitude survey (HGET-VPP) detail by question.
2. Safety inspection/observation program with sub-unit measures of counts, scores, trends and Pareto charts by finding type

3. Monthly charts correlating leading indicators to lagging indicators

Appendix 28 includes charts correlating lagging and leading indicators and a discussion of the choice of the indicators. Without the first-aid case data, we would need to wait for months if not years to detect changes in OSHA case rates in our smaller FLUOR HANFORD organizations.

Leading indicators are reported weekly at the company level (**Appendix 6**). These reports include statistical process control charts showing trends of total inspections and trends of individual finding charts, as well as Pareto charts by types of finding and observations.

5.3 The use of lagging indicators

A suite of lagging ESH indicators is maintained, with most shown on the Dashboard. The lagging indicators are analyzed using statistical process control. The Dashboard contains eleven EHS lagging indicators and three Quality Assurance lagging indicators for each of eight projects and the company overall. The lagging indicators include Days Away From Work – Lost, Days Away From Work – Restricted, OSHA Recordable, and Severity Rate (**Appendix 6**). FLUOR HANFORD does not have an Insurance Experience Modification Rate as DOE is the carrier of a joint self-insurance policy for all six of the Hanford Site's prime contractors. A theoretical rate was calculated by the DOE Third Party Administrator two years ago and was 0.8. In FLUOR HANFORD's 11-year experience at Hanford, the total cost of workers' compensation has been reduced approximately \$7 million annually.

5.4 Resource and waste management

In keeping with the ever-increasing philosophy of "Building Green," Fluor construction sites have a huge opportunity to participate. While many resources we use on construction sites are non-renewable, such as steel and petroleum products, a multitude of materials can be reused, recycled and modified for use in other applications.

FLUOR HANFORD collects actual energy cost and consumption data from Hanford contractors for all energy sources, sorted by energy type. Those records show that energy consumption was reduced by 15.8 percent from Fiscal Year 2003 through Fiscal Year 2007 through ongoing facility deactivation and decommissioning (D&D) projects, stand-down endeavors, and downsizing and consolidating activities.

These activities allowed the DOE Richland Office to far exceed the goals of the FY 2007 Energy Management Performance Agreement with DOE Headquarters.

FLUOR HANFORD generates renewable power. The site utilizes two mobile and 41 fixed solar-powered emergency sirens. Each siren is powered by two, 120-watt panels totaling 240 watts and producing 12 volts. Five photovoltaic highway message reader boards inform Hanford Site drivers of changing conditions. In addition, two 530 Hz low-power AM broadcast stations and two radio station sites are powered by a solar-charged battery system. A series of solar-charging stations and remotely operated valves and pressure transmitters are used to provide monitoring and control capabilities from the water plant control room located in central Hanford. We also operate an 85-foot tall tower with a 1.5 kVA wind turbine to provide back-up power for a photovoltaic-powered railroad crossing signal.

FLUOR HANFORD led the acquisition of E85 (alcohol-gasoline mixed fuel) vehicles for the Hanford Site. We have moved from having 1.5 percent, alternative- fueled vehicles in Fiscal Year 2001 to a current 28.9 percent, alternative-fueled fleet as of January 31, 2008. **Appendix 35** displays the ordering and purchasing history for E85 vehicles.

5.5 External impact of EHS

Fluor and its employees are extremely active in local communities and across the globe. **Appendix 7** highlights community and environmental activities. **Appendix 36** is the *FY 2007 FH Annual Energy Management Report*. Four items to note in the report include the following:

1. Training and education provided to our personnel for improved energy management and reliability
2. Energy reduction performance (Building Energy Consumption Index, vehicle and equipment fuel consumption data, etc.)
3. Operational, environmental, or energy efficiency projects
4. Information regarding our successful project for planting approximately 200,000 pounds of native grass seed on 9,500 acres of land that burned in the Wautoma Fire in August 2007. Planting native grasses helps prevent blowing dust and deters invasive plant species that provide more fuel for fires and burn more quickly.

6.0 LINKAGE BETWEEN EHS AND BUSINESS PERFORMANCE

6.1 Integration of EHS and business management systems

The Fluor Corporate Zero Incident philosophy is in alignment with Fluor Corporate objectives and strategies across all Fluor projects. All levels of management and the workforce have responsibility for environment, health and safety to the same degree and manner as their other business responsibilities. At Hanford, the Integrated Environmental, Safety, and Health Management System (ISMS) is a cornerstone of the continual improvement process that touches all aspects of environment, health, and safety from the office to the field. Every year, FLUOR HANFORD and its Department of Energy client negotiate ISMS Performance Objectives, Measures, and Commitments (**Appendix 37**) that are to be met by the FLUOR HANFORD workforce. The commitments are integrated with daily operations and are tracked monthly, along with numerous financial goals and objectives.

FLUOR HANFORD unites safety, work performance, and fee-bearing activities into a series of project performance measurements entitled: *FLUOR HANFORD Dashboard–CPOF and Critical Metrics* (**Appendix 6**), are reported monthly.

6.2 EHS as a core corporate value

Fluor Corporate values represented by **SITE** (**S**afety, **I**ntegrity, **T**eamwork, and **E**xcellence) are deeply imbedded in Fluor environment, health, and safety working practices (**Appendix 38**). As a corporation, Fluor has earned multiple international certifications such as ISO 14001 and ISO 9001 (See **Appendix 39** for other certifications). The practices that led to those certifications have been brought to FLUOR HANFORD to contribute to improved and efficient operations.

The ISMS Guiding Principles and Core Functions (**Appendix 40**) demonstrate that environment, health, and safety are well-integrated into all facets of the work planning/execution cycle as shared values and common practices. These two factors are at the core of the dramatic improvement that could only have occurred if they were embraced by all levels of the organization.

6.3 Alignment of EHS with corporate objectives and strategies

The Fluor Corporate EHS Management System directs assigning environment, health and safety responsibilities. Organizational responsibility for achieving environment, health, and safety objectives ultimately rests with senior management. However, that responsibility extends successively from senior management to line management and to our employees. We align environmental, health, and safety objectives and strategies with Fluor Corporate **SITE** values.

6.4 Continuous and systematic EHS and business performance improvement / sustainability

We value employee feedback, independent evaluations, best practices and lessons learned (**Appendices 41 - 42**) as ways to critique and continuously improve performance (**Appendix 3**).

FLUOR HANFORD has earned 90 percent-plus award fee for the last five years through excellent safety and operational performance.

FLUOR HANFORD and our DOE customer compile, schedule, and publish assessments in an Integrated Evaluation Plan. Assessments are completed in all topical areas and are centrally collected by an assessment coordinator. The assessments are reviewed as a group (See Section 5.1). Personnel conducting the assessments receive classroom training and mentoring on the process before they are given authority to perform assessments independently. Any conditions requiring prompt corrective actions are immediately reported to responsible management and are captured in a Corrective Action Management System that tracks the progress in correcting a deficiency or improving performance. Each registered action lists a responsible party, specific requirements that must be met, and a completion date.

Safety Improvement Plans are living documents that are maintained by the employee-led safety councils. This not only allows employees and management to focus on existing initiatives, but also allows flexibility to make adjustments as emerging trends are discovered.

We have created a work environment where managers and employees work as a team to integrate environment, safety, and health requirements and principles into planning and performing work, using both the ISMS and the DOE-Voluntary Protection Program. ISMS provides the systematic and structured

approach to integrating environment, health, and safety into planning and doing work. VPP promotes excellence in occupational safety and health. Learning from our own and others' experiences – both positive and negative – is an important aspect of our environment, health, and safety programs. Both ISMS and VPP require annual self-evaluations as part of continued validation and certification.

We ask our suppliers to evaluate our safety programs and performance, and we perform in-depth readiness reviews before we implement a technology or begin significant new operations. These reviews, which have rigorous environment, health, and safety components that include nuclear-related requirements, are two-tiered: first we plan and conduct them ourselves; then, when we declare ourselves “ready,” DOE observes and grades our performance.

6.5 Dynamic nature and interactivity of EHS with other operational functions

Environment, health, and safety staff and processes are integrated into the overall project management structure, with additional accountability within the corporate organization. Beth Bilson, Vice President of Environment, Safety, Health, and Quality (ESH&Q), reports directly to the President of FLUOR HANFORD (**Appendix 43**). The EHS&Q organization (**Appendix 44**) has more than 700 full-time employees and more than 80 percent are assigned directly to field projects. This allows for quick resolution of actions/issues and supports safe completion of our nuclear cleanup mission.

The FLUOR HANFORD ISMS guiding principles require “Line Management to own the HSE function.” This is reinforced in all training, publications and assignments. The ESH&Q organization assists project management and oversees compliance, while the line project management integrates and implements EHS into the work-planning and execution process.

6.6 Demonstration of improvement in productivity through EHS

FLUOR HANFORD's excellent safety, health, and contract performance played a significant role in the DOE extending the company's contract twice. At the same time, Fluor Corporation's improved productivity resulted in sales revenues doubling over the past five years. FLUOR HANFORD has met 222 of 235 (94%) regulatory milestones for cleanup under the Tri-Party Agreement, identified in

Appendix 11. In addition, cost avoidance in our workers' compensation cost has exceeded \$7 million. due to the strength of FLUOR HANFORD's health and safety programs, the company

Measurement and Evaluation

The assessment and feedback mechanisms are important to the Fluor Corporate EHS Management System. These mechanisms are used to confirm the EHS Management System is being implemented and used correctly. The assessment and feedback mechanisms also measure performance, monitor effectiveness, and evaluate proposed changes to the system. Fluor uses methods discussed in Section 6.1 to track and measure progress with corporate goals.

6.7 Triple, bottom-line effect

We promote integrity, transparency, and accountability by fostering strong and independent board-level oversight. We use a global workforce and supplier network of diverse ideas, backgrounds and expertise. Fluor supports, along with our employees, vital educational and other community institutions. Fluor trains local citizens around the world – more than 250,000 to date – to become skilled craftspeople, consequently improving their job capabilities and strengthening local economies. Fluor values that promote environment, health, and safety have contributed to Fluor's rank among the safest companies in the industry which we work (**Appendix 34**).

7.0 OTHER FACTORS

One of the largest challenges at FLUOR HANFORD is an aging workforce. The average age of the workforce of 3,600 employees is approximately 52. We took this into account when declaring a “Safety Stand Down” in August 2007. The stand down generated five key safety improvement initiatives (**Appendix 45**) and more than 1,800 items to address both in the offices and in the field. One of the five initiatives resulted in the “Stretching at the Workplace Initiative” which has been embraced by the workforce. Groups across FLUOR HANFORD Projects start their day with a 15-minute exercise program to physically prepare for work. This program is available to all employees and subcontractors who choose to participate.

A long-standing challenge facing FLUOR HANFORD is the dynamic change of mission from nuclear weapon production to environmental restoration and demolition and decommissioning of aging facilities. To address this issue, management, workers, and subcontractors attend training courses at HAMMER (**Appendix 24**). More than 29,000 student-hours of instruction were conducted in fiscal year 2007, utilizing a successful worker-trainer program (**Appendix 46**). The switch from an operational workplace to one that focuses on environmental remediation and demolition/decommissioning of facilities presents safety and environmental issues: asbestos removal, isolation of electrical power and lines, and water table management, which have been addressed through environmental engineering and new training programs.

The Hanford Information Lessons Learned Share (HILLS) is a program that gives employees access to more than 700 lessons learned activities for informational use. The program creates over fifty reports per year which become available to every employee and subcontractor (**Appendix 41**).

8.0 CONCLUSIONS AND PATH FORWARD

Fluor's environment, health, and safety management system is the framework for continual improvement of our EHS performance. The management system is used by Fluor projects to address all aspects of EHS. Keeping employee knowledge, skills, and abilities current in a changing work environment has resulted in Fluor training more than 250,000 people to become skilled craft personnel and support workers. At Hanford, our success has resulted in significant, challenging milestones being completed ahead of schedule and under cost. We have eliminated two of the Hanford Site's most urgent risks: moving tons of deteriorating nuclear fuel to dry storage and stabilizing 20 tons of plutonium material.

FLUOR HANFORD senior management is commitment to safety. We have a deeply involved workforce at office and field levels to implement safety and health initiatives. Project/safety performance results are directly related to financial rewards, and we have an energetic community outreach program.

Fluor will continue to strive for increased improvements in environment, safety, and health. The corporation will capitalize on the proven management systems and lessons learned at Hanford and integrate these key concepts into environmental remediation and national laboratory work for the DOE at the Savannah River Site in South Carolina and the U.S. Department of Defense Logistics Civil Augmentation Program (LOGCAP) contracts. Additionally, FLUOR HANFORD environment, health, and safety initiatives, and lessons learned result, will be placed in the corporate database to be used in future governmental and commercial proposals.