A Review of the State's Plan To Integrate Hazardous Materials Databases

Office of the Legislative Analyst

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Introduction

Introduction

This report contains our findings and recommendations regarding the hazardous materials integrated data system proposed by the Environmental Affairs Agency (EAA) pursuant to the review requirements specified in Ch 1559/85 (AB 2184).

Chapter 1559 requires the EAA to study the need for changes in the current way in which the state collects and maintains information regarding hazardous materials and to report its findings to the Legislature. The chapter also requires the Legislative Analyst to review the agency's report and submit any findings and recommendations regarding the program to the Legislature.

Chapter 1559 makes the following specific declarations in supporting the need to change the current systems used to collect information on hazardous materials:

- Releases of hazardous materials pose acute and chronic health risks to individuals who are exposed as a result of where they reside or where they work.
- State residents should be made aware of the use and dangers of hazardous materials in their vicinity in order to enhance planning concerning potential exposures.
- Basic information on the locations, type, characteristics, and health risks of hazardous materials used, stored, or disposed of in the state is not currently available to residents and local and state employees concerned with regulating the handling of these materials and planning for regulation and emergency response.
- Existing information on hazardous materials is incomplete and is stored in various formats, thus limiting its usefulness for planning and response purposes.
- Existing state database systems are not capable of effectively exchanging information on hazardous materials, nor are they accessible to state and local agencies that have a need for the information.

Based on these findings, Chapter 1559 directs the EAA to develop a plan for ensuring reasonable access by public agencies to information on hazardous materials and standardization of data inputs. In addition, Chapter 1559 requires the agency to (1) identify gaps in the current data collection system, (2) recommend data collection techniques in order to develop a statewide database on the handling of hazardous materials, and (3) make recommendations concerning the creation of a fully integrated database system for hazardous materials.

The Legislature appropriated $200,000 from the General Fund for support of the EAA's study. The EAA used these funds to support a contract with Deloitte, Haskins &

Sells and CH2M Hill. The EAA based its report on the five reports issued under the contract. It submitted its report to the Legislature on January 23, 1987.

Chapter I of this report provides (1) background information on the state's current system for collecting, managing, and disseminating information regarding hazardous materials and (2) a summary of the EAA's findings and recommendations. Chapter II contains our findings based on our review of the EAA's report, and Chapter III contains our recommendations for future agency and legislative action regarding the development of an integrated data system for managing hazardous materials information.

This report is based largely on our review of the EAA report. Some information that is provided in the EAA report, such as specific tasks to be performed towards implementation of an integrated system, is not repeated here. We suggest, therefore, that this report be read in conjunction with the EAA report.

This report was prepared by Sarah Reusswig, under the supervision of Carol Bingham. ❖

Executive Summary

Executive Summary

I. Legislative Analyst's Findings

- The EAA concludes, appropriately, that the state's current hazardous materials data systems are fragmented, aimed at meeting the needs of individual programs, difficult to access for users outside of a particular program, and do not adequately anticipate the need for future information. These problems can be addressed through several means, including (1) setting standards for data collected by various systems, (2) assisting users in accessing data, and (3) collecting more data in areas where the state currently collects little or no data.
- The EAA proposes to rectify problems with the current systems and to integrate them through periodic transfer of copies of departmental data to a "core" system. Implementing this plan is projected to cost a minimum of $800,000 for development and at least $1.7 million annually to operate. These figures should be viewed as low because there are many potentially costly items of expense for which the EAA contractor was unable to develop estimates.
- The EAA's plan fails to provide the Legislature with any specific cost estimates for various options it identifies for increasing the usefulness of the current data systems and for integrating the systems. In addition, there is insufficient detail to determine the degree of increased integration and usefulness that would occur as a result of implementing the EAA's core system plan.
- The EAA plan calls for greater coordination and standardization between state and local hazardous materials data systems, but fails to specify how, and at what cost, local conformity with the state's hazardous materials data system would be obtained.
- The EAA report does not contain complete timelines for implementation of the plan. Only one date—July 1, 1987—is specified for implementation of the first step of the plan. This date has passed and the administration has not begun formal implementation of the plan, nor even identified a source of funding for implementing this step.
- The EAA plan does not contain a specific proposal for ensuring that the data in the core system would be of high quality. Instead, the plan relies on each department and/or program to control the quality of the data.

II. Legislative Analyst's Recommendations

We recommend that the EAA provide additional information to the Legislature by March 15, 1988 concerning (1) the costs of the various options evaluated by the agency, (2) the manner in which local government conformity with state data standards would be achieved, and the costs of accomplishing this goal, (3) proposed timelines for implementing the recommendations contained in the report, and (4) the establishment of quality control measures to be used by participating departments to ensure that high-quality data are available to system users. We further recommend that the Legislature not provide new funding for implementing an integrated hazardous materials data system until it has received and reviewed this additional information. ❖

Chapter I

Chapter I
Background on Hazardous Materials Data Systems and Review of Recommendations Made by the Environmental Affairs Agency

Background

Currently, each state agency concerned with the regulation of hazardous materials individually collects and maintains the data required for its own program. In addition, many local agencies maintain hazardous materials information systems to support local planning, emergency response, and public health and safety programs.

The contractor for the EAA identified 36 state hazardous material databases—maintained by 12 separate departments—that are partially or wholly automated. (The number of local automated databases is unknown.) The information contained in these databases can be divided into four broad categories: (1) facility or site identification, (2) regulatory data, (3) health effects data, and (4) hazardous materials management. Table 1 lists the types of information collected in each category. Table 2 summarizes the kinds of information available in each database. As Table 2 shows, all of the databases contain information for more than one category. In fact, 24 databases—or 67 percent—contain information for three or more categories, and 11 systems contain information related to all four categories.

Table 1
Types of Information Contained in
State Hazardous Materials Information Databases
By Category

Facility or Site	Regulatory	Health Effects	Hazardous Substances Management
• Name of firm • Identification number • Responsible persons • Location • Map coordinates • Nature of activity • Standard industrial classification • Size and/or capacity • Environmental setting	• Jurisdiction • Permit numbers • Permit requirements and conditions • Monitoring and enforcement • Manifests • Programs, special studies • Inventories • Labels or markings	• Exposure • Exposure point concentration • Receptor activities • Pathway • Nature of receptor • Release rate/duration • Action causing release • Location of release • Mitigating responses • Transport and environmental fate • Receptor location • Environmental concentration • Toxicity • Chemical • Measured consequences	• Manufacturing and generation • Storage • Use and handling • Waste transport • Treatment, storage, and disposal

Table 2
Categories of Hazardous Materials Data Collected by the State's Automated Information System

Agency	Facility or Site	Regulatory	Health Effects	Hazardous Materials Management
Department of Health Services				
Hazardous Waste Information System	●	●	●	●
Abandoned Site Project Information System	●			●
Hazard Evaluation System and Information Service			●	●
State and Regional Water Boards				
Waste Discharger System	●	●	●	●
Underground Tank Leak Detection System	●	●	●	●
Automated Compliance Checking	●	●		
Statewide Water Quality Information System	●	●	●	
Toxic Substance Monitoring System	●	●	●	
State Mussel Watch	●	●	●	
Field Section Data Base	●		●	
South Bay Site Management System	●	●	●	●
Cleanup Tracking of Underground Tanks	●		●	
Department of Food and Agriculture				
Pesticide/Well Inventory	●	●	●	
Registration Data System	●	●	●	●
Pesticide Residue Data	●	●	●	●
Pesticide Illness Surveillance Program	●		●	
FOODCONTAM		●	●	
Study Title Index	●	●		
Air Resources Board				
Toxic Emission Data System	●	●	●	●
Pesticide Use	●		●	
Air Monitoring Data System/Toxic Air Quality	●	●	●	
Department of Fish and Game				
Water Pollution Control Laboratory System		●	●	
State Mussel Watch	●	●	●	
Oil/Hazardous Materials Incident Reports	●	●	●	
California Waste Management Board				
Solid Waste Information System	●	●	●	●
Department of Transportation				
Material Management System	●		●	●
Maintenance Management System	●	●	●	
Pesticide Use Report	●		●	
California Highway Patrol				
Hazardous Material Spill/Release Reports	●	●	●	
Terminal Evaluation Records	●	●	●	●
Office of Emergency Services				
Hazardous Material Reporting System	●	●	●	
Board of Equalization				
Hazardous Waste Registration System	●	●		●
Hazardous Waste Return System	●			●
Department of Industrial Relations				
Carcinogen User Registry	●	●	●	●
Material Safety Data Sheets	●		●	●
University of California				
Oil and Hazardous Material Technical Assistance Data Systems	●	●	●	●

The ability of users to cross-tabulate data, integrate data from various systems, and ask questions requiring responses from two or more information categories is limited because many basic data elements are not collected routinely by all or most of the programs. Only four data elements in two information categories are collected routinely by a majority of the databases. Specifically, these data elements are (1) name of the firm, (2) identification number for the firm, (3) location of the firm, and (4) a chemical name for the hazardous material or materials.

In addition, users are hampered because even in those cases where a data element generally is included in many systems, it often is recorded in such a manner as to be incompatible with other databases. For example, within the facility or site category, the data element for location of the facility is recorded by 22 separate databases. Some of these databases use map coordinates, while others use street addresses or other forms of identifying the location of the facility. Still others use the same basic form of location identification but utilize different formatting conventions.

Until these system problems are resolved, the state will be unable to respond effectively to (1) new data and application needs that are continually being identified by the many state agencies which regulate and/or track hazardous materials, (2) increasing state and federal requirements on local governments to collect information on hazardous materials within their jurisdictions, and (3) an increasing demand by the public for information due to increasing concern with the dangers connected with hazardous materials.

Findings and Recommendations of the Environmental Affairs Agency

Chapter 1559 requires the EAA to (1) develop a plan for ensuring reasonable access by public agencies to hazardous materials information and standardizing data inputs, (2) identify gaps in the current system of data collection, (3) recommend data collection techniques in order to develop a statewide database on the handling of hazardous materials, and (4) make recommendations concerning the creation of a fully integrated database system for hazardous materials.

The EAA's report addresses each of the areas identified in Chapter 1559 and recommends phased-in implementation of an integrated hazardous materials data system. The findings and recommendations of the report are summarized below.

1. ***Plan for Ensuring Access to and Standardizing Hazardous Materials Information.*** The EAA report concludes that it is difficult for potential users to determine what information is available through various departments, and how that information may be accessed. In addition, the report finds that there are substantial numbers of data elements which can and should be standardized between databases in order to enhance the ability of the various departments to exchange data and the ability of the public and local governments to match data across systems. Based on these findings, the report makes seven specific recommendations on how to improve the accessibility and standardization of information on hazardous materials. Specifically, the report recommends that the state:

- Establish a central information desk function to guide individuals and organizations to the proper source of specific information.
- Develop a computerized index of existing hazardous material databases that would indicate both the type of data contained in the database and how it can be accessed.

- Monitor requests for hazardous materials information in order to determine which data should be more easily accessible across organizational lines in order to satisfy information requests.
- Determine minimum data requirements for hazardous material databases.
- Adopt standard methods for coding geographic location, industrial classification, and facility identification.
- Distribute the data standards to state and local agencies and require the standards to be used in all *new* database development and in existing systems where conversion would be feasible.
- Establish a state-level Hazardous Materials Information Management Committee to oversee issues related to access to information and newly identified concerns regarding standards for data elements.

Implementing these recommendations would (a) provide a "map" for users of the various state data systems and (b) increase users' ability to cross-match data elements from various systems in the future.

2. ***Identification of Information Gaps.*** The report makes two recommendations designed to rectify the problem of information adequacy. Specifically, the report recommends that the state:

- Investigate the feasibility of, and proper methodology for, collecting information concerning the quantity and location of hazardous materials in the environment.
- Develop a hazardous materials inventory system that provides the capability to cross-match and integrate location-specific information regarding the presence of hazardous materials in the environment.

Implementation of these recommendations would ensure that exposure to hazardous materials could be determined more easily for a specific geographic location.

3. ***Recommendations for Data Collection Techniques in Order to Develop a Statewide Database on the Handling of Hazardous Materials.*** The report recommends the phased implementation of a statewide database on the handling of hazardous materials. The steps in implementation are discussed below as part of establishing data standards for the integrated database system.

4. ***Recommendations Concerning Creation of an Integrated Database System for Hazardous Materials.*** The final review requirement imposed by Chapter 1559 on the EAA is the development of "recommendations, with respect to both state computer hardware and software, for the creation of a fully integrated database system in order to effectively meet the health and safety needs of the public." In addressing this requirement, the EAA evaluated five basic approaches to integrating the existing state data systems. Specifically, these approaches are:

- A computerized index for the current systems.
- A "gateway" system to route user requests automatically to the correct department and system in the proper format.
- A "core" system in which individual departments would maintain control of data collection and periodically transfer copies of data to a standardized system for centralized access and reporting purposes.
- A centralized computer system that would be responsible for collecting, formatting, and reporting all hazardous materials data, regardless of the departmental function to which it is related.
- A hybrid approach in which some data elements would be reported using the core method, while other elements would be collected using the centralized system approach.

Based on a review of the feasibility and costs of each of these approaches, the EAA

recommends that the core system approach be implemented because it (1) allows departments to keep control of information flow necessary for managing individual programs and (2) can be used to standardize necessary data elements across departmental lines of authority in order to facilitate cataloging and sharing of information.

Specifically, the EAA recommends a phased implementation of the core system through a "Hazardous Materials Data Development Plan." This plan would involve the following phases:

- ***Increase Organizational Capabilities.*** This phase would include (1) establishing a central staff unit and information management committee to provide leadership and direction as the phases are implemented and (2) providing an information desk function to direct users to sources of information.
- ***Establish Data Standards.*** This phase would entail developing (1) a data model and dictionary, (2) standards for data reporting and data entry, (3) quality assurance procedures, and (4) a computerized index for hazardous materials databases. In addition, it entails developing an inventory of facilities that produce, handle, store, or dispose hazardous materials in the state and identifying the geographic location of specific substances.
- ***Implement Integrated System.*** This phase would consist of three related steps. The first step would entail obtaining approval for a pilot project. Implementation of the pilot system and evaluation of its performance would constitute the second step. The third step outlined by the EAA for increasing system integration would entail the actual implementation of the hazardous materials core system.
- ***Add New Functions and Data Elements.*** The final phase would be the ongoing operation of the system and the addition of new functions and data elements to the inventory system. ❖

Chapter II

Chapter II
Analysis of the Environmental Affairs Agency's Report

This chapter contains our findings and comments concerning the EAA's review of current data systems and its plan for future integration of hazardous materials information collection and reporting.

Our review of information concerning current data systems indicates that the EAA's conclusions are reasonable. Specifically, the current systems for hazardous materials data collection are fragmented, geared towards specific program needs, inaccessible or difficult to access for many potential users, and do not do a good job of anticipating future needs for information. The current systems lack significant detail concerning the location of hazardous substances.

The EAA report notes correctly that the problems with the current systems of data collection can be addressed in several ways. Specifically, the state can increase access by (1) standardizing data and (2) assisting users in connecting with the proper database. In addition, the state can begin to collect more data concerning substance presence, dispersion, and accumulation in the environment.

We find, however, that the EAA report is lacking in four areas. Specifically, the report (1) does not provide necessary budget detail for a meaningful comparison of the costs associated with various options for developing an integrated database, (2) fails to evaluate the cost of new requirements recommended to be imposed on local agencies, (3) fails to present timelines for the implementation of an integrated system, and (4) does not propose sufficient controls to ensure that data of high quality are entered into the system. Each of these problems is discussed in greater detail below.

Report Lacks Meaningful Fiscal Detail

The feasibility study report (FSR) for an integrated database prepared by the contractor (one of the backup documents to the EAA report) fails to provide necessary detail concerning the costs of the five options identified by the report. As a result, we cannot determine for *any* of the five alternatives evaluated under the contract whether the benefits justify the costs of implementing the specific alternative. In fact, specific costs are available only for the chosen "core" system alternative—and these cost estimates are incomplete.

According to the contractor's reports and detail provided by EAA staff, initial costs of implementing the EAA's plan would exceed $800,000. This includes (1) $300,000 for establishing the central organization and help

desk, standardizing data, and developing an inventory project and (2) $500,000 for implementing the pilot inventory system and, subsequently, the full system. Ongoing operation of aspects of the proposal for which the EAA currently has estimates would cost approximately $1.7 million to $2.5 million annually.

The contractor's estimates of the costs of developing the system are not based on any workload standards or performance measures. As a consequence, there is currently no means to determine what the initial system proposed by the EAA would actually be capable of doing. In addition, these estimates do not include many items for which the contractor was unable to determine the cost. Such additional costs include (1) increased workload for existing agencies to coordinate with the central organization, (2) hardware, software, and formatting modifications of current decentralized systems necessary to interact with, and report data to, the core system, (3) staff training, (4) ongoing maintenance of hardware and software, and (5) purchase of hardware and software to support additional functions and data collection that may be added to the system in the future.

Thus, the ultimate cost of developing an integrated hazardous materials data system for the state could be substantially higher than these estimates.

Data System Proposal Fails to Account for Costs of Mandates To Be Imposed on Local Governments

The EAA report proposes to establish, through a central organization, standards for the reporting of basic hazardous materials data. These standards are proposed to be applied to (1) all new data being collected by both state and local agencies and (2) certain data already being collected at the state and local level, to the extent that conversion to standardized formats is feasible. The report, however, does not specify how the state would ensure that local agencies comply with the standardized reporting formats.

Essentially, the state could follow one of two policies—the state could offer a "carrot" to local governments through incentives and inducements, or use a "stick" by mandating reporting requirements. Both of these approaches carry price tags that neither the final report of the agency nor the preliminary reports of the contractor evaluate.

We are unable to provide the Legislature with an estimate of costs that might be incurred by the state to ensure local participation in the hazardous materials integrated database program proposed by the EAA because the report gives no information on (1) how many data elements ultimately would be standardized, (2) the extent to which hardware or software conversions would be necessary at the local level to standardize data, or (3) the extent to which inducements or requirements would be used to gain local conformity with the standards. Without such information, the Legislature cannot determine the extent to which local government participation in the program would enhance the state's data systems, or the extent to which the increased information available to the state due to local participation would justify the costs.

Report Lacks Complete Timelines for Implementation of Its Recommendations

As indicated earlier, the EAA report proposes a phased approach to implementing an integrated database system for hazardous materials information. The report proposes to implement the first phase—establishing the central organization for the system—by July 1, 1987. At the time this report was prepared (July 1987), this deadline had al-

ready passed and the EAA did not have any specific plans for establishing the central organization. Furthermore, the 1987 Budget Act does not provide resources for support of such an organization.

The EAA does not propose dates for other phases of implementing the hazardous materials information system. Hence, there currently is no indication as to how or when the administration proposes to phase in the program.

Based on our review of the FSR prepared by the contractor, we estimate that implementation of the pilot project will be delayed until 1988-89 at the earliest because the FSR prepared by the contractor does not meet the requirements of the State Administrative Manual for approval by the Office of Information Technology. In fact, the FSR must be modified substantially before implementation of major portions of the integrated information system may proceed. These modifications include (1) adding an analysis of the feasibility and costs of various hardware and software alternatives and (2) providing a detailed comparison of the costs and benefits of each of the five basic implementation alternatives evaluated by the contractor.

We further estimate that full implementation of the core system cannot proceed before 1990-91, given the plan as currently formulated by the EAA. This is because the pilot project should be evaluated before the full system is implemented.

Core Approach Proposed by the Agency Lacks Sufficient Data Quality Controls

By investing primary responsibility for data collection and reporting at the individual department level, the "core" system advocated by the EAA risks continuation of problems that are endemic to current information gathering and reporting efforts. Currently, departments institute their own controls to ensure data quality. Such controls may include data sampling, auditing of report forms, and monitoring of firms and agencies that report to the department. The departments do not use a standardized approach for quality control. As a consequence, the quality of one department's data may differ significantly from that of another. The EAA plan contains no provision for standardizing the approaches of various departments to quality control or for ensuring that departments transfer data of substantially equal quality to the core system. To the extent that the quality of data entering the core system is not assured, use of the system by state and local agencies may suffer because these agencies may lack confidence in the reliability of the data. Until the EAA specifies the approach that it plans to take for ensuring the quality of data at the departmental level, we are unable to evaluate the extent to which the core system is likely to improve access and use of data by state and local agencies. ❖

Chapter III

Chapter III
Legislative Analyst's Recommendations

We recommend that the EAA supplement its previous report by providing information to the Legislature concerning (1) costs of the various options evaluated, (2) the method and projected costs to the state for securing conformity by local agencies with the standardized formats, and (3) proposed timelines for implementing each of its recommendations. We further recommend that the EAA submit a plan to the Legislature providing for uniform quality control measures by all state agencies currently collecting hazardous materials information to ensure that data entering the core system are accurate and usable.

We conclude that the EAA's report does not provide sufficient detail regarding certain crucial aspects of the plan for the Legislature to evaluate the feasibility of an integrated hazardous materials data system. Specifically, the report inadequately addresses the following major issues:

- The cost of each of the five options for developing an integrated system that were evaluated by the contractor, including budget detail and a description of the benefits of each approach.
- Detailed information on the hardware and software needs associated with each of the options, as well as a specific analysis of the hardware and software options for the core system.
- Specific goals that the system is projected to meet at each phase of development, including the type and amount of data to be collected and reported, the kinds of analyses to be undertaken with the data, the number of agencies and/or programs to benefit from the services, and the types of agencies to benefit from the services.
- A plan for inducing and/or requiring local agencies to use standard data formats promulgated at the state level, and the costs to the state associated with gaining local conformity.
- A timeline for implementation of all phases of the integrated data system that accounts for necessary periods of development, testing, review, and evaluation by affected agencies and the Legislature.
- The methods for ensuring that data entering the core system are accurate in order to encourage use by state and local agencies, as well as the public.

Our review indicates that the agency should address these issues in order to provide the Legislature with the assistance it needs in deciding whether to support the core system approach, at what level such support should be budgeted, and over what period of time the system should be established.

Accordingly, we recommend that the EAA provide additional information to the Legislature no later than March 15, 1988 focusing on greater fiscal and programmatic detail to support the conclusions stated in its report of January 23, 1987. This additional information should be submitted to the Joint Legislative Budget Committee, the legislative fiscal committees, the Committee on Toxics and Public Safety Management in the Senate, and the Assembly Committee on Environmental Safety and Toxic Materials. At a minimum, the additional information to be provided by the agency should address the problems identified in this report.

Pending submission of this additional information to the Legislature for review, we recommend that the Legislature not dedicate increased resources to establishing an integrated data system at this time. We make this recommendation because the Legislature will be in a much better position to determine the likelihood of success of such a project and the level of resources that should be dedicated to the hazardous materials integrated data system after it receives additional information from the agency. ❖