There I was, standing at the edge, staring deeply into the still, blue water. The pool was calm and enticing, and I longed to dive in. But I resisted the urge. At the bottom lay a vault of the world's most radioactive material–highly enriched spent nuclear fuel from the Navy and the Idaho National Engineering and Environmental Laboratory's nuclear reactors. Though the vault is sealed, I didn't want to go through the scrubbing and decontamination required for any worker who falls into that water.

I had spent my morning at INEEL's advanced test reactor in the middle of the windy Idaho desert watching highly skilled operators respond to a simulated dangerous situation as part of their on-going training. They used a sophisticated simulator with real nuclear reactor data to ensure total fidelity. The U.S. Department of Energy demands that all workers at its facilities undergo extensive training to meet strict regulatory requirements. Getting this training right is critical.

Worker-Directed

By Stacey Wagner

For some people, a bad day at the office means misplacing an important file. But for workers at INEEL, where nuclear reactor fuel from Three Mile Island is stored, a bad day can mean the destruction of millions of dollars worth of equipment, lasting damage to the environment, or death. It's high-risk, high-consequence work requiring a well-trained workforce dedicated to doing it right and safely. No one wants another Chernobyl.

INEEL, the foremost nuclear energy and environmental lab in the United States, will undoubtedly play a major part in President Bush's plans to enhance the U.S. energy infrastructure. But this story isn't about energy; it's about power—the power to improve business performance outcomes through a commitment to people and empowering leaders at all levels.

INEEL is a U.S. multiprogram laboratory supporting DOE's missions and business lines of environmental quality, energy resources, science, technology, and national security. Established in 1949 as the National Reactor Testing Station, INEEL was once the site of the world's largest con-

Training

There's no room for error in nuclear safety training. The key to assurance was getting workers involved in their own training, among other actions.

centration of nuclear reactors—52 in all. Only two of those reactors are still in use. INEEL, located in southeast Idaho, is spread over 890 square miles.

Management and operation of much of INEEL is the responsibility of private contractors working under the U.S. Department of Energy, Idaho Operations Office. Bechtel BWXT Idaho is INEEL's prime contractor and a unit of Bechtel Group, an engineering, construction, and project management firm with operations in 66 countries.

Some background

In 1998, while under contractors other than Bechtel BWXT, an INEEL worker died in an industrial accident. The ensuing investigation showed that workers were getting insufficient training to meet DOE standards and that the training was inconsistent across sites.

Part of the problem was the lack of one organization to coordinate all of the training functions and assets. In addition, construction subcontractors were providing their own training to their own employees. Due to the lack of centralization, training was being duplicated unnecessarily and each site provided the kind of training it wanted to deliver, in the way it wanted to deliver it. Workers were being pulled off the job or were unable to start their contracts until they received the necessary training. Some workers were being trained to operate equipment they no longer used. Worker certifications and qualifications were difficult to track, and if their certs and quals expired or were recertified too early, money was lost in the lapse or overlap. It was necessary to keep meticulous records, and updating the paper case files absorbed an enormous amount of time, energy, and money. To top it off, some of INEEL's best training assets focused on external issues, and management's relationship with the unions was poor.

In response, INEEL implemented a comprehensive corrective action plan to improve its safety record, with a goal of operational excellence. The plan included creating an operations training directorate to bring a singular focus to workforce training. To lead the directorate, the contractor hired retired Army LTC Fred Flynn, who had a strong background in operations, maintenance, training, and teambuilding. The new directorate was made up of three departments: the Center for Performance Improvement; Policy, Planning, and Records; and Site-Wide Training and Facility Support. Training became performance-oriented, directed toward proficiency, and integrated with Operations and Maintenance according to their schedule, not the training schedule. All enterprise-wide training processes, policies, and procedures were standardized, and collegial relationships with the unions were forged.

As the director of ASTD's Benchmarking Forum, I had the opportunity to spend three days at INEEL talking with the training staff, site directors, union representatives, workers, and the vice president of Bechtel. I also saw INEEL's e-learning initiatives, simulators, and training programs and visited several sites. I left with a story of transformational change comprising these key initiatives:

- Build exemplary stakeholder relationships and teams.
- Use technology to leverage learning.
- Ensure that training is integral to achieving business objectives.

This is the story of how they did it.

Inclusion, responsiveness, trust

In only two years, INEEL improved to the point that it was designated a Voluntary Protection Program Star Site, a distinction given by OSHA to recognize effective safety and health management. INEEL was the first DOE national lab to achieve that recognition. It couldn't have happened without the directorate creating an environment of inclusion and responsiveness regarding employees and building trust alliances with stakeholders.

"Our greatest challenge," says Flynn, "is to make sure our workforce is well trained, certified, qualified, and proficient to work safely. That's the ultimate act in taking care of our employees. There are many facets to keeping a workforce safe, but the big one—and the one we focus on—is training."

The directorate devised a mission to ensure operations and R&D success through the cost-effective, systematic application of training and HR performance solutions, relying largely on a strong customer focus, effective communication, and leveraged partnerships.

Twenty-four percent of INEEL's 6,000-member workforce is unionized—1,400 direct hires and construction subcontractors. Prior to the Operations

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Training Directorate, union workers weren't consulted about their training even though their lives depend on it. They believed their worth was underestimated and ill considered and that there was little value in the training, viewing it as a nuisance that pulled them off their jobs. Invited to a union hall meeting, the OTD management team listened to the union's concerns and set about refashioning their relationship by involving workers in their own training. The OTD now asks what and when workers should receive training, if it was effective, and what they'd like done differently.

"Ownership—that's what's different now," says Leroy Duenes, a union vice president. "I felt the power, and I know I can make changes."

Under the new alliance, workers were empowered to take responsibility for their competence. When they said the training simulators for isolating energized systems were obsolete, INEEL replaced them immediately. In addition, the unions rewrote much of their training curricula to make it more applicable to their jobs, and some of the union representatives now serve as instructors. Taking a proactive step, the unions obtained grant money from the Department of Energy for hazardous materials training, which they helped write and implement. And when the Northwest Laborers Union received DOE grant money to set up its own training center, NLU made sure to involve the OTD in helping create a technology-supported learning component. Now, instead of INEEL holding workers responsible for being trained, the workers hold the OTD accountable for providing the appropriate training. But there's no mistake on the part of workers that they own their career development.

Domino effect, triple play

The improved relationship between the unions and the training function has also benefited general workplace relations. Bob Nord, Bechtel's labor relations manager, has seen a marked difference in the perceptions of worker value and importance of safety on the job. Workers are now encouraged to stop work when they think a situation is unsafe. Management recognizes workers' ability to make such calls; workers know they won't be reprimanded. The improved relationships don't stop there. In the past, INEEL's many construction contractors and subcontractors had been left on their own regarding certifying and qualifying their workers. The contractors didn't always know when they would work, at which site they'd be needed, or the job roles their workers would take on, so it was especially tough making sure their employees were trained to DOE standards. In some cases, subcontractors were unaware of new standards. That meant lost business for them and wasted time and money for INEEL.

"John Howanitz, Bechtel's director of construction management, changed all that," says Flynn. "He's the best at building teams and inspiring people to get the job done."

Two members of Howanitz's team are Lamar Hayward, a construction subcontractor, and Andrea Gilstrap of the OTD. They formed a committee of contractors, union representatives, craftworkers, INEEL, and, later on, companies and all local unions. The committee defined ways to keep contractors and subcontractors informed about changes in training requirements and eliminated training duplication; it continues to ensure job readiness and rapid deployment of training.

Gilstrap and her team met many of the committee's objectives by developing C-Train, Construction Safety Online Learning System. Setting a precedent at INEEL, her team provides contractors with training access from outside INEEL's firewall and established computer-based learning labs in the nearby communities of Idaho Falls and Pocatello. The labs offer many training topics required of the construction workforce. By taking training at a lab before their jobs start, workers' wait time until they're considered "job ready" is shortened significantly.

Howanitz believes everyone will win with the new learning labs. "In baseball, this would be a triple play," he says. "First, customers benefit by reduced cost and improved schedules. Second, contractors benefit by being able to focus on planning and executing the work, as well as eliminating the logistics and uncertainty of training requirements. Third, prospective employees have the advantage to take training at a comfortable pace and in a comfortable atmosphere. They also avoid being saturated with all requirements at once."

Howanitz predicts a home run once

There's no mistake on the part of workers that they own their career development.

INEEL, the construction subcontractors, and building trade unions take full advantage of the program. "INEEL will demonstrate not only that we've learned how to develop the most trained, qualified, and competent workforce, but also that we can do it more efficiently than anyone else," he says.

The committee is now coming up with ways to certify supplier training for equivalency to INEEL training requirements. That'll eliminate the need to take INEEL-required training when those requirements are met by training taken elsewhere for other purposes.

The OTD works hand-in-glove with INEEL's nine sites to offer enterprise-wide and site-specific regulatory training in such areas as radiation hazards and hazardous waste. Though each site has its own training department, the OTD provides technical advice, staff augmentation, and training whenever and wherever the sites need it. Technical training takes place mostly at the worksites, but the OTD makes Web-based training available and accessible via INEEL's intranet.

Collaboration, partnerships

The department of Site-Wide Training and Facility Support is headed by Rick Ludholtz of the OTD management team. Only recently were the two functions consolidated, creating efficiencies for both areas.

"We have a really good working relationship with facility training programs," says Ludholtz. "When they have questions about training processes or requirements, they come to us. We use the DOE standards to evaluate our programs, and we help them evaluate their programs."

The OTD leverages outside partnerships through which it obtains expert talent and exchanges good practices. The partnerships include the DOE's Cross-Cutting Training Forum, the Institute of Nuclear Power Operations, the Training Resources and Data Exchange, the National Institute of Environmental Health and Safety, Utah State University, Idaho State University, Eastern Idaho Technical College, and the National Environmental Training Organization.

In addition to customer orientation, the OTD ensures operations and mission success through the strategic use of technology. As a part of its training plan, the OTD develops and implements technology-based solutions for human performance and process improvement, including Web- and computer-based learning, intranet-Internet access to information, EPSS, and other media. The OTD delivers about 15 percent of training via technology, expected to rise to 20 to 25 percent. In the past two and a half years, the OTD developed and deployed more than 100 Web-based courses and activities delivered through an in-house training portal. The OTD also manages nine remotely located learning centers and an internal TV network, and hosts four training and performance-oriented Websites for the DOE.

Like several companies in the ASTD State of the Industry report, the OTD uses a blended learning approach for technology-supported technical training. Long before John Chambers of Cisco Systems declared education to be the next "killer app" for the Internet, companies were using technology to deliver training content. But INEEL realizes that technology for its own sake is putting the cart before the horse, so it focuses on optimal technology opportunities and, as a result, achieved efficiencies and large cost reductions.

To make sure INEEL and its employees were ready to use technology for training, Richard Holman and Robert Richards of the OTD Center for Performance Improvement developed GARTH—General Acceptance and Readiness for Technology Heuristic. Adapted from the Software Engineering Institute's Capabilities Maturity Model, GARTH categorizes five levels of organizational maturity for adopting the use of technology for learning. GARTH also defines the planning activities, information paradigm, technology applications, and quality and training expected at each of these readiness levels:

- Initial
- Centralization and Integration
- Technological Advancement
- Performance Enhancement
- New World.

Holman, the center's manager, thinks INEEL is currently at a 2+ level but aspires to a 5. At 2+, an organization's

Like several companies in the ASTD State of the Industry report, the OTD uses a blended learning approach.

acceptance and readiness for learning technologies is at the logistic and tactical levels but is moving quickly towards strategically integrating learning technology with information resources. GARTH has helped ensure the systematic implementation of learning technologies at INEEL.

In the OTD, trainers use branded templates that don't require them to have sophisticated computer skills to construct online learning. The templates make it easy for trainers to post content and help users navigate the online courses and feel comfortable with the technology. All technology-supported learning at INEEL uses existing infrastructure, which is managed by the Information Resource Management department, which supports all of INEEL and OTD.

One of the more sophisticated Web-based programs offered by the OTD is *SimGen*, a simulation generator augmented with instructional features. Users learn at their own pace at a level—instruction, coaching, or solo—they're comfortable with, while having access to the instructor's commentary, sequenced messages, coaching, and feedback. *SimGen* is a path simulator, which teaches the best path based on the expertise of the user. Currently, the OTD is using *SimGen* practice scenarios to teach a complicated, enterprise-wide software program. Fidelity is so good that users often think they're in the actual program. The OTD trainers can update the content quickly and easily, and the developers can put new content and graphics in the template without needing special programming skills. That has resulted in a 60 percent savings in instructional development time.

The OTD also uses other computer simulations, such as one I witnessed, in which actual nuclear reactor data drives each scenario, providing operators with a real-life experience managing nuclear operations. Interestingly, when operators do experience a real-life situation, their performance support tool is a big notebook of regulatory procedures, but they're considering putting them into an EPSS.

A few years ago, when the U.S. General Accounting Office audited all DOE training expenditures, it found they were too high, some training was redundant, and applicable training wasn't being shared across the DOE. In response to the findings and in behest of the DOE's Office of Training and Human Resources, the OTD created the Cross-Cutting Training Forum for sharing training. Michelle Kirby, the forum lead, explains, "We created an online activity in which people can query participants across the DOE for courses they need. So far, 60 organizations from 13 sites are taking part, and we have saved almost $40,000 by sharing learning materials."

Because the energy industry is highly regulated, many courses are applicable outside of the organization for which they were created. By listing their specific training needs, trainers can find out who has similar courses and how the courses are rated, talk to users, and share training. When someone sends a query, an email goes to every participant in the forum. They can then link back through their email and respond to the request or go to the main request page to respond. When a reply is sent to the inquirer, all participants who'd like to know the answer are emailed. The program is password protected, and Kirby helps users access and navigate the Website, as well as monitor courses.

Standardizing, streamlining

In the nuclear energy industry, making sure workers have the proper documentation to perform their jobs can be a Sisyphean task. INEEL has to certify, track, and store the qualifications of its contractors and many subcontractors. Workers must be qualified for various tasks and must continually renew their qualifications to conform to DOE and industry standards. In the past, those records were kept by their owners on paper and in several independent databases. Now the OTD keeps them in an automated system that also helps plan workforce development, notifies people about training, delivers schedules and attendance records, and describes job training requirements. The system, TRAIN (Training Records and Information Network), was brought into INEEL in 1995 from the DOE's Savannah River Site and has undergone considerable customization to conform to the requirements of the Idaho site,

The templates make it easy for trainers to post content and help users navigate the online courses and feel comfortable with the technology.

providing more than US$2 million in cost savings or cost avoidance in just three years.

Those savings wouldn't have been possible without standardizing and streamlining policies, processes, and procedures, says Doug Hillman, OTD manager of Policy, Planning, and Records. OTD built job codes based on functional areas and created a training-requirements matrix so trainers can see the different training components and qualifications. The result is a systematic way to access worker and training information history and use. The OTD worked closely with INEEL's training coordinators to identify employee needs, and the coordinators worked closely with line managers at INEEL sites to acquire the information. The OTD depends on coordinators to ensure that workers know when their requalifications are due and to funnel training information into the system as it occurs. To facilitate that process, there's an automatic notification feature and barcode scanners for worker identification and training records.

Getting employees on board wasn't easy, says Hillman. When first introduced, TRAIN lacked some functions relevant to workers' needs, and the OTD didn't sell people well on TRAIN's capabilities. Workers now praise the system, which has become integral to many daily work processes.

An important issue for the OTD is Bechtel's desire to improve all management systems, including training. INEEL spends $34 million per year on training for the 6,000 employees in its core workforce. In comparison, ASTD Training Investment Leader companies (average employee population 16,000) spend $33 million annually, and ASTD Benchmarking Forum firms average $75 million annually for 55,000 employees on average. Most of INEEL's training expenditures are for "student labor"—costs associated with tuition, travel, and nonproductive time—followed by costs for infrastructure, staff, tuition assistance, and purchased training. INEEL aims to reduce student labor by $4.5 million annually by introducing what it calls the Annual Training Process, conceived seven months ago. It will attain training efficiencies at many levels, including employee, functional, program, and facility, without compromising worker safety. The process provides a structure for examining the amount of training required, how efficiently requirements have been interpreted, and who receives training.

Oren Hester, program manager for the OTD, oversees the Annual Training Process. As a cost-reduction and efficiency strategy, he says, the directorate initiated procedures to validate and document required training and its costs, switch training from global to targeted, reevaluate site zoning with respect to defining the training requirements for a work area, and reevaluate required training based on the type of work being performed. In addition, the expansion of INEEL's CBT and WBT is expected to eliminate many costs of downtime, travel, and classrooms.

Because ATP's success hinges on involving site area directors, facility managers, and training managers, the OTD provides a framework for helping them estimate training costs, assigning facility-specific requirements, and eliminate unnecessary training. The framework—called Site-Wide Training Requirements and Costs Book, or Book One—is a comprehensive list of employee and functional job codes and associated site-wide training requirements. Book One, in tandem with OTD course listings and automated scheduling, will help managers oversee employee training requirements.

Stephen Somers, DOE Idaho program manager for INEEL training, gives ATP a thumbs-up. "I consider this bottom-up, task-based approach to be an important factor in maintaining a trained and proficient workforce," he says, "especially in a time when there are limited training resources."

Another tool for managing training is STRIB, Site-Wide Training Review and Implementation Board. Its mandate is a systematic review and implementation of required training across INEEL. The board reviews all requests for training to ensure that training is the correct intervention to a performance issue and that the appropriate training is delivered to the right people, in the right medium, at the right time. If training *is* called for, the board works with the designers and developers to conduct an analysis. Then customers, SMEs, and technicians develop a solution and provide effective delivery. STRIB is made up of members from

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each site. The cycle time from submission to implementation varies from three weeks to three months, depending on the desired outcomes and the length, complexity, and solutions. In fiscal year 2000, STRIB saved INEEL more than $1million by eliminating unnecessary training.

While STRIB monitors site-wide training requests, the OTD Center for Performance Improvement takes a proactive stance, providing performance consulting solutions across INEEL. With an implicit understanding that not all performance problems result from inadequate training, the center makes it clear that attaining business goals requires a performance perspective, not just a training one. The OTD also advises on various lab projects in which training will be conducted. It also consults to outside organizations, such as the Defense Advanced Research Projects Agency and the U.S. Navy, to help them define and meet their performance requirements.

The OTD evaluates its performance through these activities:

- independent assessment of training by the Institute of Nuclear Power Operations, a globally recognized organization that conducts assessments of more than 100 commercial nuclear power plants
- systematic evaluation of training to measure participant reaction, learning, and behavior change
- qualitative and quantitative evaluation of instructors and courses
- measures that document the successful completion of performance requirements, including integrated safety management systems, spent nuclear fuel moves, and operational safety performance.

Workers are the reason the OTD exists, but its end customer is the Department of Energy. It falls to the directorate to help INEEL meet its mission to deliver science-based engineering solutions, national security, environmental cleanup, and enhancement of the site's scientific and technical talent. Bechtel COO Paul Divjak expresses great pride in the directorate's achievements: "Our focus on technical training and safety has been a win-win for everyone. Having a safe, well-trained workforce gives INEEL an advantage in growing new missions. Some of our new work with Department of Defense and DARPA are examples of that."

In the past two years, the safety of INEEL's operations has been audited 16 times, with a 93 percent average performance rating each time. Holman likes to say, "Where safety reigns, people train."

Beverly Cook, head of DOE's Idaho Operations Office, cites the directorate for its literacy program, which teaches reading and comprehension skills to INEEL employees who volunteer that they want to learn to read and write better. Side benefits are enhanced self-esteem and a newfound sense of achievement, leading to improved relationships in and out of the workplace.

In describing the success at INEEL, Flynn says: "We work very hard at putting round pegs in round holes. I've never met an employee who wanted to do a bad job. I have met some managers…who put round pegs in square holes and were offended when the employee failed. Well, the employee didn't fail; we failed as leaders."

One of my strongest impressions from visiting INEEL was the training staff's concern for employees and each other. Having experienced the death of a worker two years ago, they know the importance of training. They also know the importance of including everyone's voice in the design and deployment of that training.

It's a tough time at INEEL now, with severe cutbacks and downsizing about to take place. But employees aren't hiding their fears; they're talking about them—how changes might affect them and their colleagues. On my final day, I was part of a directorate "All-Hands Meeting," where Flynn delivered a "Sermon on the Mount." Such regular informational sessions give directorate employees a chance to ask questions about changes taking place, including rumor, innuendo, and gossip. The discussion I attended was forthright, and I was impressed that bad as well as good news was delivered. I think that acknowledging the elephant in the room prevented the typical dysfunctional behavior generated by avoidance. That principle also applies to how training is conceived and conducted. TD

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Note: SimGen *is a trademarked name.*