Chemical Hazard Surveillance:

An Evaluation of Data Collection Systems in California, the United States, and Scandinavia

University of California, Berkeley Report
to the
Hazard Evaluation System and Information Service
California Department of Health Services

CDHS Contract No. 00-92178

May 30, 2003

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Chapter 1: Introduction

This report evaluates existing chemical surveillance systems, and makes recommendations for courses of action that HESIS can pursue to improve the system by which the organization identifies chemical end-users in the State of California.

1.1 Goal

The goal of this project is to determine how the Hazard Evaluation System and Information Service (HESIS) can identify California workplaces in which specific hazardous chemicals are used. HESIS needs this information to more effectively fulfill its legislative mandate to reduce occupational illness and disease through the timely provision of information about new and unappreciated workplace health hazards.

1.2 Background and Significance

While HESIS continues to identify and evaluate new chemical hazards, it has become increasingly difficult to find out where (or if) chemicals exerting identified toxic effects are used in California. The development of new industries leads to new uses for chemicals such as n,n-dimethylformamide, which in turn leads to newly exposed workforces in new workplaces. Additionally, environmental regulations can result in the use of newly developed unregulated chemicals like 1-bromopropane that pose new health hazards. These rapid changes signify it is critical that HESIS have timely access to chemical use information.

Public health surveillance has traditionally been the tracking of disease, injuries, and fatalities. Considering the long time lag between exposure and disease manifestation, as well as the difficulty of attributing disease to occupational or environmental exposure,

disease surveillance is not a timely or efficient way to reduce disease incidence. Rather, it results in delayed reaction to widespread or dramatic disease outbreaks, injuries and fatalities. Surveillance of chemical use, however, will facilitate preventative intervention in workplace exposures and environmental release of toxics.

NIOSH has conducted two surveys of chemical usage in the United States: The National Occupational Hazard Survey conducted from 1972-74 and the NIOSH National Occupational Exposure Survey conducted from 1981-83. In both of these surveys *potential* exposures were evaluated by the inspection of 5000 facilities randomly selected from the strata of size and 2-digit SIC codes. These surveys have been used to prioritize research and policy development, but the study design and data's inaccessibility have limited their utility.

In addition, increasing concern over environmental health has prompted many communities to develop environmental health indictors as surrogate measures of exposure and adverse health. The community of West Oakland, for example, has developed an indictor of air quality based on aggregate data from the EPA's Toxics Release Inventory, which is complimented by a count of the number of children hospitalized for asthma and respiratory problems (1). Unfortunately, while useful for the generation of hypotheses, environmental indictors remain vague measures of health, frequently confounded by the socioeconomic status of community members, with little insight into causation. These indictors, for example, cannot answer the question, is my child's asthma caused by living in this community?

The exposure-disease link could be more clearly inferred though chemical hazard surveillance. If, for example, we think that children in a community have asthma because of exposure to Polymeric MDI, it would be possible to identify all facilities in the community using the chemical, and estimate or sample community exposures. Or, if we are concerned about an illness caused by a chemical (asthma caused by Polymeric MDI), we can identify who is using that chemical, and examine the health status of workers and the surrounding community. Though the level of exposure would remain to be

determined through monitoring, chemical use surveillance enables the identification of exposed populations, facilitating exposure assessment and identification of chemically induced disease.

1.3 Scope

The scope of this project has been defined as:

1. Identify existing mechanisms to conduct chemical hazard surveillance in California and conduct a comprehensive review and evaluation of the mechanisms;
2. Test the effectiveness of the surveillance mechanisms using a limited number of specific chemicals; and
3. Make recommendations regarding a chemical hazard surveillance mechanism that would allow HESIS to identify end users of chemicals in California and provide hazard prevention information to these end users in a timely manner.

1.4 Chemical hazard surveillance systems evaluated

Existing chemical hazard surveillance mechanisms have been identified in the State of California, in other States, at the federal level, and in the Scandinavian countries.

Chemical surveillance systems in the State of California are described in Chapter 2, and include:

1. California Accidental Release Prevention Program
2. Air Toxics Programs
3. Site Mitigation and Brownfields Reuse Program Database (CalSites)
4. Business Plan Hazardous Material Inventories
5. Unidocs Hazardous Materials Online Inventory Project
6. Client Lists from Distributors and Manufacturers

Chemical Surveillance systems in other States are described in Chapter 3, and include:

1. Oregon Hazardous Substance Information
2. Massachusetts Toxics Use Reduction Institute
3. New Jersey Community-Right-to-Know Inventory

Chemical Surveillance systems at the national level are described in Chapter 4, and include:

1. NIOSH National Occupational Exposure Survey (1981-83)
2. OSHA Integrated Management and Information System
3. EPA Toxics Release Inventory
4. Environmental Defense Fund's Scorecard

Chemical surveillance systems used in Western European countries are described in Chapter 5, and include:

1. Finland's Product Register
2. Norway's Product Register
3. Denmark's Product Register

1.5 Evaluation Criteria

Identified chemical hazard surveillance mechanisms are reviewed and evaluated against three criteria that were developed in conjunction with HESIS.

Criterion 1: *Ease of Use*. The information source must be easy to use: The user interface should be easily navigable, and the process fast. An example of a highly rated system is a database that can be searched by chemical to produce a list of facility or SIC codes in which the chemical is found. An example of a poorly rated system is one that required extensive review of filed documents; i.e. a labor-intensive system.

Criterion 2: *Completeness and Accuracy*. The chemical surveillance information system must be complete and accurate: All required information is present in the system and accurate. A highly rated system might, for example, collect information from the

relatively few sources – distributors and manufacturers; or have demonstrated high compliance. A potentially weak system might be based upon facility self-reporting, without an effective enforcement mechanism.

Criterion 3: *Threshold and Breadth*. To fulfill the goals of HESIS, it is important that information be collected on a broad variety of chemicals used in relatively small amounts. A highly rated system should be able to identify small businesses that use specialty chemicals, and traditional chemicals in new, as well as old applications. Seven "test" chemicals have been chosen to help evaluate the breadth of chemicals identified by chemical surveillance systems.

1.6 Test Chemicals

Seven chemicals were chosen to evaluate the effectiveness of chemical surveillance systems. The choices were made in conjunction with HESIS based on chemical toxicity, regulatory status, and uses. A summary is presented in Table 1-A

1. **Methylene Chloride** (CAS# 75-09-2)
Methylene chloride is used in paint strippers and adhesives, as a degreaser and cleaner, a solvent in food processing, a textile coating, a propellant in foam manufacturing, and in chemical processing (2). This chemical was chosen because it is a widely used, highly regulated carcinogen.

2. **Polymeric MDI** (CAS#9016-87-9)
Polymeric MDI, also known as polymeric diphenylmethane diisocyanate, is used in foam manufacturing, in elastomers, and as a polyurethane foam adhesive (2). This chemical was chosen because it has been recently introduced, and causes asthma.

3. **Pentabromodiphenyl ether** (CAS#32534-81-9)
Pentabromodiphenyl ether (PBDE) is used as a flame retardant in flexible furniture foams. This chemical was chosen because it has recently become a concern to

environmental regulators, yet is unregulated. PBDEs, like PCBs, bioaccumulate and are suspected to be endocrine disrupters (3).

4. **1-Bromopropane** (CAS#106-94-5)

1-Bromopropane is a new replacement for chlorofluorocarbons (and possibly methylene chloride) in solvent applications: vapor degreasing, fabric and garment finishing, and aerosol degreasing applications (4). This chemical is a reproductive toxicant, unregulated, and the subject of regulatory controversy.

5. **n-Hexane** (CAS#110-54-3)

n-Hexane is used as a solvent in printing and degreasing applications, including vehicle repair; in adhesives and paints. Its neurological effects are amplified when mixed with acetone, methyl ethyl ketone, methyl isobutyl ketone, or lead acetate (5). n-Hexane was chosen because while it is widely used and regulated. The use of n-hexane has recently changed as a result of environmental regulations so as to increase the potential for exposure and adverse neurological effects among workers.

6. **n-Methyl-2-pyrrolidone** (CAS#872-50-4)

n-Methyl-2-pyrrolidone is used in paint stripping, latex production, and as a solvent in the semiconductor industry. This chemical was chosen because it is a reproductive toxicant and little regulated (6).

7. **n,n-Dimethylformamide** (CAS# 68-12-2)

n,n-Dimethylformamide is a solvent used in the production of electronics components, pharmaceuticals, textile coatings, and urethanes (7). This chemical is a reproductive and liver toxicant, and was chosen because it is being used in new ways (2).

Table 1-A. Summary of the regulatory status and health effects of the seven "test" chemicals.

Chemical	OSHA PEL [a]	Toxic Release Inventory [b]	Extremely Hazardous Substance[c]	Toxic Air Contaminant (California)[d]	Accidental Release Prevention[e]	Health Effects
Polymeric MDI	-	Yes	-	-	-	Asthma[f]
Methylene Chloride	25ppm TWA	Yes	-	Yes	-	Carcinogen [g]
1-bromo propane	-	-	-	-	-	Reproductive[h]
n-methyl pyrrolidone	-	Yes	-	-	-	Reproductive[g]
Dimethyl formamide	10ppm TWA	Yes	-	Yes	-	Liver and Reproductive[f]
n-Hexane	500ppm TWA	Yes	-	Yes	-	Neurologic[f]
PentaBDE	-	-	-	-	-	Endocrine System[I]

[a] Permissable Exposure Level defined by OSHA (8)
[b] Chemicals included in the Toxic Release Inventory are listed in Section 313 of the Emergency Planning and Community Right to Know Act, Exhibit A (9)
[c] Extremely Hazardous Substances are defined in Section 304 of the Emergency Planning and Community Right to Know Act, Exhibit A (9)
[d] Toxic Air Contaminants identified by the State of California include those defined by Section 112(r) of the Clean Air Act, Exhibit C (10)
[e] Chemicals regulated under Accidental Release prevention are defined by State and Federal bodies, Exhibit B (11)
[f] This information is compiled from reviewed literature in the Hazardous Substances Information Database (2).
[g] Identified by Proposition 65 (6).
[h] The National Toxics Program has identified 1-bromopropane as a potential reproductive toxicant in humans, and as a reproductive toxicant in rats (4)
[I] Tom McDonald (3)

1.7 Interpretation and Recommendations

The results of the hazard surveillance system queries are compiled, and the systems compared in Chapter 6 with the intent of identifying successes and limitations of the chemical surveillance. Recommendations for hazard surveillance policy in the State of California are outlined in Chapter 7: The creation of a product registry and the standardization of hazardous material inventory data management are recommended to facilitate the identification of chemical end-users in the State of California.

Chapter 2: Chemical Surveillance Systems in the State of California

The majority of the chemical surveillance systems in the State of California are administered by departments within the California Environmental Protection Agency, or the Governor's Office of Emergency Services. Enforcement and data maintenance, however, is largely performed by local agencies.

2.1 Accidental Release Prevention Program

The California Accidental Release Prevention Program (CalARP) was initiated in 1997 under the administration of the Governor's Office of Emergency Services (1). On the local level, 125 Certified Uniform Program Agencies (CUPAs) and Associated Agencies (AAs) implement CalARP requirements. A complete list of CUPAs and AAs is included in Appendix A. The final regulations of the California Accidental Release Prevention (CalARP) Program are found in the California Code of Regulations, Title 19, Division 2, Chapter 4.5. These regulations meet the requirements of Section 122(r) of the Clean Air Act (2).

The purpose of the CalARP program is to reduce risks associated with an accidental release. To that end, businesses that have a process involving more than a threshold quantity of a listed substance must submit a Risk Management Plan (RMP) to the Local Emergency Planning Committee (the CUPA or AA). RMPs consist of three components: Hazard Assessment, Release Prevention Program, and Emergency Response Program. Within these components, RMPs must include information on safety, training, and maintenance, compliance audits, incident investigation protocols, and the proximity of the facility to sensitive populations (1). Hazardous material inventories are submitted for regulated chemicals present above the threshold using a standardized hazardous materials inventory form: the facility may use the same hazardous material inventory form for both

the CalARP program and the Hazardous Material Business Plan (discussed in Section 2.4).

In the State of California regulated substances include:

- Extremely Hazardous Substances listed in the Code of Federal Regulations Title 40, Part 35 Appendix A
- Toxic and Flammable Substances listed in Section 112(r) of the Clean Air Act
- Substances Identified by the Office of Environmental Health Hazard Assessment and the Office of Emergency Services

A list of substances regulated in California, including threshold values, is included in Exhibit B. None of the seven "test" chemicals identified for this project are regulated under this program. It is surprising that methylene chloride is not regulated under this program because it is recognized as a carcinogen under Proposition 65. The rationale for the exclusion of methylene chloride from regulation might be that it is not highly flammable or acutely toxic.

Risk Management Plans are submitted locally in the State of California: No data is compiled at the State level (3). The hazardous material inventory data can be queried by writing a letter to the local agency.

Risk Management Plans are also submitted to the federal EPA, though the regulated substances that prompt submission of RMPs are only a subset of the substances regulated in the State of California. RMPs submitted to the EPA, however, are contained in a centralized database. This information is no longer available on-line, but government employees and qualified researchers can obtain this information by contacting their Regional Implementation Contact (4). In the State of California that contact is Tracey Vardas, Chief of OES, though communications can also go through Cara Roderick, a staff person at OES.

EVALUATION

1. Ease of Use. The lack of centralized database limits the ease of access to CalARP information. Collection of information requires contacting local CUPAs and AAs. A list of the 125 CUPAs and AAs is included in Appendix A.

2. *Complete and Accurate*. Completeness and accuracy of information depends on compliance and enforcement at the local level. RMPs are created by the facilities, and only the hazardous material inventory is submitted on a standardized form.

3. *Threshold and Breadth*. The reporting threshold varies from 10 to 10,000 pounds, depending on the chemical form and level of hazard. At this time 415 chemicals are regulated under CalARP; though none of the seven "test" chemicals selected for this project are included.

Overall, the information collected through the CalARP program is not useful to HESIS. The primary reasons are the limited number of regulated chemicals, and the fragmented data management.

2.2 Air Toxics Programs

The Air Resources Board (ARB) of the California Environmental Protection Agency is responsible for administering a variety of programs to identify and control emissions of Toxic Air Contaminants (TAC) and Criteria Air Pollutants.

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987) was enacted to collect emission data on Toxic Air Contaminants and identify stationary sources having localized health impacts (5). Emissions of interest are those that result from routine operation or are predictable, including continuous and intermittent releases and process upsets or leaks. In an effort to reduce economic hardship and the workload

of small businesses, certain facilities identified by Regional Air Districts are covered by industry-wide inventories.

A facility is subject to the act if it meets one of the following confusing criteria (6):

- It manufactures, formulates, uses, or releases a regulated substance and emits 10 tons or more per year of total organic gasses, particulate matter, nitrogen oxides, or sulfur oxides.
- It is listed in any district's existing toxics use or toxics air emission survey, inventory, or report released or compiled by a district.
- It manufactures, formulates, uses, or releases a regulated substance and emits less than 10 tons per year of criteria pollutants and is subject to emission inventory requirements.

At this time, 189 chemicals are identified as TACs in the State of California (Exhibit C). Included in this list are the Hazardous Air Pollutants listed in the Clean Air Act Amendments of 1990. Of the seven "test" chemicals, only methylene chloride, dimethylformamide, and hexane are considered TACs (7).

Every four years, facilities are required to update their emission inventory report. These data are the basis for the stationary source emission data in the California Emission Inventory Data and Retrieval System (CEIDARS) (5). CEIDARS essentially has two types of reports (8). The first is a summary report for a geographical area (statewide, air district, air basin, or county) and provides information on stationary, area, mobile and natural emissions in seven categories: Total Organic Gases (TOG), Reactive Organic Gasses (ROG), Carbon Monoxide (CO), Nitrogen Oxides (NOX), Sulfur Oxides (SOX), Particulate Mater (PM), and Particulate Mater less than 10 microns in diameter (PM10). Exhibit D includes a copy of the summary report for the State of California, organized by emission source category. The second type of report, the Emissions Inventory Data, is a facility report that includes a list of emissions for each regulated chemical released at the facility. Exhibit E includes an example of a facility query. It is possible to compile lists of facilities that report emissions in a certain geographical area, but it is not possible to compile lists of facilities that report emissions of a certain TAC.

Another database maintained by the Air Resources Board is the California Toxic Inventory, which lists emissions for 33 toxic air pollutants (criteria air pollutants) in each county, broken down into emissions from stationary, area, mobile, and natural sources (9). The Inventory was last compiled in 1996, and provides no information on specific facilities. None of the seven "test" chemicals are included in the California Toxic Inventory.

EVALUATION

1. *Ease of Use*. It is very easy to access and search the ARB databases, but no searches can be performed by chemical.

2. *Complete and Accurate*. Completeness and accuracy depends on compliance and enforcement. Reports must be updated at least once every four years, which is probably not frequent enough to capture changes in chemical usage to fulfill the goals of HESIS.

3. *Threshold and Breadth*. The threshold for triggering reporting is rather high, though emissions of criteria air pollutants can lead to reporting of TACs at lower emission levels. There are relatively few chemicals identified as TACs, so the database has limited breadth of information.

The Emission Inventory Data and Retrieval System, and particularly the California Toxics Inventory, are not useful to the goals of HESIS: It is not possible to identify facilities by chemical, and relatively few chemicals are included in the reporting system.

2.3 Site Mitigation and Brownfields Reuse Program Database (CalSites)

The Site Mitigation and Brownfields Reuse Program Database (SMBRPD) has been developed by the California EPA Department of Toxic Substances Control (DTSC) and contains information on properties where hazardous substances have been released or where there is potential for release (10). For each site, information about the history of clean-up activity, contaminants of concern, scheduled future clean up activities, and land use restrictions are included. The sites, however, cannot be sorted by chemical contaminant.

SMBRPD is available on-line, or can be accessed by calling the SMBRPD Help Desk (11).

EVALUATION

1. *Ease of Use*. The SWBRPD is easy to query and includes statewide information.

2. *Complete and Accurate*. This database may be complete and accurate, but the content is not relevant to the goals of HESIS.

3. *Threshold and Breadth*. Inclusion criteria for this database are not chemical specific, but based on the site's status as a "confirmed" or "unconfirmed" hazardous waste site. Given a certain site address, it is possible to learn what chemical contaminants are present, but classification as a hazardous waste site is based upon an aggregate measure of contamination, not the amount of certain chemical present.

The SMBRPD is not useful to the goals of HESIS because it cannot be sorted by chemical. Additionally, the database contains information on hazardous waste sites where, presumably, there are no workers other than those employed in hazardous waste clean up who are supervised by EPA under Hazardous Waste Operations and Emergency Response (HAZWOPER) legislation.

2.4 Hazardous Material Business Plans

The Emergency Planning and Community Right-to-know Act (EPCRA) requires that businesses submit hazardous material business plans, which include hazardous material inventories (HMIs), to Local Emergency Planning Committees (LEPCs): Details of inventory requirements are outlined in 42 U.S.C. Chapter 116, Section 11022 (12). Requirements in the State of California are outlined in the California Code of Regulations Title 19, Division 2, Article 4 (13). In the State of California, the LEPCs are the Certified Uniform Program Agencies (CUPAs) and Administering Agencies (AAs).

Substances subject to hazardous material inventory in the State of California include (13):

- Extremely hazardous substances as identified in Appendix A, Part 335 of Title 40 of the Code of Federal Regulations.
- Radiologic materials
- Hazardous materials that require an MSDS

Facilities submit hazardous material inventories annually to CUPAs or AAs, just as they do under the California Accidental Release Prevention program. These inventories, in contrast, are submitted for fire safety and community right-to-know purposes. For fire safety, facilities may be required submit complete inventories of chemicals stored, used, or processed on site. For community right-to-know and emergency planning, facilities submit inventories of chemicals on site that exceed the threshold of 55 gallons, 500 pounds, or 200 cubic feet. The difference in reporting results from the fact that fire safety personnel are concerned about aggregate quantities of chemicals in each hazard class (14).

Community Right to Know and fire safety reporting are done using the same form, unless the facility has no substances on site that exceed the threshold of 55 gallons, 500 pounds, or 200 cubic feet. Therefore, depending on how the CUPAs or AAs organize their data, the more complete hazardous material inventory needed for fire safety may be included in the information given to the public.

The standardized instructions and forms for the submission of a hazardous material business plan and inventory are included in Exhibit F.

While CUPAs and AAs utilize similar reporting forms, and perform the same functions throughout California, the processing of hazardous material inventories varies. Most local agencies maintain paper files of inventories, but some, including the County of San Diego, the Los Angeles County Fire Department, the Orange County Fire Authority, and the City of Palo Alto maintain computerized databases. Table 2-A includes a summary of the facility lists obtained from these four databases: In total, 366 facilities were identified that have reported the use or storage of one of the seven "test" chemicals.

Table 2-A. Number of facilities identified by querying the hazardous material inventory databases

Chemical	Orange County	San Diego County	City of Palo Alto	Los Angeles County	Total
Polymeric MDI	-	25	-	23	48
Dimethyl formamide	2	12	7	6	27
n-Methyl pyrrolidone	10	10	19	20	59
PBDE	-	-	-	-	-
Methylene Chloride	71	48	11	40	170
n-Hexane	8	1	6	38	53
1-Bromo propane	2	6	-	1	9

The database in the County of San Diego can be downloaded from the web into a database or spreadsheet and searched by CAS# (15). The chemical inventory and contact information are in separate files. For a computer literate who does not work regularly with Excel®, it took two-and-a-half hours to compile the list of facilities that utilize the seven "test" chemicals. For one who works regularly with Excel®, the facility list can be

compiled in less than thirty minutes. The complete list of facilities, including contact information, is in Exhibit G.

The Orange County Fire Authority database can be searched by chemical synonyms by contacting the Assistant Fire Marshall Jennifer Bower (16). Query results are returned in an Excel® spreadsheet and are included in Exhibit H.

The Los Angeles County Fire Authority database can be searched by CAS# by sending a letter to the Custodian of Records at Public Health Investigation Office of Los Angeles County. Data is maintained as PDF files: A PDF file is available for each facility and includes the CAS#, common name, components (for mixtures only), physical state, quantity, storage method, and hazard categories for each chemical present at the facility. Query results are included in Exhibit I.

The City of Palo Alto Fire Department is participating in the development of a database system called Unidocs Hazardous Materials Online Inventory Project (Unidocs). At this time the database can be searched by CAS# by contacting Environmental Coordinator Dan Firth (14, 17). The query results are to be found in Exhibit J. More information on Unidocs is included in Chapter 2.5 of this report.

EVALUATION

1. *Ease of Use.* At this time collecting information of chemical end-users through hazardous material inventories is not easy: the local agencies are not electronically linked to a central office that compiles data, and only a handful utilize computerized databases. The inventories of most CUPAs and AAs are organized by address, and cannot be searched by chemical. The few computerized databases, however, are accessible and easy to use. It is unclear, however, when additional agencies will convert to such a record keeping system, though most will be upgrading their data management systems in the next five to ten years.

2. *Complete and Accurate*. The completeness and accuracy of the hazardous material inventories varies between local agencies, depending upon the frequency of inspection, training of inspectors, and pressure placed upon businesses to report accurately and completely. Though inventories must be updated annually, and fire safety inspections, which should include a check of the inventory, are done at least once every three years, it is unclear that the hazardous material inventories are consistently accurate.

3. *Threshold and Breadth*. The reporting threshold for fire safety purposes is zero, and the reporting threshold for community right to know purposes is low – 55 gallons, 500 pounds, or 200 cubic feet. For both purposes, businesses are required to report all substances for which there is an MSDS. It seems that the threshold and breadth of reporting requirements are adequate for the needs of HESIS.

At this time, the Hazardous Material Inventory reporting systems have limited use for the identification of chemical end-users because of the fragmented system. Where computerized databases are in place, the inventories are able to meet the goals of HESIS. If more agencies convert to the use of computerized databases like that of the County of San Diego, the Orange County Fire Authority, or Unidocs, even if they remain isolated, it would be relatively easy for HESIS to compile lists of facilities that report using a particular chemical.

2.5 Unidocs Hazardous Materials Online Inventory Project

Unidocs is a model program initiated by the Santa Clara County Fire Chief's Association and Santa Clara County Environmental Health Department that is a database of hazardous material inventories, risk management plans, and facility maps (14,17). The State Water Resources Control Board is interested in the inclusion of Underground Storage Tank information in the database.

Data entry is done both by businesses and inspectors (14). Once businesses have submitted their reports electronically, fire department personnel conduct an initial verification in which they look for problems with the building occupancy rating, and chemicals not identified by the Unidocs chemical database. The initial verification may be followed by an inspection. Inspections are required to be performed at least once every three years, and are additionally performed during times of new permits, closures, remodeling, and new businesses; though Palo Alto and several other cities in Santa Clara County attempt to inspect facilities annually. During an inspection, inspectors verify the hazardous materials inventory, business plan, or modify the maps while at the site.

The Hazardous Material Inventories collected in the database serve for determination of building occupancy, which is based on the amount present in each hazard class, so all substances present at the facility can be included, regardless of quantity (14). For the purposes of determining building occupancy, information may also be included regarding the amount of chemicals in use in open systems, in use in closed systems, and in storage.

The Unidocs chemical database was initially developed from combining several chemical lists including Orange County Fire Authority, Mountain View Fire, Van Waters and Rogers in San Jose, IBM in San Jose, Agilent in Palo Alto, and Hewlett Packard in Palo Alto. These databases include a variety of information, including trade names, synonyms, CAS#, and hazard class identification (14). The chemical database exists as a reference for businesses, primarily to reduce the potential for disagreements about the hazard classification of chemicals. It is possible to add additional information to the chemical database such as: Permissible Exposure Levels, and the National Fire Protection Association safety triangle. Recently, Proposition 65 thresholds were added.

It is possible to search the database by CAS# to generate a list of facilities that report the use or storage of the pure chemical and mixtures with that chemical. At this time, the data must be compiled manually, though Unidocs could be upgraded to permit routine generation of such reports (18). The query performed for this project includes the facility

ID, facility name, city, and date of inventory submission (Exhibit J). It is possible to amend this report to include the quantity present at each facility, and contact information.

For more information regarding Unidocs, contact Dan Firth, Environmental Coordinator of the City of Palo Alto Fire Department and project manager for Unidocs.

EVALUATION

1. *Ease of Use*. This database is easy to use.

2. *Complete and Accurate*. The completeness and accuracy of the information contained in Unidocs depends upon compliance and enforcement. The City of Palo Alto Fire Department appears to have well-trained inspectors and good compliance. Compliance would likely vary if this database were utilized in other areas. This database, however, may be favored by businesses because of the ease of electronic submission and updating.

3. *Threshold and Breadth*. Facilities may report all hazardous materials individually, or may group materials stored below community right to know reporting thresholds into fire hazard categories.

Unidocs will fulfill the needs of HESIS. Unfortunately, at this time Unidocs is presently used by the City of Palo Alto, the City of Santa Clara, and a few large businesses outside of Palo Alto. Several other jurisdictions are evaluating the feasibility of converting to Unidocs. Additionally, CalEPA and US EPA are interested in the potential uses of Unidocs. A recent grant proposal was submitted to US EPA by CalEPA to significantly expand the use of Unidocs at a state and local level. More than 11,000 business listings have been added to Unidocs from a dozen local agencies to facilitate industry's use of the system. Other CUPAs and AAs may be interested in utilizing Unidocs when they next consider upgrading their data management systems, particularly if business push for such a system.

2.6 Waste Water Pretreatment and Pollution Prevention Plans

Water Code section 13263.3 authorizes the State Water Resources Control Board, a Regional Water Quality Control Board, or a Publicly Owned Treatment Works (POTW) to require a facility that discharges into the sanitary sewer to complete and implement a pollution prevention plan (19). Industrial and commercial facilities are identified for potential regulation by a POTW through process surveys, field inspections, city business licenses, phone book listings, agency lists, interagency referrals, and industrial association lists (20). Once identified, facilities are inspected and permitted by POTW personnel.

Generally, substances that are prohibited from discharge in the sanitary sewer system are: flammables or explosives; solid, viscous, or visibly oily substances that can cause obstructions or interferences with proper operation of the sewer systems; toxic or poisonous substances in sufficient quantity to constitute a hazard to humans or animals; and noxious or malodorous substances capable of creating a public nuisance (21).

During the application for a waste discharge permit, information is collected on chemical usage in the facility, though the specificity of the information varies with the type of facility. For example, the Regional Water Quality Control Plant in Palo Alto has a very simple permit application for vehicle service facilities that asks about activities at the facility and treatment systems in use; while industrial facilities complete a twelve page application that includes lists of chemicals that may be present in the wastewater (22, 23). Of the seven "test" chemicals, only methylene chloride is included. Copies of these applications are included in Exhibits K and L, respectively.

After review of the permit application, the POTW or Regional Plant will issue a permit that may include pretreatment requirements, effluent monitoring, and/or pollution prevention plans.

The information collected on chemical usage through the permitting process is retained at the local level (24). POTWs, in compliance with their National Pollutant Discharge Elimination System (NPDES) permit, submit an annual report to the Regional Board that includes the characteristics of the bulk influent and effluent (24). No information on discharges from specific facilities is included beyond compliance status (20).

EVAULATION

1. *Ease of Use*. The process of collecting information on the chemical characteristics of facility wastewater is complex and time consuming. This information is not included in the annual reports of the POTW, so each POTW would need to be contacted. This information is likely to be computerized. There are hundreds of POTW in the State of California.

2. *Complete and Accurate*. I expect that most facilities requiring wastewater discharge permits have the permits.

3. *Threshold and Breadth*. There is no threshold level officially, though practically speaking the facility identification system imposes a threshold. A breadth of chemicals can be included, but for the most part they are grouped into categories (volatiles, semi-volatiles, metals, oils and grease, and particulates) because the aggregate quantity is of more interest to the POTW except when effluent regulations pertain to specific chemicals or metals.

The wastewater permitting system is of little use to HESIS because it does not regulate very many individual chemicals and because all data is kept at the local level.

2.7 Client Lists

A convenience sample of distributors and manufacturers of the seven "test" chemicals was identified using the CAS numbers and MSDS-Search (www.msdssearch.com). MSDS-Search is an MSDS library that posts MSDSs obtained from manufacturers for use by customers, distributors, emergency responders, government and the general public. In an effort to identify a variety of products currently available, only products with MSDSs updated since 1990 that contained the seven "test" chemicals, and identified the distributor or manufacturer were included.

HESIS sent a letter, Exhibit M, to 96 companies asking that the company submit a list of their clients who purchase products that contain any of the seven "test" chemicals to the State of California. Responses were accepted for two months.

The response was low: 17 companies responded to the letter, for an overall response rate of 18%. Six companies responded with client lists for a 6% positive response rate.

Of the 17 responses, 6 companies (35%) provided client lists, 5 companies (29%) reported that they no longer use any of the "test" chemicals, 3 companies (18%) refused to provide clients lists, 2 companies (12%) reported that they have no customers in California, and 1 response (6%) was unclear.

Two of the companies that responded with client lists sell products containing pentabromodiephenyl ether. Client lists were provided one company for products with the following chemicals: Polymeric MDI, n-hexane, methylene cloride or n-methyl-2-pyrrolidone. Many of the clients identified are retail establishments such as hardware or paint stores, indicating that the chemicals are in consumer products. Retail establishments are not required to submit hazardous material inventories of consumer products to the CUPA or AA, as evidenced by the absence of these facilities from the hazardous material inventory databases. This suggests that client lists, rather than

hazardous material inventories would be a more effective means to identify retail outlets for hazardous materials.

EVALUATION

1. *Ease of Use.* This method of identifying chemical end-users could be easy for HESIS, were a reliable method of identifying manufacturers and distributors developed.

2. *Complete and Accurate*. This method has the potential to be complete and accurate. However, few companies provided the information that HESIS requested and HESIS does not have the authority to subpoena client lists. Additionally, the ability to identify all of the manufacturers and distributors is limited. Given the number of companies that responded with a change of address or discontinued production, the MSDS-Search web-site does not appear to be a very efficient method of identifying chemical manufacturers.

3. *Threshold and Breadth*. This method would be able to identify chemical end-users for all chemicals, and there is no threshold.

This method has great potential, but without legislation or incentive compliance will be low. Additionally, companies that reply are likely to already be active in the distribution of health and safety information.

Chapter 3: Chemical Surveillance Programs in Other States

This chapter reviews and evaluates chemical surveillance programs in the States of Oregon and Massachusetts.

3.1 Oregon State Hazardous Substance Information

The Office of the State Fire Marshall (OSFM) administers the community right-to-know program in the State of Oregon. This program differs from California's system in that Hazardous Substance Surveys are administered and analyzed by a central office, the State Fire Marshall, and then detailed and summary information is distributed to the relevant local agencies (1). This centralized system has allowed the OSFM to develop a series of statewide on-line databases that contain MSDSs and information on approximately 45,000 facilities (2,3). The discussion here will be confined to the on-line database that is most useful to HESIS: The Hazardous Substance Information Search (2).

The Hazardous Substance Information Search provides information about which facilities possess hazardous substances in Oregon, and can be searched by chemical name and synonyms, including trade names (2). It is essential to search the database by multiple names as the synonyms and trade names are not cross-referenced with the standard chemical name. Hazardous substance information included in this database is compiled from annual surveys sent out by the OSFM to businesses in SIC codes thought likely to possess substances in quantities large enough to require reporting under Oregon law. The reporting thresholds in Oregon are similar to those in California (4):

- Poisons or explosives in quantities greater than or equal to 5 gallons, 20 cubic feet, or 10 pounds.
- Any quantity of radioactive substances

- Substances requiring an MSDS in quantities greater than or equal to 50 gallons, 200 cubic feet, or 500 pounds.

Search results include company name, address, quantity range, and physical form of the chemical substance. Search results are included in Exhibit O. Were HESIS to begin to make routine queries of the Hazardous Substance Information Database, Ms. Johnson has offered to add an option to the web site that would permit searches to be done by CAS# (6).

It is possible to obtain lists of the 4-digit SIC codes in which certain chemicals are used by contacting Angie Johnson, Community Right to Know Hazardous Materials Information Assistant (5). The complete list of SIC codes, including product names, can be found in Exhibit P, and a summary included in Table 3-A.

Table 3-A Number of 4-digit SIC Codes identified by the Oregon Community Right to Know Hazardous Substance Information Database

Chemical	No. of 4-digit SIC Codes	% found in NOES
Polymeric MDI	54	20
1-Bromopropane	12	-
N-methyl-2-Pyrrolidone	30	20
n-Hexane	70	41
Methylene Chloride	87	41
Dimethylformamide	7	29
Pentabromodiphenyl ether	1	0

The Oregon database did not identify as many unique 4-digit SIC codes as were identified by the NOES, but far less than 50% of the 4-digit SIC codes where chemical use was reported in Oregon were identified in the NIOHS NOES. The data from Oregon, however, is more current, as evidenced by the identification of facilities using 1-bromopropane.

EVALUATION

1. *Ease of Use*. The databases are easy to use and provide the name and address of facilities reporting the storage, use, or manufacture of the chemical of interest.

2. *Complete and Accurate*. Completeness and accuracy of the Hazardous Substance Information Search depends on compliance, and breadth of survey distribution. The OSFM reports good compliance, and they conduct about 3000 facility audits per year. Additionally, fire personnel are being trained to verify hazardous substances inventories during their annual fire safety inspections, so accuracy should increase in the next few years. The applicability of this data to California is limited to overlapping industrial sectors, and may not fully represent chemical use in California.

3. *Threshold and Breadth*. The threshold for reporting is fairly low, and quantities beneath the threshold are reported if one chemical present in the facility exceeds the threshold. There is breadth in the reporting requirements as they apply to all chemicals required to have an MSDS.

Though these databases pertain to hazardous substance use in the State of Oregon, they provide an example of how hazardous substance inventories collected for the purposes of Community Right-to Know laws, and emergency planning can be processed to accommodate chemical surveillance. Additionally, the SIC code lists that can be generated by the Oregon Office of the State Fire Marshall may be useful in the identification of chemical users in the State of California, though the relevance is limited by the different types of industry present in the two states.

3.2 Toxic Use Reduction Institute, Massachusetts

The Toxic Use Reduction Act was signed into law in 1989 to establish toxics use reduction as the preferred means for achieving compliance with any federal or state law or regulations pertaining to toxics production and use, hazardous waste, industrial

hygiene, worker safety, public exposure to toxics, or releases of toxics into the environment (7). The initial goal was to reduce toxic waste generation by fifty percent by the year 1997 though toxics use reduction.

Covered companies are required to submit an annual report on toxic chemicals used and toxic byproducts generated, that includes the percentage reduction of toxic byproducts and toxic emissions, and the Toxic Use Reduction (TUR) techniques employed. There are approximately 600 facilities in Massachusetts that meet the reporting criteria (8):

- Have ten or more full-time employees on staff
- Fall into the following SIC codes: 10-14 (mining), 20-39 (manufacturing), 40 and 44-49 (transportation), 50 and 51 (wholesale) and 72, 73, 75 and 76 (certain services).
- Either manufacture or process 25,000 pounds or more of a reportable toxic substance during the reporting year or otherwise use 10,000 pounds or more of a reportable substance during the reporting year. Reportable substances include those on the federal Toxic Release Inventory under Section 313 of the federal EPCRA and those found on the CERCLA list (See Exhibit A).

The Toxics Use Reduction database can be searched by chemical name and CAS#, producing a list of facilities in Massachusetts that have reported manufacture, process, or byproduct generation of the chemical in any year between 1990 and 1999 (9). Selecting the listed facilities provides facility detail including the SIC code and the volume of chemical.

Using this approach, a list of 4-digit SIC codes where the use of five of the "test" chemicals has been reported was compiled (Table 3-B). No use information was available for pentabromodiphenyl ether or 1-bromopropane as neither of these chemicals are included in the lists of chemicals regulated under Section 313 of EPCRA (Toxics Release Inventory) or under CERCLA.

EVALUATION

1. *Ease of Use*. The interfaces for this database are user-friendly. Though collection of SIC code information is slightly labor intensive, the information presented here was compiled in about 90 minutes.

Table 3-B. 4-Digit SIC codes identified in Toxics Use Reduction Reports

Methylene Chloride		n-Hexane	Dimethylformamide	N-methyl-2pyrrolidone	Polymeric MDI
2284	3491	2269	2269	2295	2531
2399	3498	2295	**2295**	**2672**	
2531*	**3499**	2399	**2752**	**2821**	
2821	3534	2671	2821	2841	
2833	3561	**2672**	2851	2842	
2834	3579	2821	2865	**2851**	
2851	3612	2833	**2869**	2865	
2865	3645	2851	2891	**2869**	
2869	3661	**2891**	2899	**2891**	
2891	3672	2899	**3471**	2899	
2893	3674	3069	3569	3089	
2899	3675	3089	3679	3425	
3069	3679	3199	3821	**3569**	
3081	3724	3511	**5169**	3572	
3086	3728	**4911**		3672	
3089	3823	**5169**		**3674**	
3291	3829	5172		3861	
3399	3861			3949	
3449	**5169**			**5169**	
3471	5172				
3484	7389				

*Numbers in bold indicate multiple facilities in this SIC code reported this chemical

2. *Complete and Accurate*. This is a self-reporting system, enforced by the Massachusetts Department of Environmental Protection. The Toxics Use Reduction Act was jointly supported by industry (the Associated Industries of Massachusetts) and environmentalists (the Massachusetts Public Interest Research Group), with broad political and public support so it is likely that compliance is high. The most recent information available is from 1999.

3. *Threshold and Breadth*. The threshold for reporting is rather high, and the regulated chemicals somewhat limited.

While this database is not ideal for the goals of HESIS, it is a useful tool in the identification of 4-digit SIC codes where chemicals of concern are used.

3.3 New Jersey Community Right to Know Inventory

The New Jersey Department of Environmental Protection manages the State's Community Right to Know Inventory. Similarly to the Oregon State Hazardous Substance Information database, the New Jersey Inventory is a centrally administered database and relevant information is distributed to local fire and police stations.

Reporting is required of facilities encompassed by a list of 2-digit SIC codes which generally includes manufacturing establishments, transportation industries, communication, wholesale trade, automotive services, health services, and educational services (11). The reporting thresholds under New Jersey's Community Right to Know law are different than for many states, including California (12):

- Environmental Hazardous Substances present in excess of 500 pounds unless the federal list of extremely hazardous substances (EPCRA 302) has a lower threshold.
- Materials that require a MSDS present on site in excess of 10,000 pounds.

The list of Environmental Hazardous Substances includes n,n-dimethylformamide, methylene chloride, n-hexane, n-methyl-2-pyrrolidone, and polymeric MDI. All of these substances have a reporting threshold of 500 pounds.

In the past the New Jersey Department of Health Services Occupational Health Branch has used the Community Right to Know Inventory to perform hazard surveillance. In 1997 the Department of Health and Senior Services undertook to a project to identify and educate small employers in New Jersey that use large quantities of methylene chloride concerning the requirements of the new OSHA standards and exposure control methods (13). The Community Right to Know Inventory identified 59 facilities with less than 50 employees and inventories greater than 1,000 pounds; 24 of those employers stated that they still used methylene chloride. Most of the employers interviewed received high scores for implementing employee training, however 50-72% had controls measures in place that were in need of upgrading. Further, 67-78% of employers were found to not

have, and need air monitoring and medical surveillance. The project found that small employers need assistance in complying with the OSHA methylene chloride standards. The project, however, also showed that most small employers were open to consultation with the Department of Health and Senior Services, and that the inventory could be used as a means to identify potentially exposed employees and distribute health and safety information.

More recently, the Department of Health and Senior Services has undertaken a project to identify facilities in New Jersey that use carcinogens, and question them for information about exposure levels (10). The Community Right to Know Inventory was used to identify facilities, but few facilities were identified: The lack of "hits" was attributed to the high reporting threshold. The Department of Health and Senior Services then used a different strategy to identify facilities: SIC codes where the carcinogens are used were identified from the published literature, and facility lists for those SIC codes were obtained from Dunn & Bradstreet. Questionnaires have been mailed to the facilities and follow-up is ongoing. David Valiante, Program Manager for the Occupational Health Surveillance Program, reports that there are plans to compare the facilities identified through both routes, and evaluate the limitations of the Community Right to Know Inventory.

EVALUATION

1. *Ease of Use.* Though this was not specifically evaluated, the inventory is computerized and can be searched by chemical.

2. *Complete and Accurate.* It is unclear how complete or accurate the inventory is. The Occupational Health Surveillance Program has found the inventory inadequate for some of their purposes, but this may be due to the reporting threshold rather than a lack of compliance by facilities.

3. *Threshold and Breadth.* The breadth of the New Jersey inventory is equivalent to other states. The reporting threshold is designated differently than most states, including California, however, it is similar for most substances. The Occupational Health Surveillance Program has found that the reporting threshold limits the utility of the inventory.

This inventory database was not queried, because it was investigated late into the project and would not have added much to the identification of facilities in California. New Jersey, however, is the only organization identified that has utilized an inventory database for the purpose of hazard surveillance and intervention. The 1997 intervention was successful because it was limited in scope, including only users of large quantities of methylene chloride. The limitation imposed by the reporting threshold, and possibly the poor accuracy, of the inventory were apparent, however, in the ongoing project to identify end-users of carcinogens.

Chapter 4: National Chemical Surveillance Programs

This chapter includes information on nation-wide chemical surveillance programs including those managed by the federal government, and non-profit organizations.

4.1 NIOSH National Occupational Exposure Survey

The National Occupational Exposure Survey (NOES), conducted between 1981 and 1983, is the more recent of two national occupational hazard surveys conducted by NIOSH. The survey used a stratified random sample design based on geographical location, two-digit SIC code, and number of employees to identify 5000 urban businesses, excluding mining and government activities, for survey (1). The included facilities were in 66 different 2-digit SIC codes, and located in 67 Standard Metropolitan Statistical Areas.

The survey had two components: questionnaire and inspection. The questionnaire was sent to management and focused on personnel and the utilization of health and safety programs. The inspection, performed by trained NIOSH personnel hired for the NOES, identified chemical, physical, and biological hazards present in the facility to which there was the *potential* for exposure. Actual noise exposures were evaluated, and exposures to dusts were inferred based on observable accumulation.

The goal of the survey was to gain an understanding of the prevalence of the potential for hazardous exposures, so as to better prioritize research and funding in occupational safety and health.

The NOES database can be queried by contacting Randy Young at NIOSH. Though the chemical inventory information is, by design, only representative to the two-digit SIC code, a query was made for a listing of 4-digit SIC codes where the seven "test"

chemicals were found (1,2). The complete listing is included in Exhibit Q, and a summary provided in Table 4-A. 1-Bromopropane was not identified at any facilities. This is expected because 1-bromopropane was not in use in the early 1980s.

Table 4-A. Summary of Chemical Use and Employment of Californians in SIC codes identified by the National Occupational Exposure Survey (3)

Chemical Agent	No. of 2-Digit SIC Codes	No. of 4-Digit SIC Codes	Facilities in the 2-digit SIC codes	Employment in California in the SIC Codes*
n-Methyl pyrrolidone	24	63	323,879	4,024,260
Pentabromodiphenyl ether	8	1	2,233	71,400
n,n-Dimethyl formamide	30	85	274,620	4,488,200
n-Hexane	42	221	303,875	6,087,300
Methylene Chloride	40	363	432,089	5,730,620
Polymeric MDI	16	59	252,788	4,121,700

* Employment estimates are based on the March 2001 Benchmark Annual Average of Industry Employment and Labor Force in California (4). These employment data are provided for two- and three-digit SIC codes.

EVALUATION

1. *Ease of Use*. The NOES is easy to use. Queries can be initiated by telephone or e-mail, and results obtained within a week.

2. *Complete and Accurate.* The chemical inventory taken by NOES inspectors is probably correct. Unfortunately, the survey design is such that not all industries or specialties within industries are represented: Chemical usage can vary greatly within an industry; influenced by local environmental regulations, practices in niche business markets, and economic factors. Additionally, the NOES is outdated, as evidenced by the lack of information on the use of 1-bromopropane.

3. *Threshold and Breadth of Chemicals.* The NOES resulted in complete chemical inventories of each facility inspected. Therefore, this criterion is met by the NOES.

The NOES is not particularly useful to the goals of HESIS. The database has not been updated since 1983, so it does not include data on more recently introduced chemicals. Additionally, the chemical use data is not facility specific and is only accurate to the two-digit SIC code. Utilization of this data for the dissemination of health and safety information would be grossly inefficient because of the thousands of facilities, and hundreds of thousands of workers in California that fall into each two-digit SIC code, only a small percentage of which are likely to use the chemical of interest.

4.2 OSHA Integrated Management and Information System

The OSHA Integrated Management and Information System (IMIS) includes information on facility inspections, inspector's sampling, and accident investigations. Data from State Occupational Safety and Health Agencies are uploaded to the federal database.

Citations issued as a result of facility inspections can be viewed, but can only be queried by facility name or address (5). No chemical specific information is available unless the violation is of a Permissible Exposure Level that is designated by a chemical specific law such as that for methylene chloride, benzene, and lead

Information on samples collected by OSHA inspectors is not available to the general public, though it can be gathered by contacting OSHA personnel (6). OSHA inspectors, however, rarely collect samples in the workplace, and sample collection is focused on a few chemicals.

The Accident Investigation Search, at the US Department of Labor OSHA, can be conducted by chemical agent (7). The results of a chemical query are accidents and fatalities that have been attributed to that chemical agent, and include the 4-digit SIC code where the accident occurred. A list of the SIC codes where the test chemicals were

associated with accidents is included in Table 4-B. The complete search reports are included in Exhibit R.

EVALUATION

1. *Ease of Use.* The information on sampling and accident investigations is readily obtained through on-line database searches or by contacting OSHA personnel.

2. *Complete and Accurate*. The OSHA IMIS is not comprehensive: OSHA inspects relatively few workplaces and does not routinely collect air samples just because a chemical is being used. While most accidents are investigated, they do not occur wherever the chemical is used.

3. *Threshold and Breadth*. The threshold for inclusion in OSHA IMIS is detected violation of a safety and health standard, or an accident. Hopefully, few chemical users are exposed to such levels of OSHA regulated chemicals. Further, IMIS does not include information on exposures to unregulated chemicals.

Table 4-B. SIC codes identified through the OSHA Accident Investigation Search.

Methylene Chloride		Hexane	MDI	DMF
1629	3679	1721	3149	3672
1721	3679	2046	3585	
1731	3711	2074		
1752	3724	2076		
1799*	3764	2834		
2731	4212	2911		
2869	4213	3089		
2891	5169	3149		
3052	5171	3949		
3339	7542	4212		
3471	**7641**	5231		
3479	9223	7699		
3523	9224	8731		
3625				

* Bold indicates multiple accident reports in the SIC code

4.3 EPA Toxics Release Inventory

The Toxics Release Inventory was created by Section 313 of the Emergency Planning and Community Right-to Know Act (EPCRA). Reporting requirements are outlined in 42 U.S.C. 11023 (8). Briefly, reporting requirements apply to facilities that have 10 or more full-time employees and that are in SIC codes 20 through 39. Toxic chemical release reporting thresholds vary with category of use: chemicals used at a facility have a threshold of 10,000 pounds per year, while chemicals manufactured or processed at a facility have a threshold of 25,000 pounds per year. A list of regulated toxic chemicals is included in Exhibit A. Of the seven "test" chemicals identified in this project, n-hexane, dichloromethane, n-methyl-2-pyrrolidone, and n,n-dimethylformamide are included in this list specifically; and Polymeric MDI is included in the category diisocyanates (9).

The TRI database can be searched from the TRI Explorer portal at the EPA web site (10). The most recent data available is from the year 2000 and can be sorted into Chemical, Facility, and Industry Reports. The Chemical Report describes the total release of that chemical in a geographical location. The Facility Report lists all facilities that have released selected chemicals, and provides addresses for those facilities. The complete Facility Reports are included in Exhibit S. The Industry reports lists volume of a certain chemical released in a two-digit SIC codes. A summary of these reports in made in Table 4-C.

EVALUATION

1. *Ease of Use*. TRI Explorer is easy to use, and the searches are speedy.

2. *Complete and Accurate.* This is a self-reporting system, and enforcement by EPA varies between industrial sectors. Additionally, reporting requirements are limited to the SIC codes 20 through 39. While these SIC codes include most industrial and manufacturing sectors, other sectors where occupational chemical exposures are likely

are excluded, including: construction, transportation, dry cleaning, maintenance, repair, and medical services.

3. *Threshold and Breadth*. Even though the threshold is based on a per year amount, it is rather high. The breadth of chemical represented is limited by the ability of the EPA Administrator to add chemicals to the list. The criterion for additions is broad, but regulatory friction in the addition process means that the list will not include new or "designer" chemicals.

The Toxics Release Inventory has limited use for HESIS. It is able to identify large facilities in California that use the regulated chemicals, and this information may be used in turn to identify the industries in which smaller businesses may be found to use the chemical.

Table 4-C. Number of facilities, and their 2-digit SIC code reporting releases (pounds) under the Toxics Release Inventory, in all Industries in California, 2000.

Chemical	Total On-Site Releases	Total Off-Site Releases	Number of Facilities	2-Digit SIC Codes
Dichloromethane	872,233	1,350	41	28, 30, 33, 35, 38, 39
Diisocyanates	3,853	352,361	67	20, 24, 25, 28, 30, 32, 33, 34, 35, 36, 37, 38, 39
n,n-Dimethyl formamide	85,919	415,156	27	28, 30, 36, 39
N-Methyl-2 pyrrolidone	308,797	10,401	42	28, 29, 30, 35, 36, 38, 39
n-Hexane	527,288	317	93	10, 20, 28, 29, 34, 36, 37

4.4 Environmental Defense Fund's Scorecard

Scorecard is a source for local environmental information and is designed for advocacy and political action (11). As a result, most emphasis is placed on the comparative level of environmental pollution in a geographic area, and on the health effects of chemicals. Two portions of Scorecard are potentially useful to the goals of HESIS: the About the Chemicals section, and the Pollution Locator – Select Chemical Releases from Industrial Facilities (TRI).

The About the Chemicals section profiles 6,900 chemicals and can be searched by chemical name and CAS# (12). A chemical profile includes information on: health hazards, hazard rankings, chemical use, rank by reported environmental releases, regulatory coverage, toxicology testing done, and information needed to complete a Safety Assessment. Chemical use information does not include information on specific facilities or SIC codes where the chemical is used, but includes lists of industries and the use in that industry. The source of this information is unclear. The industries that Scorecard identifies for the seven "test" chemicals are included in Table 4-D.

The Pollution Locator section provides information on pollution problems and environmental priorities for geographical areas (13). Once a geographical area is chosen, the State of California for example, a list of Environmental Issues for that region appears (14). Most useful for the goals of HESIS is the option: Chemical Releases from Industrial Facilities (TRI). Under the heading "1999 TRI Pollution Releases Ranked by Potential Human Health Risks" one can obtain lists of chemicals *or* facilities that contribute to cancer *or* non-cancer health risks. The "chemicals" list provides information about each chemical that causes cancer or non-cancer health risks, including use information that is contained in the chemical profile. The "facilities" list ranks facilities by volume of release, and it is possible to get the 1999 TRI report for each facility. The facility list cannot be searched or sorted by chemical. This is a cumbersome route to the same information that can be obtained though the US EPA TRI Explorer.

Table 4-D. Chemical Use Profiles from Scorecard

Chemical	Industry
Polymeric MDI	Adhesives Coatings Manufacture Elastomers Flexible Foam Rigid Foam
Methylene Chloride	Circuit Board Manufacture Electroplating Integrated Iron and Steel Manufacturing Lab Chemicals Metal Degreasing Paint Stripping Paper Coating Pesticide Manufacturing – Insecticides Unidentified – Blowing Agent (Foam Manufacturing) Wood Stains and Varnish
Pentabromodipehnyl ether	Included in list No information on chemical use
1-bromopropane	Included in list under CAS#26446-77-5, No information on chemical use
n-hexane	Adhesives Manufacturing - Carpet Adhesives Solvent Electroplating Insulation Materials - Gaseous Electrical Insulation Lab Chemicals Pesticide Manufacture – Insecticides Printing Wood Stains and Varnish
n-methyl-2-pyrrolidone	Paint Stripping Printed Circuit Board Manufacturing – PCB Holes SBR Latex Production –Separation Agent Wood Stains and Varnish – Resin Solvents
Dimethylformamide	Acrylic Fiber Manufacturing SBR Latex Production – Separation Agent

EVALUATION

1. *Ease of Use*. The chemical profile information is easy to access, but is of limited use as it does not include facility names, and the SIC codes must be inferred. Facility specific information about chemical releases is cumbersome to obtain, and cannot be sorted by chemical.

2. *Complete and Accurate*. The chemical emissions data is based on the 1999 TRI. More recent TRI data is available at the US EPA TRI Explorer web site. The chemical use information contained in the chemical profile appears accurate, but is less specific than the industry information contained in the NIOSH NOES.

3. *Threshold and Breadth*. Since facility emission data is based on the TRI, the same limitations apply: The threshold is high, and the number of chemicals represented is limited. More chemicals are included in the chemical profile, but the chemical use information contained in the profiles is vague.

Overall, Scorecard's main use to HESIS would be for gross information about chemical use. For HESIS' goals, TRI data is more easily obtained directly from the US EPA.

Chapter 5: International Chemical Surveillance Systems -Product Registers

This chapter describes the Product Registers used in Scandinavian countries for chemical surveillance. Though similar, the Product Registers in each country differ in what information is collected and how that information is obtained.

5.1 Finland's Product Register

The Product Register was set up in 1980 and is implemented by the National Product Control Agency for Welfare and Health, in the Ministry of Labor (1). The objective of the register is to collect information on chemicals that are dangerous or may cause risks when used, and to provide this information to authorities and experts.

This objective is carried out by the collection of safety data sheets (SDS). SDS are similar to MSDSs, but include information on purpose of use. Registered hazardous chemicals are those placed on the market by selected sectors including the chemical industry, textile industry, paper products manufacturing, printing, publishing, rubber and plastics processing, other manufacturing industries, and all activities placing hazardous chemicals on the market (2).

Every Finnish manufacturer and importer is required to submit two copies of each SDS to the Ministry of Labor before the chemical is put onto market or brought into use (2). The Ministry of Labor gives each SDS a number, and proceeds to register identification data and the remaining content of SDS if it is found to be satisfactory. The checking of the SDS is not a prerequisite for placing the chemical on the market: Only submission of the SDS is required before placing the chemical on the market.

The Product Register enables authorities to supervise and collect information on chemical use. Due to the volume of chemicals introduced annually, Finland, however, has found it difficult to extensively check the data and update records: The Product Register contains over 70,000 safety data sheets (2).

EVALUATION

1. *Ease of Use.* I presume that this database is easy to use, though it may be difficult for HESIS to obtain access. Anyone outside the Finish Labor Protection Authorities requires a permit for access.

2. *Complete and Accurate*. As the product registry applies to all activities placing hazardous chemicals on the market, and occurs when the chemical is first introduced, it is likely complete. The accuracy of the database may be limited by a backlog in the updating of records.

3. *Threshold and Breadth*. All activities placing hazardous chemicals on the market, including manufacturing and importing are regulated, so the threshold and breadth is adequate for the goals of HESIS.

The Finish Product Register is not useful for the identification of chemical end-users in the State of California. It is, however, a possible model for new legislation in the State that would help serve the needs of HESIS. It would be a more powerful tool for HESIS if a clause were added that manufacturers and importers were also required to disclose client lists upon demand. The Product Register would help ensure that HESIS is able to identify all manufacturers and importers of a particular chemical in the State.

5.2 Norway's Product Register

Norway's Product Register was established in 1981 within the Ministry of the Environment to provide a service to the Ministry of Labor and Government Administration (3). The purpose of Norway's Product Register is similar to that of Finland's, though the mechanics are slightly different.

The Product Register collects and stores information on chemical substances and products that are produced or imported into Norway. Any products that carry warning labels because they contain dangerous chemicals, and placed on the market in a quantity of 100kg or more, must be declared annually to the Product Register (3). Each year, the Register handles declarations for more than 4000 products introduced to the market, and a similar number are withdrawn. The Product Register currently holds information on about 25,000 products (3).

The basic information included in the Product Register is: the intended uses of the chemical product (use and industry categories), substances in the product and their concentrations, and the annual marketed tonnage of the products and/or substances (4).

When a company has submitted a satisfactory declaration for a product, a receipt is issued with a declaration number (3). The declaration number may be included on the warning label, and must be included on the safety data sheet. The purpose of this is twofold. First, it enables medical personnel access to the necessary information in the event of emergency. Second, the declaration number can be used as a marketing tool by chemical manufacturers as it shows their commitment to (compliance with) environmental protection and user health and safety.

The Product Register has uses for environmental pollution as well. By virtue of its information on annual marketed tonnage of products and their intended use, the Product Register can indicate changes in emissions or discharges to the environment as well as

track the observance of legislation giving chemical use restrictions (i.e. product phase-outs) (4).

Norway acknowledges that not all chemical products are being declared and updated according to regulations, though the reasons for non-compliance are not specified (4).

EVALUATION

1. *Ease of Use*. The Norwegian Product Register is available as computerized data or on Mircofice. It is possible to search the data by CAS#, though you need to include CAS# for all compounds containing the substance of interest. For example, were one interested in all Arsenic containing substances, one would need to the CAS# for all arsenic compounds. Access to this database is restricted to "authorities" and research institutes.

2. *Complete and Accurate*. Norway acknowledges that the database is not complete.

3. *Threshold and Breadth*. The threshold for reporting is very low: 100kg marketed per year. The breadth of regulation is very wide, encommpasing all chemical products that carry warning labels. I presume that warning label requirements are similar to those in the OSHA hazard communication standard.

The Norwegian Product Register is more useful to HESIS than the Finnish Register because it includes information on the industry categories using the chemical products, and is updated annually. It is, like the Finnish Product Register, a possible model for new legislation in the State of California. Including information on annual tonnage may draw support from environmental regulators.

5.3 Denmark's Product Register

The Product Register of Denmark is located in the Danish National Institute of Occupational Health (5). It differs from the Registers of Norway and Finland in two ways. First, one database is accessible to the public. Second, registration is mandatory only for "high risk" products and chemicals.

PROBAS is the primary database of the Product Register (5). It contains information on product use, composition, where it is used, quantities used in Denmark, and adverse effects on health and the environment. Approximately 40% of information is gathered from suppliers and importers, while the remaining information is compiled by staff from Scientific articles, books, reports, notifications, safety data sheets, and information connected with other databases. The database is continually updated, but access is restricted. The register has collected information on some 70,000 products and 130,000 chemical substances and is connected to other registers of exposure levels.

KEMI-INFO is the public database and contains "non-confidential" information on some 7,000 products and 10,000 substances (5). KEMI-INFO can be accessed via the internet for a fee, but information is given free of charge over the telephone.

The limitation of PROBAS is that product registration is voluntary, except for "high risk" chemical substances and products (5). As a result, only about half of the products and substances in Denmark are included in the Product Register.

EVALUATION

1. *Ease of Use*. Presumably the database is easy to search. Access to PROBAS is restricted to Danish authorities. KEMI-INFO is accessible to the general public, but is in Danish.

2. *Complete and Accurate*. PROBAS is not complete due to the voluntary nature of most product registration. What information is present should be accurate.

3. *Threshold and Breadth*. Since only "high risk" products and substances have mandatory registration, the database has limited breadth. There is no threshold for registration.

This database is an indicator of the limitations of voluntary product registration: information has been compiled on about 50% of chemical substances and products in Denmark, and only 40% of that information has been gathered from suppliers or importers (5). Were a similar voluntary program initiated in California, compliance would be about the same; too low to satisfy the goals of HESIS.

Chapter 6: Successes and Limitations of Existing Chemical Surveillance Systems

This chapter summarizes our experience in using existing chemical surveillance systems to identify California workplaces where the "test" chemicals are used.

6.1 Identification of California Workplaces

We have had little success at identifying workplaces in California where the "test" chemicals are used, primarily because the most informative data is kept at the local level and is not computerized. The complete list of facilities identified is included in Appendix B, and the number of facilities identified is summarized in Table 6-A. There was some overlap of facilities identified by the TRI and the Hazardous Material Inventories, however not all facilities included in the TRI were included in the HMI reports from the local agencies. The reason for this is unclear, though it may be partially explained by the fact that many large companies, such a petroleum refineries, have an in-house fire authority and may not report a hazardous materials inventory to the CUPA or AA in their region.

Accidental Release Prevention Program:
None of the test chemicals are regulated under this program.

Air Toxics Programs:
No facilities were identified because the databases cannot be searched by chemical.

Site Mitigation and Brownfields Reuse Program Database (CalSites):
No facilities were identified because the database cannot be searched by chemical.

Hazardous Material Business Plan Inventories:

Few facilities were identified. Hazardous material inventories are kept at local agencies, and only four agencies were found to have computerized databases that can be searched by chemical.

Client Lists:

Few facilities were identified, and most of those identified were retail establishments. A convenience sample of 96 manufacturers were contacted, and only six of the contacted companies (6%) provided client lists.

EPA Toxics Release Inventory:

The EPA Toxics Release Inventory identified 270 facilities in the State of California that report the release of five of the seven "test" chemicals (Table 6-A). No facilities reported releases of 1-bromopropane or pentabromodiphenyl ether because these chemicals are not regulated under the Toxics Release Inventory.

Table 6-A. Summary of facilities identified in the State of California, which report the use, storage, or release of the "test" chemicals.

Chemical	San Diego County HMI	Orange County Fire Authority HMI	City of Palo Alto (Unidocs) HMI	L.A. County Fire Authority HMI	Toxics Release Inventory	Total
Polymeric MDI	25	0	0	23	67	**115**
1-Bromopropane	6	2	0	1	Unregulated	**9**
n-Methyl-2-pyrrolidone	19	10	9	20	42	**100**
Dimethyl formamide	12	2	7	6	27	**54**
n-Hexane	1	8	6	38	93	**146**
Methylene chloride	48	71	11	40	41	**211**
Pentabromo diphenyl ether	0	0	0	0	Unregulated	**0**
Total	111	93	33	128	270	**635**

6.2 Identification of 4-digit SIC Codes

While we had limited success at identifying facilities, compilation of a list of 4-digit SIC codes has been more successful. Most SIC codes have been identified through databases in other states and at the national level. This must be taken into consideration when reviewing this list for accuracy: industry in California is very diverse, and industrial sectors present in California may not be found elsewhere.

Programs that provide information on 4-digit SIC codes include:

- Oregon Office of the State Fire Marshall Hazardous Substance Database
- Massachusetts Toxics Use Reduction Institute
- NIOSH National Occupational Exposure Survey
- OSHA Integrated Management and Information System, Accident Investigation Database
- County of San Diego Hazardous Material Inventory

Table 6-B. Number of unique 4-digit SIC codes identified in which facilities report the use, storage, or release of the "test" chemicals.

Chemical	Oregon State Fire Marshall	Massachusetts TURI	NIOSH NOES	OSHA Accident Investigation	L.A. County Fire Authority	San Diego County	Total
Polymeric MDI	54	1	59	2	22	11	95
1-Bromo propane	12	-	-	-	-	5	16
n-Methyl-2-Pyrrolidone	30	19	63	-	17	11	98
Dimethyl formamide	7	14	85	1	4	7	99
n-Hexane	70	17	221	13	29	1	272
Methylene Chloride	87	42	363	27	34	18	432
PBDE	1	-	1	-	-	-	2

A complete list of 4-digit SIC codes are included in Appendix C, and summary is presented in Table 6-B. It is possible to obtain lists of California businesses in these SIC codes from Dunn & Bradstreet.

6.3 Evaluation of the NIOSH NOES

The NIOSH National Occupational Exposure Survey (NOES) was completed nearly twenty years ago, yet remains the primary resource for the prioritization of chemical hazard research and funding distribution. In this project we collected data on SIC codes from hazardous material inventories in the State of Oregon and areas of the State of California, from the EPA's Toxics Release Inventory, and from the Toxics Use Reduction Institute in Massachusetts. Tables 6-C and 6-D compare chemical usage patterns identified through the NOES and those reported by State and County agencies at the 4-digit and 2-digit SIC codes levels, respectively.

Overall, only 36% of the unique 4-digit SIC codes identified by State and Local agencies are included in the NOES (Table 6-C). The highest percentages were seen with the Toxics Use Reduction Institute (TURI) in Massachusetts, where the overall percentage was 58%, and approximately 70% of the 4-digit SIC codes where the use of n-hexane and methylene chloride were identified by the TURI were included in the NOES. The similarity between the TURI and the NOES may be explained by the survey designs. The TURI focuses on traditional large industries, which are less likely to have changed since the NOES was conducted. Conversely, small businesses can be more dynamic than large businesses and those surveyed in the NOES may have changed production methods and/or products since the early 1980s. This could explain why there was poor overlap between the NOES survey results and the hazardous material inventories currently reported to authorities in California and Oregon.

Table 6-C. Specificity of the NIOSH NOES at the 4-digit SIC code level: The number of unique 4-digit SIC codes identified by state and local agencies that are included in the NOES.

Chemical	Oregon HMI	San Diego County	LA County	TUR Institute	Total
Dimethylformamide	2 of 7 (29%)	2 of 7 (29%)	3 of 4 (75%)	7 of 14 (50%)	44%
1-Bromopropane	0 of 12 (0%)	0 of 5 (0%)	-	-	0%
Pentabromodiphenyl ether	0 of 1 (0%)	-	-	-	0%
Polymeric MDI	11 of 54 (20%)	1 of 9 (11%)	5 of 22 (23%)	0 of 1 (0%)	20%
n-Hexane	29 of 70 (41%)	0 of 1 (0%)	12 of 27 (44%)	12 of 17 (71%)	46%
Methylene Chloride	36 of 87 (41%)	7 of 19 (37%)	15 of 30 (50%)	29 of 42 (70%)	49%
N-methyl pyrrolidone	6 of 30 (20%)	4 of 11 (37%)	2 of 13 (15%)	6 of 19 (32%)	25%
Total	30%	27%	39%	58%	38%

At the 2-digit SIC code level, the NOES included 70% of the unique 2-digit SIC codes reported by State and local agencies (Table 6-D). Over 90% of the SIC codes identified by the TURI and Los Angeles County were present in the NOES, a much higher rate than for data from the Oregon State Fire Marshal and San Diego County.

Consideration of the NOES design may explain the better specificity at the 2-digit SIC code level. The NOES was a randomized sample design, stratified by 2-digit SIC code and business size. Although the chemical use data from the NOES may be representative of industries at the 2-digit SIC code level, companies in many 3- and 4-digit SIC codes were not included in the sample.

A problem with the poor correlation between the SIC codes identified by the NOES and more current survey tools is that the NOES remains the basis for many decisions on prioritization and funding for occupational health research. The problem is most obvious when one considers the risks of exposure to novel chemicals: given the absence of novel chemicals from the NOES, the risks posed by these chemicals receive no priority. Further, when one tries to identify the users of novel chemicals, the NOES is not

informative. Users of 1-bromopropane, for example, can be identified in the State of Oregon and San Diego County, but 1-bromopropane was never identified by the NOES. In general, the NOES seems to be a poor predictor of current chemical use patterns for 1-bromopropane, pentabromodiphenyl ether, n,n-dimethylformamide, and Polymeric MDI, which are the newer and less regulated of the seven "test" chemicals; with less than 30% of the unique 4-digit SIC codes identified in Oregon and San Diego County included in the NOES.

Table 6-D. Specificity of the NIOSH NOES at the 2-digit SIC code level: The number of 2-digit SIC codes reported by state and local agents that are included in the NOES.

Chemical	Oregon HMI	San Diego County	LA County	TUR Institute	Total
Dimethylformamide	2 of 3 (67%)	4 of 5 (80%)	3 of 3 (100%)	8 of 8 (100%)	89%
1-Bromopropane	0 Of 6 (0%)	0 of 5 (0%)	-	-	0%
Pentabromodiphenyl ether	0 of 1 (0%	-	-	-	0%
Polymeric MDI	11 of 21 (52%)	5 of 11 (45%)	11 of 14 (79%)	0 of 1 (0%)	57%
n-Hexane	20 of 26 (77%)	1 of 1 (100%)	16 of 17 (94%)	9 of 9 (100%)	87%
Methylene Chloride	26 of 37 (70%)	11 of 14 (79%)	13 of 14 (93%)	14 of 14 (100%)	81%
N-methyl pyrrolidone	11 of 15 (73%)	5 of 6 (83%)	7 of 7 (100%)	8 of 10 (80%)	82%
Total	65%	62%	93%	93%	75%

The use of the NOES as a chemical surveillance tool today would have two adverse impacts should HESIS rely on the NOES to plan the distribution of health and safety information: Namely, many companies not using the chemical would be needlessly contacted, and many companies using the chemical would not be contacted. For example, if HESIS were to consider a statewide mailing of health and safety information to end-users of methylene chloride based on NOES, 432,089 informational packets would be distributed to the facilities in thirty-eight 2-digit SIC codes. Only some fraction of those facilities, say 50%, actually use methylene chloride, so approximately 216, 045 of the informational packets would be provided to facilities unnecessarily. Additionally, taking San Diego County as a model, there are approximately 20% more 2-digit SIC

codes in which methylene chloride is used but are not included in the NOES. Therefore, there are 86,418 additional facilities[1] in California in which methylene chloride may be used, but which would not be contacted by HESIS.

Table 6-E. Number of facilities in California in 1999 that are in the 2-digit SIC codes identified by the National Occupational Exposure Survey. (1)

Chemical	No. of Facilities
N-Methyl pyrrolidone	323,879
N,n-Dimethylformamide	274,620
n-Hexane	303,875
Methylene Chloride	432,089
Polymeric MDI	252,788
1-Bromopropane	-
PentaBDE	2,233

Table 6-E estimates the number of facilities that would have to be contacted, and the potential for waste of HESIS' resources, were HESIS to rely on the NOES for an outreach effort to end-users of n-methyl pyrrolidone, n,n-dimethylformamide, n-hexane, methylene chloride, and Polymeric MDI. Table 6-E also illustrates the lack of information about more recently introduced chemicals.

6.4 Limitations of Existing Systems

Unfortunately, we have not identified an existing chemical surveillance system or set of systems that effectively and efficiently identifies chemical end-users in the State of California.

The EPA Toxics Release Inventory allows one to identify large industrial and manufacturing facilities that emit high-volume chemicals, but fails to identify users of new chemicals and small businesses. We failed to identify an efficient system that provides information on small business and new chemicals, primarily because the

[1] The number 86, 418 is 20% of the 432,089 facilities in California that fall into the 2-digit SIC codes.

relevant information collected is maintained by local agencies and is generally not computerized. Hazardous material inventories are submitted by all facilities to a local agency, but few agencies maintain computerized databases. Where these databases exist, it is easy to identify small facilities that use "new" chemicals because all substances for which an MSDS is required are included, and there is no reporting threshold for the collection of chemical use data pertaining to life safety.

We have found it easier to obtain information on SIC codes where chemical use is reported in other states or on the federal level, though the completeness of such lists are limited by the amount of overlap in industrial sectors between the data source and the State of California. At the national level, the NIOSH NOES can be queried for SIC codes, but that database has not been updated in nearly twenty years. The Oregon Office of the State Fire Marshall will provide a list of SIC codes upon request, information that is based on hazardous material inventories. SIC codes can also be obtained with a little work from the Massachusetts Toxics Use Reduction Institute, though this data is limited to chemicals regulated under the Toxics Release Inventory and CERCLA. It is also possible to search the County of San Diego database to obtain lists of SIC codes.

The problem with using SIC codes to identify chemical end-users is the large number of facilities that might appear in those codes as potential end users of the chemical, but which don't actually use the chemical: HESIS would be forced to provide information to tens of thousands of companies which to do not actually use the chemical of interest. Clearly, this is a waste of resources and decreases the efficiency of HESIS in carrying out its legislative mandate overall.

Chapter 7: Recommendations

After a review of existing chemical surveillance systems, we have developed three recommendations that will help HESIS to fulfill its legislative mandate to distribute health and safety information to workers in the State of California.

7.1 Product Registry

We recommend that HESIS promote the development of a Product Registry in the State of California modeled on the Product Registries of Scandinavian countries. The Product Registry could collect the MSDS of every hazardous material sold in California, as well as information on the uses of the products (use categories, industry categories, and/or facility names and addresses), and marketed tonnage. The Product Registry would not limit or delay the marketing of chemicals in the State of California, but would collect information on products introduced into commerce, and permit the State of California to track the use of hazardous materials.

The Product Registry will provide the State of California with the ability to review MSDSs for accuracy. While the Registry would not have the ability to remove products from market or delay their entrance, the Registry could ask manufacturers and distributors to resubmit improved MSDSs if the Registry deems them inaccurate or uninformative.

The chemical use information and MSDSs collected through the Product Registry would provide a wealth of information to health and safety professionals, and workers. If, for example, a clinician is concerned that her patient is experiencing a chemically induced disease, the clinician can obtain the MSDSs for the hazards to which the patient was exposed through the Registry. Additionally, if the clinician and State employees deem that other California residents are experiencing the same hazardous exposure, the Product

Registry will permit the identification of other facilities or industries in which the hazard is present.

A further benefit to the Product Registry would be the ability to track the tonnage of hazardous materials introduced into commerce in the State of California. This information could be used to evaluate the accuracy of emission and hazardous material inventory reporting throughout the State, and identify trends in chemical use on the large scale. This could provide a benchmark by which to evaluate pollution prevention initiatives that are focused on substitution and decreased use of hazardous materials.

Administration & Enforcement

The Product Registry could be administered by one or two full time staff members in an existing State agency. Additional staff may be necessary during the start-up phase of the Registry as the volume of initial work will be substantial.

The Product Registry could be supported by a small fee, perhaps $100, assessed for each product submitted for registry. Products could be registered annually, eliminating the need for a formal process by which to remove products from the Registry.
All information required by the Product Registry could be submitted electronically by product manufacturers and distributors. A streamlined process could be developed for the re-registry of products.

The quality of data collected through a Product Registry would depend upon enforcement and ease of compliance. Voluntary product registration would not provide comprehensive data collection because compliance would likely be lower than the 50% compliance observed in Denmark, where product registration is voluntary for all but extremely hazardous chemicals. Enforcement could occur by selecting a random sample of Hazardous Material Inventories submitted by business to their local Certified Uniform Program Agencies, and verifying the registration of the inventoried chemicals.

7.2 Hazardous Material Inventory Database

We recommend that HESIS promote the utilization of computerized databases by local agencies for the storage of the hazardous material inventories collected for the purposes of life safety and community right to know. The reporting threshold for community right know inventories may be too high to completely fulfill the needs of HESIS, as indicated by the work in New Jersey. However, facilities could be encouraged or required to provide complete hazardous material inventories for the purpose of life safety, rather than report aggregate quantities for each hazard class when inventories are below the community right to know threshold. This should provide complete information of chemical use. The database should be designed so that all facilities reporting the use or storage of a chemical can be identified through a CAS number search. Local agencies (the Certified Uniform Program Agencies and Associated Agencies), which currently collect hazardous material inventories, are the logical administrators of such a program. HESIS could contact a designated representative of each local agency through e-mail to solicit a list of facilities reporting the use or storage of a particular chemical.

There are several models for such databases in the State of California. Unidocs, for example, has been developed by a consultant for the City of Palo Alto and Santa Clara County and can be scaled-up for use by other agencies. Los Angeles County, Orange County, and the City of San Diego also maintain computerized databases of hazardous material inventories.

Hazardous material inventory databases can be designed to integrate additional health and safety information, as well as environmental reporting requirements with the inventories. Unidocs and Los Angeles County, for example also utilize a database of fire safety information on chemicals, and Proposition 65 warning levels have been added to Unidocs. It would be possible to include Permissible Exposure Levels. With regards to environmental reporting, it would be possible for facilities to report underground storage tanks, pollution prevention permit information, and emissions information through the same interface.

Administration & Enforcement

Administration of hazardous material inventory databases would most easily be accomplished through the existing Certified Uniform Program and Associated Agencies. These agencies already collect hazardous material inventories from facilities in their jurisdiction, but many store that information in paper files.

Conversion to computerized databases would require money to train employees and businesses in the use of the system. The databases can be accessed and updated from standard computer workstations, and would supplement, not replace, internal agency networks. An individual should be employed to maintain and upgrade the database system, and to provide technical services to local agencies.

Hazardous material inventories are currently mandated by federal and state legislation. Local agencies already have a mechanism for the evaluation of the inventories, and enforcement of the reporting requirements.

No new legislation would be required to facilitate data collection and enforcement of reporting, though legislation may be required to provide resources for the development of a statewide database system.