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Title: **Testing, Expanding and Implementing Pollution Prevention Tools for Environmental Restoration and Decontamination and Decommissioning**

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Abstract

Pollution Prevention (P2) programs and projects within the DOE Environmental Restoration (ER) and Decontamination and Decommissioning (D&D) Programs have been independently developed and implemented at various sites. As a result, unique, innovative solutions used at one site may not be known to other sites, and other sites may continue to duplicate efforts to develop and implement similar solutions. Several DOE Program offices have funded the development of tools to assist ER/D&D P2 projects.To realize the full value of these tools, they need to be evaluated and publicized to field sites. To address these needs and concerns, Sandia National Laboratory (SNL/NM), Los Alamos National Laboratory (LANL), and the Oak Ridge Field Office (DOE-OR) have teamed to pilot test DOE training and tracking tools; transfer common P2 analyses between sites, and evaluate and expand P2 tools and methodologies. The project is supported by FY 98 DOE Pollution Prevention Complex-Wide Project Funds. This paper presents the preliminary results for each of the following project modules:

1. TRAINING - In December, 1997 the DOE/EM-40, P2 in ER training modules were presented to 40 SNL/NM and LANL ER/D&D personnel. Feedback from the participants was collected, and incorporated into the training.
2. WASTE TRACKING PILOT - The ER P2 Information Management System (ERP2IMS), developed at DOE-OR, is a customized program designed to capture P2 strategies used during ER activities so that P2 successes implemented during the projects can be tracked. The ERP2IMS was installed at SNL/NM and LANL in January, 1998, and is being used to track the results of P2 activities on several projects at each site.
3. INFORMATION EXCHANGE - Experience at LANL and SNL/NM indicates that most common P2 practices are applicable at more than one DOE site. Sites independently develop cost and technical justifications before the project implementation phase; however, future activities can be streamlined through technical assistance and information exchange. A team of LANL and SNL/NM representatives have identified several common practices/technologies, and are developing a series of templates for project managers to use when developing cost and technical justification for these

practices. The standard templates (for Segmented Gate Systems, Launderable PPE, Concrete Crushing, and Clean-up Levels) will include implementation steps, benefits, barriers, and general cost information.

4. EVALUATE P2 TOOLS FOR ER/D&D - Many documents and resources (e.g., Argonne Waste Minimization Handbook, RAPIC database, etc.) exist to assist the project manager; however, finding the right resource for a specific project activity is difficult. This task is to identify and evaluate available resources, and condense this information into a "package" of reference tools for ER project personnel.
5. FIELD TEST OF P2 TOOLS - A team of ER/D&D personnel from LANL and SNL/NM was formed in February, 1998, to field test the developed tools and methodologies and evaluate their applicability and usefulness to ER and D&D projects. The team will finalize and test standard methodologies and approaches to ensure that project managers and engineers can use them to incorporate P2 into their work.
6. DOE INFORMATION EXCHANGE - The results of this project will be disseminated to other DOE sites through existing Web pages and presentations at DOE sponsored conferences and workshops.

Keywords: environmental restoration; decontamination and decommissioning; P2 tools; P2IMS; P2 strategies; cost and technical justifications; information exchange

Introduction

Environmental restoration activities are currently the largest source of waste generation within the Department of Energy (DOE), and generate approximately three times more waste than any other activity, according to the *DOE Annual Report of Waste Generation*. Because of this, any efforts to disseminate successful practices, technologies, and tools to Environmental Restoration (ER) and Decontamination and Decommissioning (D&D) projects have the potential to positively impact large waste volumes and reduce project costs. Conducting waste evaluations for each significant waste stream from ER or D&D projects will help DOE move beyond best management practices toward aggressive identification of methods to minimize overall waste volumes. This will reduce costs and liability, and may help DOE complete its clean-up ahead of schedule as well.

Because the Los Alamos National Laboratory (LANL) and the Sandia National Laboratories, New Mexico (SNL/NM) have well developed ER waste minimization programs, the two sites jointly submitted a proposal for Complex-Wide Project funding to further develop and standardize a set of P2 tools to be used by ER projects complex-wide. This project will pilot test DOE-developed training and tracking tools, transfer common P2 analyses between sites, and evaluate and expand P2 tools and methodologies. The project was designed to test, expand, and implement existing pollution prevention tools, developed across the DOE complex, and to standardize activities where possible. Each P2 tool is then been described below as a separate module for clarity.

DISCLAIMER

Project Status and Preliminary Results

*Module 1: **P2 / WMin Training for Environmental Restoration Personnel***

ER project managers and project teams are faced with the challenge of completing cleanup activities on an accelerated schedule (and smaller budget) while continuing to meet milestones and regulatory requirements. Integrating P2 and waste minimization techniques and principles into a project can meet this challenge and achieve the vision of DOE's Paths to Closure by reducing project costs and enhancing project efficiencies.

EM-40 developed two training packages during 1997 which serve as an awareness briefing for ER project managers and ER project teams. The training packages provide ER personnel with the P2/WMin tools to realize significant project savings. The objectives of the two courses are

- Introduce project teams to the cost benefits of integrating P2/WMin into an ER project;
- Identify examples of P2/WMin techniques successfully integrated into ER projects;
- Provide specific P2/WMin tools and references;
- Encourage project personnel to access waste reduction opportunities;
- Assist project teams in utilizing P2/WMin tracking and reporting systems; and
- Explain the life-cycle costs for waste.

The project team module is useful for every member of the ER project team. It includes information to implement P2/WMin into all phases of the project from planning to field implementation. This module typically takes two to three hours to complete.

The project manager training module is a thirty minute awareness briefing tailored to project managers and supervisors. The briefing gives an overview of what P2/WMin is and what the benefits are to the overall project. The briefing also focuses on current program drivers, tracking and reporting requirements, and P2 resources. The intent of this module is to provide the managers with the incentive to require project teams to assess waste reduction potential and to assure progress is tracked and monitored.

The training modules can be tailored with site specific information and can either be self-taught or presented via an instructor.

The complex-wide project team held a pilot training session on December 15, 1997 in Santa Fe, New Mexico. Both modules were presented to 40 project team personnel and project managers from LANL and SNL/NM. Specific job responsibilities represented at the pilot training included cost estimators, waste management personnel, project engineers, safety and health personnel, design engineers, project managers for decommissioning and remediation projects, and P2/WMin specialists.

An effectiveness survey was sent to all participants to gauge the usefulness and appropriateness of the training program. Overall, participants thought the training modules were an effective way to educate ER personnel about P2/WMin benefits and to expand their knowledge of the types of

tools and resources available for successfully deploying these techniques in their projects. Most of the responses stated that the training modules were useful and that the case study examples were relevant to their job functions. Several respondents would like to have more site specific examples included in the training (by tailoring the training courses to the specific site) and discuss specific waste types and the most common waste reduction techniques per waste stream. This could be provided in the form of a checklist to use as a tool for recognizing the subtle and often overlooked waste reduction efforts that might be employed. Several comments mentioned the fact that there are currently no real incentives for practicing P2/WMin, and unless incentives are offered and publicized, it may be difficult to fully integrate and track waste minimization efforts.

The training materials will be bound and distributed to all DOE sites (via the Assistant Managers for Environmental Management) in May, 1998, with a memorandum from Jim Fiore (Acting Deputy Assistant Secretary of EM-40). The memorandum will also request that all ER project managers and teams at the sites receive the training as early as possible. Each site will be required to provide a summary report at the year-end review on the status of the training being completed by ER personnel.

Module 2: ER Waste Tracking Pilot

The Oak Ridge National Laboratory (ORNL) Pollution Prevention Information Management System (P2IMS) was installed for pilot testing at LANL and SNL/NM in January 1998, and is being used to track several environmental restoration projects at each site. Two projects at LANL (TA-16 and TA-49) and three projects at SNL/NM (Site #2, Site #71, and a decommissioning project) scheduled for FY98 are being used to pilot the P2IMS tool. LANL and SNL/NM P2 personnel have been inputting waste forecasting data into the P2IMS, and will track the P2/WMin results. The system can track and report on any number of techniques that result in cost savings from the reduction and/or avoidance of both primary and secondary waste.

This tool was developed at Oak Ridge and is a unique, customized program designed to capture P2 activities and approaches used during ER activities, and to track the P2/WMin successes realized during each phase of an ER project. The software program was designed to run on a Microsoft® Access platform, and can be used in a Local Area Network (LAN) environment. This feature allows numerous users to input and update project information so that it is available to all project team members. The program can also be used on a stand-alone computer with some modifications to the program code.

Although background information has been input in the P2IMS at both LANL and SNL/NM, no substantial results are available as of yet. This is due in large part to the status of the projects being tracked, i.e., the field work portion of the projects are not all fully underway. However, a preliminary evaluation the P2IMS (the software program itself) is as follows:

- The program is relatively self-explanatory, but even veteran users of Microsoft® Office will need to read the users' manual, as some items (e.g., how to add a new project or P2 strategy)

are not obvious. A more "user-friendly" version of the software is currently being developed, so some of the problems encountered with this version will be addresses;

- One of the most valuable functions of the program is the ability to consistently (and continually) roll-up data from one level to the next. This feature allows the user to input or change data at a very detailed level, and have those changes roll forward into the previous level. The program always asks if you want to save the changes before exiting a level, and if so, the changes are incorporated throughout the project record. This helps avoid the problem of having to make changes in every single form that pertains to that particular project record, or from ending up with internal inconsistencies;
- The program allows the user to track all phases of a project from preliminary planning through implementation and final closure. A standard version of the PPOA format, similar to that offered by the Kansas City Plant (KCP), is included, as are standard return on investment (ROI) funding requests and proposals. Having the ability to keep all the information pertaining to a project in one central record should ease reporting and tracking burdens, once users get familiar with the P2IMS; and
- The program runs from Access 97, which is a widely available relational database program offered in the Microsoft® Office 97 suite; however, it will not run properly with an earlier version of Access, e.g., the Microsoft® Office 95 suite which is still used at DOE sites.

Module 3: Project Assistance and Information Exchange

Experience at LANL and SNL/NM indicates that most common P2 practices are applicable at more than one DOE site. Sites independently develop cost and technical justifications before the project implementation phase; however, future activities can be streamlined through technical assistance and information exchange. A team of LANL and SNL/NM representatives identified several common practices/technologies, and are developing a series of templates for project managers to use when developing cost and technical justification for these practices. Standard templates (for Segmented Gate Systems, On-site Radiological Screening, Launderable PPE, Concrete Crushing, Metals, Lead, Soil Pile Control, Authorized Limits, and Clean-up Levels) are being developed, and will include implementation steps, benefits, barriers, and general cost information. Additionally, a P2 checklist has been developed to assist project personnel in determining if P2 has been adequately considered during the planning stages of a project.

Module 4: Evaluate P2 Tools for ER/D&D

Many documents and resources exist to assist the project manager; however, finding the right resource for a specific project activity is difficult. The task of this module was to identify and evaluate available resources, and condense this information into a "package" of reference tools for ER project personnel. Twenty different information sources (web sites, databases, manuals, etc.) relating to P2 in ER activities have been evaluated. The evaluation includes type and quality of information provided, the relative strengths and weaknesses, and applicability to LANL and SNL projects. Still being considered is an effort to incorporate this task with a similar project currently underway at the Fernald site.

Module 5: Field Test of P2 Tools

A team of ER/D&D personnel from LANL and SNL/NM (the Information Exchange Team) was formed in February, 1998, to evaluate the results of Modules 3 and 4, and to determine the applicability and usefulness of the developed tools to ER and D&D projects. The team will finalize and test standard methodologies and approaches to ensure that project managers and engineers can use them to incorporate P2 into their work.

During the initial training session (Module 1), it became clear that personnel at each site were unfamiliar with activities at the other site. (In some cases, personnel were unaware of on-going activities at their own site.) To help alleviate this problem, the scope of the Information Exchange team was modified to include a discussion of issues common to both sites. Topics of interest were identified during the training session, and were narrowed down at a subsequent meeting to provide a focus for the team. The topics that are being addressed include:
(1) regulatory barriers; (2) authorized limits; (3) release criteria; (4) recycle/disposal options; (5) contract language; (6) P2 checklist; and (7) investigate opportunities and share ideas with other DoD facilities.

The team meets monthly to evaluate the results of Modules 3 and 4, discuss and resolve common interest topics, and provide a final reality check on the field implementation of the P2 tools. The location for the meetings alternate between LANL and SNL/NM, and each meeting includes a tour of either an active ER site or an available technology that can be used at either site. In addition to providing general information about the ER projects, these tours provide a list of ER personnel contacts at each site that can help with similar projects and/or provide insight on future projects.

In addition to the general benefit of sharing ideas and approaches, some specific successes resulting from this approach include:

- SNL/NM personnel learned of a unique lead decontamination technology (Electrochemical Immersion) at LANL. SNL/NM had a large quantity of lead BBs that are difficult to decontaminate using conventional techniques. As a result SNL/NM received ROI funds to modify the LANL process to decontaminate the lead BBs. Mixed waste reduction is estimated at 4784 kg, with a cost savings of $44,000. The decontaminated lead will be reapplied as shielding.
- SNL/NM has used the experience at LANL to help in shipping low-level contaminated metals off-site to the GTS Duratek, Bear Creek facility for processing into waste shipping casks.
- SNL/NM cleared all of the state and federal regulatory hurdles to permit a Corrective Action Management Unit (CAMU). The CAMU is now operational, and will begin processing ER waste in the next few months. LANL is evaluating this experience to determine whether to pursue permitting a CAMU at LANL.

Module 6: DOE Information Exchange

The results of this project will be disseminated to other DOE sites through existing Web pages and presentations at DOE sponsored conferences and workshops.

Conclusions

Preliminary results indicate that this project will result in several useful, widely-applicable P2 tools for environmental restoration projects across the DOE complex. This project has been designed to test, refine, and distribute existing P2 tools, and builds on previous work -- those efforts should also be recognized and applauded.

Using a team approach has many benefits, and promotes sharing between DOE sites to achieve common goals and standardize methodologies and approaches to solve common problems. This effort to evaluate and refine developed tools and techniques, and to enlist a diverse group of professionals in all aspects of the project, ensures successful implementation and provides a model for incorporating cost-effective P2 practices as a routine aspect of ER and D&D projects.

Credits

The project team wishes to express appreciation for support provided by the Albuquerque Operations Office, the Oak Ridge Operations Office, the Office of Pollution Prevention (EM77), the Office of Environmental Restoration (EM-40), the ER Project staff at LANL and SNL/NM, and all the personnel working to incorporate P2 into their ER projects.

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