

DOE WASTE INFORMATION NETWORK:
DATA MANAGEMENT AND COMMUNICATIONS^a

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ABSTRACT

The U. S. Department of Energy's Waste Information Network (WIN) is an integral part of DOE's Hazardous Waste Remedial Actions Program. WIN has played an active role in the national program's mission to identify the magnitude and nature of existing DOE hazardous chemical and mixed radioactive waste streams and inventories and to provide a mechanism for disseminating pertinent information on technology activities. The information systems activity is structured into three key areas: data base development, data analysis, and data dissemination. As a result of this effort, several key data bases have been developed. Data dissemination is important to the use and management of the diversity of information and communication features developed by the program.

INTRODUCTION

The Hazardous Waste Remedial Actions Program (HAZWRAP) was established by the U. S. Department of Energy's (DOE) Office of Defense Waste and Transportation Management to support the improvement of hazardous chemical and radioactive mixed waste management for DOE Defense Programs (DP), such that public health and safety are protected and DP missions are efficiently accomplished. A major component of the program involves the development of specialized information systems encompassing all aspects of hazardous chemical and mixed radioactive waste technology. This effort is structured into three key areas. The first area focuses on the formulation of a variety of computerized data bases designed for data retrieval and analysis. The second area involves the development of several technical information transfer mechanisms that will provide a means for promoting hazardous waste information exchange between all the DOE installations. Analysis of the collected data is the third area of concentration. These three subtasks are combined to formulate the DOE Waste Information Network (WIN).

DOE WASTE INFORMATION NETWORK

The development of a DOE-wide Waste Information Network (WIN) was established through the efforts of the HAZWRAP to provide a mechanism for DOE Headquarters (HQ), Operations Offices, and their contractors to access a single, comprehensive information resource covering major aspects of hazardous and mixed waste technology. WIN encompasses a variety of data base systems incorporating information on DOE-DP hazardous and mixed waste streams, sources, characteristics, disposition, and general data on the generating site; treatment, storage, and disposal (T/S/D) technology applications and adaptations; remedial response capabilities and compliance; and information on vendors available for T/S/D of hazardous wastes. Additional data bases on DP

activities in response to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and a resource directory identifying key contacts at the installations are being developed for addition to WIN. WIN also provides a unique mechanism for conducting information transfer between DOE-HQ, DOE Operations Offices, and the contractor sites.

WIN is being established in a series of stages, with development planned according to identification of needs. Phase one, completed during FY 1985, utilized a personal computer for managing the computer applications. This phase created a strong foundation for the network to build upon and at the same time demonstrated a common need within the DOE community for more advanced methods of technology transfer. The second stage of development is nearing completion with the procurement of a dedicated host system designed to function as a research tool in the areas of communications, data base management, and data analyses. This centralized unit will permit multiuser and multitasking operations, greatly improve the user response time, create a consistent organization of data, and support sophisticated techniques for retrieving and analyzing data in a user-friendly environment. This expansion of WIN will provide a state-of-the-art resource for building a communication link between the DOE installations and will provide the mechanisms for promoting a more efficient, cost-effective means of conducting information data analysis and information exchange.

DATA MANAGEMENT

Several specialized data bases covering pertinent aspects of hazardous and mixed waste technology addressed by the program are currently under development. These include the following topics: (1) Hazardous and Mixed Waste Streams; (2) Technology Adaptation; (3) Commercial Treatment, Storage, and Disposal Vendors; (4)

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Environmental Restoration Activities (CERCLA); and (5) Resource Directory. Priority has been placed on establishing the first three data bases listed above and they are described below. The others are briefly discussed under Supporting Data Bases.

Hazardous and Mixed Waste Data Base

Emphasis has been placed on the design and structure of the Hazardous and Mixed Waste Data Base through the identification, collection, analysis, and computerization of detailed waste stream data for DOE-DP installations. Information for the data base was extracted from implementation plans and hazardous waste management plans submitted by the DOE Operations Offices and contractor sites in response to DOE Order 5480.2 (Hazardous and Radioactive Mixed Waste Management, December 13, 1982). Additional information was taken from draft reports on candidate mixed waste streams, from contractor reports, and through visits to the DOE-DP installations. To date, detailed data on approximately 2000 waste streams have been entered for 44 DOE contractor sites, and an estimated additional 2500 are anticipated for the remaining DOE installations.

Waste stream information includes (1) source of waste stream; (2) hazard classification (flammables, corrosives, etc.); (3) waste form (liquid/solid/gas); (4) waste classification (hazardous or mixed); (5) hazard ranking and toxicity ratings; (6) U. S. Environmental Protection Agency (EPA) hazardous waste identification numbers; (7) generation rates, plus volume in inventory; (8) waste stream destination; and (9) general information on related site activities. By utilizing a unique waste stream identification number, a particular waste stream can be tracked from its generation point through treatment, storage, and disposal. New waste streams produced as a result of specific treatment methods were incorporated into the overall tracking methodology. The system also allows for the mixing and separation of specific components of waste streams (e.g., the mixing of acid waste and a caustic waste to neutralize each other, or the separation of effluents and precipitates).

A major effort to analyze the collected data has been underway since FY 1985. The waste streams were analyzed by identifying generation points, treatment or storage processes, and final disposition. Generic classifications were assigned to the streams for use in determining possible technological and regulatory implications. Treatment processes currently being applied to DOE's hazardous and mixed waste streams were categorized for analysis purposes and for recommending alternatives, where applicable. Preliminary annual generation rates were calculated for each of the DOE installations to aid in characterizing the magnitude of the problem. The nature of the wastes generated by the specific hazard classification was also determined. The contents of the data base is currently being updated and further analyses will be performed. The data base serves as a single, easily accessible resource for summary information on DOE's waste streams. Availability of the information is restricted to DOE installations and their contractors.

Technology Adaptation

The Technology Adaptation Data Base is being designed to function as an information tool for the integration of specific waste stream data with appropriate T/S/D technologies. Specific data elements in the Hazardous and Mixed Waste Data Base (e.g., waste form, source of waste, treatment method, etc.) will be used as a cross-index link to the Technology Data Base. This will allow users to retrieve data on available technologies while perusing the waste stream data. This feature of the data base is referred to as the Technology Alternatives Modeling System and implementation proceeds through four key stages. The first and second stages involve translating the waste stream components and the generating process into generic chemical and process classes (e.g., aromatics and halogenated solvents). Through this information, appropriate T/S/D technologies for treating the waste stream can then be identified in the third step. Finally, the system begins a process simulation of the various technologies and provides the following key information.

1. Preliminary or initial design criteria, including heat and material balances, operating temperatures and pressures, rate expressions, and other preliminary design information.
2. New and innovative engineering approaches to hazardous waste management under development at various DOE installations.
3. Preliminary cost information concerning similar systems, estimated capital and operating cost.
4. Associated regulatory impacts (e.g., the Resource Conservation and Recovery Act and the National Pollution Discharge Elimination System) and the approach to compliance achieved by the model to support decision making.

The system is being developed for use on a personal computer and will be made available through WIN following completion of the initial design and review phase.

Commercial Treatment, Storage, and Disposal Vendors Data Base

At the request of DOE-HQ, a data base of commercially available T/S/D vendors in the United States and Puerto Rico permitted by the EPA to handle hazardous wastes was compiled. The data base provides a comprehensive, easily accessible, standardized source for DOE contractors to use in the selection of qualified vendors. In developing the data base, key resources for information on available vendors were identified. The Hazardous and Mixed Waste Data Base was used to pinpoint brokers currently being contracted by DOE to treat, store, or dispose of waste offsite, and a considerable amount of information on permitted T/S/D facilities was received from EPA. To augment the EPA data, information on additional T/S/D facility services from commercially available publications was collected and reviewed for relevant data. To date, 686 vendors have been identified. An addendum to the data base contains information on approximately 200 remedial response

and spill contractors and approximately 100 nationally accredited sampling and analysis laboratories.

Detailed information on each vendor is categorized according to (1) vendor name and EPA permit number; (2) addresses and phone numbers of facility, sales office, and parent company; (3) waste forms handled; (4) transportation mode; (5) wastes accepted; (6) on-site processes; (7) regulatory status; (8) current DOE user; and (9) background data on the facility. The contents of the data base will be published in April 1986 and will be made available through WIN.

Supporting Data Bases

Additional data bases being developed for DOE include the Environmental Restoration (CERCLA) Data Base and the Resource Directory. The CERCLA Data Base will include information on DOE-DP's inactive hazardous and mixed waste disposal sites as defined by DOE Order 5480.14, May 1985. Detailed data are currently being collected on Phase I activities for each DP installation's CERCLA sites. The data will be fed into an appropriate hazard ranking system so as to derive an initial ranking of the sites for purposes of planning, budgeting, and implementing corrective actions. The data base will then be used to support the data characterization activity needed to complete Phase II, confirmation of undue risks to health, safety, and the environment. Information on continuing phases will be incorporated into the data base as received.

The Resource Directory will serve as a major data base for identification of contacts at each Operations Office and DP installation for hazardous and mixed waste activities. As an addition, information on remedial response equipment available at each installation will be included. The data base will be available through WIN and will be updated as new information is received.

Work is also underway with EPA's Hazardous Waste Engineering Research Laboratory in Cincinnati, Ohio, to develop a data base on thermal treatment technology for handling hazardous wastes. The Hazardous Waste Control Technology Data Base serves as a multifunctional information tool to support permit writers, researchers, private industry, and decision makers in managing, analyzing, and comparing similar waste components and technologies. The data and information features of the data base incorporate (1) technical engineering data on permit applications for existing, new, and research, development, and demonstration (RD&D) facilities and trial burn and design data; (2) specialized interactive input, retrieval, and report-generation capabilities; and (3) methods for conducting similarity analyses. Online interactive, menu-driven retrieval sessions have been designed to generate summary reports on a personal computer. Currently, data can be retrieved by permit application, thermal treatment process, specific EPA region, heating value, waste component, and EPA waste code. The data base can also be used to conduct similarity analyses of the data for (1) reevaluating the technology data to

compare with actual industry performance and operating conditions; (2) providing a reference guide in order to meet new and existing regulatory standards; and (3) providing a means for calculating the theoretical performance of trial burns for research capabilities. Overall, the data base functions as a means of tracking the status of permit applications and RD&D, assists decision makers in determining future research strategies, provides support data for public hearings on permit decisions, and supports EPA's regulatory standards and procedures. The data base will be made available through WIN.

COMMUNICATIONS

WIN will provide a sophisticated communications system for accessing data bases, transmitting electronic mail messages, and conducting file transfer operations. A value-added telecommunications system will be installed whereby users at remote sites can dial a local number for telephone access to the dedicated host computer located at the DOE Oak Ridge Operations Computer Center in Oak Ridge, Tennessee. The electronic mail component of WIN provides a means for timely interchange of required communications between DOE-HQ, Operations Offices, and contractor sites. A variety of equipment with several different uses will be used to implement these communications features. Various terminals and personal computers can be used to access the host, remote line printers for printing reports at the cognizant DOE installations, and special telephone lines to connect the host with other existing mainframe systems.

SUMMARY AND FUTURE PLANS

WIN continues to play a major role in promoting technology adaptation and application and information exchange within the DOE community. Progress has been made in the areas of data base development, data analyses, and information transfer. Priority will be placed on continuing to collect up-to-date information on waste streams for the sites and on conducting detailed discussions and/or visits with site personnel to ensure data quality and completeness. The supporting data bases will be developed, particularly those relevant to CERCLA activities. Concentration will also be placed on the data analysis activity, with emphasis on determining the status of technology application within DOE and analyzing the future needs for technology development. All the data bases discussed above will be incorporated into WIN and made available to the DOE community, and information exchange mechanisms will be expanded to focus on technology transfer. Interactive menus are being developed to allow data retrieval through a user-friendly, menu-driven system with on-line help modules. Customized reports of summary information, itemized data listings, and graphic data representations will also be available online. Interagency efforts will be continued, and close interaction with the DOE installations will remain a high priority item.