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THE DOE HAZARDOUS WASTE MANAGEMENT PROGRAM

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ABSTRACT

The Department of Energy (DOE) has responsibility for nuclear weapons and nuclear materials production. Such large scale production requires more than two dozen production, processing, testing and R&D installations in seventeen states. Like other large industries, nuclear materials production generates wastes requiring special handling and procedures to protect public health and the environment. Under the Atomic Energy Act of 1954 DOE has the authority to regulate source, special nuclear, and byproduct material in order to protect health and minimize danger to life and the environment.

There has been increased concern and legislative attention given to issues involving hazardous and mixed radioactive wastes (HCW) generated by DOE. A Memorandum of Understanding between DOE and EPA has recently been signed; in it DOE essentially incorporates all aspects of the Resource Conservation and Recovery Act for handling hazardous and mixed radioactive wastes. It has become clear that new and effective technologies are needed to adhere to these procedures and to other legislation, such as, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and Toxic Substances Control Act (TSCA). The Assistant Secretary for Defense Programs (ASDP) has established a Hazardous Waste Program to address technology development and technology transfer aspects for DOE sites nation-wide. The assignment for coordinating, integrating and reporting program activities was given to DOE's Oak Ridge Operations Office which established the Hazardous Waste Management Program (HWP) at Oak Ridge National Laboratory.

The goal of this national program is to develop technologies and provide solutions to support ongoing generation, storage, treatment and disposal of hazardous chemical and mixed wastes such that operation of defense facilities is continued and public health and safety are protected with minimum impact on the environment. The near-term strategy is to define the current magnitude and character of HCW, to identify areas of needed improvement in the treatment, storage, and disposal of HCW, to determine resources available to respond to technology development issues and ultimately to develop comprehensive plans to resolve them. Principal supporting objectives are to: act as a central resource for DOE in identifying problems and developing solutions; integrate and coordinate activities among DOE installations; and develop databases and disseminate information on methodologies for treatment, storage, disposal and environmental restoration at DOE installations.

This paper elaborates on the technical issues, problem areas and progress achieved by DOE's HWP.

INTRODUCTION

The U.S. Department of Energy (DOE) National Hazardous Waste Management Program (HWP) was chartered in response to changed and changing laws and regulations and new information regarding hazardous materials<sup>1</sup>. The program addresses the management of currently generated hazardous wastes, as these are defined by the Resource Conservation and Recovery Act (RCRA) and the Toxic Substances Control Act (TSCA); radioactive mixed waste; and any wastes that otherwise may be considered to be hazardous. The other major focus of the program is to assist DOE in its compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA requires DOE to identify and eliminate cases of substantial risk to public health, public welfare, and the environment resulting from releases of hazardous substances from the department's inactive hazardous waste sites.

One program is needed to assist all DOE sites with hazardous waste management and the retrofitting of facilities. Hazardous and mixed wastes are generated in significant quantities at more than 50 large DOE facilities located in 17 states. Although their processes are diverse and their environments varied, many of these facilities produce similar wastes, some of which are not common in private industry (e.g., uranium-contaminated halogenated solvents or other mixed wastes). Additionally, DOE has strict national security requirements for safeguarding material and information. DOE must maintain a coordinated, uniform program despite regulations that vary from location to location.

The goal of the DOE HWP is to support the implementation and improvement of hazardous-chemical and mixed-radioactive-waste management such that public health, safety, and the environment are protected and DOE missions are effectively accomplished. The strategy for accomplishing this goal is to define the character

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and magnitude of hazardous wastes emanating from DOE facilities, determine what DOE resources are available to address these problems, define the regulatory and operational constraints, and develop programs and plans to resolve hazardous waste issues. Over the longer term the program will support the adaptation and application of technologies to meet hazardous waste management needs and to implement an integrated, DOE-wide hazardous waste management strategy.

The HWP integrates DOE operations. Our purpose is to reduce costs and duplication of effort and to help DOE save time in responding to compliance priorities. Through integrated planning, providing technical support for decision making, improving communication and information transfer, and providing recommendations regarding technology applications, the HWP fulfills this purpose.

The objectives of the program are

1. to act as a central resource for DOE in identifying problems and developing solutions for handling hazardous wastes;
2. to support planning and implementation of environmental restoration activities;
3. to coordinate with other DOE waste programs (Low-Level, High-Level and Transuranic);
4. to develop information systems supporting the management of hazardous wastes and site clean up; and
5. to coordinate with other federal hazardous waste programs (Department of Defense, Environmental Protection Agency, Department of the Interior, etc.).

### Organization

The HWP is organized to carry out its functional roles and objectives through its functional units (Fig. 1), which are information

Systems, Interagency Coordination, Regulatory Analysis and Special Studies, Technology Adaptation, and Program Planning. Each of these units has a specific role in support of DOE Headquarters' decision-making and site-specific activities.

Support to Headquarters decision making is provided through quick-response technical overviews and regulatory analyses, as well as through detailed technology assessments and program plans. In doing this, information is provided to DOE Headquarters and operations offices regarding recent technology advances and regulatory changes or anticipated changes. Site support is provided through identifying and coordinating facility needs and integrating activities among sites; as well as through providing direct technical assistance; remedial action support; and on-call regulatory evaluations.

Technology adaptation activities involve identifying needs across DOE, determining which problems are common to several sites, identifying resources, and establishing priorities. Within these activities, the program integrates funding and oversees and manages actions related to the development and adaptation of needed technologies.

### Progress to Date

The program has been extremely vigorous in its first year of operation. We met milestones ranging from site evaluation reports to overall program plans. Program staff visited the 32 major DOE installations and collected and evaluated data regarding treatment, storage, and disposal (TSD) facilities; waste streams; and current compliance difficulties.

A detailed assessment of available hazardous waste treatment technologies was compiled. This document included evaluations of models for selecting treatment technologies for specific waste stream mixtures and characteristics.

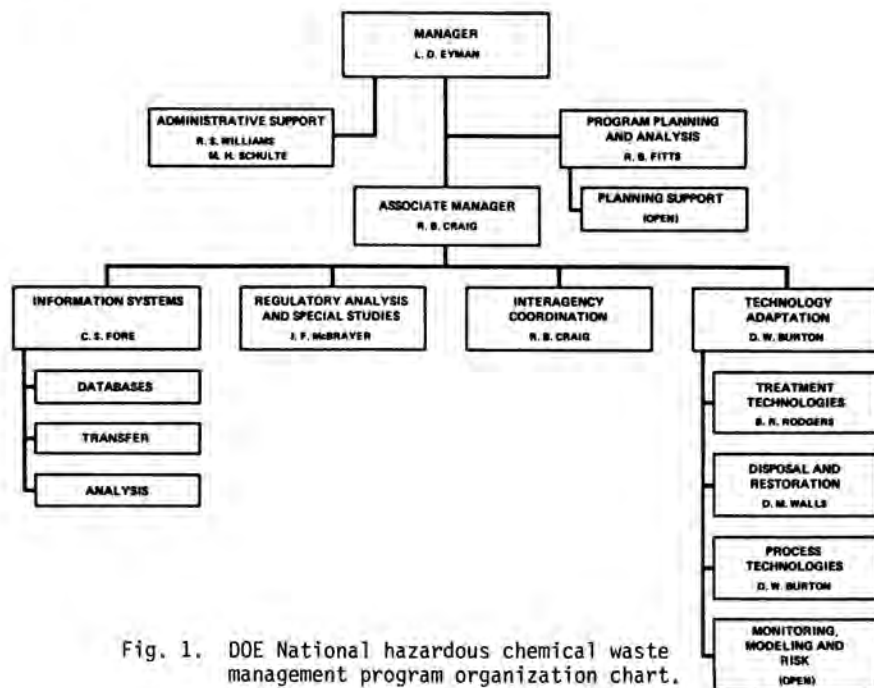


Fig. 1. DOE National hazardous chemical waste management program organization chart.

For DOE decision making we have provided such documents as action plans for RCRA and CERCLA compliance, operational impact assessments, actions required by DOE to respond to RCRA reauthorization (Amendments), "comparisons of low-level waste (LLW) and hazardous waste regulations,"<sup>2</sup> and technical support to the DOE task force on mixed wastes and the task force on hazardous waste internalization. Evaluations of several current DOE programs and proposed initiatives have also been prepared.

Our progress in establishing communications between DOE offices and their contractors has been very successful. The Waste Information Network (WIN), has been based on an IBM PC microcomputer system. Virtually all DOE offices and their contractors are networked from their PCs through our current PDP-10 system that is to be upgraded to a Vax 11/785. Currently, information is exchanged through an electronic mail system, and administrative and record-keeping functions are being formatted for the PC systems.

Five major data bases are being compiled: the waste stream, technology, regulatory, and remedial response data bases and a contact directory. Initial efforts have focused on establishing the waste stream data base. Data have been collected and synthesized from historic data bases, the data submittals required by DOE RCRA Order 5480.2, and site visits. Information regarding waste streams; waste generators; and treatment, storage, and disposal facilities has been organized and encoded into a user-friendly retrieval system on an IBM PC with a 147 MB hard disk. A relational data base management system is used where waste stream information is organized by site and facility. Waste streams can be tracked from generator to treatment, storage, and, finally, to disposal. Hazardous characteristics and chemical analyses are given as well where the wastes come from and go to. This data base made its inaugural run, with all DOE facilities recorded, in March 1985. The analytical data are not complete, but over 6000 waste streams have been identified.

Progress in coordinating DOE HWP with analogous functions in other agencies has met with unexpected success. Interagency agreements have been instituted between DOE and the U.S. Air Force, Army and EPA. The most active area is currently with the Air Force's Installation Restoration Program (IRP). The HWP is exchanging information and research results with the Air Force's Environics Laboratory which is a part of the Air Force Engineering and Services Center. The HWP has been requested to handle the initial tasks of the IRP's clean-up phase. Our role will be to develop remedial action plans for CERCLA sites at Air Force installations. The HWP's role will be to evaluate alternatives, including costs; assess environmental concerns; communicate with the public; and develop preliminary design.

Technology adaptation efforts are now under way. Technology priority needs were established, and the following areas were identified for funding this fiscal year:

1. risk assessment studies,
2. advanced treatment methods,
3. incineration/thermal destruction technology,
4. chemical recycle and reuse,
5. evaluation of material substitutions in process,
6. evaluation of alternative methods for HCW disposal,
7. in-situ destruction of organics,
8. alternative methods for gas cylinder disposal,
9. monitoring well sampling techniques,
10. treatment/disposal of reactive metals, and
11. in-situ biodegradation studies.

A call for proposals was made to DOE contractors in late FY 1984; 93 proposals were received. Eighteen projects have been funded for this fiscal year for a total of \$1,475,000. This, of course, is not the entire DOE budget for hazardous waste technology development. Each of the sites is undertaking designed programs to solve site-specific issues. The anticipated budget for HWP technology adaptation activities for FY 1986 is to be in excess of \$8 million.

#### Future Directions

The HWP is rapidly moving to assist all DOE operations and functions in dealing more effectively with hazardous wastes. We see a key role for our program in the development of guidance and in supporting the actual promulgation of regulations. We will continue to assist Headquarters and specific sites in the application and adaptation of appropriate TSD technologies. We are undertaking a vigorous program to review and set priorities for CERCLA activities. We will also expand the centralized accumulation and exchange of data and will continue to provide DOE with an independent and objective viewpoint, to ensure efficient and timely compliance with hazardous waste legislation and regulations.

#### REFERENCE

1. C. L. Matthews and W. E. Pasko, Strategy and Need for the Department of Energy's Hazardous Waste Program. Proc. Waste Management '85, Tucson, Arizona.
2. J. F. McBrayer and D. C. Jacobs, Institutional and Technical Issues in the Management of Low-level Mixed Wastes.