

Mentoring Human Performance – 12480

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Safety Culture Definition

An organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect the workers, public, and the environment.

(EFCOG/DOE ISMS Safety Culture Task Team Final Report 2010-2)

ABSTRACT

Although the positive effects of implementing a human performance approach to operations can be hard to quantify, many organizations and industry areas are finding tangible benefits to such a program. Recently, a unique mentoring program was established and implemented focusing on improving the performance of managers, supervisors, and work crews, using the principles of Human Performance Improvement (HPI). The goal of this mentoring was to affect behaviors and habits that reliably implement the principles of HPI to ensure continuous improvement in implementation of an Integrated Safety Management System (ISMS) within a Conduct of Operations framework. Mentors engaged with personnel in a one-on-one, or one-on-many dialogue, which focused on what behaviors were observed, what factors underlie the behaviors, and what changes in behavior could prevent errors or events, and improve performance. A senior management sponsor was essential to gain broad management support. A clear charter and management plan describing the goals, objectives, methodology, and expected outcomes was established. Mentors were carefully selected with senior management endorsement. Mentors were assigned to projects and work teams based on the following three criteria: 1) knowledge of the work scope; 2) experience in similar project areas; and 3) perceived level of trust they would have with project management, supervision, and work teams. This program was restructured significantly when the American Reinvestment and Recovery Act (ARRA) and the associated funding came to an end. The program was restructured based on an understanding of the observations, attributed successes and identified shortfalls, and the consolidation of those lessons.

INTRODUCTION

The Central Plateau Remediation Project on the Hanford Site near Richland, Washington was awarded to a new contractor in the fall of 2008. This contract included a significant change in the mission and the associated changes in work scope and methods. As the new contractor management and the incumbent workforce initiated the changes to address the mission, the ARRA provided a significant increase in authorized funding for the Central Plateau Remediation Project. To achieve the goals of the ARRA funding, the staffing levels were nearly doubled. The combination of new work scope and increased staffing resulted in challenges with the consistent, effective implementation of Conduct of Operations and ISMS principles during the conduct of work.

This project was managed through five operational lines, referred to as “projects,” in the field and on site, which included activities associated with maintenance and operations of certain facilities, decontamination and demolition, soil and groundwater remediation, waste retrieval and repackaging, and support to engineering, projects, and construction. A central group included company leadership, and central business operations providing common support to the company and the five projects.

Faced with such rapid changes and management challenges, senior management identified approaches to reinforcing a safety-conscious work environment. Concurrent with wide-ranging assessments to determine root and common causes underlying events, a mentoring program was chosen as one tool to improve performance. As a charter was being developed to define the goals, objectives, methods of practice, and measures of performance for the mentoring program, analysis of assessment and event data indicated that the leading causal factors were human performance issues.

While other initiatives, more traditionally based in formal corrective-action-management techniques and processes were in place or being reinforced, additional emphasis was needed to incorporate the principles of ISMS and the requirements of the Conduct of Operations into the organizational psyche. This emphasis had to be applied across the entire enterprise to ensure clear, consistent messages were communicated and the desired end state of “One Culture. One Team.” could be attained.

Against this backdrop, there evolved a recognition that alongside the more formal and regulatory programs that were being strengthened and bolstered, there was a need to address the human face of changes to the organization. Further, despite the positive feedback on the new employee training, which included practical methods and tools for improving human performance, consistent application of those tools and techniques was proving difficult in the field. A mentoring program was devised as a means to facilitate improvement across the full range of project work and take on the many facets of these challenges.

METHODS

The most salient feature of this mentoring program was also its most provocative. Intentionally designed into the program was a lack of formal reporting. A very considered decision was made as the program was being established that the principal tool for the mentors was their ability to communicate openly across all boundaries. Mentors were to be open-minded and not carry their own agenda into any interaction. The assertion was that a perception that the organizational culture and process barriers to safety performance improvement would be more easily understood and more quickly embraced if mentors could be approached openly and without fear of attribution, or even retribution. With multiple objectives for the mentoring program and multiple touch points in the organization, different mechanisms were established for mentors to interact with the whole company, their specific project, and directly with individuals.

Co-Lead Mentors were selected and assigned work space within the core of the central group. The lead mentors had regular access to senior management through a variety of scheduled and unscheduled interactions including regularly scheduled management meetings and informal office drop-ins. This central structure provided better insight and a deeper understanding of senior management’s challenges, as well as a framework for communicating with mentors in each of the five operational projects. Lead mentors attended senior staff meetings, Executive Safety Review Board meetings, and other ad hoc groups sponsored by senior management and applicable enterprise-wide.

A strategic-level communication plan was developed and executed that included the use of video, print, and group presentations. Co-Lead Mentors were charged with using various communication techniques to tell the mentoring story. Supporting the goals of promoting and encouraging mentor acceptance, while simultaneously reinforcing cultural acceptance of HPI techniques and philosophies through various communications pathways was a primary function of the co-Lead Mentors. An overarching strategic communication plan was developed that highlighted themes, messages and activities, venues and pathways, stakeholders, and timelines.

Organizational alignment was considered an important enabler to this program's success. The mentors were very specifically established as direct reports to the Chief Operating Officer (COO) and seconded to the project vice presidents. This alignment provided a hard backstop to ensuring the principles of the program were followed and that the vision of senior company leadership would not get suborned to perception of more urgent needs. There can be a strong tendency, and it had been noted by senior leadership in previous similar efforts under different contracts, to pull the senior and experienced mentors into the fray and put them directly on an urgent and pressing problem. This assignment then prevents the mentor from remaining engaged across the entire project, establishes an "agenda" that drives the mentor's own behaviors and perceptions, and prevents the mentor from being that "trusted agent" or "honest broker" in the field.

With the COO's vision and reinforcement of the boundaries of the program clear, mentors were free to work within their projects at the discretion of project leadership — typically the vice president or deputy. Inside each project, mentors were dispatched with different focus areas, levels of autonomy, and feedback structures. The controlling variables in determining mentor activities on a day-to-day basis in each project included the nature of the work, upcoming tasks, the number of mentors assigned, the recent history of successes or challenges, and the personalities of the stakeholders involved.

Mentors were assigned in varying numbers to each of the five operational projects — from one per project to as many as four. Project mentors met biweekly with the lead mentor and the COO. These closed-door meetings allowed mentors to share observations from their activities, look for common threads in problems that might be crossing project lines, or suggest a larger organizational issue, and offer each other support and advice. The COO had a conduit to sense the pulse of the projects. In the mentors, the COO also had a vehicle for communicating company policies and philosophies to the projects and the work force. This biweekly forum provided an open dialogue and a non-attribution platform for the COO to hear "the rest of the story."

Because the goal and objectives were improved performance by the personnel implementing the work-management process, the mentoring method chosen was direct observation, followed by timely feedback and reinforcement of good behaviors. The basic method used for mentoring was observation followed by immediate feedback and coaching. Another common method was asking questions that prompted dialogue and discussion, and interaction. A third method involved participation in problem-solving discussions in a role of coaching those responsible into thinking through and making reasoned decisions.

Building trust between the mentors and all levels of the company was considered the initial task of the highest order. Without open lines of communication, the mentors would neither be able to facilitate the open, if unofficial, line of communication throughout the company, nor provide coaching and mentorship as they engaged at the worksite. One set of activities undertaken to foster trust between the mentors and the people in the company was to raise the awareness of

the existence of the program. A variety of media was used to introduce the mentors and mentoring programs to the enterprise.

RESULTS

“Success is a journey, not a destination. The doing is often more important than the outcome.” Arthur Ashe, Jr. (1943-1993)

With the above philosophy in mind, the mentoring program could declare success. It was, and continues to be, a journey in affecting the behavior of an organization and its workers.

As stated in the section above, the mentoring program did not engage in focused data gathering, particularly in data gathering that was aimed at directly demonstrating the value of the mentoring program as an end in itself. The metrics collected at the outset of the program were not malleable enough to clearly give form to the objectives of the mentoring program. Furthermore, the company adjusted metrics on a fairly fluid basis as they sought continual improvement of company operations. And while these frequent changes to collected metrics and means of reporting them supported other company goals, the mentoring program was neither able to establish a solid baseline against which to commence its operations, nor was it able to unequivocally point out progress and improvement attributable solely to mentoring efforts.

Mentors were selected and assigned to each major project, and were assigned focus areas by the Project Vice-President. This further impacted the ability to measure the effects of mentoring as mentors took on different focus areas across the various projects. However, anecdotal and subjective evidence was cultivated and obtained, and conclusions were drawn based upon that data.

Self-Assessment and Senior Leadership Assessment

The first assessment conducted was one internal to the mentoring program. Mentors were polled approximately eight months into the program to determine where they felt improvements had been achieved and where mentoring was most beneficial to the company. Mentors were given a simple questionnaire with six seed questions. Narrative responses were distilled, collated, and the data “binned” to identify trends and salient points. These findings were first discussed and agreed to by the co-Lead Mentors, then briefed to all the mentors to verify interpretations were correctly made and conclusions reflected the status of the program.

The findings of this review indicated success was achieved by the mentors in gaining acceptance and trust within their respective projects. This included all levels of project operations from the actual work at a job site, to daily meetings, to closed-door meetings with project leadership. Mentors were able to establish themselves as trusted advisors and share their wisdom. More concrete results were attained in the area of pre-job and pre-task briefings where a concentrated effort was made to bolster first line manager skills in running these meetings to achieve typical objectives. A final area of noted achievement was in improving communication within their respective project

Two categories emerged from the aggregated answers. They are shown below in figures 1 and 2. Note that the size of the pie slice indicates *relative strength of response* and the data do not suggest absolute or empirical measurements.

The first observation (see figure 1) concerned what were deemed “mentoring successes.” These were areas where the mentors themselves felt they had made significant contributions toward establishing trust, opening lines of communication, facilitated improvements in planning and pre-job activities, and encouraged renewed commitment to specific HPI techniques. Because ‘trust’ was deemed the fundamental enabler of all other mentoring activities (i.e. its absence would preclude mentoring effectiveness), establishing trust between the mentors and all levels of the company. Mentors found they could effectively communicate with workers and first-line supervisors, as well as project and company management and leadership.

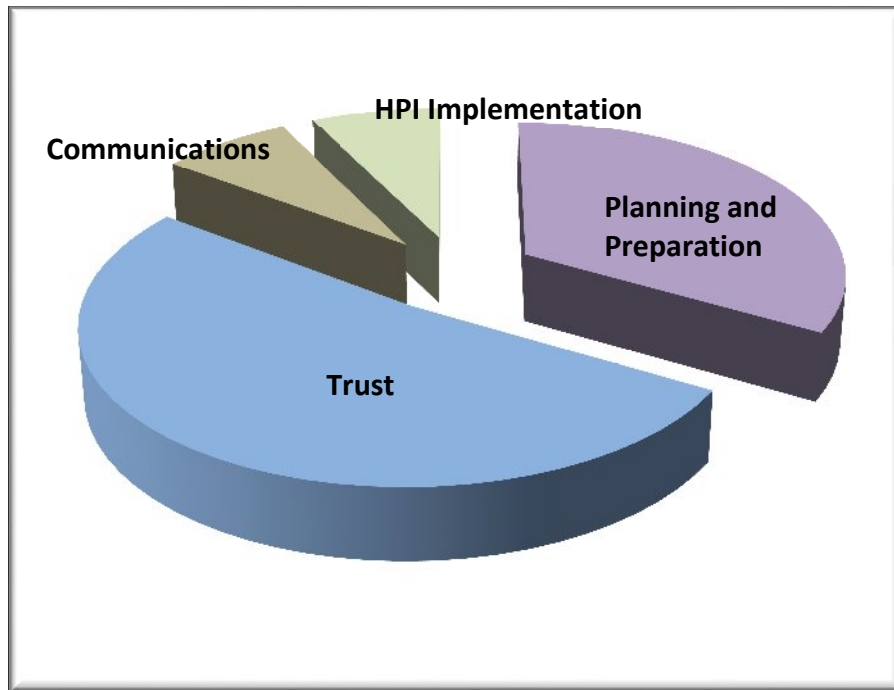


Figure 1 Mentoring Successes Enabling Improvements Achieved by the Mentoring Program

A second observation that came out of this initial self-assessment was that mentoring contributed to improvements in the day-to-day operation of the company. Not only was mentoring effective in creating environmental shifts (figure 1 above), but the principal objective of the program—to affect behaviors and habits to reliably implement HPI—appeared to be in progress.

Figure 2 shows internal program perceptions of operational improvements to which mentors felt they contributed. Again, it is important to point out that figures 1 and 2 are based upon subjective data and there is no norming or standardizing that took place. However, coupled with the anecdotal evidence collected during routine meetings and communications between mentors and the co-Lead Mentors strongly suggested supporting performance improvements. For example, *Rate of Production Improvements* shown in figure 2 below was the result of improved pre-job briefs and improved readiness to get to work once at the job site. Since mentors put a high level of attention on improving pre-job briefs, credit for this improvement accrued to the mentoring program.

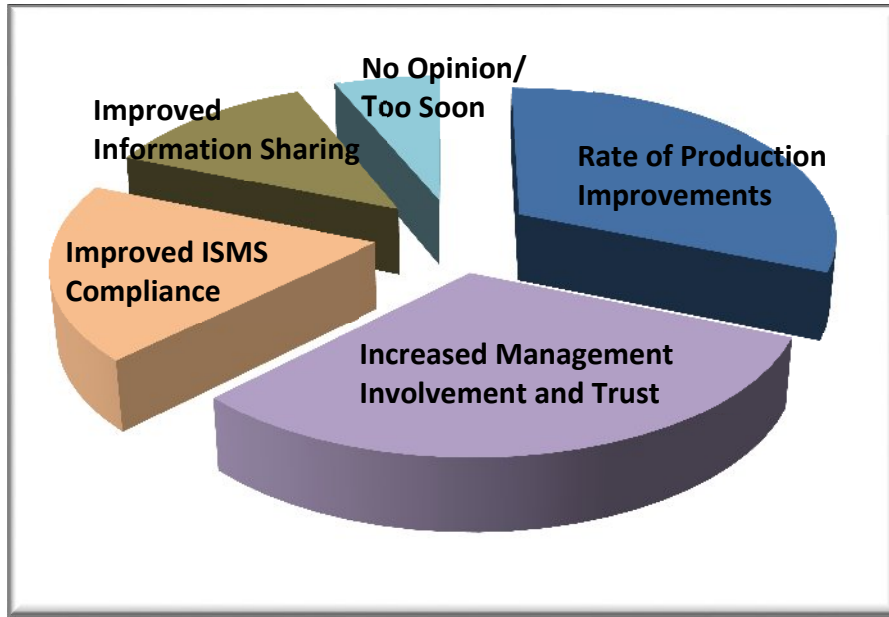


Figure 2 Positive Impact Benefits to Operational Projects Attributed to the Mentoring Program

The second assessment was conducted by project leadership. In this case, a survey form was provided with a grading scale for each question. Room for comments was provided at the end of the form.

Responses were received from each of the project vice presidents and other designated project leaders and managers. See figure 3 below. Survey results were scattergram'd, and then the mean and mode for each question plotted.

Attempting to distill contributions from a program without formal metrics in a highly complex organizational structure through the lens of operational projects and the individuals who lead and manage them is problematic, to say the least. However, the data suggest that in the heavily production-oriented environment extant throughout the projects, mentoring was valued and perceived as being an effective change agent. This observation is supported by the close correlation of the mean and mode of the scores for each question.

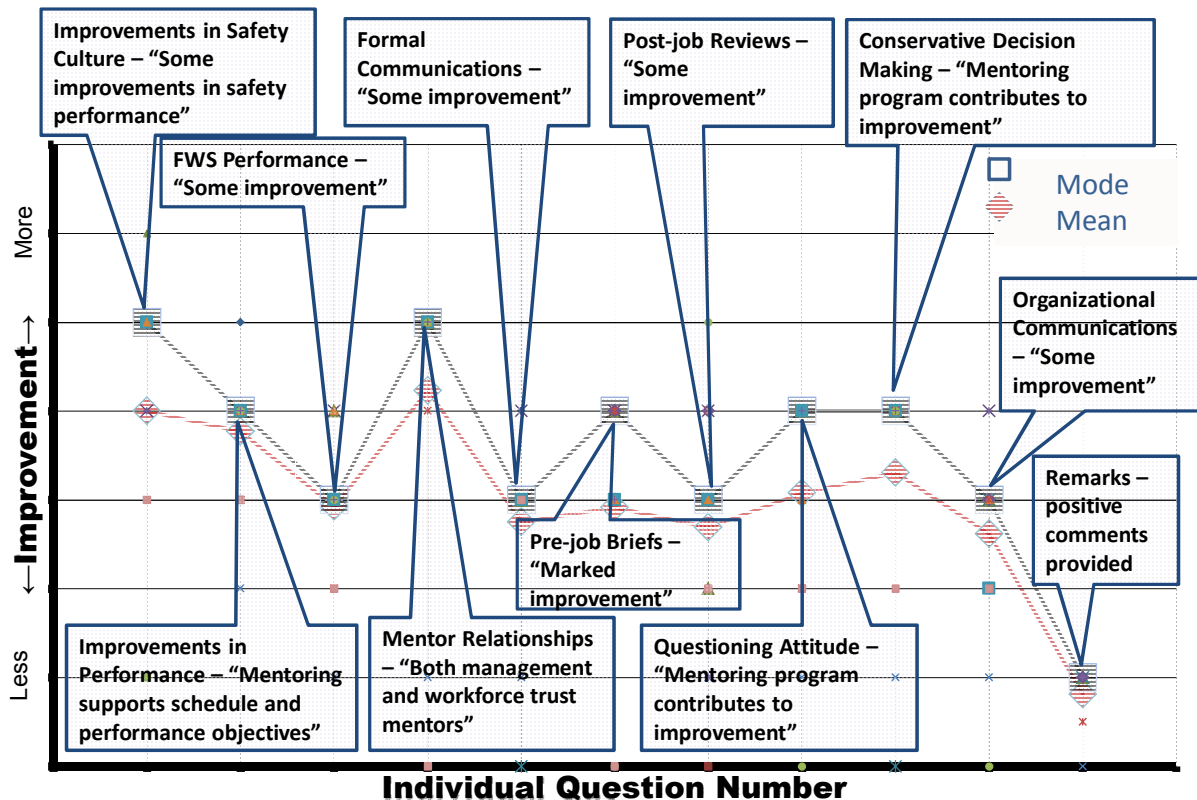


Figure 3 Project Leadership Perceptions Mentoring Program a contributor to improvement

Beyond these two more formal assessment efforts, mentors reported field activities and results to the Co-Lead Mentors on a biweekly basis. The reporting format was informal and varied from project-to-project, and mentor-to-mentor. While the lion’s share of the report was given to a narrative style, there was a scoring element, very subjective in nature that scaled each mentors observations in general categories.

The results of mentoring were measured by a performance rating metric of one to five, where five was the best performance. The attributes measured were either performance of a task, or performance that addressed error precursors. After several months of data collection, the Co-Lead Mentors were able to norm the scores across the various mentors to achieve a clearer picture of the relative effects the program had. Each mentor, looking at relatively similar items, tended to grade on slightly different internal scales.

Pre-job briefing performance improved steadily during the six months period of evaluation from a beginning average of two-to-three to an average of four across all the major projects.

Major activities which were mentored from beginning to completion achieved increased success and reduced events with an average rating increase from two to four. Noteworthy achievement was observed in the glove box size reduction team performance; the D&D work team performance in the 100K area and U-Plant; and the Waste Retrieval work teams.

Work scheduling, work release, and coordination with key support organizations improved across the major projects from an initial average rating of one-to-two, to an average of three-to-four. Noteworthy improvement was observed in the Soil and Groundwater Project, well sampling and Pump & Treat Operations and maintenance; in the Plutonium Finishing Plant Project; and in the Waste and Fuels Management Project.

Several work teams were successful in improving their work documents and work practices, such that their safety performance improved and their productivity improved (e.g., drum repack in T-Plant and the Waste Retrieval work teams). The rating of performance at T-Plant improved from an average of two, to an average of three-to-four. Performance rating in Waste Retrieval improved from an initial average of one-to-two, to an average of four-to-five.

The company's performance in safe work delivery improved throughout the six-month rating period. Although as stated above, direct correlation of company-gathered metrics to successes achieved through mentoring is tenuous, some conclusions were made. Issues or events due to human performance failures decreased by approximately a fifth. The predominant human performance causal factor is poor work practices, which are often evidenced by first aid injuries. One causal factor that showed noteworthy improvement was inadequate communication. These findings are loosely supported by the data depicted in figures 1, 2, and 3.

Senior Management, consisting of the COO and the project VPs, reported a general satisfaction with the mentoring methods and the favorable performance improvement. As a result, senior management decided to focus on continuing improvement of the human performance of 1st-line supervisors through development and implementation of a supervisor training program.

Mentors became essential, trusted resources for the entire organization, but especially for the project vice presidents. The COO responsible for the kickoff of the program remarked on the first anniversary of the program that the mentoring program was like music. He couldn't quantify how much better he felt when listening to fine music, but he knew he felt better. The mentoring program was similar—it made the company better even if that 'better' couldn't be quantified.

DISCUSSION

Selection of Mentors

Selection of mentors for this method requires key attributes, including knowledge of the work, experience in observing work and behaviors, skill in coaching and mentoring people, ability to interact effectively with craft personnel, supervision, and management, and the ability to form and build trust with people throughout the organization.

Mentors were carefully screened and selected using the attributes described above. The initial cadre of mentors was assigned to each major project in the Central Plateau Remediation Project. The project senior management developed the priorities for mentoring focus areas in their project. HPI was mentored for work teams, including craft personnel, technical supervisors, and associated support personnel, such as assigned safety professionals. Each project mentoring focus area was selected to improve performance in key project mission activities. Mentors were assigned different activities, based on management evaluation of need for improvement.

Initial Training for Mentors

While all the mentors selected for the project were very experienced and knowledgeable, a specialized training course in HPI principles, observation methods, and suggested methods for coaching was required. The content of this course was also incorporated into subsequent training courses offered to managers, supervisors, and professional staff, as discussed later.

Pre-Job Briefing

One common initial focus area for performance improvement was the conduct of pre-job briefings throughout all projects. These briefings are designed to be an interactive discussion of the scheduled work for the day, including the planned work scope, facility/job site conditions, job-specific hazards and associated controls, roles and responsibilities for each member of the work team, pre-planned actions in the event of an upset condition, review of suspension limits or other hold points, communications methods, and support resource interfaces. A checklist was used to guide the supervisor in the conduct of the briefing. The mentor focus was to improve the interaction during the briefing so that the work team participated and accepted responsibility for the safe performance of the job, and provided input into the final readiness preparation for executing the work. This activity proved to be a valuable mentoring effort, because the pre-job briefing not only prepares the work team for the job, but also fosters development of the work team into a cohesive unit, and helps the supervisor build confidence and trust.

Complex Jobs

A second common area of focus was to observe the work team from the initial planning through the development of the work document, the training and mock-up, preparation and pre-job briefing, execution of the work, and closeout, including feedback. These mentoring activities were applied to major mission scope.

These major mission-critical activities are complex and usually high-hazard and require significant planning and preparation. Mentors initially observed the planning effort, particularly how the work planner and job supervisor incorporated technical, safety, and environmental subject matter experts into the development and preparation of the work plan. Three areas of focus were discovered during the initial observation of the work planning: 1) a thorough review, understanding and agreement on the definition of the work scope and the associated boundaries; 2) the thorough, interactive identification of hazards and associated controls; and 3) a walkdown of the work site by the work team to develop a clear picture of the job and the surroundings. Mentor observation and feedback on the behaviors of the work planning team during these activities was instrumental at improving the interaction, communication, and trust among the planning team members.

Execution of these complex mission-critical activities had been previously a source of significant events. Mentors focused on three areas during execution: 1) command and control by the job supervisor and defined roles and responsibilities for each work team member; 2) communications, including verbal with repeat-back, both face-to-face and over the radio; and 3) response to changed, unexpected, or upset conditions, including pre-planned actions and the use of step-back and stop work. Mentor focus in these three areas offered the most striking improvement in performance and work team behavior.

Job completion offered the final mentoring opportunity on these complex mission-critical activities. Since many of these activities were to be repeated numerous times to complete an entire project, the job closeout, feedback and lessons learned processes are important for improving performance from job to job. The feedback process was not practiced often and when used was very informal. The mentors focused on getting the work team to promptly sit down and review and discuss the job as it progressed and when it was completed. Improved performance in conducting feedback resulted in improvement in complex job safety and efficiency.

Recovery from Events

A third common area of focus was to observe and mentor work teams that were recovering an activity following an event. Mentors observed and coached the conduct of critiques, development of cause analysis and corrective actions, and implementation of the actions. Mentors were able to build relationships with work teams and supervision as they worked their way through the process of recovering from an event, and developing actions that resolved the issue and improved performance. One key to improving human performance in recovery efforts is to encourage active participation in defining the causes and developing the corrective actions, so the team feels responsible to achieve a good outcome. Mentor participation in this type of activity was an excellent way to build trust with a work team.

Facility Coordination

A fourth common area of focus was observation and coaching personnel responsible for control of facility or project activity scheduling, work release, and coordination interfaces with supporting organizations or subcontractors. The Central Plateau Remediation Project is comprised of a variety of projects, including those that are centered in a single facility and those that are spread across many square miles of open land. Each project has unique challenges in planning, scheduling, coordinating, authorizing work release, and maintaining status. Mentors focused on observing and coaching managers and supervisors as they performed these tasks.

Training

Mentors supported classroom training for craft, supervision, technical support, and management personnel in the skills of observing human behaviors, and recognizing error precursors. During the timeframe of the mentoring project, the company was also pursuing continuous improvement, including training on HPI principles and methods. The mentors participated as trainers for this course. As a result, mentors also focused some coaching on the application of HPI principles and methods during the normal day-to-day activities of managers, supervisors, and subject matter experts. Application of HPI and other related tools for leading and managing people were incorporated into the curriculum for 1st-line supervisor training.

Communication

Mentors also focused on communicating to the entire organization the successes of work teams that applied human performance improvement to their day-to-day activities; and to inform people on the human performance improvement principles, techniques, and tools. On a monthly schedule, mentors provided articles for the company newsletter and a weekly safety bulletin. The articles focused on providing common sense methods for applying the HPI principles and tools in the conduct of work on a day-to-day basis. One focus of this communications effort was to increase the level of knowledge and foster behaviors that promote improved performance in preventing and detecting human performance issues and error precursors.

CONCLUSION

Mentoring the application of proven methods for improving human performance was shown effective at increasing success in day-to-day activities and increasing confidence and level of skill of supervisors. While mentoring program effectiveness is difficult to measure, and return on investment is difficult to quantify, especially in complex and large organizations where the ability to directly correlate causal factors can be challenging, the evidence presented by Sydney Dekker, James Reason, and others who study the field of human factors does assert managing

and reducing error is possible. Employment of key behaviors—HPI techniques and skills—can be shown to have a significant impact on error rates. Our mentoring program demonstrated reduced error rates and corresponding improvements in safety and production. Improved behaviors are the result, of providing a culture with consistent, clear expectations from leadership, and processes and methods applied consistently to error prevention. Mentoring, as envisioned and executed in this program, was effective in helping shift organizational culture and effectively improving safety and production.

REFERENCES

References for the creation of the mentoring program abound at Hanford, and likely throughout the Department of Energy Weapons Complex. Corporate and individual history with a variety of past mentoring programs, and familiarity with a substantial amount of material on HPI provided input to the structure of the mentoring program. Material was drawn from the Institute of Nuclear Power Operations, the Defense Nuclear Facility Science Board, Department of Energy Environmental Management, and other government and publicly available sources.