ENVIRONMENT, SAFETY AND HEALTH ONSITE TECHNICAL ASSISTANCE ACTIVITY SUMMARY OCTOBER-DECEMBER 1996

U. S. Department of Energy

The Department of Energy (DOE) Office of Environment, Safety and Health's (EH) Onsite Technical Assistance Program continued to provide support to DOE field elements during the fourth quarter of 1996. Efforts focused on supporting DOE's Enhanced Work Planning (EWP) initiative to bring about dramatic improvements in efficiency, productivity, and safety through innovation in work planning and control and helping operations offices improve safety and health programs in the field.

During the fourth quarter, the Onsite Technical Assistance Program completed an extensive effort to benchmark self-assessment programs at a broad range of commercial companies. The effort involved collecting information from more than 30 different companies involved in diverse activities such as chemical manufacturing, waste management, environmental restoration, and operation of nuclear power plants. Based on this effort, a detailed paper has been prepared that identifies the guiding principles and critical attributes of these "best-in-class" self-assessment programs. Appendix B provides a summary of the results from the effort to date. The Onsite Technical Assistance Program is currently working with DOE field elements to begin a series of pilot projects that will quantify the benefits from potential improvements in self-assessment programs and practices.

EWP projects continued to expand in scope and provide additional benefits at a broad range of DOE sites in the fourth quarter. Efforts were initiated at the Mound Plant, the Idaho National Laboratory (INEL), and the Oak Ridge Reservation to expand successful initial EWP demonstration projects sitewide. New initiatives building on the success of demonstration projects were also started at the Mound and Pantex Plants. Ongoing implementation of EWP sitewide at Fernald and Los Alamos National Laboratory (LANL) continued to produce many positive results.

During the fourth quarter, plans were developed at the Mound Plant to expand the EWP demonstration project across the entire site. A multidisciplinary team was formed to study adaptation of tools developed at the Hanford Site to the Mound Plant and to use EWP principles to augment existing efforts to improve project management and waste management. The ongoing demonstration project in the Maintenance Department continued to produce significant gains in productivity and efficiency through use of job delay codes to track causes of work stoppage or delay, the improved scheduling process, and planned improvements in material disposition.

At the Idaho National Engineering Laboratory, two new teams were formed to support sitewide implementation of EWP. The teams have developed a detailed action plan that addresses issues identified during completion of the demonstration project at the Idaho Chemical Processing Plant and standardization of work planning and work control processes across the site. EH Mentors helped initiate a new project at INEL to apply EWP principles to the

Asbestos Management Program. Work also continued during the fourth quarter on the medical monitoring and hazard assessment computer system, which will enhance the ability to obtain, document, communicate, and use data on exposure to hazardous materials.

At the Oak Ridge Reservation a core team and four "sub-core" teams have been established to promote the application of EWP principles and complete specific actions promoting sitewide integration and standardization. The team is working with site personnel to adapt a common approach to work planning and permitting information systems. This system will automate preparation, review, and approval of more than 30 permits and forms for environmental, safety, and health management.

The EWP demonstration project focusing on waste minimization at the Savannah River Site achieved a major milestone with the completion of a handbook providing guidance on decreasing the size of controlled (and potentially contaminated) work areas. The *Rollback Handbook*, a product of this effort, describes innovative methodologies and work strategies to decrease a facility's area that is considered contaminated, resulting in higher productivity and reduced waste generation. The Work Planning Team is working with other site organizations to plan additional rollback implementation initiatives and to identify and prioritize additional future improvements in work practices to minimize waste generation even further.

At the Los Alamos National Laboratory, preparations continued for sitewide "rollout" of a new work control process. New procedures governing the process were issued for comment and review. Development of an electronic work request system continued, including formation of a new programming project team to develop a production version of the software. Efforts also continued to finalize the bases for allowing work to be performed under skill-of-the-craft. This effort will significantly improve productivity and expedite completion of work.

At the Pantex Plant, a project applying EWP principles continued to produce significant savings. Efforts to reconfigure railcars were ahead of schedule and under budget as a result of involving workers in the planning process, creating multidisciplinary work review teams, and applying a graded approach to work planning. Efforts also continued at the site to develop an innovative approach to monitoring exposure to health risks through establishing homogeneous exposure groups. This effort is expected to improve occupational medical monitoring and surveillance as well as expedite the work planning process.

At the Hanford Site, EH Mentors continued to assist a broad range of activities to develop and apply sophisticated tools to work planning, work control, and safety and health monitoring. EH Mentors worked with site personnel to improve the automated job hazard analysis and employee job task analysis tools and implement their use sitewide. These tools are important elements in the Hanford occupational health process, which will provide a preventive and risk-based occupational health and medical surveillance process across the entire Hanford Site.

Efforts to build on the success of initial demonstration projects at several key facilities at the Hanford Site also continued in the fourth quarter. The Evaporator and the Liquid Effluent Facility implemented the automated job hazard analysis process to improve identification and mitigation of risks associated with work activities. Efforts continued at the K Basins to identify and implement major improvements in work management and work control during

planning, scheduling, coordinating, conducting, and closing work packages.

EH Mentors from the Radiological Protection Staff in the Office of Nuclear Facility Safety continued to provide a broad range of technical assistance in improving radiological protection practices in the DOE complex. A joint team from the DOE Fernald Area Office and the contractor at Fernald continued to evaluate a broad range of radiological program management issues at the site to identify potential improvements relating to contamination control, use of personal protective equipment, application of engineering and administrative controls, and work planning. The effort is focused on identifying and applying good practices from other DOE sites and from commercial nuclear facilities. Based on initial successes, the project is being expanded to encompass all five sites in the Ohio Field Office complex.

Technical support efforts in radiological protection also are under way at the Hanford, Oak Ridge, and Rocky Flats sites. At Hanford, EH Mentors conducted training for RL staff members on radiological fundamentals and conduct of radiological operations. Other efforts at Hanford included support for the transition to the new Project Hanford management contract and coaching on radiological protection for senior management of the site's environmental restoration contractor. At the Oak Ridge Site, EH Mentors continued to assist the Y–12 and K–25 radiological control manager in evaluating and implementing program and process improvements. Finally, at Rocky Flats, EH Mentors conducted an evaluation of the radiological protection program and provided advice and consultation on potential program improvements.

EH Mentors continued to provide technical assistance to waste management efforts at the Mound Plant. Work with the site's Waste Management Steering Committee continued focusing on helping organizations that generate wastes to develop and maintain necessary documentation to support characterization and appropriate packaging. The EH Mentor helped identify innovative disposal options resulting in accelerating shipments of wastes and cost savings. For aqueous scintillation-vial waste, treating wastes onsite and subsequently shipping them directly to the disposal contractor's facility will produce more than $200,000 in savings. EH Mentors also provided assistance to a new program for recycling and reusing radioactive sources that should significantly decrease quantities of materials to be buried and associated costs.

At the Mound Plant, EH Mentors provided extensive support for efforts to prepare the site's Tritium Emissions Reduction Facility for operation. The facility is expected to reduce releases of tritium from the site by a factor of 100 and to improve reliability and reduce maintenance costs significantly. EH Mentors worked with plant personnel to develop emergency procedures and to plan for the transition between operation of the Tritium Emissions Reduction Facility and the existing Effluent Removal System. A set of operational acceptance criteria were developed, along with an engineering basis for placing the Effluent Removal System in safe shutdown.

EH Mentors worked with the 222S Laboratory and the Plutonium Finishing Plant at Hanford in developing and conducting a leadership development training program and in conducting a workshop on the use of "fuzzy" performance indicators. Theleadership development program includes eight modules covering topics such as communications, conflict management, time management, delegation, and accountability. Performance indicators showed a 55-percent improvement in skill levels and a 40-percent improvement in efficiency after personnel completed the

training program. Savings in the first year after the training program is completed should be approximately $386,000. A separate workshop for senior managers on the use of "fuzzy" performance indicators to measure a wide range of important, subjective attributes was held at the 222S Laboratory. The workshop helped attendees establish performance expectations and develop analytical skills to identify and measure associated performance attributes. ■

APPENDIX A: INDIVIDUAL FUNCTIONAL AREA ACTIVITIES

INDIVIDUAL FUNCTIONAL AREA ACTIVITIES

WORK PLANNING AND CONTROL

OHIO (FERNALD)

Fernald has significantly benefited from implementing the tenets of Enhanced Work Planning. EWP has fostered improvements in safety and productivity, and EWP is now a "household name" at Fernald. More managers are realizing the benefit and simplicity of EWP and welcome its involvement in their projects. EWP is no longer perceived as an external force destined to increase a project's scope, but as a means to improve project planning.

Fernald's Enhanced Work Planning program continues to focus on—

< taking a cooperative, multidisciplinary team approach to planning;

< improving communication between line management, workers, and occupational health and safety organizations;

< balancing the rigor of planning with the job's risk and complexity; and

< enhancing productivity through reduction of unnecessary controls, monitoring, and medical surveillance.

Programming and implementation were completed on the Automated Work Package in October 1996. The Automated Work Package is an electronic system developed to increase the efficiency of maintenance work package planning and approvals. In December, a two-tier training package was developed for the Automated Work Package. Classroom and one-on-one, hands-on training were provided to all key personnel involved with requesting, reviewing, approving, planning, and scheduling maintenance work. The Automated Work Package was being used by Fernald employees across the entire site (administrative and remediation areas).

The Automated Work Package has decreased the average time to review and approve maintenance work packages from 121 days to 11 days. This is comparable to a 91 percent decrease in labor costs associated with the review and approval process.

During November, the EWP staff at Fernald provided support to the Vitrification Pilot Plant project The assistance related to developing a system to receive, review, approve, document, and track internal (self-assessment) and external (audit) findings related to the project. A core team consisting of project, internal assessment, and external audit personnel was established to determine the status of current findings and to control the flow of new findings to the project. With a communication channel open between the assessment organization and the project, meaningful schedules could be developed to track closure of findings and develop schedules for future audits and assessments. All findings were funneled through one project team member to improve control and documentation. Project personnel and the assessment organizations expressed complete satisfaction with the new system's simplicity and accountability.

The Waste Programs Management Department started a new EWP initiative in December. The site DOE Director and Fernald EWP staff identified Waste Programs Management as the next project that can benefit from EWP. A meeting was held with members from Waste Programs Management and the Fernald EWP staff to discuss how Waste Programs Management's task order system (system to request, review, approve, and

track waste management work activities) could be improved. The EWP staff demonstrated the Automated Work Package to show the benefits of automation and a mechanism to identify the work flow process. Waste Programs Management personnel are extremely excited about EWP. Fernald EWP staff have emphasized that automation only improves efficiency, not the planning process, which must be clearly defined. They are currently working with Waste Programs Management personnel to define the work flow process and identify responsibilities with that process.

A new automated tool, Worker Exposure Linkages, was developed in December for Fernald's Medical Department. It will provide more efficient access to former-employee exposure data in the future. Programming of the new system has been completed, and testing is under way and will be completed in February 1997. The new system will provide information on who worked, what they did, for how long, under what hazard conditions, with what permitting, type of personal protective equipment used, potential exposure, and will identify what improvements (controls or mitigators) have been made. Currently, because of the detailed work description provided by the Automated Work Package, the system is primarily designed to track exposures of maintenance craft personnel. The system provides exposure records, without the benefit of a detailed work description, for all Fernald employees.**Ë**

OHIO (MOUND)

During this reporting period, Mound's Enhanced Work Planning project continued to benefit from previously implemented enhancements in maintenance scheduling and planning, while focusing on an initiative involving a major EWP expansion across the site.

Mound has reviewed the successes achieved at both the Fernald Environmental Management Project and The Idaho National Engineering Laboratory in their work with maintenance delay codes and hopes to build on these successes. The EH Mentors at both sites provided information for possible consolidation with Mound's current job status monitoring system, to help develop an improved method of identifying productivity problems. Craft input has been requested and a group was formed to develop specific codes that will be tested in the next quarter. These tests will focus on identifying and categorizing the most significant delays to job progress and should ultimately result in improving productivity within the tritium facilities.

Mound's Master Scheduler initiated plans to export the highly successful maintenance scheduling processs developed during the EWP demonstration phase. The Logistics organization has been integrated into the weekly scheduling process and groups involved in decontamination and decommissioning and environmental restoration are developing plans for implementation for their respective organizations.

The planning team also identified and quantified critical deficiencies in the radiological engineering/maintenance planning process and developing a radiological work planning flow chart to help integrate these two functions. By better defining expectations and organizational requirements, and by concentrating on how maintenance planners and radiological engineers obtain and share required information, the team expects to reduce planning effort expended by both organizations.

The materials disposition team began an initiative this quarter to review the process of controlling movement of materials onsite. Realizing that materials often impact job

performance, the team targeted improving individual process steps while focusing on the bigger picture (i.e., all material movements at the site). The team developed an improved movement request form that consolidated information from multiple forms, thereby reducing confusion over which forms to use and enhancing efficiency through reduced response time.

Expansion of EWP into areas other than maintenance was strongly endorsed by the onsite contractor of Mound, and has been incorporated into the cost-plus-award-fee criteria for the current performance period. The strategy for achieving these objectives involves continued refinement of maintenance enhancements while pursuing additional improvement efforts through the Project Management Board, a multidisciplinary team formed to review project management improvements; investigating the job hazard analysis and employee job task analysis systems developed at Hanford for coordinating medical monitoring and exposure information; assisting the Waste Management organization with low-level waste reengineering efforts; and exploring environmental restoration and radiation protection initiatives to determine where the fundamental concepts of EWP might be most appropriately applied.

During initial discussions with the Board on how to incorporate EWP into its operations, administrative issues were resolved and decisions made to concentrate initially on incorporating two existing documents, Mound's *Guide for Project Managers* and Waste Management's *Guide for Project Managers*, into a single format. This improved document will serve as the basis for training and enhancing the project management skills of several project managers. The Board also discussed how to identify a method for development of performance indicators for measuring progress. These indicators will be finalized during the next quarter and implemented by the Board following final selection of measurement areas.

The Mound EWP team continued to interact with Hanford to acertain additional information on Hanford's highly successful automated job hazard and exposure assessment initiatives. These two programs, the Job Hazard Analysis and Employee Job Task Analysis, have resulted in significant savings for the Hanford Site and will be reviewed during the next quarter to determine the feasibility of using similar automated processes at Mound.

During finalization of the fiscal year 1997 technical assistance plan and as a result of an October meeting with the president of the contrzctor organizaion, EH Technical Support met with key Waste Management personnel to help develop EWP project objectives for a low-level waste initiative. Goals were established to reduce the cost of waste generation by planning for waste generation and disposal up front in the project planning process. Meetings with the low-level waste team resulted in development of a model to be used in identification of waste generator requirements and waste management actions. In addition, the team identified the need for a sitewide waste data checklist to assist in reducing legacy waste. The team is currently selecting a waste management pilot area for implementation of the model and checklist during the next quarter.

Another site goal, that of expanding the use of EWP elements to radiological operations,is also under way. This initiative involves working to identify process improvements and support implementation of Radiological Work Permit Enhancement Team initiatives. The Radiological Work Permit Enhancement Team was initiated by the contractor following the success achieved by the EWP Phase I demonstration.

The EWP team will develop general guidance as it identifies radiological work permit deficiencies and implements enhancements to the radiological work permit process.

In addition, Mound Environmental Restoration personnel reviewed site successes and discussed how EWP might benefit their organization. Specific aspects of increased worker involvement in the project design phase surfaced as potential candidates for application of EWP. Further discussions will be conducted during the next quarter to develop options for improving environmental restoration operations.Ë

IDAHO

During this reporting period, INEL personnel moved forward on three Enhanced Work Planning demonstration projects: Sitewide Plant Enhanced Work Control Process development, Sitewide Asbestos implementation, and Medical Surveillance/Hazard Assessment Computer System development.

Idaho's Chemical Processing Plant, a nuclear operations facility, is implementing an enhanced work control process and expanding the enhanced work planning process across the entire Idaho site. The Chemical Processing Plant's enhanced work control process was initiated last quarter. It was built upon the strengths of the plant's previous work control system by using Enhanced Work Planning principles to streamline the overall process. The new work control system provides significant cost avoidance, improved worker productivity, and better quality environment, safety, and health input. Performance indicators have been established to measure these attributes. Since the startup of the new system, the work order backlog has been reduced by approximately 16 percent and the backlog continues to decrease. Customer satisfaction survey results regarding use of the new work control system show continual improvement and an increased sense of personal involvement in using the work control system. Also, suggestions for further improvement have been identified through this survey process. A multidisciplinary team for continuous improvement of the new work control process has been established. This team includes craft, craft supervision, administrative personnel, engineering and operation management, and safety and health professionals (Quality, Radiological Controls, Environment, Health, and Safety).

Major accomplishments of the Chemical Processing Plant's new work control system include (1) full implementation of a plantwide schedule that integrates Nuclear Operations and Site Services maintenance activities, (2) an objective priority rating system to rank work orders for appropriate placement in the work control system, and (3) an improved job requirements checklist. The job requirements checklist, an interactive, computer-based tool that assists the work order preparer, is based on the Hanford Job Hazard Analysis tool. It has been revised to improve environmental compliance and to enhance the industrial safety and criticality control sections associated with maintenance work orders. Additional specific training for work order owners (responsible persons) has been identified and is being developed by the site training organization to help clarify the work control system and associated duties of system engineers and other work order owners.

Codes for tracking the reasons for work delays of jobs in the field were established after learning of Fernald's success with this work contorl tool. These task codes allow an employee to charge time directly to a given work order, including time spent on specific activities in that job. Recently, however, the system has been modified to track delays in work execution once the work package is in

the field. Codes have been established to account for delays due to personnel, materials or equipment, customer (delays caused by the responsible person), changed conditions (expected prerequisites not met), work package errors (requiring changes after the package got to the field), and safety delays (late identification of new safety issues or improper mitigation of a job hazard). The personnel who normally will use delay codes will be craft foremen and craftworkers, but these codes also may be used by Radiological Controls, Industrial Hygiene, Operations, or Quality Assurance personnel.

The Idaho management and operating contractor is expanding enhanced work planning (initially pilot tested at the Chemical Processing Plant) across the site as part of the Safety Improvement Plan submitted to ID. This action is a key element of the contractor's commitment to the Operations Office to achieve sitewide improvements in productivity and safety. The technical assistance plan for this project was signed during this period. The contractor submitted to the Idaho Operations Office a safety improvement plan that articulates the commitment to sitewide improvements. Following the plan, action was taken to establish sitewide expansion of the enhanced work planning process that was successfully piloted at the Chemical Processing Plant. One action in this plan involved forming a group representing all branches to determine how best to implement sitewide enhanced work control practices. The contractor established a facility-manager-level INEL Sitewide Enhanced Work Planning Directorate Steering Committee, including representatives from Site Services, Nuclear Operations, Environmental Management, Projects/Construction, and Advanced Engineering Development Laboratories organizations to provide direction and assistance in EWP implementation. In addition, ID is represented with two directors on this committee. The Directorate Steering Committee is supported by an INEL sitewide working committee.

During expansion of the enhanced work planning process across the INEL, the Directorate Steering Committee will ensure that the principles of Enhanced Work Planning are applied so that hazard identification and safety requirements are integrated in work controls at all INEL facilities and operations. The EWP Directorate Steering Committee will develop and execute a plan for establishing enhanced work planning at each of the INEL facilities and provide advice and direction to the INEL EWP Working Committee.

The Directorate Steering Committee will provide direction and oversight to the EWP Working Committee, provide assistance for developing improved processes, provide assistance in standardizing procedures and practices for sitewide implementation, provide assistance for implementing changes to improve sitewide safety and productivity performance, and assist in focusing facility-specific EWP teams on their most important areas to improve. Other responsibilities include ensuring that the INEL EWP activities are consistent with LMITCO Voluntary Protection Program principles and actions and communicating EWP successes across the INEL site and the DOE complex.

The INEL Working Committee is a multidisciplinary team chartered to recommend actions for improving productivity and safety through improved work planning. This committee evaluates EWP products and tools from other DOE sites and individual INEL facilities and recommends means to incorporate these tools at appropriate INEL facilities. The team has co-leads from two branches (Nuclear Operations and Site Services) and includes facility maintenance managers from each INEL facility and representatives from Maintenance Work Control

management; Environment, Safety and Health; Radiological Controls,;Planning and Scheduling; Quality Assurance; ID; crafts; as well as EH Mentors.

The EWP Working Team developed a two-phase plan to implement the sitewide EWP process. This plan was reviewed and endorsed by the Directorate Steering Committee. Phase 1 will implement the EWP process to address issues and recommend actions to resolve work control issues identified in the contractor's Safety Improvement Action Plan. These issues include work order ownership, prework reviews, team reviews, value-added sign-offs, safety of field changes, removal of unnecessary boilerplate information, and criteria for final work package approval.

Phase 2 will develop a working understanding of EWP principles, complete a baseline review of current work planning and work control practices and procedures at 10 different INEL facilities and organizations, evaluate current practices, and recommend changes to incorporate EWP and standardize practices across the site. A detailed schedule for phase 1 and a preliminary schedule for phase 2 were approved by the Directorate Steering Committee in December.

The INEL Corporate Training Department has been requested to participate on the Working Committee to assist in developing training materials on work control processes utilizing information developed by the Working Committee. Also, generic training on EWP principles, tools, products, and successes will be developed for a variety of audiences as a coordinated activity with other sites in the DOE complex.

The EWP Working Committee members have developed a consensus definition of "work order owner," and this standardized concept will be incorporated into all site work control systems. A Working Committee Subteam agreed that the definition should be incorporated in the Sitewide Maintenance Work Control Procedure and that subteam members representing each facility or organization should incorporate this definition into their specific work control systems.

The Working Committee recognized that including team reviews in the INEL sitewide work control process ensures that individuals, including craftworkers, from all the functions that have value to add in planning a work package are assembled as a team. The work control procedure establishes a formal process to initiate the team's efforts and specify the makeup of the team based on the complexity and risk of the job. Worker involvement during planning activities, including walking down the job at the work location, is effective, since these employees are the ones who do the work, know the equipment, and understand job hazards in performing work. In addition, team review and approval on complex, high risk jobs are more timely since reviews are completed simultaneously rather than sequentially.

The team also has been reviewing a craft loan-out training and medical qualification form developed at one facility and will refine this form for INEL sitewide use. Changes to the craft loan-out training form to clarify its layout and to determine the system to be used as the source of the training information will be made. Also, it was decided that the form should be made more general to cover training information of other INEL loaned employees (such as Radiological Control technicians). The Training Department offered assistance in providing information about existing INEL databases that may be helpful in completing the requested training and medical certification information on the form. Also, the team recommended that Industrial Hygiene personnel assist in reviewing the information on the

form. The EWP Working Committee was informed that the INEL Occupational Medicine organization is developing improved computerized linkages between medical surveillance and industrial hygiene data and that a separate meeting with interested parties (including Industrial Hygiene, Occupational Medicine, and Training) will be held to resolve issues and finalize the format of the form.

Two separate INEL facilities have developed facility-specific procedures for prejob briefings, one of the Safety Improvement Action items being addressed by the EWP Working Team. Representatives from the now-disbanded INEL Conduct of Operations Committee offered assistance to the EWP Working Committee in standardizing sitewide practices for determining when informal briefings are acceptable and when formal, structured prejob briefings are required. It was determined that there is no current, single, sitewide driver for prejob briefings but that both informal and formal briefings are held by many organizations. Existing facility-specific prejob briefing procedures will be reviewed and used in developing the sitewide guidance. It was suggested that the conduct of operations manual may be the appropriate home for the sitewide guidance and that work control procedures would then be changed to comply with the guidance.Ë

OAK RIDGE

Beginning in the fourth quarter 1996, an expanded Enhanced Work Planning program was launched at all three sites comprising the Oak Ridge Reservation. Building on a successful EWP demonstration within the K–25 Site's Waste Programs Division during the first half of 1996, EH has been assisting senior site representatives in initiating an expanded program with participants from the Y–12 Plant, K–25, and Oak Ridge National Laboratories.

Based on meetings convened among key personnel representing groups such as engineering, operations, maintenance, information systems, and waste management, a Core EWP Team was established to direct the EWP program at the three Oak Ridge sites. The Core Team has set as its primary objective the "integration and refinement of the best elements of the K–25, Y–12 and ORNL work control processes such that a consistent, enhanced work control system can be piloted during critical upcoming activities dealing with restart of processes, waste management, and maintenance." To this end, four EWP subcore teams have recently been established and are focusing on the following:

< Practical implementation of the skill-of-the-craft and graded approach concepts through institutionalization of a streamlined work control approach embodying fundamental EWP principles such as multidisciplinary planning, worker involvement, and "up-front" participation by safety and health organizations.

< Enhancement of the benefit and use of work control performance measures by managers and supervisors (e.g., work delay codes, electronic manager alerts) through refining and supplementing existing metric systems and training.

< Standardization and integration of the work permitting and job hazard analysis processes at Oak Ridge through use of computerized systems.

< Linkage of EWP efforts to other complementary initiatives currently being undertaken at the site (including implementation of integrated safety management, OSHA's Voluntary Protection Program, and the Malcolm Baldridge Award).

As each EWP group advances toward its goals, special emphasis is being given to building on work products developed through EWP efforts at other sites. EH Mentors have helped disseminate information and tools by (1) facilitating a visit to Hanford by an Oak Ridge EWP team leader to review how that site has automated its job hazard analysis processes, (2) demonstrating and distributing EWP software and demonstrations such as the Fernald Automated Work Package and the Idaho Job Requirements Checklist to Oak Ridge Information Management personnel, and (3) making available other information such as Fernald's work delay codes and Hanford's skill-of-the-craft procedures. EH Mentors are helping the Oak Ridge EWP program take full advantage of the successes and lessons learned from the complexwide EWP program.

One key goal of the Oak Ridge EWP program is to help integrate work control processes at Y–12 and K–25 (and eventually at ORNL) through the use of a single, consistent, automated process to identify job requirements, work controls, and permits. To this end, the Work Planning and Permitting Information System developed during the original EWP pilot at K–25 in 1996 is being refined, with additional input and buy-in from key representatives on the EWP team. This system is an automated and defensible way to determine which permits are to apply to work being planned and which jobs lend themselves to simple skill-of-the-craft controls. It will be used to identify and electronically attach applicable permits to a work package for eventual computerized routing and approval, improving efficiencies and reducing the potential for errors or omissions.

As a fundamental step in integrating work control processes, the Work Planning and Permitting Information System is being used to make the work permitting system consistent among the Oak Ridge sites. The objective is to consolidate and make consistent the current systems, containing more than 30 permits and forms for safety, industrial hygiene, radiation control, environmental protection, and engineering in use at K–25 and Y–12. Project management checklists, including automated "work smart" standards checklists used by project managers to help determine the extent of standards and DOE Orders that are considered "necessary and sufficient" for the work at hand, are being added to the system.

Consistency within the work control systems—and in particular, within the permitting processes—is a goal that senior contractor management has for activities beyond the Oak Ridge Reservation. Specifically, senior management is also considering using the strategies and automated systems being developed through the Oak Ridge EWP efforts at Environmental Management Enrichment Facilities, including Portsmouth and Paducah.Ë

LOS ALAMOS

During the fourth quarter, efforts continued to revise and refine the controlling documents for implementing the Los Alamos National Laboratory (LANL) institutional work control process. Activities focused on preparation of the tools necessary to use an electronic work request system, refinement of the LANL skill-of-craft task list, training and orientation of Facility Management Unit personnel, and preparation for laboratory-wide roll-out of the process in January 1997.

The work control procedures that will govern the institutional process, Work Control Program Plan and Zone Maintenance Work Control Process, were issued in draft form late in the third quarter 1996. Comments received from Facility Management Unit personnel and the DOE Los Alamos Area

Office (LAAO) were evaluated and incorporated or resolved. Processes to handle "Emergency" and "Urgent" work were developed and added to the program document. Process logic flow charts were revised for clarification, and a mechanism to document formally and evaluate field changes was developed and included in the zone maintenance procedure. These documents were issued under the Laboratory Director's signature in December 1996. A work control manual was prepared for Laboratory personnel, containing the controlled documents, copies of reference documents used in developing the new procedures, and other guidance documents and forms to assist personnel in the proper preparation and processing of work requests.

The Electronic Work Request Pilot Project began in October 1996, when it was introduced to three Facility Management Units to evaluate its usability and investigate improvements. Several minor program problems were identified and corrected. During the pilot, LANL's Computing, Information and Communications Division determined the optimum system software that should be used for the production version of the Electronic Work Request System to increase efficiency and permit interface with other LANL systems. To support that choice of software, a programming project team was formed and efforts were initiated to meet deployment in February 1997. In the meantime, the existing Electronic Work Request System software will be used to continue evaluation and identify additional process improvements that can be incorporated.

More meetings were held with LAAO personnel to ensure that the draft skill-of-craft task list contains only tasks that are determined to be exempt from the Davis-Bacon Act. The task list was formally submitted to the LAAO Davis-Bacon Committee in mid-October, and a determination of "not covered" was received in October. This decision allowed the Electronic Work Request database to be finalized and will permit several routine maintenance work requests to be issued promptly to the Maintenance Zone to be worked following a site hazard screening and analysis.

The Work Control Project Manager conducted one-on-one work control process training for individuals in the three Facility Management Units participating in the pilot project. In addition, the Project Manager held five formal orientation sessions in December for Facility Management Unit and LAAO personnel. An individual from the Facilities, Security and Safeguards Division has been tasked with formalizing the training approach and associated materials to be used when the work control process is rolled out Laboratory-wide. To facilitate the development of training materials, this individual attended selected orientation sessions to become familiar with the kinds of questions encountered.

Initiation of Laboratory-wide work control implementation is scheduled to begin in early January 1997. It is anticipated that two or three teams comprising representatives from environment, safety, and health; work control; and computer services will be formed to provide on-the-job training to responsible facility personnel at their work locations. When the production version of the Electronic Work Request System is available, it is anticipated that additional computer training in the field will be necessary. The roll-out of the work control process supports LANL's commitment to DOE to institutionalize facility-related work control by March 31st.Ë

PANTEX

The Pantex Plant established an EWP Core Team and began evaluating Enhanced Work

Planning in January 1996 as a potential tool for improving productivity and enhancing coordination among various organizations at the plant. Although the concept was introduced through the ES&H organization, the plant maintenance organization has assumed primary responsibility for applying EWP principles at Pantex. In July 1996, Pantex identified the Railcar Reconfiguration Project as a pilot project to evaluate the benefits of using EWP principles in planing and conducting a major project. Currently, there are several EWP teams at Pantex in addition to the core team established for the original EWP pilot project.

Pantex's Railcar Reconfiguration Project continued to achieve success during the fourth quarter of 1996 and serves as a model for other projects applying EWP principles at Pantex. In November, the project was approximately 20 percent under budget and ahead of schedule. Numerous unanticipated benefits from using EWP principles have been noted. The following is a summary of the project's accomplishments:

< Including safety and health professionals on the project team reduced the time needed to identify and resolve issues relating to explosive-component handling and packaging, Radiation Work Permits, confined-space-entry permits, and materials handling. Each member of the project team was involved in the hazard analysis process. For this project, collaborative efforts of team members reduced required confined-space-entry permits were reduced from a projected need for two or three permits every day to only one permit for each railcar. This has resulted in a savings of 18 hours per railcar.

< Cooperation and coordination between the railcar reconfiguration team and the explosive safety and security organizations reduced explosives materials transfers from four per railcar to one for every two cars. Explosive materials transfers are complex operations because of the need to coordinate the activity with several organizations, and reducing the number of moves was a significant benefit.

< Workers participating on the team contributed valuable insight relating to kinds of tools that would be effective in performing the work safely and efficiently. One of the principal hazards identified at the project's beginning was the removal of several thousand sandbags (each weighing approximately 40 pounds) from inside the railcars. Team memberes noted that handling so many sandbags in a tight space would result in back injuries if not conducted properly. After investigating several alternatives, the team identified an approach that involved cutting each bag open in the railcar and using a large mobile vacuum system to vacuum out the sand. This process removes the sand rapidly, and there have been no musculoskeletal injuries to date even though many hundreds of sandbags have been removed from the eight railcars reconfigured thus far. The process is also faster than removing the sandbags manually, resulting in a savings of 50 hours per railcar.

< Including representatives from the design agency on the team led to reduction in procedure approval time. The EWP process resulted in fewer memorandums and telephone calls between Pantex and the design agency staff, thereby contributing to shortening the procedure development and approval cycle.

< Team members significantly enhanced waste minimization through suggestions and actions. For example, insulating materials removed from the railcars that were originally to be sent to a landfill as waste were instead collected into pallets and sold at auction. Approximately six pallets of insulation per car were sold for scrap or reuse

instead of being sent to waste disposal. The team also found a way to recycle the sand removed from the railcars (approximately 700 sandbags per car) by using it in preparing cement at site construction projects.

Recognizing early successes from the EWP Pilot Project, the Facilities Operations Division has drafted a policy that all new maintenance activities and projects undertaken will be managed under the tenets and principles of EWP. During December 1996, five new EWP projects were established relating to the turnaround on Building 12–84. There are also individual Pantex EWP teams working on developing a decontamination project and in shortening the job order closeout cycle time.

The EWP Core Team coordinates overall implementation of EWP concepts at Pantex. This team performed the original baseline evaluation and recommended the completion of a pilot project to validate the EWP concept at Pantex. The team continues to coordinate the activities of the various EWP teams and provide an interface between plant management and the overall EWP process. Based on the successes of EWP during the previous calendar year, Pantex plans to continue the assimilation of EWP concepts and principles into additional plant organizations and functions throughout 1997.Ë

RICHLAND (GENERAL)

Developmental efforts at the Hanford Site continued in the fourth quarter on Version 2.0 of the automated job hazard analysis. Version 2.0 incorporates planning documents and various types of work permits and will also offer many additional features and improvements over the original version. The program is fully compatible with the employee job task analysis and the risk management medical systems. These three databases are essential components of the Hanford occupational health process, which is designed to place employees in proper medical programs based on risk and improve the sensitivity of health trend analyses.

In November, developmental efforts were temporarily suspended on the job hazard analysis system Version 2.0 to focus vital resources instead on preparing the employee job task analysis system for implementation in January. With employee job task analysis system preparations now complete, developmental efforts will resume in January for Version 2 of the job hazard analysis system. When complete, Version 2 will be implemented, replacing Version 1.0.

In addition to providing information for implementation of the Hanford occupational health process, the automated the job hazard analysis system is a vital component of the work control process. The job hazard analysis system helps to determine the overall risk of each task and the degree of planning rigor necessary, based on risk and complexity. The the job hazard analysis system supports decisions regarding the balance between craft skills, supervision, and documentation necessary to perform work properly, efficiently, and safely. Thus, the automated job hazard analysis system is key to decisions regarding implementation of skill-of-the-craft.

The new Hanford integrating contractor is currently evaluating computerized maintenance management systems that could replace the current job control system. As part of this evaluation process, the contractor plans to integrate the automated the job hazard analysis system with the computerized maintenance management systems to optimize the interface between the two systems. This will simultaneously accomplish both work control and occupational health objectives.Ë

RICHLAND (PUREX)

During the last quarter of calendar year 1996, PUREX has continued to achieve its facility deactivation goals. PUREX has expanded implementation of Enhanced Work Planning, including work planning teams, integrating job hazard analysis with work control, and applying risk- and complexity-based approaches.

As part of the EWP effort, PUREX has implemented work teams that involve workers in all aspects of the work control process involving initial planning, scheduling, coordination, and conduct of work. These work teams use automated job hazard analysis and, if the hazards identified by the job hazard analysis process warrant, involve key support disciplines such as Industrial Safety and Radiological Controls. Skill-of-the-craft approaches and graded approaches to planning and conducting work are applied based on relative risks and complexity of work.

PUREX continues to use the automated job hazard analysis system as a fundamental component of its work control process. In support of refining and exporting the job hazard analysis to other Hanford facilities, PUREX is providing input and lessons learned to other facilities at Hanford, such as the Evaporator at Tank Farms. PUREX experience has supported development of the updated version of the job hazard analysis, which is nearing readiness and will initially be field tested at the Evaporator.

Transition to the Project Hanford management contractor and its subcontractor team occurred on October 1, 1996. Even with these transitional changes, PUREX continued to make progress toward finishing deactivation 3 months ahead of schedule with a $10-million reduction in costs. Performance measures reflect that PUREX is maintaining safety performance compatible with past performance, recording a lost-workday rate well below the DOE average; completing milestones well ahead of schedule (on average 124 days); and completing milestones and tasks approximately 38 days ahead of the critical-path schedule.

The PUREX deactivation is scheduled for completion in early 1997. The project provides a 16-month working history where EWP has been applied to the work control and hazard identification and control processes as the normal way of doing business. The project has demonstrated the value of EWP principles and EWP's benefit to productivity, efficiency, and safety.Ë

RICHLAND
(PLUTONIUM FINISHING PLANT)

Plutonium Finishing Plant management has implemented several work management and control initiatives as a result of EWP work improvement team recommendations.

The most significant initiative has been the development and implementation of a corrective maintenance schedule for fiscal year 1997. The ensure that work is accomplished consistent with plant safety, operability, and schedule compliance, the introduction of a formal, approved schedule was essential. In the absence of a formal schedule, various work activities were competing for the same manpower resources.

The corrective maintenance schedule will also provide the basis for creating a plant integrated schedule, which will incorporate plant modifications, DNFSB Recommendation 94–1 activities, and the like. Initial results have been encouraging. On introduction, the schedule realized a 26 percent improvement in performance, and adhesional improvements will be achieved as experience and data is accumulated regarding schedule performance.

The plan of the week and plan of the day are keyed to the corrective maintenance schedule, and management is making a concerted effort to adhere to the schedule, Emerging work, for example, which previously took precedent to planned work, is now being reviewed by management on an ongoing basis and planned, schedule, or implemented consistent with plant priorities.

In order to implement the schedule successfully and establish accountability for performance at the working level, maintenance resources have also been reorganized into three self-directed maintenance teams: corrective maintenance, preventive maintenance, and support maintenance. Planners, schedulers, persons-in-charge, and others are now assigned directly to the teams under the direction of individual team managers or leaders. Support activities such as engineering, radiological control, safety, and quality assurance are matrixed to the teams and participate in work planning and preparations as appropriate. In addition, administrative support requirements that impact work planning and preparations (e.g., the need for engineering change notices, radiological engineering review) are now identified as constraints, where applicable, directly on the maintenance schedule.

Formation of individual teams has allowed management to focus on the backlog of maintenance work, consolidate duplicate work packages, reprioritize work packages, optimize the use of general use and routine use work packages, and interrogate the composition and age of backlog work. The result has provided visibility to the backlog in qualitative and quantitative terms.

In order to monitor ongoing maintenance performance and establish work improvement targets, plant management has also developed introductory functional performance indicators. The performance indicators concentrate on corrective maintenance backlog reduction, work package workoff rate, the ability to work off critical work packages expeditiously, productivity improvements resulting from the conversion of planned work packages into routine work packages, the effectiveness of the work control process, and schedule performance delays.

Additional performance indicators (e.g., performance-to-schedule, work control process cycle time, cost performance) are being developed as experience is obtained in the collection, analysis, and presentation of relevant data now being captured as PX scheduling statistical data.

The performance indicators selected represent core programmatic work management baselines, which Plant management will use to evaluate performance. Based on ongoing Work Management Review Program results, additional initiatives will be taken to resolve negative trends, promote positive trends, and evaluate emerging problem areas.

Based on the knowledge gained in developing functional performance indicators, Plant Maintenance management has established specific improvement goals in several areas, including achieving a 90 percent schedule-adherence level, maintaining and overdue periodic maintenance and surveillance rte no greater than 2 percent of the total number of associated activities, and reducing Priority 2 work packages by 10 percent during the first quarter of 1997. Delays experienced at plan of the day meetings are also being identified, evaluated, and assigned to responsible managers for resolution to maintain schedule discipline. As the maintenance teams, administration, scheduling, and management obtain greater experience in analyzing trend data, additional opportunities for improvement will be identified.

EH Mentors are continuing to work closely with management in facilitating the development of a team concept in work management and control that emphasizes safety, plant operability, and schedule compliance. The primary goal is to ensure that work is identified, validated, prioritized, planned, schedule, and implemented safely and cost-effectively.

Continued emphasis on plan of the day involvement by key personnel, increased on-the-job surveillance by first-level supervisors, and a greater involvement by the crafts, engineering, radiological control, safety, and other support organizations in planning and implementing the actual work will create the degree of pride and ownership essential to improved performance. Progress to date has been encouraging, and the challenge will be to remain focused on the overall objectives of EWP performance improvement at the Plutonium Finishing Plant.Ë

RADIOLOGICAL CONTROLS

Technical assistance in radiological protection and related engineering disciplines continued at various field sites during the fourth quarter. These activities are consistent with EH's role as a corporate safety and health support organization.

At the Fernald Environmental Management Project, radiological experts continued to provide technical and managerial expertise to a joint Fernald Area Office and contractor team chartered to evaluate contamination control, personal protective equipment (including respirators), engineering and administrative controls, work planning, and radiological program management at the site. The project is focused on applying the well-established principles of "as low as reasonably achievable" and reducing costs of radiological protection without adverse impacts on safety.

Although the radiological protection program at the site has been effective, the team was tasked with benchmarking other DOE sites and commercial nuclear facilities and formulating recommendations for potential improvements at Fernald. This project is being expanded to encompass all five sites in the Ohio Field Office complex. At Fernald alone, potential savings identified as a preliminary result of this effort amount to several million dollars annually between now and planned site closure early in the next century. Additional studies may address work efficiency and physiological effects of working in respirators and anti-contamination clothing at sites undergoing decontamination and decommissioning.

At the Hanford Site, radiological experts continued to assist the Richland Operations Office and several contractor organizations within the new Project Hanford management contract structure. Activities included management assistance in transitioning from the former contractor to the new management contract, radiological protection improvements at the 222S Analytical Services Laboratory, radiological and management assistance in the High Level Waste Tank Farms, and training and indoctrination of the new President of the Environmental Restoration Contract regarding radiological protection. EH Radiological Mentors also participated in and advised members of the Radiological Control Center of Expertise in contamination control, procedures, conduct of operations, and program management. Additional areas of focus at Hanford deal with radiological operations at the Plutonium Finishing Plant, specifically involving radiological release surveys of equipment from noncontaminated buffer areas to site controlled areas and further free release to uncontrolled areas.

For RL, radiological experts helped develop and deliver a training course in radiological

fundamentals and conduct of radiological operations for RL staff. This course, which is a commitment to the Defense Nuclear Facilities Safety Board, will continue to be delivered to all RL staff members whose jobs involve radiological protection.

At Oak Ridge, EH Radiological Mentors assisted the combined Y–12 and K–25 radiological control manager in program and process improvements. This continuing project includes quarterly visits by a contracted radiological expert and occasional visits by the Director, Radiological Protection Staff, Office of Nuclear and Facility Safety.

At the Rocky Flats Environmental Technology Site, six radiological experts from EH and the Idaho Operations Office conducted an evaluation of the radiological control program. During this evaluation and subsequent trips to Rocky Flats, EH Radiological Mentors provided radiological and managerial advice to field office and contractor management. Assistance from EH Radiological Mentors was a part of the Rocky Flats corrective action plan in response to a Price-Anderson civil penalty levied on site contractors.

Also during the fourth quarter, the Westinghouse Savannah River Company completed its lead role in editing, compiling, and issuing the *Westinghouse Government and Environmental Service Company Radiological Engineering Guide*. This guide is a compendium of best practices throughout the government and commercial nuclear industry. It complements previously issued Westinghouse GESCO guides on radiological containment and radiological work practices. The Radiological Engineering Guide is a candidate for a Department standard. This guide also complements and reinforces the WSRC *Rollback Handbook* developed under the Enhanced Work Planning initiative.

In the expert opinion of EH Radiological Mentors, innovation and improvement in work management, planning and control, and radiological engineering represent break-through opportunities for the Department to accomplish its mission of deactivation and decommissioning, remedial action, cleanup, restoration, and closure of its sites.**Ë**

WASTE MANAGEMENT/ WASTE MINIMIZATION

OHIO (MOUND)

EH Mentors continued to provideEnhanced Work Planning assistance in waste management to the DOE Miamisburg Environmental Management Project Office and Mound's management and operating contractor. The Mound Waste Management Steering Committee, including representatives from Mound waste management, projects, and operations groups that generate waste, continued to address issues that will affect the timely and efficient disposal of all wastes generated at the Mound site. The key issues center around characterization and proper packaging of waste and the need to prepare a complete paper trail required for its disposal. The EH Mentor has served as a facilitator, providing support in evaluating the technical alternatives available.

Using the model of low-specific-activity waste disposal it successfully developed and implemented in the last quarter, the Steering Committee is successfully addressing other low-level waste streams. The goal is to assist waste generators in resolving waste problems early in the planning stages of projects, identifying the waste stream so that characterization is documented, and packaging the waste in containers that will not require repackaging later. If this goal is achieved, the waste stream is "disposal ready," meaning that it meets the require-

ments for the offsite disposal facility and thus can be transferred to Mound's waste management organization for disposal at any time. The Steering Committee has identified facility waste coordinators to serve as the interface between waste management and waste generators and has proposed use of an existing waste evaluation form for the collection of initial waste generator information.

The waste management organization remains on schedule in its effort to dispose of Mound's mixed waste scintillation vials. Efforts are under way to identify external sources that will aid in this disposal effort. By using the services of outside firms, waste management was able to accelerate the conversion of the gamma scan data collected on the vials into real activity values so that the drums could be efficiently characterized, allowing waste management to complete this phase of the project and prepare to ship the drums of vials to the waste disposal contractor. In addition, efforts are under way to define waste acceptance criteria.

Mound generates approximately 80 drums of waste scintillation vials annually, which are categorized as either mixed or nonmixed waste. Disposal of the aqueous scintillation vials (nonmixed waste) has progressed to the point that shipment and disposal of the existing 120 drums of waste vials are imminent. Mound defined a process wherein the disposal contractor treated the materials at its site, and Mound waste management then authorized the waste to be shipped directly from the contractor's site to the burial facility for disposal. By using this approach, the site has saved approximately $1800 per drum. The former method of disposal (involving the blending of mixed and nonmixed waste cost $2200 per drum versus $400 per drum using this new approach. which translates into $216,000 saved for the 120 drums now on site. In addition, another $144,000 in cost savings is projected annually for the 80 drums generated each year at Mound. This process may benefit DOE complex-wide since there are many other DOE sites generating this specific waste stream that can now use this method to dispose of their waste streams economically.

After rigorous review of shipping requirements, Mound waste management has concluded that shipment and disposal of high-level tritium to the Nevada Test Site can now be accomplished. By using the proper low-specific-activity Department of Transportation waste shipping container (LSA II), which allows for a higher level of radioactivity for each package, all but 11 drums of high-level tritium can now be shipped to Nevada. Use of the LSA II package will be fully established in a procedure so that all the newly generated waste from the Tritium Emissions Reduction Facility can be shipped to Nevada immediately. This is a significant milestone because in the past, waste generated by the Effluent Removal System was destined to become legacy waste (i.e., waste generated that has not been characterized or packaged properly or that does not have identification of the package contents and therefore must be held until it can be characterized and repackaged).

A Project Management Plan for re-engineering Mound's waste disposal process has enabled the waste management organization to control those waste streams currently being generated. In the past, waste treatment and disposal were not considered part of the project planning process. Consequently, waste generated during projects or from nonroutine operations was most likely incorrectly packaged and not characterized or packaged but not identified. This forced Mound to categorize the waste as "legacy waste" until such time as it could be sorted, characterized, and repackaged. By having project managers and waste generators incorporate the waste volumes, waste forms,

activity levels, and composition into their work plans and consider the waste a "product," Mound waste management has been able to receive waste from generators that is essentially "disposal ready." Furthermore, the Project Management Plan has led directly to incorporation of the concept of Enhanced Work Planning. The EWP process is now being applied to aid in the successful development of this reengineering concept through the use of multidisciplinary teams and process description and layouts.

Enhanced Work Planning is being applied to a new program involving the recycle or reuse (or both) of radioactive sources from the Mound site. This program is one that will affect the entire DOE complex when fully implemented. It addresses reusing and recycling radioactive sources and scrap radioactive materials as preferred methods of disposal rather than direct land burial. Several companies and DOE program offices that are individually soliciting the acceptance of certain source materials have been contacted. These contacts indicated that there is a loose coalition of government and private contractors that are willing to recycle source materials. This option, when fully developed, could save considerable disposal costs and will provide source materials that can be reused. Efforts are under way to develop and implement a project management plan that will address reusing and recycling these source materials.Ë

SAVANNAH RIVER

During the fourth quarter, activity increased on the waste minimizatoin enhanced work planning initiative at Savannah River.

During the past quarter, the EWP waste minimization team completed the *Rollback Handbook* and continued infusing waste minimization planning into the work planning process. In addition, an effort to implement a contaminated-tool inventory and control system using EWP principles began. Efforts continued to coordinate the various Savannah River EWP projects in subcontractor work planning, privatization, and waste minimization to share information and lessons learned.

The waste minimization project is a model of success for the EWP initiative and was developed using EWP principles—multidisciplinary teams, worker participation, and health and safety personnel fully integrated into work planning. The team members wrote individual sections of the *Rollback Handbook* based on their particular areas of expertise. In addition, the decontamination team in the field was represented on the EWP core team, so that ideas could be easily exchanged among the core team, the field, and the members of the rollback team preparing the various sections of the handbook. Several innovative methodologies and work practices from the field were incorporated into the handbook. In addition, the Core Team reviewed several innovative industry technologies. Finally, after the handbook sections were assembled, a draft version was sent for review and comment to several Savannah River divisions, as well as DOE. All comments were reviewed by the core team and incorporated. The final handbook was completed in December. Results to date indicate that .26 cubic foot of low-level waste will be eliminated for every square foot of controlled area rolled back. At $45/cubic foot, every square foot rolled back will save $11.70.

The *Rollback Handbook* will be exported to other Savannah River facilities (beginning in the next quarter) and throughout the DOE complex. Currently, the following Savannah River facilities are planned for rollback implementation in 1997: (1) F–B Line, (2) High-Level Waste, (3) the Savannah River

Technology Center, and (4) Excess Facilities/Reactors.

The Work Planning Team is using EWP principles to identify areas for improvement. Current practices were benchmarked by reviewing work control packages and interviewing facility generator certification officials, who certify waste streams. In addition, waste minimization practices at other Savannah River facilities were reviewed. The team then identified deficiencies in existing work practices and drafted a lengthy list of improvements for review, prioritization, and implementation.

The Savannah River Nuclear Material Stabilization and Storage Facility formed a team to implement a program for inventory and control of contaminated tools in their facilities. This initiative is scheduled for completion in June 1997. In addition, issue papers are being prepared to evaluate and prioritize potential new EWP initiatives within the facility maintenance organization, including interfacing with the sitewide maintenance reengineering effort.Ë

MEDICAL MONITORING/ SURVEILLANCE

RICHLAND

In the fourth quarter, the employee job task analysis process to compile employee job requirements, hazards, exposures, and overall risk was finalized. Preparations were made to implement the process and compile the information according to an implementation schedule between January and June 1997. This information, along with other elements of the Hanford occupational health process, will allow for a risk-based and preventive medical surveillance program where employees are placed in appropriate medical programs based on their actual job requirements, hazards, and exposures.

In November, a Hanford occupational health process workshop was held, during which key Hanford occupational health process databases were linked and demonstrated. These database systems included the employee job task analysis, the automated job hazard analysis, the Hanford industrial hygiene exposure database, and the risk management medical system. The demonstration showed how inputs from the employee job task analysis and the job hazard analysis system are made to the risk management medical system, which in turn recommends the appropriate medical programs. The demonstration also showed how the exposure database supports employee job task analysis and the job hazard analysis system completion. As part of the demonstration, an employee job task analysis was completed for a painter's normal work job. This was followed by using the job hazard analysis for a specific lead abatement (paint removal) job. The combined employee job task analysis and the job hazard analysis inputs provided the proper information regarding recommended medical programs.

In October and November, the employee job task analysis process was piloted at a second demonstration facility, West Tank Farms. This followed the pilot conducted at K-Basins in May and June 1996. At West Tank Farms, employee job task analysiss were completed for approximately 260 employees. A preliminary review of employee job task analysis information at West Tank Farms showed a potential reduction in the number of medical examinations of approximately 80 percent for four programs alone. At the same time, the employee job task analysis process identified a number of employees who should be in certain programs but are not currently enrolled. These results, consistent with results from the K-Basins pilot, indicate that a risk-based approach to occupational health and medical surveillance can lead to elimination of un-

necessary examinations, while workers at risk can be identified and appropriate examinations completed. This provides for a more efficient and cost-effective occupational health process, while at the same time improving the quality of that process.

Starting in January and extending through June 1997, the employee job task analysis process will be implemented across the Hanford Site. Employee job task analyses are to be completed for all employees, including those of the prime contractors (Fluor Daniel Hanford, Pacific Northwest National Laboratories, and Bechtel Hanford Incorporated), their respective subcontractors, and DOE-RL. Concurrently, work will continue on the RMMS and a communication plan will be implemented, such that when employee job task analyses are compiled at the end of June, the appropriate action regarding medical placement can be implemented in a timely manner.

Developmental efforts at the Hanford Site continued in the fourth quarter on Version 2.0 of the automated job hazard analysis. Version 2.0 incorporates planning documents and various types of work permits and will also offer many additional features and improvements over the original version. It is programmed in Microsoft Access® so that the program is fully compatible with the employee job task analysis and the risk management medical system. These three databases are essential components of the Hanford occupational health process that is designed to place employees in proper medical programs based on risk and improve the sensitivity of health trend analyses.

In November, developmental efforts were temporarily suspended on Version 2.0 of the automated the job hazard analysis system to focus resources instead on preparing the employee job task analysis for implementation in January. With employee job task analysis preparations now complete, developmental efforts are to resume in January for the job hazard analysis system Version 2.0.

In addition to providing information for Hanford occupational health process implementation, the automated the job hazard analysis system is a vital component of the work control process. The automated the job hazard analysis system helps to determine the overall risk of each task and the degree of planning rigor necessary based on risk and complexity. The the job hazard analysis system supports decisions regarding the balance between craft skills, supervision, and documentation necessary to perform work properly, efficiently, and safely. Thus, the automated the job hazard analysis system is key to decisions regarding implementation of skill-of-the-craft.

The new Hanford integrating contractor is currently evaluating computerized maintenance management systems that could replace the current job control system. As part of this evaluation process, the contractor plans to integrate the automated the job hazard analysis system with the computerized maintenance management systems to optimize the interface between the two systems. This will simultaneously accomplish both work control and occupational health objectives.

Version 1.0 of the automated the job hazard analysis system is currently being used as part of the work control system at three Hanford facilities, PUREX, West Tank Farms, and B-Plant. The Evaporator Facility will be the next facility to implement the automated the job hazard analysis system. The Evaporator is undergoing a reengineering process and is currently in the "laboratory" phase, during which the improved process is developed and preparations are made for implementation. Training on the automated the job hazard analysis

system was conducted for Evaporator management and work teams in November and December. the job hazard analysis system implementation will occur concurrently implementation of reengineered processes. Either Version 1.0 or 2.0 will be implemented depending on the reengineering schedule and the automated the job hazard analysis system developmental schedule.Ë

IDAHO

INEL is using Enhanced Work Planning principles to improve its ability to obtain, document, communicate, and use hazardous exposure information. The July-September 1996 Technical Assistance Report gives a detailed description of INEL's Medical Monitoring/Hazard Assessment Computer System Development project. Following is the current status of this project.

The current exposure assessment project is progressing on schedule. The project is being developed in three components: assessment, survey, and monitoring.

The assessment component analyzes available background information to determine if a work site survey is warranted. The first version of assessment is more than 90 percent complete and is being evaluated by the industrial hygienists who are participants in the project. A second version will be evaluated along with the first versions of the Survey and Monitoring components by a wider group of industrial hygienists than the project participants.

The survey is based on the outcome of the assessment component. It characterizes the worksite and determines if exposure monitoring is warranted. The survey component is 60 percent complete; the first version will be evaluated by industrial hygienists in mid-January 1977.

The monitoring component consists of monitoring data and results for those sites that require monitoring based on the outcomes of the assessment and survey components. Like the survey component, it is 60 percent complete and will be evaluated by industrial hygienists in mid-January 1997.Ë

PANTEX

Another effort at Pantex that involves applying EWP principles is the establishment of Homogeneous Exposure Groups, which are groupings of employees based on the potential for exposure to similar chemical and physical job hazards. The goals of this effort are to—

< Document various S&H risks to Pantex employees according to job code. This will assist the occupational medicine department and the personnel department in scheduling job placement examinations and surveillance activities, as well as in providing the medical certification that is required for certain jobs.

< Establish job code-based exposure groups for employees having similar hazard and exposure potential. With this information, the JHA process can be streamlined, allowing work packages to be planned and executed faster. Potentially, this will also facilitate the development of a central database of hazards in addition to those that are related to industrial hygiene.

< Manage S&H support and surveillance activities based on risk to defined homogeneous exposure groups. Using a risk-based model for managing surveillance activities will result in reduced surveillance costs because only those individuals who need to be monitored will be included.

By the end of the fourth quarter, Pantex had completed the workplace analyses and prepared hard-copy documentation of work-

place hazards. Pantex is preparing to make revisions to the Pantex HealthNet system that will make the exposure group information readily available to the plant medical staff.Ë

CONDUCT OF OPERATIONS

RICHLAND (K BASINS)

During the period from October through December 1996, K Basins management and personnel used Enhanced Work Planning principles to strengthen conduct of operations, maintenance, and work control.

During this period, Duke Engineering & Services Inc. assumed operational responsibility for storage of spent nuclear fuel at K Basins. The new contractor immediately set new standards for conduct of operations and work control. Operationally focused work schedules are developed and continually improved. Commitments are established in weekly work schedules, and work packages are developed, reviewed, and walked down by all affected groups, when appropriate, before the scheduled execution day. Expectations have been established that maintenance teams will give greater attention to detail and that emergent work tasks will be controlled to minimize impact on committed schedules. Finally, work tasks that are not completed as scheduled are individually evaluated for identification of barriers, lessons learned, and areas for improvement.

To communicate these higher standards, management held meetings with K Basins personnel and addressed areas such as management leadership, starting time, prejob briefing, and working safely while increasing productivity. Mindful of the scheduled commitments for relocation of the spent nuclear fuel and of declining budget resources, management challenged all personnel to identify and propose new methods for accomplishing the required tasks. All personnel were invited to bring to management's attention present practices that add no value, potential improvements in procedures, and other means of increasing productivity while enhancing worker safety.

Following these meetings, a noticeable change has been evident in management practices and in the level of initiative of operators and craft. Work started at 7:30 a.m. with the morning preshift briefing, followed by prejob briefings starting consistently by 7:45 a.m. The content and duration of both types of briefings were appropriate. Actual work began by 8:00 a.m. or soon after. Although there are still many changes to be made in streamlining work processes and improving job coordination, the the facility has aggressively responded to job delays, procedural deficiencies, and equipment problems. Job problems (whether related to equipment, procedure, or job coordination) were no longer treated as mundane, "to be expected," or acceptable. Management and personnel attacked problems affecting work activities with the appropriate level of energy to advance timely resolutions.

K Basins management has implemented a 3-week look-ahead schedule that is locked in and committed to 1 week before the scheduled execution of the work to improve schedule compliance. The week prior to the scheduled work, management commits to the planned start and completion dates, and final preparations (personnel, paper, and materials) are verified. Success in this area primarily rests with the ability of appropriate personnel to establish an accurate schedule and then with personnel being held accountable for adhering to the schedule. During the first 4 weeks of implementation, K Basins successfully completed 68 percent of all scheduled work. Although the goal is 90 percent, the 68 percent completion rate shows a

marked increase over past practices. This performance indicator specifically tracks scheduled work; however, many routine jobs that are not identified on the schedule are used as "fill-in" work to ensure full use of available resources.

To support further productivity increases, the position of operations representative (more commonly known as an outage manager) has been established so that a single individual is responsible for prioritizing work; setting scheduled dates; and reviewing work packages for total facility integration, coordination of emergent work, and overall job coordination. A qualified shift manager rotates into the position for a 4-week assignment. The success of this function will primarily rest on the ability to make a "step change" in job coordination and timely problem resolution.

K Basins is developing an administrative procedure that will greatly enhance the effectiveness of the facility's champions program. Key elements in this program include required time in the field each week, real-time coaching and feedback to improve performance, issue tracking and followup, and periodic reporting of results. This program addresses only conduct of operations but may be expanded to include health physics and maintenance. An effective champions program will greatly enhance K Basins ability to reach the higher standards needed to meet spent nuclear fuel commitments.Ë

OHIO (MOUND)

During this reporting period, EH Mentors provided technical assistance to the Mound Tritium Emissions Reduction Facility project. When operational, the system will improve performance and environmental protection by enhancing control of tritium releases at Mound. With the impending deactivation and decommissioning of tritium facilities as well as the ongoing unloading of tritium from components at Mound, tritium releases are expected to be limited to much less than 1,000 Ci/year using the Tritium Emissions Reduction Facility as compared with releases of as much as 100,000 Ci/year using the existing, less reliable Effluent Removal System. In October 1996, an unexpected release of approximately 60 Ci of tritium from the existing aging system occurred due to failure of one of the catalytic converter beds. In addition, because of the increased operational capacity of the new facility, tritium cleanup efforts will be significantly accelerated. It has been estimated that this acceleration, coupled with the shutdown of the Effluent Removal System, will result in approximately $10 million in cost savings to DOE's cleanup efforts. Thus, startup of the Tritium Emissions Reduction Facility will provide both safety and cost benefits to DOE.

During this quarter, Mound moved toward completion of the operational readiness review and subsequent startup for the Tritium Emissions Reduction Facility. Facility personnel successfully developed and conducted dry runs and drills, improving their ability to execute technical procedures and to work as a team for the forthcoming transition to and operation of the new facility. Mound personnel prepared six draft emergency procedures with EH Mentor assistance. These procedures addressed (1) personnel injury, (2) potential system explosions, (3) tritiated waste tank leaks, (4) tritium leaks during maintenance, (5) total loss of power, and (6) glovebox overpressurization. The preparation of those proceedings enhanced the level of operational safety and completed a critical aspect of preparation for the operational readiness review.

The DOE Miamisburg Environmental Management Project Office, DOE Ohio Field Office management, and the management

and operating contractor made substantial progress in preparation for the December 1996 operational readiness review. Technical assistance was provided to these organizations that led to the formation of a team to plan the overall transition from the Effluent Removal System to the Tritium Emissions Reduction Facility and to ensure proper completion of preparations for the operational readiness review. The team established the Tritium Emissions Reduction Facility operational acceptance criteria, the engineering basis to place the Effluent Removal System in a shutdown condition, options and recommendations for the operational readiness review process, and time lines to complete these activities.Ë

LEADERSHIP TRAINING (RICHLAND)

In their continuing quality improvement initiatives, the 222–S Analytical Services Laboratory and the Plutonium Finishing Plant have implemented leadership development programs to improve line supervision and management of day-to-day operations. The strategic objective is to bring about a positive cultural change based on a behavioral development approach designed to provide gradual improvement in the knowledge and skills of supervisors. Cultural and personal patterns and habits of behavior develop over a long period; consequently, considerable time is required to extinguish the undesirable habits or habituate the new skills.

The Leadership Development Program has been specifically designed to address the needs associated with individuals who have been promoted from within the organization. The promotions of these individuals are based on their technical knowledge and general work habits. This program builds on that foundation by developing leadership skills in communications, delegation, consistency, conflict resolution, time management, attention to detail, accountability, and quality systems.

Team behavior models that are introduced include team dynamics, "the path" communication process, leadership styles, awareness, change dynamics, influence and trust, logical consequences, fuzzy performance indicators, and Meyers/Briggs type indicators (personality styles).

The first seven topics were identified by the Plutonium Finishing Plant's Positive Improvement Team (another Mentor-led effort) to be the most helpful in the day-to-day activities of line supervisors. The last topic, quality systems, was requested by 222–S Laboratory management.

The philosophy of this leadership development effort reflects the belief that people will develop their leadership aptitude if the efforts are applicable to their work, the development takes place over a long time, and they teach others what they have learned.

The approach to leadership development focuses on building the knowledge base, personal awareness, skills, and ability of the student and the people he or she interacts with daily. Empowerment of the extended workforce is accomplished through the proactive teaching efforts of the students. Students are required to provide a training and team-building session on any topic they have covered in class. The first teams to go through the program have to date taught more than 100 of their fellow workers.

To assist in improving line supervision, EH Mentors have designed and developed and are currently implementing the eight-topic program for first-line supervision. The 222–S Analytical Services Laboratory has two teams that have completed all eight topics in the 20-week program. The Plutonium Finishing Plant has two teams that

have completed 90 percent of the program. Team composition embraces a wide range of groups, including Operations, Radiological Control, Chemistry, Quality Assurance, Maintenance, and Engineering. Analysis of this team effort will be available at the end of January.

Team feedback and statements from management at both facilities indicate that the process is producing positive results. Recognizing that a key factor in this program is the mentoring of prospective educators in the client's organization, the 222–S Laboratory has agreed to allow EH Mentors to indoctrinate and train two individuals from the current classes who currently act as support instructors in the program series. Each person is paired with a lead instructor. This pair is now with a team. At the completion of the program, they will be certified as instructors. They will then become mentors within their own facility. After certification, the next 222–S team to go through the program will be taught by 222–S instructors.

Feedback from program participants, their management, and co-workers indicates that some significant behavior changes are taking place in the work environment. Quantification of the program performance indicators indicates a 55 percent improvement in skill levels with a 40 percent improvement in efficiency. Return on investment is 2 months. In the first year after completion, the estimated savings is $386,000. Students in the program report 20 percent to 60 percent time savings, less stress due to their new abilities to manage personnel in conflict situations, and closer relationships with team members of other organizational groups. With these new relationships, the students are helping each other improve their leadership skills. Management has indicated that they are seeing significant improvements in the students' communication patterns, team building, and conduct of meetings. Co-workers have stated they appreciate the improved communications of their supervisors.

One of the modules is delegation. As the students begin to delegate more of the workload, their direct reports are providing them with feedback that indicates they appreciate the opportunities to excel. This is an example of the team's new ability to diagnose a performance problem, determine corrective actions, and provide an action plan to management on improving individual and organizational performance. This is the beginning of a new self-assessment initiative.

DOE site Analytical Laboratory 222–S is using the fuzzy performance indicator process for team building. Generally, performance trending is understood by management to be the trending over time of parameters known or believed to be indicative of the quality of plant or systems operation. Trends are intended to provide management with advance notice of impending problems or opportunities so these can be averted, exploited, or otherwise effectively dealt with. Trends are historically seen as representing business or engineering processes or both. Senior Laboratory management sees the value in developing a fuzzy performance indicator to enable a higher level of performance for their team.

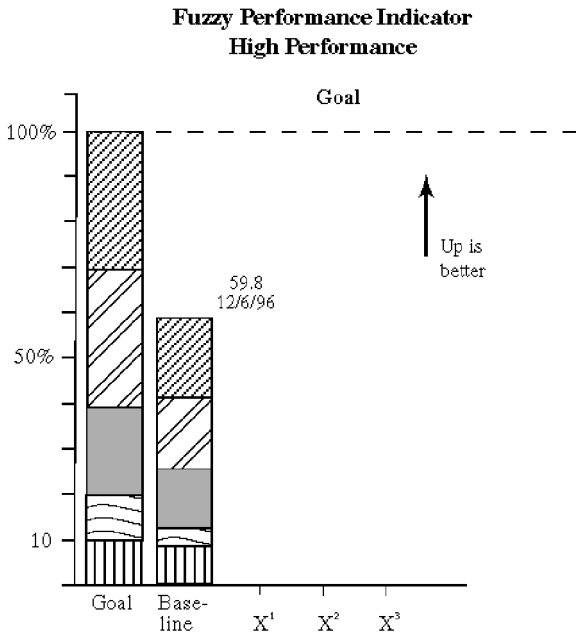
In addition to standard performance indicators, the teams focus on those concepts that people associate with decision-making and performance but do not quantify in the reporting process. Fuzzy performance indicators measure those performance characteristics generally thought to be unmeasurable, such as effectiveness,

sponsorship, morale,

resistance, accountability, and human performance. Performance indicators can reflect human performance states such as awareness, communications, dependable, change, attitude, bad, better, and worse. Fuzzy performance indicators reduce or eliminate (or both) the inexactness and poor definition of human performance, thus providing a crisper picture of human endeavor. The performance methodology answers the question, How do we know when our efforts are effective in achieving our stated goals? The methods employed by the teams monitor, track, and measure human performance.

EH Mentors are providing team-building workshops to the 222–S Analytical Services Laboratory. The first workshop helped the senior management team focus on how they define high performance. Additional workshops are planned to accomplish the measured goal for each characteristic (see Fuzzy PI figure). The senior management team has found the process useful in addressing a much wider range of topics and issues than they previously thought could be measured. Many "subjective" topics are starting to be measured. In addition, participants find the process aids them in their group communications.

A software tool is available that allows individuals and organizations to put their efforts on a computer system and print out the performance indicators. The print-out format is identical to the format produced in the workshops. This is a stand-alone computer program that allows users to "plug and play."



Characteristic	Goal	Baseline	X....
Communications/ People Skills	30	15	
Shared Values	30	15	
Work Ethic	20	18	
Goal Orientation	12	7.8	
Personal Confidence	8	4	
Total (%)	**100**	**59.8**	

Developed by the 222–S Analytical Laboratory Senior Management TeamË

ASBESTOS SAFETY (IDAHO)

The Idaho National Engineering Laboratory, working with EH and the Idaho Operations Office, has initiated the Sitewide Asbestos Management Program EWP Project. The technical assistance plan for this project was approved during this period and calls for two teams, the Asbestos Abatement Team and the Asbestos Program Team, to conduct the initiative. These two teams held their first meetings at the end of this quarter. The Asbestos Abatement Team, which includes staff responsible for the day-to-day conduct

of asbestos management activities across INEL, will evaluate current practices and develop asbestos management program work planning and performance enhancements. The Asbestos Program Team, which is composed of managerial and supervisory staff from across the site, will review and comment on the recommendations of the Asbestos Abatement Team and ensure facility cooperation in the Sitewide Asbestos EWP Project.

At its first meeting, the Asbestos Abatement Team identified the following preliminary asbestos management issues for further review: (1) the funding cycle and its relationship to the planning of asbestos projects at various facilities, (2) training needs for workers involved in asbestos abatement projects, (3) clearance variances across the site, (4) funding for asbestos management projects, (5) a sitewide inventory of asbestos management equipment, (6) the need for asbestos management services to function as a private-sector enterprise (to the fullest extent practical), (7) the need for industrial hygienists and supervisors who are assigned and dedicated to the asbestos management program to ensure consistency in program and application of appropriate requirements, and (8) the applicability of the newly revised asbestos management program procedures.**Ë**

INDEX BY OPERATIONS OFFICE

IMPROVING SELF-ASSESSMENT WITHIN DOE

Self-assessment is an essential component in the implementation of the Department of Energy's (DOE) Integrated Safety Management Program. As a key part of the feedback and control element in the Integrated Safety Management Program, self-assessment helps line management continuously evaluate performance to identify both weaknesses that must be corrected and best practices that should be promoted. Self-assessment encompasses all those activities performed by an organization to evaluate itself and implement improvements.

The Office of Worker Health and Safety within the Office of Environment, Safety and Health (EH) began studying self-assessment programs and processes used in private-sector companies and in DOE in June. The effort is aimed at identifying common elements of superior programs and best practices that could be adapted to DOE. To date, the project team has interviewed or met with representatives of more than 30 private companies, including firms involved in manufacturing chemicals, waste handling and operations, environmental restoration, construction, operation of commercial nuclear power plants, and operation of DOE facilities. The project team focused on companies recognized as leaders in self-assessment by regulatory agencies or industry trade associations and involved in high-hazard operations comparable to those at DOE facilities. Table 1 provides a list of the companies contacted.

Chemical and Processing Industries	Commercial Nuclear Power Plants	DOE Management and Operating Contractors
3M Air Products & Chemicals Dow Corporation DuPont Chemical Occidental Chemical Quantum Chemical Simpson Tacoma Kraft Syntex Chemical	Arizona Public Service Commonwealth Edison Co. Duke Power Entergy Pennsylvania Power & Light Virginia Power	AlliedSignal Lockheed Martin Sandia National Laboratory Westinghouse Savannah River Co
Waste Management and Hazardous Waste Operations	**Environmental Construction Companies**	**Other**
Envirocare Scientific Ecology Group	Foster-Wheeler Environmental ICF Kaiser	USAir General Electric

Table 1

Based on critical review of the data collected so far, the project team has determined that the following three critical factors must be present for self-assessment programs to be effective: (1) management involvement and commitment, (2) employee involvement, and (3) a positive self-assessment environment. The project team synthesized an idealized self-assessment process based on approaches used at the various companies examined during the benchmarking effort. This idealized process provides a framework for DOE organizations to evaluate their existing self-assessment processes and programs and identify areas where improvements may be desirable. In addition, the project team identified a broad range of best practices within the programs and processes reviewed that could help DOE organizations improve their current self-assessment efforts.

Management Involvement and Commitment

The first of the three essential elements of effective self-assessment programs is full commitment of all levels of management to implementing the self-assessment program. Senior executives, managers, and work group supervisors must provide visible leadership in completing self-assessments, analyzing results, and applying lessons learned to improve performance. In addition to providing leadership, management is responsible for helping to create a positive environment and building a culture that eschews complacency and embraces constructive self-criticism.

Management involvement takes many forms in the best programs examined to date. Management's first responsibility is to communicate expectations regarding self-assessment clearly and to encourage and support efforts by the employees to meet these expectations. A variety of mechanisms are available to accomplish this objective, including issuance of policy statements, participation in training for employees, and one-on-one coaching sessions with subordinates. For example, **Foster Wheeler Environmental Corporation** has issued a procedure in the company's health and safety manual that establishes specific requirements for managers and workers to conduct detailed walkthroughs of work spaces as part of the company's self-assessment activities.

To affirm the importance of self-assessment to the organization and to stay in touch with the organization's overall effectiveness in completing work, the entire management team must perform self-assessment activities. Managers at all levels should conduct walkthroughs of the workplace, meet with subordinates to discuss self-assessment results, and participate in planning corrective actions. At **DuPont**, all personnel—senior executives through junior staff members—talk with plant personnel regarding conduct of operations and safety, reporting any issues or weaknesses both to plant line management and to the corporate organization.

One of the most important ways through which management remains actively involved with self-assessment is by supporting timely and appropriate resolution of issues identified as a result of self-assessment activities. By planning appropriate corrective actions and then ensuring that these actions are implemented, management demonstrates to all employees that self-assessment produces lasting improvements in the workplace. For example, at **General Electric Company**'s jet engine manufacturing plant near Cincinnati, Ohio, each finding from a self-assessment review is assigned a work order number and tracked in the work control system until corrective actions have been formulated and implemented.

Employee Involvement

Total employee involvement is the second element that is essential for successful self-assessment programs. Workers are the most knowledgeable individuals in any organization regarding how a task is performed and how it could be performed better. Employees must embrace the need for continuously assessing their own performances as well as those of their co-workers and supervisors. Further, employees must help plan, conduct, document, and resolve findings from self-assessment activities in order for the activities to be meaningful.

Employee participation in completing self-assessment activities is vital to the success of any program. Employees understand hazards associated with completing individual tasks and are best suited to evaluate current work practices, training, procedures, and safety documentation. The best programs examined reflected a strong commitment to employee involvement.

< Scientific Ecology Group has implemented the Safety Observation Program, in which each employee receives a card summarizing the process and objectives for completing self-assessment observations.

< At **Air Products and Chemicals**, the company has implemented a Total Involvement Process, in which employees are trained to identify problems, work on teams to conduct self-assessments, and then plan corrective actions for identified performance weaknesses.

< Workers and supervisors at **AlliedSignal Company**'s Kansas City Plant complete comprehensive checklists each month covering 15 separate program elements as part of the plant's ongoing self-assessment program.

Positive Self-Assessment Environment

Management and employees must work together to build the third critical element for effective self-assessment programs, a positive environment in which self-assessment programs can flourish. The environment has become an essential part of the organization's culture when self-assessment is built into all activities and when all personnel embrace their responsibility to continuously evaluate their own performances as well as the performance of their work group. The following are characteristics of a positive self-assessment environment.

< Managers, supervisors, and workers consistently demonstrate a technically inquisitive attitude that rejects complacency and doing things "the way they've always been done."

< All personnel accept that self-assessment is a personal responsibility and not something assigned to a separate organization or a different group.

< Personnel are held accountable for completing self-assessment activities and meeting management's expectations regarding organizational performance.

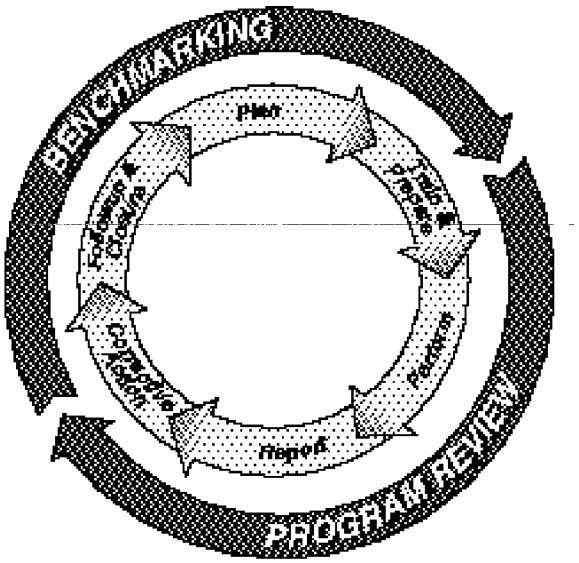
< Managers and employees trust that their working together cooperatively in completing self-assessment activities will bring about lasting improvements in organizational performance.

Management fosters this positive self-assessment environment through a wide range of behavior reinforcement techniques. Employees are rewarded for identifying performance weaknesses that need improvement or best practices that can be promoted within the organization. Rewards can include recognition as well as financial incentives. At its most basic level, management's goal

should be that each employee feels his or her efforts are contributing to the overall good of the organization and to accomplishing the assigned mission.

Self-Assessment Process

Based on review of more than 30 different approaches to establishing and implementing self-assessment programs, a generic self-assessment process has been drafted and is depicted below. This process represents a blend of the best practices from the full range of programs evaluated. Although circumstances vary among DOE sites, each of the elements identified in the generic process should be included in the overall self-assessment processes used at DOE sites. The project team identified best practices related to each element of the generic process.



Benefits From Self-Assessment Programs

Private-sector companies have invested substantial resources in developing and implementing effective self-assessment programs because they recognize that these programs can pay dramatic dividends in improved performance. Savings include costs associated with accidents that are prevented and environmental releases that don't happen, as well as improvements in productivity and efficiency. These benefits result directly from finding and correcting performance weaknesses before they adversely affect operations as well as promoting broad use of best practices within the organization.

Industry self-assessment programs have evolved out of corporate commitments to move beyond minimum compliance with regulations and achieve excellence in operations. The net effect is an upward spiral in performance in which weaknesses are detected and eliminated; best practices are promoted; new, higher standards are established; and the cycle of evaluation and improvement is repeated.

Benefits that have resulted from implementation of self-assessment programs at companies contacted during the survey include the following:

< Improved project performance, including higher productivity, accelerated schedules, and decreased resource commitments.
< Reduced worker compensation costs and decreased lost-time injury rates.
< Heightened accountability of employees and managers for finding and correcting performance weaknesses.
< Improved performance records with external regulators, including fewer noncompliances and violations, decreased oversight burden, and enhanced credibility.
< Empowerment of employees who identify and implement performance improvements, thereby enhancing morale and applying the organization's intellectual capital directly to the most important performance issues.

< Enhanced sense of ownership of responsibility for safety, health, and environmental performance as a result of self-evaluation of performance against objective standards.

Path Forward

Having compiled and reviewed study data, EH's next goal is to determine whether best practices identified during the study to date can be adapted to operations at DOE facilities. This will include developing additional descriptive information on best practices, organizing materials obtained from companies during initial contacts, and working with DOE sites to pilot test selected improvements and evaluate their overall value. EH is currently seeking sites to work with in conducting pilot projects on strengthening elements of self-assessment programs. EH will provide assistance in facilitating the project, gathering pertinent materials from companies contacted during the study to date, and documenting results from the pilot project. Pilot projects are anticipated to begin in the first quarter of 1997 and be completed before the end of the fiscal year. Currently, EH is studying a range of options for communicating results, including hosting a topical meeting on self-assessment, conducting a workshop on results from the pilot projects, publishing documents describing results from the pilot projects, and establishing a Home Page to share lessons learned and best practices on self-assessment. Ë