Pollution Prevention Opportunity Assessment Approach, Training, and Technical Assistance for DOE Contractors

FY94 Report, ADS #ALHQ-3530-3C

Kansas City Division

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**POLLUTION PREVENTION OPPORTUNITY ASSESSMENT
APPROACH, TRAINING, AND TECHNICAL ASSISTANCE
FOR DOE CONTRACTORS**

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Published January 1995

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Abstract

One of the tools used in a successful pollution prevention program is a pollution prevention opportunity assessment (PPOA). The purpose of this project was to share the Kansas City Plant's (KCP's) PPOA expertise with other Department of Energy (DOE) personnel and DOE contractors. This consisted of five major activities in FY94:

- 1. Validating DOE's PPOA Graded Approach methodology,*
- 2. Providing DOE-funded PPOA training and technical assistance to interested DOE personnel and DOE contractors,*
- 3. Developing a promotional campaign,*
- 4. Conducting a feasibility study to develop a DOE-wide PPOA information exchange mechanism, and*
- 5. Organizing and coordinating information sharing among related DOE EM-334 pollution prevention projects.*

This report documents the FY94 efforts, lessons learned, and future plans for all of the PPOA-related activities.

Summary

The Department of Energy (DOE) and its contractors are faced with environmental concerns and large waste management costs. Federal legislation and DOE Orders require sites to develop waste minimization/pollution prevention programs. In response to these requirements, the Kansas City Plant (KCP) developed a pollution prevention tool formerly called a process waste assessment (PWA) and now called a pollution prevention opportunity assessment (PPOA). Pilot assessments resulted in the development of a graded approach to reduce the amount of effort required for activities that utilized nonhazardous and/or low-volume waste streams.

The project's objectives in FY94 were to validate DOE's PPOA Graded Approach methodology, provide PPOA training and technical assistance to interested DOE personnel and DOE contractors, develop a promotional campaign throughout the DOE, complete a feasibility study for a DOE-wide PPOA information exchange mechanism, and organize and coordinate information sharing among related DOE EM-334 pollution prevention projects.

The validation of DOE's PPOA graded approach methodology began in FY94 with DOE providing a variety of sites in the complex with funds to complete PPOAs while using the methodology. These projects were initiated in mid-FY94 and are ongoing. The PPOA Graded Approach methodology developed for the DOE complex in FY93 was added to the DOE Defense Programs' Pollution Prevention Opportunity Assessment Guidance.

KCP also continued to deliver the performance-based PPOA training class utilizing Total Quality principles and participant involvement. Brochures and articles were mailed to past pollution prevention conference attendees as well as to the FY93 PPOA contacts. A logo was created for both PPOAs and for pollution prevention to promote the purpose of each. These logos were

utilized for class materials, presentations, and brochures. Seventeen classes and two workshops were delivered to approximately 390 DOE personnel and DOE contractors, bringing the to-date total (FY93 and FY94) trained to over 450.

The Quality Function Deployment (QFD) tool was used to complete a feasibility study for the PPOA information exchange mechanism. A multi-site team representing the DOE complex was used to identify customer needs and desires. Options for the mechanism were developed as a result of the QFD study. A cost/benefit study was completed for each option and then issued with a recommendation for implementation within the DOE.

Finally, the DOE EM Pollution Prevention Conference X, held May 2-5, 1994, in Denver, Colorado, was used as a convenient location to gather the project leaders of DOE EM-334's pollution prevention projects. Information was exchanged, and an agreement was made to share quarterly reports among principal investigators.

Discussion

Scope and Purpose

One of the tools used in a successful pollution prevention program is a pollution prevention opportunity assessment (PPOA). Opportunity assessments are used to identify the nature and amounts of waste from each process within a site's operations, identify the opportunities that exist for pollution prevention, and then evaluate those opportunities for feasible implementation. PPOAs also provide baseline data from which pollution prevention progress can be measured. Therefore, PPOAs can be the foundation for a comprehensive and effective pollution prevention program. The purpose of this project was to share the methodology and experiences of the three-year-old PPOA program at the Kansas City Plant (KCP) with other Department of Energy (DOE) personnel and DOE contractors. This consisted of five major activities in FY94:

1. Validating DOE's PPOA Graded Approach methodology,
2. Providing DOE-funded PPOA training and technical assistance to interested DOE personnel and DOE contractors,
3. Developing a promotional campaign for the DOE complex,
4. Conducting a feasibility study to develop a DOE-wide PPOA information exchange mechanism, and
5. Organizing and coordinating information sharing among related DOE EM-334 pollution prevention projects.

Activity

General Background

The Kansas City Plant has a well-developed, site-specific PPOA methodology. Lessons learned from pilot assessments in both manufacturing and nonmanufacturing operations led to the development of model worksheets, a PPOA Guidance, performance-based training, and graded approach methodology. This project was initiated in FY93 to share this methodology and lessons learned with others in the DOE complex. The goals in FY93 included 1) modification of KCP's Graded Approach methodology with the assistance of DOE/DP's laboratories and 2) delivery of PPOA training and technical assistance to interested DOE personnel and DOE contractors.

KCP tailored the scope of its site-specific PPOA training module to meet the needs of other DOE sites and contractors. A two-day, performance-based training class was designed and piloted.

In the first quarter of FY94 the term process waste assessment, PWA, was replaced by pollution prevention opportunity assessment, PPOA. This was done to incorporate a more positive term—opportunity assessment avoids the implication that assessments should be limited to process wastes. Instead, they should address all releases. Therefore, the remainder of this report addresses the assessments as PPOAs.

Graded Approach Validation

Background

In FY93, the graded approach methodology was developed for the DOE complex by a team from the KCP and the four Defense Programs' national laboratories: Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Sandia National Laboratories/New Mexico, and Sandia National Laboratories/California. This methodology was developed with the understanding that processes vary in the quantity of pollution they generate, as well as in perceived risk and associated hazards. The variance due to the cost of performing and utilizing the PPOA information was also recognized. Therefore, one of the team's goals was to provide a cost-effective and flexible methodology which allowed individual sites to prioritize their local concerns and align their efforts with the resources allocated, while also providing consistency throughout the DOE to perform PPOAs with minimal documentation. In FY94, the following milestones and schedule were created to complete the validation of the graded approach methodology.

FY94 Graded Approach Validation Schedule and Milestones

<u>Planning, Engineering, & Development</u>	<u>End Date</u>
Receive approval and funding for project.	FY94-1Q
EM-334 will select and approve the participating DOE test sites.	FY94-2Q
Identify support personnel from each of the selected sites.	FY94-2Q
Test PPOA graded approach methodology through the completion of pilot PPOAs.	FY94-3Q
Develop lessons learned from the completion of the pilot projects.	FY94-4Q
Refine DOE's PPOA graded approach methodology.	FY94-4Q
Review graded approach methodology with DOE sponsor, EM-334.	FY94-4Q
Document FY94 efforts, lessons learned, and issue DOE PPOA Graded Approach Methodology.	FY94-4Q

DOE EM-334 selected the sites to validate the graded approach methodology. The following list indicates the sites selected and the respective site contact.

<u>Site</u>	<u>Contact</u>
Hanford	Jill Engel
Nevada Test Site	Terre Maize
Oak Ridge Site	Sam Suffern
West Valley Nuclear Services	Sally Kalamanka

The milestones selected for this activity were too ambitious for the receipt of funding and approvals. Therefore, the team members began pilot assessments using the current methodology in the third quarter of FY94. In order to allow enough time to complete the pilot assessments, the lessons learned and methodology refinement milestones will be continued into FY95.

PPOA Training, Assistance, and Promotional Campaign

Background

The KCP developed a comprehensive Pollution Prevention Program aimed at all environmental media in response to DOE Order 5400.1. PPOAs are the cornerstone for this program because they are used to define the waste stream baselines and to identify opportunities for the elimination of hazardous and nonhazardous materials and wastes.

A site-specific PPOA training program for KCP team leaders was developed in FY92. The purpose of the performance-based course was to increase consistency in PPOA content, increase team leader confidence and enthusiasm, and decrease the amount of time required for completion. Over 300 KCP associates have received this training.

The success of the KCP course led to the FY93 development of a PPOA training course for the Department of Energy and its contractors. The approach for this course, while still performance-based, was modified to address pollution and waste concerns that could exist across the DOE complex. The assessment process was streamlined, and a new series of worksheets was designed. The training was divided into twelve modules in which a premium was placed on instructor/student interaction through the use of examples and exercises. The course included modules on pollution prevention concepts, development of a pollution prevention program, the application of Total Quality to pollution prevention, two class exercises, the DOE graded approach methodology, the computer software database for recording PPOA information; and an opportunity for participants to share lessons learned. The training materials were evaluated in several pilot courses. Three class offerings were delivered during the last quarter of FY93. Sixty-six participants received the training. Feedback from the participants and support from the DOE indicated a strong demand for this type of training. This led to the continuation of this activity in FY94.

FY94 PPOA Training, Technical Assistance and Advertising Schedule, and Milestones

<u>Planning, Engineering, & Development</u>	<u>End Date</u>
Receive approval and funding for project	FY94-1Q
Revise PPOA training module based on FY93 lessons learned.	FY94-1Q
Invite interested DOE personnel and DOE contractor personnel to attend training and volunteer off-site assistance.	FY94-1Q
Revise worksheet software based on FY93 recommendations and lessons learned.	FY94-2Q
Initiate advertising campaign for PPOA awareness, training, and assistance availability.	FY94-2Q
Develop supplementary train-the-trainer PPOA material.	FY94-3Q
Deliver PPOA training as needed.	FY94:1Q-4Q
Provide PPOA technical assistance as requested.	FY94:1Q-4Q
Brainstorm addition of energy assessments into the PPOA structure.	FY94-4Q
Identify follow-on plans for FY95.	FY94-4Q
Document training and assistance through an annual report and recommend future initiatives.	FY94-4Q

The training team began FY94 by incorporating improvements suggested from FY93 lessons learned. Examples of these are listed below.

1. Some of the course design was changed to incorporate the basic learning philosophy of "tell them how to do it," "show them how to do it," and "let them do it;"
2. The user-friendliness of the computer software was improved;
3. The DOE PPOA Contact list was updated;

4. An acronym list and TQ tool definition list were added to the resource section of the course notebook; and
5. The two-day program was revised to a one-day program for workshops.

With the addition of Style II, the PPOA worksheet software was enhanced to incorporate radioactive waste categories. This provides an improved mechanism for DOE facilities to share information. Another revision was the combination of Worksheets 4 and 5 into one input screen. This allowed a visual representation of the data and additional calculated fields to ensure that the input information was correct.

The PPOA software manual was also revised to reflect the Style II addition and the changes in the input screen for Worksheets 4 and 5. The manual continues to step the user through the PPOA software worksheet by worksheet.

An additional enhancement included a supplementary Train-the-Trainer Instruction Guide. A rough draft was reviewed by the Nevada Test Site, and their comments and suggestions were incorporated into a final version. This guide will be available to any DOE or DOE contractor site that chooses to perform their own PPOA training. In addition, floppy disks are available which contain the class slides in Microsoft® PowerPoint™ and train-the-trainer material in Microsoft® Word™.

The following activities were also pursued and completed.

Advertising Campaign and Promotion

This year's advertising campaign was focused in two distinct directions. First, an extensive effort was developed to increase the awareness at DOE sites as to what a PPOA is, its benefits, and the availability of the training and technical support. Subsequently, the purpose of the second advertising effort was to continue the message, to provide a visual reminder, and to help sustain the enthusiasm generated during the course.

The initial effort used several publications to spread the word. First, articles were published in the *Pollution Prevention Advisor*. Second, brochures were distributed to the DOE-wide contact list for waste minimization personnel. (See Appendix A for these promotional materials). Third, an announcement was also placed in the DOE internal newsletter and on the DOE-wide EPIC bulletin board. Fourth, a booth at the DOE Pollution Prevention Conference X in Denver, Colorado, publicized successful KCP pollution prevention opportunities, displayed a brochure and postcard which could be used to sign up for the training, and showcased the PPOA course materials. A videotape played continuously at the booth which highlighted the principles of PPOAs and explained the performance-based instruction and technical assistance available through the Kansas City Plant.

The second goal was to continue the message and sustain the enthusiasm after the training was completed. The two logos that were designed had to promote DOE as the leader in the pollution prevention effort and universally apply to all DOE sites. Several choices were presented to DOE-HQ and the two chosen are shown here.

These logos have been proudly displayed on the front and back of the training notebook since May. A magnet was also designed as an inexpensive way to advertise; the logo "Partner with the Environment" was used.

Throughout the year, feedback from the students indicated they wanted a way to have the training materials shipped to them after the course, as the notebook and software were quite bulky for traveling. Instead of commercial shipment, a tote bag displaying both logos was designed. This tote bag is made of 50% post-consumer wastes. One side displays the *Creating Solutions - Not Pollution* logo; the other shows the logo *Partner with the Environment*. This has been a very popular item with the students. As these various materials displaying the logo(s) are used, the expectation is that they will create an interest in the available training and technical assistance and further the DOE's goal of pollution prevention.

Class Delivery

In FY94, 71 people attended PPOA classes at the Kansas City Plant and 226 people attended at other sites, as listed below. In total, 297 DOE and DOE contractor personnel were trained in the two-day course during FY94. A list of acronyms is available at the end of the text.

PPOA Training Class Attendance			
Date	Location	# Attended	Cumulative Total
11/30-12/1/93	KCP	8	8
12/8-9/93	WSRC	50	58
1/18-19/94	KCP	19	77
2/24-25/94	Pantex	14	91
3/10-11/94	EML/NY	14	105
4/13-14/94	KCP	10	115
4/18-21/94	NTS	36	151
6/15-16/94	KCP	19	170
6/28-7/1/94	WINCO	45	215
7/21-22/94	Chicago	9	224
8/2-5/94	NTS	44	268
8/31-9/1/94	KCP	15	283
9/15-16/94	BDM	14	297

In addition to the two-day training program, the team also delivered two, half-day and one-day workshops, respectively. The locations and dates are listed below.

PPOA Workshop			
Attendance			
Date	Location	# Attended	Cumulative Total
5/4/94	DOE PP Conference X	70	70
6/9/94	DOE-HQ	22	92

Figures 1 and 2 show the distribution of attendees by DOE Operations Office and by lead Cognizant Secretarial Office (CSO), respectively.

The basic design and exercises used in the training were maintained; however, the course material and delivery were continuously improved throughout the year. The team began to rotate training responsibilities, which increased scheduling flexibility and availability.

Technical Assistance

Technical assistance has also been provided on PPOAs throughout the year. Assistance has included software support, guidance reviews, and information exchange, to name a few. One technical assistance request asked for a checklist of the steps necessary to initiate a PPOA program. Therefore, one was developed and is shown in Appendix B. In total, over 1000 hours of technical assistance have been provided. A list of the assistance provided to the respective sites is as follows:

Site	Type of Assistance
Westinghouse Savannah River	Guidance Review & Program Discussion
Nevada Test Site	Program Initiation Discussion
Westinghouse Hanford	Worksheet Software Support
Pineillas Plant	Laboratory PPOAs
Argonne National Laboratory	PPOA Guidance Review
DOE/NV	PPOA Plan/Guidance Review
Nevada Test Site	Worksheet Software Support
Nevada Test Site	PPOA Guidance & Networking Issues
Lawrence Livermore National Laboratory	KCP's PPOA List
Nevada Test Site	Worksheet Software Modifications
EG&G Idaho	PPOA Driver Examples
Fernald	Material Balance / Site Priority List
Westinghouse Idaho Nuclear	PPOA Guidance Review

Figure 1. PPOA Training Class Attendees by DOE Operations Office

Figure 2. PPOA Training Class Attendees by Lead Cognizant Secretarial Office

Lessons Learned

Many factors in addition to the content and delivery of training affect a student's ability to learn technical material. Proper attention to detail is essential to maximizing the effectiveness of the training. Therefore, this team exercised many tools to develop an extensive list of lessons learned. This attention to detail has resulted in satisfied customers. In FY94, the KCP PPOA team was presented with the National DOE Pollution Prevention award for "Education and Training - Internal."

The lessons learned section is organized into similar categories. They are as follows: Administrative and Organizational, Classroom Training, Computer Training, Benchmarking, Class Examination and Evaluation, and Follow-up Survey.

Administrative and Organizational

Lessons learned by the PPOA training team in this section are further divided into two groups - the first group is training at the contractor's location and the second group pertains to all training (General).

Contractor Location

Visit the site prior to the training class. This pre-visit has two benefits: first, to gain site-specific information in order to enhance the relevance of the training, and, second, to verify the layout of the training facilities and make direct contact with the person in charge of the facility.

Provide the site's coordinator with a model course announcement and confirmation letter which, in addition to specifying the time and place for the training, describes the purpose of the training, defines the intended audience, and lists the materials they should bring.

Do not schedule training at a contractor site which conflicts with the contractors' normal working hours. If the training is being held off-site, allow sufficient travel time for attendees to reach the training location.

If eating facilities do not exist at the training site, schedule sufficient travel time for lunch.

Develop a diagram detailing the room arrangement and a checklist for the equipment requirements.

Make direct contact with the person responsible for the training facility and verify equipment needs as well as dates. Provide the diagram and equipment checklist to the training facility contact. Verify that training materials have arrived and when the facility will be available for setup and breakdown.

Allow time to set up the classroom prior to the day the class is scheduled. At a minimum, reserve the computer facility for at least half a day prior to the scheduled computer training to load the software and resolve any problems.

Ensure that the computer training facility has an adequate projection system in order to demonstrate the PPOA software.

General

Before scheduling a class, take into account conditions that could affect attendance, for example, weather, holidays, and vacation.

For classes with students who are required to travel by air, change the class schedule so that it ends on a half-day basis to allow for late afternoon flights.

Provide a tote bag for attendees to carry the software and class notebook.

Develop a timeline for ordering materials, preparation, and shipping of course materials. (See Appendix C.)

Customize the class-specific information. Remove materials which are not relevant to each class.

Organize the presentation material notebooks by numbering the overheads (attendee notebook pages and supplemental materials.) Include notes to the presenter regarding scheduling of breaks, videos, time of group breakout sessions, etc.

Use recycled or reusable classroom materials, for example: flip charts, pencils, paper, and tote bags.

Classroom Training

Develop a check sheet listing all the materials and quantities necessary to conduct a class. (See Appendix C.)

Preparation, pace, and delivery of the materials all affect the attendee's ability to learn the material. Lessons learned dealing with presentation of the materials include

- Organize the presentation to actively involve the attendees as quickly as possible.
- Use natural breaks in the presentation to review the material which has been covered up to that point.
- Make sure that presentation material exactly matches material in attendee notebooks.

Computer Training

Use an automated procedure (batch file) to create identical working environments for all the computers in the training facility.

The computer instructor should review the computer training facilities prior to the first training session to become familiar with the layout of the room. Instructions should be received in the proper use of the facility's computer and overhead projection systems.

It is strongly suggested that the complete training exercise be tested in at least one of the participant's computers prior to the actual class. This will avoid embarrassment during the training session if memory or other problems are encountered between the facility's computer system and the FileMaker® Pro software. These problems should be resolved prior to class.

When developing a computer training exercise for the PPOA worksheets, the instructor must understand the varied level of participants' capabilities in using PC computers. With the limited time allocated for the computer training, it can become frustrating to pace the training to less knowledgeable participants. Therefore, in order to maintain an even pace, it is necessary to develop a training style that first tells what is expected for a particular section of the software, demonstrates how to use that section of the software, and then uses facilitators (one per five students) to assist the participants in using the software. This allows the instructor to concentrate on the class instruction pace and discuss those aspects of the software that require special attention by the participant.

When sending out a new revision of the PPOA worksheet software, provide detailed instructions on how to export existing data to a diskette, how to install the revised software, and how to import the data back to the PPOA software files. Make sure the computer manual matches the revised software.

Benchmarking

Existing assessment training programs were benchmarked to analyze their strengths and then incorporate improvements into the PPOA training. The benchmarking was conducted at three different sites during FY94:

- Los Alamos National Laboratory (LANL) PWA Training Course,
- Pollution Prevention Assessment Training by the Waste Reduction Institute for Training and Applications Research (WRITAR), and
- DOE EE-223's Energy Analysis and Diagnostics Center/Industrial Assessment Center (EADC/IAC) Directors' Waste Assessment Training.

All three of the assessment training programs contained strengths that the KCP could learn from and incorporate into the PPOA training. The following is a brief synopsis of the different training courses and how they could benefit the KCP PPOA training.

LANL PWA Training Course - This training teaches the student how to use a computer modeling program which is designed to identify inefficiencies in a process. The program simulates a process by defining variables such as time, parts, resources, locations, operators, work orders, and work centers, and then exercises the process for a defined period. A "trace" of the simulation can then be studied to determine where inefficiencies exist. Parameters can

be changed to verify the results. The process modeling would be useful when applied in conjunction with the PPOA training, especially for complicated processes with many variables. The simulation would be used to test pollution prevention opportunities before changing the actual process.

Pollution Prevention Assessment Training by WRITAR - This training focused on three approaches to conduct opportunity assessments: prescriptive, descriptive, and integrated. The prescriptive approach is qualitative, the descriptive approach adds quantitative information, and the integrated approach is an expanded assessment where pollution prevention strategies are tailored to the company's needs and business context. The portions of the training that the PPOA team could incorporate are the hands-on process visit for verification and the concept of "selling" a pollution prevention option. The PPOA team is considering incorporating a visit to a process location as an exercise in the training program. The class participants would observe an operator performing a process; then they would complete an assessment as a team. Another concept learned was that pollution prevention goals are symbiotic with business goals; in other words, pollution prevention should be integrated with business optimization. The PPOA team is considering adding a course objective and material addressing how to "sell" a pollution prevention option.

DOE EE-223's EADC/IAC Directors' Waste Assessment Training - The training was designed to teach EADC/IAC Directors from different parts of the country how to conduct combined energy/waste assessments at small- to medium-sized companies in their region. The PPOA team is incorporating energy assessments into the current program during FY95. By attending this training the KCP was able to gather information and contacts that will aid the team during the development of the energy assessment portion of the PPOA training.

Class Examination and Evaluation

After the PPOA training is complete, a class examination and evaluation are filled out by the class attendees (see Appendix D for an example evaluation). The results of these documents are analyzed to provide a measure of how well the course objectives were met. The course evaluation also provides a forum for the class attendees to make written comments about the strong and weak points of the training. These comments have been instrumental in making improvements to the training. Figures 3 and 4 summarize the results from the course examination and evaluation for both the on-site (KCP) and off-site training, respectively. Please note that the examination scores and evaluation results are averages for each class. The grand total average for the training to date is 3.59 out of 4.0 from the evaluations and 83.23 out of 100 from the examinations.

Follow-up Survey

A follow-up survey was sent to all past PPOA training attendees to determine the effectiveness of the training program after sufficient time was given to use the PPOA tool at their sites. A response rate of 29 percent was observed when 37 out of 126 surveys were received. The survey asked a variety of questions relating to the PPOA training. A copy of the survey is contained in Appendix E. Figure 5 summarizes some of the results from the surveys received.

Figure 3. PPOA Training Class Results - Kansas City Plant

Figure 4. PPOA Training Class Results - Contractor Locations

Was the course effective in helping you when performing PPOAs?

Have you completed any PPOAs since you received the training?

Did you use DOE's graded approach methodology?

Would a meeting with others to discuss PPOA implementation be beneficial?

Figure 5. PPOA Training Class Follow-Up Survey Results

The results of this survey show that the training course was effective in helping perform PPOAs. Over half of the respondents have completed PPOAs since completing the training course. A tremendous number of the participants used the DOE PPOA Graded Approach methodology. The survey also indicated a strong interest in sharing implementation issues.

The complete summary results are shown on the following three pages. (Ratings are based on a scale of 1, very little, to 5, a lot.)

In summary, the follow-up survey indicated to the PPOA team that additional technical assistance and course improvements are merited. The responses validate the planned activities in FY95.

Feasibility Study for DOE-Wide PPOA Information Exchange Mechanism

Background

Many sites within the Department of Energy have completed opportunity assessments. Others are just starting. DOE EM-334 recognized the need for these sites to share their information. Several benefits are achieved when information sharing is effective, such as (1) the elimination of redundant efforts, (2) the minimization of resources, and (3) the creation of valuable contacts. Therefore, EM-334 asked the Kansas City Plant to complete a feasibility study on a DOE-wide PPOA information exchange mechanism.

FY94 PPOA Follow-up Survey Results

1. Was the PPOA training beneficial in enhancing your site program?

Extremely Beneficial	37%
Very Beneficial	54%
Moderately Beneficial	9%
Somewhat Beneficial	0%
Not Beneficial	0%

2. Was the course effective in helping you when performing PPOAs?

Extremely Effective	31%
Very Effective	56%
Moderately Effective	13%
Somewhat Effective	0%
Not Effective	0%

3. Have you completed any PPOAs since you received the training?

Yes	54%
No	46%

4. How useful are the computerized worksheets?

Have Used Them	54%
Haven't Used Them	46%
Of those respondents that have used the software:	
Extremely Useful	16%
Very Useful	42%
Moderately Useful	31%
Somewhat Useful	0%
Not Useful	11%

5. How useful is the software manual?

Have Used It	54%
Haven't Used It	46%
Of those respondents that have used the manual:	
Extremely Useful	22%
Very Useful	28%
Moderately Useful	28%
Somewhat Useful	11%
Not Useful	11%

6. Which of the TQ tools do you find useful in performing PPOAs?

Brainstorming	73%
Fish Bone	54%
Weighted Sum	46%
Benchmarking	16%
Other (Mass Diagrams, TQM "Crosby" method, Cost Evaluation)	8%

FY94 PPOA Follow-up Survey Results

7. Did you use DOE's graded approach methodology?

Yes	81%
No	19%

8. What methods or techniques did you use to establish your site's priority material waste stream list?

Involved	83%
Not Involved	35%

Of those respondents that were involved, they answered:

"Listed the waste streams. Identified the activities contributing to that waste stream. chose the activity based on cost/volume or other necessary reason team identifies"

"Quantity, Toxicity, EPA 33/50, ODS"

"Referenced the RCRA Biannual Hazardous Waste Report"

"The hazardous material inventory database. SARA 313 usage information based on largest quantities used"

"Volume based, weighted by type of waste (Haz, LLW, LLM, etc.)"

"Largest waste streams/generators. Waste generators interested in doing a PPOA."

9. Do you need any technical assistance at your site?

Yes	26%
No	74%

10. Would a meeting with other PPOA trained individuals to discuss PPOA implementation be beneficial?

Extremely Beneficial	22%
Very Beneficial	56%
Moderately Beneficial	25%
Somewhat Beneficial	6%
Not Beneficial	11%

Would you attend if held as a separate meeting?

Yes	61%
No	39%

FY94 PPOA Follow-up Survey Results

Would you attend if held in conjunction with a DOE sponsored WMin/P2 meeting?

Yes	88%
No	12%

11. How can we improve the PPOA training program?

Some of the responses were as follows:

"Adaptability for D&D activities."

"Additional time could be allocated to the computer portion of the training."

"Excellent as it is!"

"The program is really good as it is. Maybe some more training or hands on help in actually setting up a system to prioritize PPOAs for a site."

"During training it would be beneficial to have more "hands-on" example PPOAs. Also a portion of the training should be on implementing a PPOA program at your site - a "how to" in program implementation."

"The training was excellent and very beneficial from my perspective of just trying to understand the PPOA process, even though I do not perform assessments."

12. List other people at your site who could benefit from PPOA training.

These responses will be used to target potential class attendees from the different sites.

13. Would a train-the-trainer program at your site be beneficial?

Yes	53%
No	47%

FY94 Feasibility Study for Information Exchange Mechanism Schedule and Milestones

<u>Planning, Engineering, & Development</u>	<u>End Date</u>
Receive approval and funding for project	FY94-1Q
Initiate a Quality Function Deployment (QFD) study with sponsor and other customers to determine needs and structure for PPOA information exchange.	FY94-3Q
Document identified requirements and modify structure of FileMaker® Pro software to meet QFD study needs or	FY94-4Q
Develop a conceptual schema for the PPOA system based on the QFD feasibility study.	FY94-4Q
Develop implementation plans to determine the time and resources needed to develop the new system. (This is contingent on FileMaker® Pro being less than adequate.)	FY94-4Q
Document FY94 activities in an annual report and make future recommendations.	FY94-4Q

A meeting was held at the Kansas City Plant on March 2-3, 1994, to initiate a feasibility study that would determine the requirements of a Pollution Prevention Opportunity Assessment (PPOA) information mechanism. The approach used was Quality Function Deployment (QFD). Quality Function Deployment is an approach to identify and carry the voice of the customer through each stage of product development and implementation. This study requires customer involvement, and therefore it benefited from the cross-functional team that participated.

Those attending the QFD study included DOE Headquarter sponsors (DOE/EM-334), representatives from both EM and DP, potential users, and DOE personnel currently working on associated databases such as EPIC and the Waste Cost Avoidance Model. The mission statement for the feasibility study was clarified as "Provide a Mechanism to Increase the Exchange of PPOA Information within the DOE Complex." The QFD exercise focused on identifying the necessary elements for the PPOA exchange mechanism.

Consensus within the team indicated that the minimum amount of PPOA information to be exchanged among DOE contractors was as follows. (This is referred to as "basic PPOA information.")

PPOA Title
PPOA ID Code
Issue Date
Site
Contact (Site Coordinator)
 Phone Number / Fax Number
Contact (Specific PPOA)
 Phone Number / Fax Number
Waste Type
Process Type
Brief PPOA Description
Option Descriptions

Information sharing options were generated as a result of the QFD study, and a cost/benefit analysis was completed for each. Based on the following criteria of option cost information, technical evaluation, QFD results, and speed of completion, a recommendation was made to DOE EM-334 to implement Option #3A (Central Database of Basic Information Using Dedicated PC), followed by implementation of #3B (Central Database of Basic Information Using Modem). Option #3A is the least expensive of all of the options (\$175.8K - first year costs); it is technically available and can be readily implemented. Both options concur with the QFD team's expectation that only basic data, not the entire PPOA, be shared among sites. Option #3B is suggested because it would provide a better response time. Requesters of information would not have to wait for a central site resource to answer their requests. Implementing option #3B after #3A would require an additional \$62.3K (\$238.1K - first year costs). A description of each of these options follows:

Option 3A Central Database on Dedicated PC Description:

The central site collects and maintains a database of the basic PPOA information from all sites in the DOE complex. The central contact receives requests by phone, fax, or mail to provide PPOA information to interested DOE or DOE contractors. Site coordinators provide the basic PPOA information and updates to the central contact through hard copy or diskette form. This information will have already received the appropriate security reviews prior to being sent to the central site.

First Year Total Costs:	\$175,825
Annual Maintenance Costs:	\$37,325

Option 3B Central Database with Modem Description:

The central site collects and maintains a database of the basic PPOA information from all sites in the DOE complex. Site coordinators provide the basic PPOA information and updates to the central contact, preferably transferred through electronic media or disk. This information will

have already received the appropriate security reviews prior to being sent to the central site. Basic PPOA information must be input into an electronic central file server for receipt and retrieval via a modem. The PPOA information would be accessed through a modem via a PPOA bulletin board. The PPOA information would be available on the bulletin board for viewing or downloading 24 hours a day. A training video will be developed to facilitate the PPOA bulletin board use. The bulletin board would also serve as a PPOA information exchange, where the DOE complex could share information through a message center. The central site would maintain the bulletin board along with the PPOA information to ensure the integrity of the PPOA database information.

First Year Total Costs:	\$254,175
Annual Maintenance Costs:	\$37,925

Information Sharing Among Related EM-334 Pollution Prevention Projects

Background

A number of the EM-334 tasks and funded projects share common elements with the PPOA Approach, Training, and Technical Assistance project. Therefore, EM-334 requested the Kansas City Plant to organize and coordinate information sharing among these various tasks and projects.

FY94 Information Sharing Schedule and Milestones

<u>Planning, Engineering, & Development</u>	<u>End Date</u>
Receive approval and funding for project	FY94-1Q
Define the format and frequency for information exchange among the related EM-334 pollution prevention projects.	FY94-3Q
Coordinate information sharing among related projects.	FY94:3Q-4Q
Document FY94 activities in an annual report and make future recommendations.	FY94-4Q

Based on discussions with DOE-HQ program managers and the various project principle investigators, a decision was made to hold an Information Sharing working group meeting in conjunction with the DOE/EM Pollution Prevention Conference X in Denver, Colorado, May 2, 1994.

The goals for that meeting were the following:

- 1) share task/project status information among the task leaders/principle investigators,
- 2) determine the best ways to share technical information, and
- 3) determine the frequency for future information sharing activities.

The following tasks/projects were represented at the meeting:

- Annual Report,
- Benchmarking Common Waste Streams,
- Cradle-to-Grave Tracking,
- EPIC,
- Headquarters Tasks,
- Information Sharing,
- PPOA Training,
- PPOA Training and Assistance, and
- Waste Cost Avoidance Model.

In addition to briefly describing the task/project status, each person was asked to address specific questions in order to determine the current level of information sharing. The questions were:

- What channels (direct request, through DOE) are you using to get information?
- How do you learn what other sites are doing?
- What other sites are involved in your project?
- How are you sharing information with other sites?
- Who (on- and off-site) will benefit from your project?
- What (and to whom) reporting requirements do you have?

Although information sharing is currently occurring, it is happening through informal networks as opposed to formal channels. It was the general consensus of the group that additional reporting requirements or channels such as a newsletter are not necessary. Rather, existing mechanisms should be used to the maximum extent possible in order to share information. The participants agreed that each task team leader/principle investigator should include all the others on distribution for their technical and progress reports. It was agreed that for the time being distribution would be in the form of hard copies. When the outstanding issues regarding the electronic distribution of reports on government funded projects are resolved and all the sites have access to the Internet, this decision could be revisited.

Additionally, the participants agreed that periodic project status meetings would not be the most effective use of limited resources. These meetings, if they do occur, should be held in conjunction with other meetings or conferences which are likely to be attended by a large percentage of the task leaders/principle investigators. However, if meetings are scheduled, they should be early enough in the year to allow the task leaders/principle investigators time to incorporate the information they gather into the current year task plans.

Recommendations

The team recommends that DOE-HQ prepare a list each year of the pollution prevention projects and provide this to the principal investigators/task leaders.

Rather than create a new system, existing means to share information should be fully utilized.

Actions to achieve electronic dissemination (Internet, EPIC) should be investigated.

Accomplishments

The following accomplishments have been realized as a result of this project in FY94:

- Seventy-one participants received PPOA training at the KCP site.
- Two hundred and twenty-six participants received PPOA training off-site (at contractor locations).
- A workshop version of the course materials was prepared and presented at the DOE EM Pollution Prevention Conference X, May 4, 1994, and at DOE Headquarters on June 9, 1994.
- The PPOA training materials were revised based on lessons learned from FY93.
- The PPOA database software was upgraded to enhance retrieval of PPOA data and worksheets and to incorporate Style II - radioactive waste categories. The software manual was also revised to include these changes.
- The training team received the 1994 National DOE Pollution Prevention Award for DOE Education and Training - Internal.
- The list of DOE PPOA contacts was revised and updated.
- The PPOA methodology developed for the training course was utilized to update the DOE/DP's Model Pollution Prevention Opportunity Assessment Guidance.
- A Train-the-Trainer Instruction Guide was developed to provide sites with information needed to conduct their own PPOA training course. This information is also available upon request in a floppy disk format.
- A course checklist was developed to aid in timeliness and consistency of material delivery.
- A program checklist was developed to help sites initiate a PPOA program.
- Over 1000 hours of technical assistance were provided to twelve DOE sites during FY94.

- A follow-up survey was created and distributed to past participants to determine if the training was helpful in initiating their program and if additional support was needed.
- The PPOA course was advertised through Pollution Prevention Advisor articles, the DOE Newsletter, the EPIC bulletin board, and internally-developed brochures.
- A promotional campaign was developed including two slogans; *"Partner with the Environment"* and *"Creating Solutions not Pollution."*
- Promotional materials and logos were developed based on these slogans. This included magnets and tote bags.
- The PPOA course content was benchmarked against similar courses offered by Los Alamos National Laboratories, WRITAR and the EPA/DOE EE-223's Energy Assessment Diagnostic Center/Industrial Assessment Center Waste Minimization training.
- A QFD study was completed with customers to determine the structure and needs for a PPOA information exchange mechanism.
- A cost benefit analysis was completed and recommendations made to implement a DOE-wide PPOA database.
- Additional information sharing among EM-334 pollution prevention projects was achieved as a result of a meeting at the DOE Pollution Prevention Conference X.

Future Work

The last deliverable for each project activity included the development of FY95 follow-on plans. They are as follows:

- Complete the validation of the DOE PPOA Graded Approach methodology.
- Continue to provide training and technical assistance to interested DOE and DOE contractor personnel. Two classes have already been scheduled in FY95.
- Enhance the PPOA methodology with energy analysis and tools for environmental restoration (ER) and decontamination and decommissioning (D&D).
- Develop Style III for the PPOA software. This involves waste stream definitions used in the Annual Report on Waste Minimization and Waste Generation.
- Continue to benchmark other pollution prevention training programs.
- Implement a DOE-wide PPOA database.

Acronyms

AD - Department of Energy's Administration Program
ANL - Argonne National Laboratory
BDM - BDM Oklahoma Inc.
CSO - Cognizant Secretarial Office
DP - Department of Energy's Defense Programs
EADC/IAC - Energy Analysis and Diagnostics Center/Industrial Assessment Center
EE - Department of Energy's Energy Efficiency and Renewable Energy Program
EM - Department of Energy's Environmental Management Program
ER - Department of Energy's Energy Research Program
FE - Department of Energy's Fossil Energy Program
HQ - Department of Energy's Headquarters
EML/NY - Environmental Measurements Lab/New York
EPIC - Department of Energy's Pollution Prevention Information Clearinghouse
FY93 - Fiscal Year 1993
FY94 - Fiscal Year 1994
KCP - Kansas City Plant
LANL - Los Alamos National Lab
LLNL - Lawrence Livermore National Lab
NE - Department of Energy's Nuclear Energy Program
NP - Department of Energy's New Production Reactor Program
NTS - Nevada Test Site
PPOA - Pollution Prevention Opportunity Assessment
PWA - Process Waste Assessment
RW - Department of Energy's Civilian Radioactive Waste Management Program
QFD - Quality Function Deployment
SNL/CA - Sandia National Laboratories/California
SNL/NM - Sandia National Laboratories/New Mexico
WRITAR - Waste Reduction Institute for Training and Applications Research
WINCO - Westinghouse Idaho Nuclear Company
WSRC - Westinghouse Savannah River Company

Appendix A

Promotional Materials

Pollution prevention...

The Pollution Prevention Act of 1990 established a national policy hierarchy for pollution prevention activities with source reduction as the preferred method over waste treatment, control, and disposal. The Department of Energy chooses to lead the way in this effort. Pollution prevention is not a one time opportunity, it is a continuous process.

A Pollution Prevention Opportunity Assessment is a systematic planned approach to pollution prevention. The assessments are used to evaluate input materials and parameters of a process, *identify* pollution and waste exiting the process, and *generate* options for pollution prevention.

The Kansas City Plant has been asked by the Department of Energy to share its experience and expertise in the field of pollution prevention training and technical assistance.

A multi-disciplined team from the Kansas City Plant is available to offer *free* technical assistance and training.

To make pollution prevention assessments work you must be open to change. Everyone must take ownership and accountability.

Linda Taylor, Instructor

Technical Assistance...

The instructional team also offers assistance to aid in the initiation of pollution prevention and assessment programs, provide training, review PPOAs, facilitate site assessment teams, share lessons learned, and help overcome barriers in the assessment process.

Sponsored by...

Through the sponsorship of the Department of Energy, Office of Waste Management, Division of Waste Minimization, the Kansas City Plant will provide pollution prevention opportunity assessment training and technical assistance *at no cost* to Department of Energy personnel and contractors.

Training includes...

- ▲ Performance-based methods
- ▲ Graded approach
- ▲ Easy to use worksheets
- ▲ Computer-based forms
- ▲ Composite lessons learned

AlliedSignal Inc. manages the Kansas City Plant for the U.S. Department of Energy under contract number DE-AC04-76-DF00613.

Pollution Prevention Opportunity Assessment

Training and Technical Assistance

Background...

Pollution Prevention Opportunity Assessments, previously known as Process Waste Assessments, are an integral part of a successful pollution prevention program.

An opportunity assessment is a tool for participants to identify the nature and amount of wastes, stimulate the generation of pollution prevention opportunities, and evaluate those opportunities for implementation. This resulting baseline assists in measuring pollution prevention progress.

Pollution Prevention Opportunity Assessments identify processes, operations, and procedures at your site that need to be improved or replaced to promote pollution prevention.

Training...

The two-day training program uses performance-based methods in conjunction with a set of model worksheets to structure the assessment. Participants will complete an assessment as a team exercise and enter the worksheet information into a microcomputer-based system. They will receive database software and a course notebook containing a section on how to set up a pollution prevention program. The notebook also includes assessment methodology, a graded approach, a summary of lessons learned from multiple DOE sites, and resource lists.

Participants learn to...

- ▲ Initiate and sustain an effective pollution prevention organization.
- ▲ Develop a prioritized waste stream and process list.
- ▲ Determine process boundaries.
- ▲ Apply a graded approach to complete assessments.
- ▲ Use assessments as a tool to further pollution prevention.
- ▲ Use a computer-based assessment worksheet program.

The two-day training course is designed to increase pollution awareness and demonstrate the effectiveness of assessments as a tool in identifying pollution prevention opportunities.

The training is beneficial to anyone who is assigned responsibility for pollution prevention programs. This may include scientists, lab technicians, engineers, waste management professionals, waste generators, and other line personnel.

Training dates at the Kansas City Plant

- ▲ April 13-14, 1994
- ▲ June 15-16, 1994
- ▲ August 31-September 1, 1994

*Training can also be scheduled
at your site.*

Registration form...

To receive a registration packet, Fax or mail this information request form to:

Susan Pemberton D/837, 2C43
Kansas City Plant
AlliedSignal Inc.
P.O. Box 419159
Kansas City, MO 64141-6159
Phone (816) 997-5435
Fax (816) 997-2049

Firm Name _____

Address _____

City/State/Zip _____

Telephone _____

Registrants...

Name _____

Title _____

Phone/Fax _____

April 13-14 _____ June 15-16 _____

August 31-September 1 _____

Name _____

Title _____

Phone/Fax _____

April 13-14 _____ June 15-16 _____

August 31-September 1 _____

Name _____

Title _____

Phone/Fax _____

April 13-14 _____ June 15-16 _____

August 31-September 1 _____

an early phase-out schedule for hydrochlorofluorocarbons (HCFCs). President Clinton also has issued Executive Order 12856, "Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements" (August 1993), and Vice-President Gore, as part of the Reinventing Government proposal, has introduced the National Clean Industry Initiatives to promote development of environmentally friendly refrigerants.

At the U.S. Department of Energy (DOE) three-plant complex in Oak Ridge, Tennessee, researchers are taking an aggressive approach to complying with the CAA Amendments while at the same time, leading the way in developing and testing new refrigeration equipment and alternative refrigerants. State-of-the-art equipment and technologies have been developed to meet Energy Policy Act (1992) demands for increased energy efficiency while searching for alternative refrigerants that do not damage the ozone layer. And, as part of the technology transfer and licensing programs developed at Oak Ridge, scientists, engineers, and technicians are working to help private industry and other government facilities solve research and development, manufacturing, and application problems associated with CFC and HCFC alternatives.

Researchers at the Oak Ridge Y-12 Plant were first in DOE Defense Programs to develop a long-range stratospheric ozone protection plan to minimize plant emissions of ozone-depleting substances administratively, to maximize the use of ozone-friendly alternatives, and to achieve cost-effective compliance with the CAA Amendments. The plan is a model for government agencies, manufacturing plants, and private industry facilities. Recycle and recovery programs were implemented several years ago, with tracking of "lessons learned" that are available to other organizations on request.

The Y-12 Plant is also the first DOE Defense Programs facility to request line-item funding to retrofit and replace air-conditioning and refrigeration equipment for compliance with the CAA Amendments. Detailed engineering studies have been completed for converting heating, ventilation, and air conditioning (HVAC);

chillers; and refrigeration equipment to operate with alternate refrigerants. Engineers have performed cost analyses of replacement versus retrofit options and have conducted additional studies of health and safety effects of the alternate refrigerants that are being tested. And, through the testing and study process, Oak Ridge has maintained efficiencies and capacities to minimize upstream power plant emissions. Where practical, some equipment will be retrofitted to reduce project costs. Technical assessments have been applied to finding alternatives to halon in fire protection systems, and projects to find alternatives to halons have also been initiated.

The Y-12 Plant researchers have also implemented an innovative program in alternative solvents and cleaning technologies through which vapor degreasers have been replaced with ultrasonic cleaners using aqueous detergents. That program was a means for finding replacements for chlorinated solvents used in hand-wiping or specialty operations. A water-displacing solvent blend developed and patented at the Y-12 Plant adds polar solvent to non-polar solvent to increase water displacement capability and solvent power. Tests of effects on welding, bonding, painting, and plating have been performed, along with compatibility tests for short- and long-term effects, toxicity, disposal, and waste minimization. Equipment and expertise available to private industry to measure cleaning effectiveness include X-ray photoelectron spectroscopy, Fourier transform infrared spectroscopy, and analytical rinse techniques.

By virtue of traditional missions, Y-12 Plant employees have developed expertise with the most modern and sophisticated equipment for recycle/recovery and storage of CFCs and HCFCs. The Y-12 Plant automotive mechanics are certified by EPA for work on motor vehicle air conditioners, and Y-12 refrigeration mechanics have been trained in CAA requirements and the use, operation, and maintenance of refrigerant recycle/recovery equipment. The Y-12 Plant training program includes courses for craftsman on the proper operation of most recycle and

recovery equipment. An EPA-approved program leads to certification of technicians in all four refrigeration classifications, and additional courses are taught in preventive maintenance, chiller high-efficiency purge systems, and CAA effects on equipment operation (including liability issues). There is also a management awareness course for HVAC owners on CAA and types of refrigeration equipment. Other training focuses on protecting the environment with refrigeration management, including ozone depletion theory; the CAA Amendments; the National Recycle and Emissions Program; safe handling of refrigerants; the Y-12-Martin Marietta Energy Systems Stratospheric Ozone Protection Plan; refrigerant recovery and recycle stations; Occupational Safety and Health Act requirements; confined-space entry; electrical wiring; handling of hazardous materials; and other topics that complement HVAC and refrigeration training.

The Oak Ridge Y-12 Plant is managed by Martin Marietta Energy Systems, Inc., for DOE.

Tom Kevil, 615-574-1094.

KANSAS CITY PLANT OFFERS PROCESS WASTE ASSESSMENT TRAINING AND ASSISTANCE

The U.S. Department of Energy (DOE) Office of Environmental Restoration and Waste

Management, Division of Waste Minimization, EM-352, asked the Kansas City Plant (KCP) to expand its existing Process Waste Assessment (PWA) program and offer it to DOE and DOE-contractor personnel. KCP has modified its existing performance-based training program and has developed a set of worksheets that lead the user through the process. A microcomputer-based system (both IBM- and Macintosh-compatible) was also developed to record and retrieve PWA information.

Sixty-six DOE and DOE-contractor personnel have completed the two-day.

performance-based training program. Each class worked through the steps of a PWA to learn how PWAs can be used to define process waste stream baselines and to identify opportunities for the elimination of hazardous materials and wastes. Participants learned to:

- 1) define process boundaries,
- 2) perform a mass balance to quantify the input materials and waste streams,
- 3) identify pollution prevention (P2) opportunities,

- 4) use economic and environmental, safety and health criteria in a systematic manner to prioritize P2 opportunities, and

- 5) apply DOE's "graded approach" methodology.

Each class then demonstrated their newly learned skills by performing a PWA on a typical laboratory process. After completing the worksheets for the typical laboratory process, each class used the microcomputer-based system to enter their data.

Two additional training classes will be held at KCP. The class dates are:

- November 30 - December 1, 1993, and
- January 18 - 19, 1994.

There is no fee for DOE and DOE-contractor personnel to attend this class. A training workbook, model worksheets, and a diskette containing the database software will be provided.

KCP personnel will also provide technical assistance, at no cost to recipients. Experience has shown that meaning-

Process Waste Assessment Training and Technical Assistance

I am interested in attending the performance-based training class.

___ November 30 - December 1, 1993

___ January 18 - 19, 1994

___ I am interested in technical assistance with PWAs at my site.

Name/Address:

Please also send information to:

Phone: () _____

FAX: () _____

tul pollution prevention only occurs when generators, rather than outside consultants, are responsible for performing PWAs. Therefore, KCP will

- 1. aid in the initiation of a PWA Program for your site
- 2. provide PWA training,
- 3. assist your site PWA teams to overcome roadblocks in the PWA process,
- 4. facilitate site PWA teams, and
- 5. critique PWAs

For more information, please mail or FAX the attached response form below, or contact Susan Pemberton at

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P.O. Box 419159 D/837 2C43
Kansas City, MO 64141-6159
Phone (816) 997-5435
Fax (816) 997-2049

UPCOMING EVENTS

U.S. Department of Energy Defense Programs Biannual Technology Workshops

The U.S. Department of Energy, Defense Programs fifth biannual technology workshop is currently scheduled for March 1994, in Las Vegas, Nevada. The next issue of this newsletter will provide more details on the program along with a summary of the fourth biannual technology workshop. The fourth biannual technology workshop is scheduled for October 25 through 28, 1993, in Pleasanton, California.

We Invite Your Participation

DOE's Defense Programs would like to encourage participation from subscribers and others to make the newsletter more interactive. The Pollution Prevention Advisor looks forward to your submissions of articles and upcoming events on issues relating to pollution prevention and waste minimization. We would appreciate any ideas or information you would like to share through this publication. If you would like to contribute, please contact Victoria Carter or Beth McPherson at 615-481-0036 or 615-543-5422.

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A DEFENSE PROGRAMS PUBLICATION • QUARTERLY NEWSLETTER for the NUCLEAR WEAPONS COMPLEX

Process Waste Assessments now PPOA's

Awards Program Rewards Successes

What's New with Process Waste Assessments? For one, the name is

changing. If anyone was giving you trouble about PWA representing Printed Wire Assembly, you don't have to worry. The Department of Energy will now refer

to process waste assessments (PWAs) as pollution prevention opportunity assessments, or PPOAs. The new term corrects the inaccurate implication that assessments are limited to process wastes; rather, assessments should address all releases.

Additionally, the DOE/Defense Programs' Model PWA Guidance document will be called the Model Pollution Prevention Opportunity Assessment Guidance. Suggestions for this revision were developed during two Waste Minimization Contractor Coordinator Group Workshops. The extensive revision includes the DOE PPOA Graded Approach and a set of model worksheets that a site may use as-is or modify for site-specific needs. The graded approach methodology will be piloted at various DOE sites in fiscal year 1994.

Finally, the PPOA training and assistance team at the Kansas City Plant (KCP) would like to remind you that on-site training and technical assistance are

available at no cost. The training and assistance program is sponsored by DOE,

Office of Environmental Restoration and Waste Management, Waste Minimization Division (EM-352). The KCP emphasizes that meaningful pollution prevention only occurs when

The Kansas City Plant PPOA team

waste generators, rather than outside consultants, are responsible for the performance of PPOAs. Therefore, the KCP will: (1) aid in the initiation of a Pollution Prevention or PPOA Program, or both; (2) provide on-site PPOA training; (3) assist site PPOA teams to overcome roadblocks in the PPOA process; (4) facilitate site PPOA teams; and (5) critique PPOAs.

To date, the KCP has trained 74 DOE personnel and contractors. A two-day class is being offered at the KCP site on January 18-19, 1994. More classes will be scheduled later in the year.

If you are interested in either PPOA training or assistance, please contact Susan Pemberton at 816-997-5435 or fax a request to 816-997-2049.

The Process Waste Assessment (PWA) will now be known as the Pollution Prevention Opportunity Assessment (PPOA).

However, PWA is still used in some of the articles in this issue of the Pollution Prevention Advisor. Future issues will adopt PPOA as a standard.

New awards for pollution prevention will encourage DOE operations across the country to compete for national recognition.

The DOE Pollution Prevention Awards Program will reward outstanding pollution prevention activities performed for the Department of Energy. Awards will be offered for categories including source reduction, recycling, awareness and training, and technology transfer. Most award categories reflect activities described in the DOE 1993 Waste Minimization/Pollution Prevention Crosscut Plan.

Judging will be completed in two rounds. Applications from each DOE site will be judged by the site Waste Minimization Coordinator. Applications chosen as the best from each site will be forwarded to DOE Headquarters for national judging.

Awards will be presented in May, 1994, in conjunction with a pollution

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REDUCE REUSE RECYCLE

Printed on Recycled Paper using Soy-Based Ink

Pollution Prevention Included in Facility Design

By Elizabeth Raney
Advanced Engineer
Westinghouse Hanford Company

A new series of training material has been developed to include pollution prevention in the design of new or modified DOE facilities. Material for the training course, *Pollution Prevention Design Guideline and the Orientation to Pollution Prevention for Facility Design*, was developed at the Hanford Site for the Office of Environmental Restoration and Waste Management, Waste Minimization Division (EM-352). The project was a collaborative effort between Westinghouse Hanford Company (WHC) and Kaiser Engineers Hanford (KEH). David Encke of WHC is credited with the original idea for developing a pollution prevention guideline formatted after DOE Order 6431.1A. The training material demonstrates how the design of a facility can affect the generation of waste throughout a DOE facility's entire life, and it offers guidance on how to prevent the generation of waste during design.

The training materials include:

- *Orientation to Pollution Prevention for Facility Design* (training course booklet),
- *Pollution Prevention Design Guideline*,
- *Orientation to Pollution Prevention for Facility Design* lesson plan,
- training participant survey and pretest, and
- training facilitator's guide and schedule.

The *Orientation to Pollution Prevention for Facility Design* training course familiarizes design engineers with the concepts of pollution prevention and walks them through the process of using the *Pollution Prevention Design Guideline*. This course was developed to be approximately 3 hours in length but can

be adjusted to suit individual needs. The first half of the course is dedicated to defining pollution prevention. Specific case studies and examples from the Hanford Site illustrate pollution prevention concepts and benefits and their relationship to design. The second half of the course presents the *Pollution Prevention Design Guideline*, explains its features and use, and offers a case study exercise to practice the guideline. Distribution of course slides and overheads has been limited to allow for site and facility-specific alteration and revision.

The *Pollution Prevention Design Guideline* is a compilation of nearly 250 questions organized to follow the structure of DOE Order 6430.1A, "General Design Criteria." The questions are intended to generate ideas, methods, and information that will assist in the prevention of pollution during the design process. The *Guideline* is contained in the training course booklet but can be removed for use as separate document. An electronic version using multi-media and graphical interfaces is being developed at the Hanford Site.

The *Orientation to Pollution Prevention for Facility Design* lesson plan describes the course objectives and provides information and discussion points that accompany the course slides contained in the training booklet. The intent of the lesson plan is to provide potential training course facilitators, engineering management, and course participants with enough material to understand and/or present the course.

Before the session, to assess participants' knowledge and attitude toward design for pollution prevention, a survey and pretest are sent to each participant to complete. The facilitator then can adjust appropriately the emphasis of the session. This same survey and pretest are administered to the participants soon after the session to ascertain whether any change of attitude has occurred as a result of the session. The facilitator's guide provides the schedule and structure for the training course. It presents an overview of the key points and elements of the training course.

Questions or requests for training course materials should be directed to the Quality and Training Resource Center,

U.S. Department of Energy, Richland Operations Office at (509) 376-7117. Other questions may be directed to Elizabeth Raney, Westinghouse Hanford Company, Pollution Prevention Program at (509) 372-0469.

'Green Policy' Adopted by EPRI

By Brad Connasser
Technical Writer/Editor
Power Electronics Applications Center

The Electric Power Research Institute (EPRI) has adopted a "green" print media policy that requires all documents to be printed with soya inks on recycled paper. According to Virginia Hess, Communications Manager of the Customer Systems Division, the paper used for all EPRI documents must contain at least 50% recycled fiber, including 10% postconsumer waste. Founded in 1972, EPRI discovers, develops, and delivers high-value technological advances through networking and partnership with the electricity industry, with special attention paid to cost-effectiveness and environmental concerns. Because EPRI delivers millions of sheets of paper to its 700-plus member utilities each year, the green policy will save hundreds of trees annually, as well as spare the environment from the pollution cause by oil-based inks.

Contact Brad Connasser 615-974-8316.

PPOA Training Sessions Scheduled

A series of Pollution Prevention Opportunity Assessment (PPOA) training sessions have been scheduled that may be of interest to waste minimization personnel and contractors at DOE field sites. The training is jointly sponsored by The Department of Energy, Office of Environmental Restoration and Waste Management, Waste Minimization

Division EM-352 and AlliedSignal, Inc., Kansas City Division.

Three training sessions will be held at the Kansas City Plant. They are scheduled for April 13-14, 1994, June 15-16, 1994, and August 31-September 1, 1994. Please share this information with the appropriate personnel in your organization and at your organization's field sites.

Federal legislation, DOE Order 5400.1, and DOE implementation documents including the "Waste Minimization and Pollution Prevention Awareness Plan" and the "Waste Minimization and Pollution Prevention Crosscut Plan" emphasize the need for successful pollution prevention programs. The performance-based training course at the Kansas City Plant covers the Pollution Prevention Opportunity Assessment model and the elements of a successful pollution prevention program.

If you have questions concerning the course or would like us to contact specific people directly, please call the Kansas City Division and speak to Susan Pemberton, (816) 997-5435, or Don Watson, (816) 997-4092.

DOE Issues New Regulations

The Department of Energy has issued a final rule that extends federal environmental protection regulations, laws, codes, and ordinances to contractors that operate DOE facilities. Effective since March 9, 1994, the rule amends the preamble to chapter 9, title 48 of the Code of Federal Regulations, better known as the DOE Acquisition Regulation (DEAR).

During the development of the DEAR Amendment, eight business firms and universities—many of which would be required to comply—submitted comments on the proposed amendment. Concerns about the amendment included safety and permit requirements, the effect on operations and administration costs, and the paperwork required to comply. The DOE considered all concerns and significantly revised the amendment before it was issued.

For more information, refer to the *Federal Register*/Vol. 59, No. 25/Monday, February 7, 1994/Rules and Regulations, pp. 5529-32. Or contact: P. Devers Weaver, Procurement Policy Division, U.S. Department of Energy 202-586-8250.

PPOA for Transition Facilities Being Developed at Mound

By Mary Russell
Principal Investigator
DOE Mound

Because wastes continue to be generated there, personnel at the Department of Energy's Mound Plant have initiated a project to develop a pollution prevention opportunity assessment (PPOA) of a building, area, or site that is undergoing the transition from production to environmental management. Funded by EM-352 as part of the Albuquerque Operations Office Waste Minimization/Pollution Prevention initiative to promote waste-minimization and pollution prevention opportunities, the project is designed to develop a generic material-balance PPOA.

The Mound Plant's new PPOA project began as a result of changing missions within the DOE. A number of DOE sites are undergoing similar reconfiguration or transition. Of sites reporting to the Albuquerque Operations Office, the Mound Plant and Pinellas Plant in particular are slated for transition from Defense Programs production sites to environmental management sites under the Environmental Restoration and Waste Management programs.

A PPOA approach was adopted at Mound because the transition of a site is a process and thus subject to process

analysis. A process description is being developed from documentation and studies, a process flow diagram generated, and waste stream characterizations made so that a generic, systematic approach to waste minimization can be developed for the transition. From such an analysis, source reduction and recycling opportunities should be more apparent and the impact on waste streams more realistically assessed. Consequently, efficacious waste minimization options can be selected and implemented. Knowledge of the processes and characterization of the waste streams will also lower the probability of an inadvertent creation of toxic or mixed waste. When property is cleaned and moved from an area or building where radioactive material is handled, the potential for generating mixed waste exists.

The generic PPOA meets the intent of Executive Order 12856, "Federal Compliance with Right-to-Know and Pollution Prevention Requirements." That is, it puts the emphasis on source reduction and recycling, which will result in

both cost savings and waste minimization. It is anticipated that this project will provide a generic transition model for other sites as they are reconfigured or are downsized in accordance with new production requirements. To enhance the general applicability of this project, personnel from sites such as Argonne, Sandia/NM, and Grand Junction will research ways to implement the transition model at other sites. Personnel with DOE decontamination and decommissioning experience will be interviewed for their insight. As an additional part of the fact-gathering effort, information already obtained in the best-business practices benchmarking within and outside the DOE complex will be used.

For more information about this project, contact Mary Russell, the principal investigator for the Mound project, at 513-865-3997.

POSTCARD

Pollution Prevention Opportunity Assessment Training and Technical Assistance

Please answer the following questions so we may determine your interest in Pollution Prevention Opportunity Assessments (PPOAs).

Is your company interested in PPOA training? Yes _____ No _____
Are you interested in PPOA training at your site? Yes _____ No _____
Are you interested in PPOA technical assistance? Yes _____ No _____
Has your site completed any PPOAs? Yes _____ No _____

AlliedSignal
AEROSPACE

Name _____
Title _____
Site _____
Phone/Fax _____

Place
Stamp
Here

Susan Pemberton D/837, 2C43
Kansas City Plant
AlliedSignal Inc.
P.O. Box 419159
Kansas City, MO 64141-6159

Appendix B
PPOA Program Checklist

POLLUTION PREVENTION PROGRAM CHECKLIST

Pollution Prevention Opportunity Assessments

	Determine consistent weight factors for PPOA Worksheet 9.
	Develop consistent weight factors for Graded Approach Weighted Sums.
	Determine Cut-Off value for Weighted Sums Level II vs. III.
	Develop consistent format for Site PPOA ID Code.
	Determine site resources to be referenced at the bottom of PPOA worksheet 1. (Obtain their permission.)
	Establish consistent PPOA process location format.
	Develop list of processes in all areas that generate waste releases to all media. (Hazardous & Non hazardous)
	Rank the list of processes according to the site's Priority Material / Waste Stream List.
	Core team evaluates group of Level I's to determine Level II's and III's.
	Coordinator develops database to keep track of completed PPOAs / Point of contact within DOE complex / Reports progress at the site.
	Distribute site-specific information to PPOA teams, e.g. waste stream costs.
	Train PPOA team leaders.
	Develop library or database of completed PPOA reports at the site for information sharing.
	Generate PPOA completion list on a monthly or quarterly basis and distribute to PPOA team leaders.
	Develop standard cover sheet for the PPOA final reports.

POLLUTION PREVENTION PROGRAM CHECKLIST

Pollution Prevention Program

	Develop Priority Material / Waste Stream List.
	Form site core team & organization.
	Establish site Pollution Prevention Coordinators.
	Determine responsibilities of core team, organization, and coordinators.
	Develop site guidance and plans.
	Set Pollution Prevention goals with management commitment to apply resources to achieve the goals.
	Hold frequent meetings to share progress, lessons learned, barriers, and issues.
	Recognize team members or individuals when progress is made.
	Track progress with quarterly reports and share across site.

Appendix C
Instructor Checklist, Timeline, and Shipping Requirements

POLLUTION PREVENTION OPPORTUNITY ASSESSMENT TRAINING MATERIALS CHECKLIST

STUDENTS:

- Notebooks (1-1/2", slant-D ring, white, clear vinyl cover and spine, pockets, locking device for rings)
- Pre-printed index tabs for the notebooks
- Spine and cover inserts (front and back) for the notebooks
- Inside cover sheet carrying copyright information for the notebooks
- FileMaker® Pro software
- 3-1/2" floppy disks labeled and loaded with worksheet program
- Individual name tags and/or tent cards
- Calculators (one per breakout group)
- Hand-carry property pass (if at Kansas City Plant)
- Instructions to gas station (if at Kansas City Plant)
- Sharpened pencils, highlighters
- Markers (only for tent cards)
- Creating Solutions - Not Pollution tote bags (one per attendee)
- Partner with the Environment magnets (one per attendee)

INSTRUCTORS:

- Overhead slide notebooks
- One set "second projector" slides
- Module objectives flip charts
- Reusable flip charts
- Overhead projector markers
- Dry erase markers
- Telescoping pointer
- Double-sided tape
- Duct tape
- Push pins, clips
- Videotape: "Pollution Prevention: Past & Future" - Kent Hancock
- TQ Team Role Badges - Leader, Timekeeper, Recorder, and Spokesperson (1 set per breakout group)
- Completed worksheets 1 - 5 Washing Clothes
- Completed worksheets 6 - 10 Washing Clothes
- Final Report - Washing Clothes
- Laboratory Glassware Exercise Process Description
- Blank Worksheets 1 - 5 (6 sets)*
- Blank Worksheets 6 - 10 (6 sets)*
- Completed worksheets 1 - 5 Lab Exercise
- Completed worksheets 6 - 10 Lab Exercise

- Class examinations
- Course evaluations (site-specific)
- Overheads used to instruct computer training session
- Instructor's agenda (annotated with roles/times)
- Master disk for software loading
- Susan Pemberton's business cards (for trainee's to mail in tests, etc.)
- Worksheet software license agreements (1 per expected trainee)
- Instructors' name badges

RESOURCE MATERIAL:

- Model DOE PPOA Guidance
- Site Program Plan
- Example PPOA Reports
- Pollution Prevention Periodicals (DOE and industry)

TRAINING ROOM EQUIPMENT:

- VCR/TV
- 2 overhead projectors and screens (good ones!)
- 2 overhead projector tables or carts
- Bulletin board for messages
- Tables/chairs - students and instructors (approximately 3-4 students per table; one instructor's table)
- 2 flip chart easels
- Restroom/vending machine signs (if at Kansas City Plant)
- Reference table
- Snack table or cart

POLLUTION PREVENTION OPPORTUNITY ASSESSMENT TRAINING TIME LINE

Six months ahead:

- Select training dates.**
- Reserve training rooms - class, computer, and dining.**
- Advise DOE of dates selected.**

Three months ahead:

- Advertise training.**
- Accept reservations (limit to approximately 25 student maximum).**
- Reserve local area hotel block of rooms.**
- Select trainers and facilitators.**

Two months ahead:

- Order purchased materials. (Notebooks, tab dividers, software)**

One month ahead:

- Send out registration packets.**
- Print training material. (Notebook covers front, back, and inside; spines; notebook dividers, and software manual)**
- Confirm rooms, trainers, all required materials, etc. (for both on- and off-site classes)**
- Make any necessary travel arrangements.**
- If off-site training classes, make decisions on materials to be shipped, quantities required, and ship date.**

Two weeks ahead:

- Advise DOE-KCAO of DOE visitors.**
- Advise Patrol and Security of visitor security status.**
- Send tour memorandum to Patrol.**
- Assemble notebooks.**
- Check security clearances and obtain appropriate information (for example, social security number and software type).**
- Send tour memo to tour speakers.**
- Order refreshments (for morning and afternoon).**
- Complete DAVACS form for Weapon's Complex visitors.**

One week ahead:

- Check agenda.
- Notify Public Relations to advertise visitors and training on "wheel."
- Confirm tour stops, speakers, and security escorts.
- Complete hand carry property passes (*DOS/MAC*) (*Suggest move to Day of:*).
- Copy disks for users (*DOS/Mac*).
- Diskette labels.
- Name badges for participants.
- Pack suitcase for off-site training!
- Confirm instructor assignments.
- Forward attendee information to security.

One day ahead:

- Set up room.
- Confirm attendance list.
- Confirm security arrangements.
- Confirm refreshments.
- Check to see if requested blue badges are at gates.
- Assemble all training materials.
- Load computer software. (NOTE: This may be done during the first day of training if the computer session is scheduled for day 2.
- Check order of pages in instructor slide notebooks.

Day of:

- Greet visitors at gate.
- Confirm attendance list.
- Make certificates and distribute to class participants on 2nd day.
- Prepare attendance list handout for each class participant.
- Split up group for computer/tour.
- Make slide to identify computer/tour group participants.
- Confirm lunch escorts.
- Prepare paperwork (e.g. Hand Carry Property Pass) to allow attendees to remove software from training site.

**POLLUTION PREVENTION OPPORTUNITY ASSESSMENT
SHIPPING REQUIREMENTS FOR OFF-SITE TRAINING**

Ship via best public transportation method:

All student materials.

All instructor materials selected by traveling training team, except overhead slide notebooks, videotape of Kent Hancock presentation, reusable flip charts, and module objective flip charts (optional).

Any equipment selected by traveling team.

Hand-Carry in PPOA Team suitcase:

Overhead slide notebooks, videotape of Kent Hancock presentation, reusable flip charts, and module flip charts.

Appendix D

Class Evaluation

Course Evaluation for PPOA Training

Please Rate the Following:

	Circle the Appropriate Number			
	Poor	Fair	Good	Excellent
• Classroom Instruction	1	2	3	4
• Course Content	1	2	3	4
• Course Materials	1	2	3	4
• Computer Session	1	2	3	4
• Plant Tour	1	2	3	4
• Hospitality	1	2	3	4

How was the pace of the course? (circle one) Too Slow About Right Too Fast

Did the course meet your expectations? (circle one) No Somewhat Yes
If not, what could have been done differently? _____

What do you feel are the strong or positive points of the course? _____

What areas do you feel need the most improvement? _____

Appendix E

Follow-Up Survey

FAX-IT (816) 997-2049 TO: S.E. Penborton AlliedSignal ECD Phone # (816) 997-5435	Date: / / FROM: CO: Phone #	PP RESPONSIBILITY Generator ☐ Programmatic ☐ Other _____ ☐
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POLLUTION PREVENTION OPPORTUNITY ASSESSMENT (PPOA) TRAINING
Post-Training Survey

INSTRUCTIONS: Please respond to the following questions as they relate to the training you received from the Kansas City Plant PPOA Training Team. Circle or check your response, as appropriate.

1. Was the PPOA training beneficial in enhancing your site program?

very little > 1 2 3 4 5 < a lot

2. Was the course effective in helping you when performing PPOAs?

very little > 1 2 3 4 5 < a lot

3. Have you completed any PPOAs since you received the training?

YES ☐ NO ☐

4. How useful are the computerized worksheets?

Haven't used them. ☐

very little > 1 2 3 4 5 < a lot

5. How helpful is the software manual?

Haven't used it. ☐

very little > 1 2 3 4 5 < a lot

6. Which of the TQ tools do you find useful in performing PPOAs? (Circle all that apply)

Brainstorming

Weighted Sums

Other _____

Fish Bone

Benchmarking _____

7. Did you use DOE's graded approach methodology in the initiation of your program?

YES ☐ NO ☐

If you did, do you have any suggestions or comments?

8. What methods or techniques did you use to establish your site's priority material waste stream list? Not involved. ☐

9. Do you need any technical assistance at your site? YES ☐ NO ☐

10. Would a meeting with other PPOA trained individuals to discuss PPOA implementation be beneficial?

very little > 1 2 3 4 5 < a lot

Would you attend if held as a separate meeting?

YES ☐ NO ☐

Would you attend if held in conjunction with a DOE sponsored WMin/PI meeting?

YES ☐ NO ☐

11. How can we improve the PPOA training program?

Comments

12. List other people at your site who could benefit from PPOA training.

Site

Name(s)

Phone

13. Would a train-the-trainer program at your site be beneficial? YES ☐ NO ☐

Thank You!