

# Pollution Prevention



## Report and Two-Year Workplan

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**Pollution Prevention  
Report and Two-Year Workplan**

**California Environmental Protection Agency**

**Department of Toxic Substances Control**

**Office of Pollution Prevention and Technology Development**

April 2002

## **Document Availability**

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The Department of Toxic Substances Control's Office of Pollution Prevention and Technology Development wishes to acknowledge the time, energy, and expert advice provided by its Pollution Prevention Advisory Committee.

DTSC Pollution Prevention Advisory Committee

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Ann Heil, Los Angeles County Sanitation Districts (Vice-Chair)  
Greg Beach, Cal/CUPA Forum  
Robin Bedell-Waite, Contra Costa County Hazardous Materials  
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Cal/EPA *ex officio* representatives:  
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Finally, DTSC wishes to acknowledge the expert services of our facilitator, Ms. Laurie McCann of the California Center for Public Dispute Resolution, for helping us reach our goals.

This document was prepared by staff from the Department of Toxic Substances Control, under the direction of Kim Wilhelm, Acting Chief, Office of Pollution Prevention and Technology Development.

Cover design by Joanna Kruckenberg

\*former Pollution Prevention Advisory Committee members. At the time of publication, vacancies existed in the following categories: statewide environmental advocacy organization, industry, and organized labor.



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# Pollution Prevention Report and Two-Year Workplan Executive Summary

Californians are concerned about the quality of their environment, and are vitally interested in ensuring that the generation and release of toxic and other hazardous substances is minimized. In response to this concern, the Legislature in 1998 augmented the state's hazardous waste source reduction program, located within the California Environmental Protection Agency's (Cal/EPA) Department of Toxic Substances Control (DTSC).<sup>1</sup> The legislature also directed DTSC to convene a Pollution Prevention Advisory Committee (Advisory Committee) to help DTSC determine how to target pollution prevention resources. The Advisory Committee consists of ten public members representing diverse interests, and five *ex officio* members from relevant Cal/EPA boards and departments. Through a collaborative fact-finding and decision-making process, DTSC and the Advisory Committee developed this two-year work plan and evaluated source reduction progress in the state.

Source reduction (also known as pollution prevention, or P2) is defined in California statute as:

- any action that causes a net reduction in the generation of hazardous waste; or
- any action taken before the hazardous waste is generated that results in a lessening of the properties which cause it to be classified as a hazardous waste.

This report contains the two-year workplan required by SB 1916, as well as hazardous waste and environmental release data, proposed pollution prevention activities, and information about other Advisory Committee activities. Part I introduces the document.

## The Two-Year Workplan

Part II contains DTSC's pollution prevention workplan for fiscal years<sup>2</sup> 02/03

### DTSC Pollution Prevention Advisory Committee

#### Public Members:

- Kelly Moran, Chair, Sierra Club
- Ann Heil, Co-chair, Los Angeles County Sanitation Districts
- Greg Beach, San Bernardino County Fire Department, CalCUPA Forum
- Robin Bedell-Waite, Contra Costa County Hazardous Materials
- Barbara Brenner, Breast Cancer Action
- Stewart Crook, Agilent Technologies Inc.
- Larry Moore, Larry's AutoWorks
- Joy Williams\*, Environmental Health Coalition
- Jim Schrack\* and Gary Tietavainen\*, BP
- Maggie Robbins\*, California Labor Federation

#### Cal/EPA *ex officio* representatives:

- Don Ames, Air Resources Board
- Jim Bennett, State Water Resources Control Board
- Bob Borzelleri, Department of Toxic Substances Control
- Jim Donald, Office of Environmental Health Hazard Assessment
- Nan Gorder, Department of Pesticide Regulation
- Steven Monk, Office of the Secretary
- Bill Orr, Integrated Waste Management Board

\* former Pollution Prevention Advisory Committee members.

At the time of publication, vacancies existed in the following categories: statewide environmental advocacy organization, industry, and organized labor.

<sup>1</sup> See Health & Safety Code section 25244.12 et. seq.; SB 1916 of 1998

<sup>2</sup> California state government's fiscal years begin July 1st and end the following June 30<sup>th</sup>.

and 03/04, with emphasis on the SB 1916-related projects and the voluntary pollution prevention program. The large business program is under development and will be described in a subsequent document (see discussion on page x)

In June of 2001, DTSC decided that, rather than disinvesting in the current large/small industry projects, that it would continue them for an additional two-year period (through fiscal year 2004), for several reasons. First, DTSC felt that significant additional environmental benefits will be gained from continuing these large and complex projects. Second, DTSC wished to build on the relationships and technical knowledge developed to date. Finally, DTSC's establishment of strategic relationships within each industry focus area will allow for significant progress and a continuation of P2 activities after DTSC's involvement has ended.

### *Vehicle Services and Repair Pollution Prevention Project* Selected Vehicle Service and Repair Progress Highlights

In implementing the Vehicle Service and Repair Project, DTSC has:

- trained approximately 760 people. Training survey results showed that, of the trainees returning class survey forms, 97% of businesses and 98% of inspectors rated the training as satisfactory and above. The survey results also indicate that although many shops implement some P2 practices, there is significant room for improvement;
- coordinated with the Department of Health Services to issue a health hazard advisory warning about the use of n-Hexane in parts cleaning processes;
- distributed over 5,000 toolkits containing P2 information for vehicle service and repair facilities;
- recognized the California State Automobile Association's Sacramento Car Care Plus facility as a model P2 vehicle service and repair facility. DTSC staff assisted with facility design, management practices, and employee training; and
- established partnerships with local government P2 programs, including the Santa Monica Industrial and Storm Water Program, the cities of Long Beach and Signal Hill, the City of Los Angeles Hazardous & Toxic Materials Office, and Santa Clara County's Environmental Health Department. A primary goal of these partnerships is to collect data allowing for an evaluation of Vehicle Service and Repair Project results.

### 2002-2004 Vehicle Service & Repair Workplan

In the coming two-year planning period, DTSC will:

- continue P2 outreach to the vehicle service and repair industry;
- work with public and private fleets to implement the recommended vehicle service and repair P2 practices, including:
  - encouraging the ten state agency fleets, as well as selected local government and private fleets, to adopt P2 policies;
  - assisting fleets in conducting waste assessments and recommending specific P2 practices;
  - surveying fleets and shops, with the assistance of local government staff, to determine implementation rates to estimate project results;
- work with partners Ford, the California State Auto Association and NAPA Auto Parts to create sustainable pollution prevention programs within these organizations so that P2 implementation at their affiliate shops continues beyond the DTSC Vehicle

- Service and Repair Project life;
- work with Shasta College to distribute the vehicle service and repair P2 course curriculum currently under development for automotive technicians in both traditional and electronic on-line formats;
  - work toward achieving Automotive Service Excellence certification for the vehicle service and repair P2 course; and
  - establish a closer working relationship with the Association of Bay Area Governments to promote vehicle service and repair P2 as a component of its Green Business Program, including certification and post-training on-site technical assistance.

### *Large Industry Pollution Prevention Project*

In late March 2002, DTSC discontinued its community-based Petroleum Refineries Pollution Prevention Project. DTSC had completed environmental data profiles on 17 of California's largest refineries. These profiles were to play a critical role in bringing refineries and stakeholders together to discuss and implement local refinery P2 projects. However, the terrorist events of September 2001 and the ensuing security concerns resulted in a decision not to release the profile, and a necessary cancellation of the associated project.

DTSC has selected the semiconductor industry as a replacement large industry project under SB 1916. At the time this report was finalized, the new project was under development, for implementation beginning July 1, 2002. The final semiconductor industry pollution prevention workplan will be described in an addendum to this report. DTSC will continue to work with the petroleum refining industry to build on the relationships and expertise built over the past few years. Several refineries have expressed interest in working with DTSC on pollution prevention initiatives.

### *Voluntary Pollution Prevention Project: Hospitals Pollution Prevention Challenge*

DTSC will undertake a voluntary P2 program with the goal of virtually eliminating the presence of mercury in California hospitals. A challenge to become a mercury-free facility by 2005 will be issued to California hospitals with a letter and a mercury-reduction toolkit. The toolkit includes information about mercury-containing devices found in healthcare settings, a list of licensed mercury recyclers or other take-back programs, and access to a spreadsheet to assist in accounting for specific mercury sources within individual facilities.

Pledges will be issued to those hospitals willing to announce they are working to become a mercury-free facility. DTSC will partner with the California Department of Health Services, which will certify when a hospital has actually become mercury-free. Certificates will be presented to those hospitals that successfully eliminate mercury sources for which there are replacements, and that have a plan for properly dealing with other sources upon removal or when alternatives become available. Success will be measured by how many hospitals take the initial pledge, how many hospitals become mercury-free, and how much mercury is removed.

### *Other DTSC P2 Program Elements*

DTSC's P2 program contains numerous other elements, including implementation of the Hazardous Waste Source Reduction and Management Review Act ( SB 14 ), support to local pollution prevention programs, integration of pollution prevention into regulatory programs, technical studies, California/Mexico P2 support, among others. Expected outputs are described in Part II.

### **Pollution Prevention Advisory Committee Activities**

Part III contains information about recommendations made by the public members of the Advisory Committee to DTSC and/or Cal/EPA. The Advisory Committee has recommended that DTSC and/or Cal/EPA:

- emphasize pollution prevention through Cal/EPA's strategic planning process;
- use pollution prevention to address pollutants of concern;
- establish a pollution prevention program at the Cal/EPA level; and
- use pollution prevention strategies to address agricultural pollution issues, including reducing dependence on pesticides in urban and agricultural settings.

In addition, the local government subcommittee provided the full Advisory Committee with a list of recommendations for strengthening local government pollution prevention programs.

### **Hazardous Waste Trends, Source Reduction Progress, Current Status of Waste**

Parts IV and V of this report provide an overview of hazardous waste data, and an evaluation of hazardous waste source reduction progress. DTSC looked at hazardous waste manifest, Toxics Release Inventory and Biennial Report System data. The bulk of the analysis relied on manifest data, because DTSC's charge is the regulation of hazardous waste management. Highlights from the data review include:

- The number of hazardous waste generators manifesting waste has not increased since 1998. However, because of milkrun and modified manifesting options, these numbers are understated. In addition, more waste types are now eligible for milkrun manifesting, further reducing the system's ability to accurately identify all hazardous waste generators.
- Since 1993, the state's largest generators have not significantly altered their relative contribution to the total quantity of hazardous waste manifested in California. The top 100 (by quantity) generators have contributed between 52% to 61% of the total recurrent hazardous waste manifested in California, with 2000's percentage at 57%.
- Two hazardous waste groups stand out as possible candidates for pollution prevention effort. The organics group is about twice as large as the next-largest waste group, and may be an appropriate target for hazardous waste source reduction efforts. This waste group includes waste oil the single-largest waste stream in California. Still, the organics waste group minus waste oil constitutes a significant quantity of total waste manifested 274,157 tons in 2000. Second, the inorganics waste group is on an upward trend. Driving that upward trend is CWC 181 other inorganic solid waste, which is steadily increasing and now constitutes 17% of recurrent hazardous waste manifested.

- It is clear that total hazardous waste generation, as represented by manifested waste quantities, is increasing. Recurrent hazardous waste generation is essentially flat; the upward trend in all waste was driven mainly by increases in quantities of cleanup waste manifested as hazardous waste. In fact, recurrent waste generation increased less than 1% from 1993 to 2000. Finally, recurrent waste generation normalized per Gross Domestic Product shows a 6% per year reduction from 1993 through 1999.
- In 2000, about two-thirds of the hazardous waste manifested in California consisted of oil and oil-contaminated waste; organic and inorganic solids; and auto-shredder waste.
- The data indicate that a significant portion of the hazardous waste manifested in the state is directly or indirectly related to the production, maintenance, operation and disposal of the automobile. Waste oil and oil-contaminated waste constitute 36% of all manifested waste.
- The petroleum refining industry continues as a major contributor to hazardous waste generation in California.
- Some wastes have been excluded from regulation over time, making trends analyses difficult and potentially reducing the quantities shown in this report.
- Much of the recent increase in waste generation is associated with site clean-up activities; most other hazardous waste types are relatively flat. This indicates a positive trend in California more waste sites being reclaimed for re-use, and fewer sources of unregulated contaminants in the environment.



# **Part I: Introduction**

## **Pollution Prevention Report and Two-Year Workplan**

Californians are concerned about the quality of their environment, and are vitally interested in ensuring that the generation and release of toxic and other hazardous substances are minimized. Pollution prevention has emerged as a superior strategy to reduce the creation of pollution and the subsequent negative impacts of those pollutants. In 1998, the legislature, in response to continuing concerns about pollution, augmented the state ' s hazardous waste pollution prevention<sup>1</sup> program, which is located within Cal/EPA ' s Department of Toxic Substances Control (DTSC).

This is the second workplan developed by DTSC under this legislation (SB 1916 of 1998). This workplan details the targets and activities for fiscal years 2002 through 2004. In addition to information about planned pollution prevention activities, this report contains information such as hazardous waste generation and environmental release data, and information on other Advisory Committee activities.

DTSC has decided to continue its work with the vehicle service and repair industry and the petroleum refining industry for this planning period. These two industry types were selected for pollution prevention focus as a result of DTSC ' s evaluation of hazardous waste generation, as well as other considerations, during the initial planning cycle of SB 1916. Proposed activities were outlined in DTSC ' s 2000 pollution prevention workplan. As the scope and potential positive impact of DTSC s work with these industries are considerable, it was felt that to discontinue activities after only two years would result in a significant loss of momentum.

A new component of this workplan is the " voluntary " pollution prevention program. As required by the statute, DTSC performed a review of voluntary P2 programs and determined that such a program would be feasible. The focus of this voluntary program will be the health care industry and elimination of mercury. Details are described further in Part 2 of this report.

### **Background**

Pollution prevention (also known as " source reduction " ) is defined in California statute as:

- any action that causes a net reduction in the generation of hazardous waste; or
- any action taken before the hazardous waste is generated that results in a lessening of the properties which cause it to be classified as a hazardous waste.

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<sup>1</sup> In this report, DTSC s program will be referred to as the pollution prevention (P2) program. Note that in DTSC s statute, it is called the hazardous waste source reduction program. Because pollution prevention is defined as source reduction in federal law and in common usage, and because pollution prevention has developed as the term of art in this field, pollution prevention will be used.

As an overall environmental approach, pollution prevention (P2) stresses the importance of maximizing resource use, creating little waste, and using the least-hazardous materials as possible. While traditional regulatory programs focus on restricting releases or properly managing wastes after they are produced, pollution prevention focuses on the strategies that eliminate or reduce the creation of such wastes and pollutants.

## **DTSC's Pollution Prevention Program**

DTSC has operated its pollution prevention program since 1985. Efforts to promote hazardous waste source reduction include:

- implementing the Hazardous Waste Source Reduction and Management Review Act (commonly known as " SB 14 "). This program requires that hazardous waste generators identify processes that generate hazardous waste, consider alternatives that would reduce or eliminate waste generation, select appropriate source reduction strategies for implementation, and establish a timeline to implement these strategies. Facilities subject to SB 14 also must report their source reduction and hazardous waste management progress over time;
- providing support and resources to local pollution prevention programs;
- conducting research into P2 alternatives;
- developing printed P2 material for use by hazardous waste generators,
- training both industry and regulatory agency staff on P2;
- integrating P2 into regulatory programs at the state and local levels;
- supporting the Pollution Prevention Advisory Committee, which consists of ten public members and the executive officers of DTSC, the Air Resources Board, the state Water Resources Control Board, the Integrated Waste Management Board, and the Office of the Secretary (Cal/EPA) as *ex officio* members;
- preparing a P2 workplan that includes a summary analysis of hazardous waste generation and management patterns by SIC Code, waste stream and type of management method, and an outline of proposed pollution prevention activities for the next two years; and
- developing and implementing a voluntary pollution prevention program.

### **Pollution Prevention Strategies**

- changing a production process in order to reduce or eliminate waste
- changing the nature of a product so that the use of toxic input materials is avoided
- improving purchasing practices
- inventory control and housekeeping to preclude the generation of off-specification and outdated chemicals

### **Pollution Prevention Benefits**

- reduced costs to businesses
- reduced need for regulatory oversight
- reduced need for waste management and landfill capacity
- reduced worker exposure to hazardous waste and toxic materials
- reduced community and consumer exposure to toxic chemicals

The enactment of SB 1916 and the establishment of DTSC ' s Pollution Prevention Advisory Committee represents an exciting new chapter in California ' s efforts to protect public health and the environment through pollution prevention. This document provides details on upcoming activities and expected accomplishments.

## Part II: DTSC Two-Year Pollution Prevention Workplan (2002-2004)

### Overview

This chapter presents the workplan for DTSC ' s Pollution Prevention Program for fiscal years 2002/2004. The mission and objectives for the program are presented immediately below. This is followed by a summary of the major focus areas and activities that will be pursued this year. The third section is a general overview of the program and the available staff and contract resources. The fourth and final section is a detailed discussion of the various focus areas, including a description of activities, tasks, outputs, and resources.

### Mission

*The mission of DTSC's Pollution Prevention Program is to promote pollution prevention by providing state leadership, guidance, and assistance to industry, local government, communities and other environmental agencies.*

Although DTSC ' s statutory directive is clearly based in California s hazardous waste control law, DTSC ' s P2 program considers its mission as broader than just reducing amounts of hazardous waste generated. Such an approach would focus exclusively on businesses that generate very large quantities of hazardous waste. In order to protect public health, the environment, and workers, and to prevent media transfer of pollutants, DTSC ' s program includes activities related to small quantity generators, specific chemicals, and interagency cooperation. Full implementation of pollution prevention represents a significant cultural change and philosophical shift in the historic way of doing business, both in the private sector and in government, and requires an approach that is broad and sustained.

Note that the laws and regulations establishing the pollution prevention program within DTSC do not grant the authority to mandate or enforce prevention. Even the Hazardous Waste Source Reduction and Management Review Act of 1989 (commonly known as " SB 14 " ), which requires that large generators of hazardous waste plan to reduce hazardous waste generation, contains clear limitations on DTSC ' s enforcement authorities. DTSC does not have the authority to control the decisions made by businesses as to whether or not to implement specific pollution prevention strategies. The ultimate decision to

### Pollution Prevention Program Objectives

- Establish effective networks for communicating, promoting and distributing pollution prevention information
- Promote and provide support to local pollution prevention programs
- Achieve measurable reductions in the generation of hazardous waste and/or the hazardous properties of waste produced in California through source reduction
- Ensure that inspectors and permit staff at both the state and local levels promote pollution prevention during routine regulatory activities
- Expand current hazardous waste pollution prevention efforts to include other environmental regulatory agencies, so as to achieve better overall environmental results and minimize the unwanted shift of pollutants between environmental media
- Achieve recognition as a resource for P2 information

implement pollution prevention resides instead with individual generators, which each face a unique set of environmental, economic and technical constraints. DTSC believes that through leadership, guidance, assistance, and the integration of pollution prevention into other aspects of its regulatory program, California will ultimately achieve significant reductions in the quantity and/or toxicity of hazardous waste generated.

## **Section 1: Large Business Project Workplan**

### **Background**

DTSC ' s initial P2 workplan (2000-2002) described a large industry project directed toward the petroleum refining industry. The project involved establishing voluntary source reduction projects at two to three of California ' s 17 largest refineries. Central to this plan was the involvement of all interested stakeholders working with their local refineries to determine the nature of a voluntary source reduction project. The first stage of the plan was the preparation of a standard environmental profile on each of the 17 refineries. The profile contained publicly-available information and provided information critical to enabling the refineries and stakeholder to begin source reduction discussions. These discussions would continue, at willing refineries, resulting in the implementation of local source reduction projects. During the summer of 2001, DTSC decided, with the support of the Advisory Committee, to extend the project two more years (through June 2004), to enable the Department to support project implementation, determine source reduction success, and determine the success of establishing improved long term communication between the refineries and local stakeholders.

The profiles were completed in November 2001. More than 400 pages of multimedia environmental information were assembled for the 17 project refineries. However, in the wake of September 2001, DTSC placed a hold on the release of the profile information because of concerns about terrorism. In February 2002, the profile was given to the Strategic Statewide Committee on Terrorism for a security review to obtain approval for release. At the time of the workplan report, it does not appear that the Strategic Statewide Committee on Terrorism will be able to render a decision in the near future.

### **Future Directions**

At the March 2002 meeting of the Advisory Committee, DTSC was advised to discontinue the stakeholder-based petroleum refinery project, based upon the uncertainty of the critical profile release. The draft workplan for DTSC ' s petroleum industry project was therefore deleted in this document.

DTSC has selected the semiconductor industry as a replacement " large industry " project under SB 1916. At the time this report was finalized, the new project was under development, for implementation beginning July 1, 2002. The final semiconductor industry pollution prevention workplan will be described in an addendum to this report. DTSC will continue to work with the petroleum refining industry to build on the relationships and expertise built over the past few years. Several refineries have expressed interest in working with DTSC on pollution prevention initiatives.

## **Section 2: Vehicle Service and Repair Industry Project Workplan**

This section describes the actions that will be undertaken by DTSC to:

- continue the pollution prevention outreach work with the vehicle service and repair industry that began in 2000, and
- begin additional work that will include pollution prevention outreach and education to fleet operators.

### **Background**

DTSC staff established training and technical assistance outreach to local governments and small and medium businesses through the Vehicle Service and Repair Project that began in July 2000. Staff currently work with local government programs such as Certified Unified Program Agencies (CUPA), city environmental agencies, sewer and storm water agencies, regional air quality agencies, and business assistance groups to reach vehicle service and repair facilities and fulfill the commitments made in the work plan for fiscal years 00/01 and 01/02.

The services provided by vehicle service and repair shops and fleet maintenance facilities include general vehicle repair and maintenance, smog testing, radiator, brake, and transmission services. Typical hazardous wastes generated by the vehicle maintenance and repair industry are used oil, oil and fuel filters, waste antifreeze, lead acid batteries, waste solvents, oil/water separator liquid and sludge, and contaminated absorbent and shop rags. Vehicle service and repair facilities can release solvents, oils, battery acid, and metals to the environment through the air, ground, sewer, and storm water drain. Activities that may cause environmental releases include improper management of an oil/water separator, spills and storm water runoff, and the use of petroleum-based cleaning solvents. Poor shop practices and lack of training on hazardous materials handling and management may be the underlying cause of some of these releases. There is a significant potential for harmful releases in this industry and there are a large number of facilities in California. There are opportunities to effect positive changes by a large number of operators by implementing of P2 methods.

### **Project Goal**

The goal of the Vehicle Service and Repair Project is to reduce environmental and human health impacts of vehicle service, maintenance and repair operations within California by changing the behaviors and practices of the industry to those that promote:

1. Increased awareness of pollution prevention techniques;
2. Increased compliance with existing environmental laws and regulations; and
3. A commitment to protect public health and the environment.

The goals for this workplan (2002 — 2004) remain the same; however, the work strategies will shift. In 2000-2002 training and assistance was provided directly by DTSC staff to shops and local government staff and fleet managers. For the 2002 —2004 period the program focus will shift to working with large California organizations, such as Ford, NAPA Auto Parts and California State Automobile Association, to have them adopt the program and provide training to their affiliates with support provided by DTSC and local government staff. For fleet maintenance facilities, work will focus on outreach and education to government and private fleet operations.

One of the major focuses for this workplan will be the development of partnerships with large private companies so that they will adopt DTSC ' s P2 philosophy and training and continue the work beyond the project life. In doing so DTSC ' s private and public partners will create a sustainable pollution prevention program within each of their organizations.

### Training Workshop Survey Results

- 680 people attended training session: 52% responded to surveys distributed;
- familiarity with P2 workshop topics: 23% of responders were not familiar with the topics; 53% were somewhat familiar;
- DTSC received positive responses to the questions on whether operators would consider implementing one or more VSR Best Management Practices (BMP). For example:
- aqueous parts cleaning: 27% said they were currently using aqueous parts cleaning and 42% said they would consider converting to aqueous parts cleaning in the future;
- aqueous brake cleaning: 45% of responders were using aerosol brake cleaners: 38% would consider using aqueous brake washing system;
- reusable oil filters: 3% are currently using, 27% said they would consider using them; and
- oil-life extension: 9% are currently analyzing oil and extending time between oil changes, 26% would consider using this method.

### Strategy

During fiscal years 2002-2004, DTSC will employ 4 main strategies:

1. outreach to affiliated shops,
2. outreach to private and public fleets operations,
3. P2 curricula distribution to community colleges and other technician training programs, and
4. measurement.

The activities involved in each strategy are described in the following sections.

#### *Strategy 1 Outreach To Affiliated Shops*

The term " affiliated shops " is used to describe the individual shops that can be reached by working with a larger parent company or organization (i.e., Ford Motor Corporation, California State Automobile Association). The characteristics that make companies attractive partners for this project are that they:

- are nationally known;

- have many statewide affiliate shops;
- have the ability to impose environmental requirements or influence their affiliated shops to adopt environmental programs; and
- have expressed interest in adopting the program.

DTSC is working with the California State Automobile Association, Ford and Lincoln Mercury, and NAPA Auto Care. In fiscal years 02/04, the emphasis will be on institutionalizing P2 training and program implementation within the large private partner organizations. During the 02/04 period, the steps that DTSC ' s partners will be encouraged to take are to:

- adopt the P2 program at the corporate level;
- agree to take responsibility for the initial training at their affiliate shops; and
- expand the implementation of pollution prevention options at other affiliated shops.

Incentives for shops to participate in the program will include internal P2 recognition certificates for those shops that complete training and implementation. Ultimately, DTSC ' s partners will assume ownership and management of the project to sustain the training program that they have developed with DTSC as their own internal P2 program.

DTSC plans to build on the initial P2 workplan ' s successes with Ford, NAPA Auto Parts and the California State Automobile Association to reach the following objectives for fiscal years 02/04:

- make training available to 3,000 affiliate shops; reach 20 percent (600 shops);
- Ford and Lincoln/Mercury - expand to reach 300 dealership service centers;
- California State Automobile Association - expand outreach to 800 southern California member shops; and
- NAPA Auto Parts - expand to 1,000 shops.

DTSC plans to add additional partners who have expressed interest in committing to the program (i.e., Toyota, Honda, Standard Oil, Shell, Pep Boys, Snap-On Tools, and Auto Zone).

### **Corporate Partnership**

Ford/Lincoln Mercury has introduced our program to its Asset Program in California. The Asset program is Ford ' s community college auto repair technician training program, which is based at Cerritos, Riverside, Cuyamaca, Evergreen, and Cosumnes community colleges. Ford is interested in introducing DTSC ' s program to the individual Asset coordinators with the possibility of making DTSC ' s training a permanent part of the curriculum, providing an opportunity to coordinate with the P2 curriculum that has been developed by Shasta College and to introduce the Shasta curriculum with our program training video and tool kits to the Asset program.

### **Marketing the Vehicle Service and Repair Project**

The Sacramento County Business Environmental Resource Center Pollution Prevention Award for 2001 was presented to the California State Automobile Association (CSAA) of Northern California on September 18, 2001. CSAA was successfully nominated by DTSC staff for the award. CSAA ' s Car Care Plus facility was previously recognized by DTSC Director Ed Lowry as a model pollution prevention vehicle service and repair facility. DTSC staff worked with CSAA to improve its facility design, management practices, and employee training. DTSC ' s recognition was for industry leadership and commitment to pollution prevention.

Two articles highlighting the DTSC Vehicle Service and Repair Pollution Prevention Program, and Ford ' s adoption of the VSR P2 Program, were published in the September 3, 2001 issue of " Automotive News " . This publication, which reaches one third of the auto repair shops in the United States, is considered the premier auto repair industry trade journal.

### Local Government Support

Effective outreach to vehicle service and repair shops depends on the participation of DTSC 's local government partners. Employees from ninety different local government regulatory agencies, including water quality, hazardous waste, air quality and waste water agencies have attended past vehicle service and repair training. Most of the local agencies that have received the DTSC P2 training have used this project to incorporate P2 into their local programs. For fiscal years 02/04, DTSC staff will provide support to those local agencies that volunteer to provide a more participatory role in conducting outreach to affiliated shops, through activities such as inspections, site visits and attending local industry conferences and meetings. The support from DTSC to local agencies consists of providing training and materials, including oil-absorbing mops, fact sheets, posters, and electronic versions of these documents for individualized use.

### Local Government Green Business Program

The vehicle service and repair project team will work with the Bay Area Green Business Program<sup>2</sup> so that shops that implement the P2 practices may ultimately achieve Green Business Program certification and the recognition that comes with it.

### *Strategy 2 Outreach to Private and Public Fleets*

In response to the Pollution Prevention Advisory Committee 's recommendation to expand the vehicle service and repair program, DTSC decided to include fleet maintenance operations in its outreach and education strategy to reach larger shops that generate larger quantities of waste than small shops. Fleets were chosen because of the following:

- fleet operations have resources and potential to be models for other independent shops;
- fleets have the potential for greater implementation of P2 options because of larger volume of work;

### **DTSC/Local Government Vehicle Service and Repair P2 Projects**

Santa Monica Industrial and Storm Water Program: project work includes baseline site visits and surveys (some have been completed); training workshops; and follow-up on-site and phone surveys for data collection of results.

Cities of Long Beach/Signal Hill Joint Powers Agreement (CUPA): one workshop has been completed; more training by DTSC and CUPA staff is planned; shop visits by CUPA staff; and on-site and in-training surveys to track results.

City of Los Angeles Hazardous & Toxic Materials Office, Environmental Business Assistance: conducting outreach program with DTSC supplied materials, mops and floor clean-up posters. Project includes tracking implementation results.

Santa Clara County Environmental Health Department (CUPA): CUPA staff has received training and materials from DTSC; providing mops and materials during on-site visits.

Some of the local agencies and programs that have received mops and tool kits to use as outreach tools: Cities of San Leandro, Pomona, Hesperia; counties of Alameda, Sonoma, Riverside, Los Angeles; East Bay Municipal Utility District; Central Contra Costa County Clean Water Program.

<sup>2</sup> More information on the Green Business Program is on page 18.

- fleets have a high level of interest in P2 because of the potential for high returns on the initial investment; and
- DTSC expects that working with fleets will allow staff to collect more complete measurement data.

There is potential to effect changes in more than 650 city, county and state fleets and numerous private fleets in California. For this workplan, DTSC will work with state agency fleets, local government fleets and private company fleets. In order to maximize staff resources, DTSC 's work with fleets will be categorized into three levels:

#### 1. Level 1 Outreach

- means that relatively little staff time is used to distribute broad-based information to a majority of the fleets in the state;
- will include working with industry organizations to distribute general information to as many of their members as possible, including:
  - providing industry newsletter articles, and
  - presenting at statewide conferences;

Upon receiving information, interested fleet operators will contact DTSC for further assistance.

#### 2. Level 2 Outreach

- means that additional staff work is dedicated to provide training to individual groups (generally 10-15 people); this work includes:
  - providing half-day training sessions, and
  - presenting information at local or regional industry meetings.

As a result, interested fleet operators will come forward to complete additional work, such as on-site technical assistance.

#### 3. Level 3 Outreach

- Greatest time invested by staff providing on-site technical assistance to fleet operator and technicians, for example:
  - assisting in policy and program development;
  - providing on-site staff training to implement P2;
  - assisting with on-site waste assessments; and
  - providing on-site training to conduct waste assessments.

#### State Agency Fleets

During the 2000-2002 work period, state agencies that operate fleets were introduced to the vehicle service and repair project and how DTSC staff may assist them. In the 2002-2004 period, the ten state agencies that operate fleets will have the opportunity to develop pollution prevention plans, and adopt policies that will institutionalize P2 practices within their operations. In this plan, they will eventually become role models for local government and private fleet operations. DTSC staff will work with volunteering state agency fleets providing level 3 assistance (see above). Beginning in the first six months of fiscal year 2002, staff will assist state government fleets to conduct on-site waste assessments to evaluate P2 opportunities at their facilities. The remainder of the year will be spent providing technical assistance to help facilities

implement pollution prevention opportunities identified in the waste assessments. Staff will use the success stories to write up case studies and make them available to interested parties.

#### Local Government Agency Fleets

There are more than 650 city, county and special districts that maintain vehicle and equipment fleets in California. DTSC staff will provide level 1 assistance to inform as many local agency fleet operators as possible of the availability of resource materials. Staff will work with industry associations such as the California County Fleet Managers Association, the Public Fleet Supervisors Association, and the Municipal Equipment Maintenance Association throughout 2002-2004 and plans to:

- attend association chapter meetings and conferences; and
- provide publications, and write articles for newsletters.

Using the experience gained from implementing P2 with state agency fleets, staff plans to provide levels 2 and 3 assistance to local agency fleet managers with the following steps:

- work with the local government P2 programs to provide training to their local government fleets;
- identify at least one large and one small municipal fleet volunteer not implementing P2; and
- work with them to adopt at least two recommended practices:
  - aqueous parts cleaning, and
  - dry floor clean-up.

Additionally, staff will provide training and assistance through ongoing projects for local agency fleet operators, such as the California Integrated Waste Management Board 's School District Resource Guide project. For the School District Resource Guide project, the California Integrated Waste Management Board has developed a resource guide for school districts to help them implement source reduction, reuse, and recycling programs. DTSC staff provided review and comments on the fleet transportation section of the resource guide and agreed to provide training for school district fleet managers and technicians as part of the project.

#### Private Fleets

Concurrent to working with local agency fleet operators, staff will conduct level 1 outreach to private fleet operators. Training will be provided to groups as requested. Staff will provide level 3 assistance to at least one private fleet company, such as Federal Express, that has expressed interest in the Vehicle Service and Repair Project. The project will consist of an initial assessment of current practices at the fleet maintenance facilities; and providing technical assistance to allow the companies to adopt the recommended practices. A select number of fleets may be featured as models for other fleets to follow.

#### *Strategy 3 Curricula Distribution*

Trade schools, community colleges, high schools and Regional Occupational Programs offer automotive technician training and certification programs. Most of the vocational programs include some training in hazardous materials management as well as automotive service and repair. The California Integrated Waste Management Board and DTSC have contracted with instructors at Shasta College to develop P2 curricula and waste management for automotive repair that can be used by instructors at any of these programs. The deliverables expected from

the DTSC contract are course curricula that includes an oil-testing lab, an on-line course, and certification through the Automotive Service Excellence training and certification program. The P2 curricula development and an oil-testing lab will be completed by July 2002.

The activities planned for the 2002-2004 period include:

- distributing and promoting the use of the vehicle service and repair P2 curricula to schools,
- developing electronic on-line vehicle service and repair P2 course, and
- obtaining Automotive Service Excellence certification for completion of the vehicle service and repair P2 course.

The planned completion date for the electronic course and Automotive Service Excellence certification is July 2003. Currently, DTSC is working with Ford to recommend using the curricula in their technician training certification program, ASSET. In 2002-2004, DTSC staff will continue working with Ford as well as other corporate partners that have certified technician training programs, such as Toyota and Honda.

#### *Strategy 4 Measurement*

By July 2002, staff will have collected data and completed an analysis for the training and outreach work performed during the first two years of the project (2000-2002 period). Staff are currently conducting surveys to determine the level of P2 practices implemented and from those results, estimate quantifiable results, such as the amounts of waste reduced and cost savings. The 2000-2002 results will be important to demonstrate to businesses and corporate partners the benefits that result from implementing P2 practices. DTSC will present the project results to fleet and automotive industry associations at their conferences and in newsletter articles to promote these benefits. Positive results will also be used to show local agencies that they can use P2 methods as a tool when working with facilities under their jurisdiction. DTSC will present the project results at the statewide Certified Unified Program Agency conference and the Western Regional Pollution Prevention Network 's annual conference to demonstrate that instituting a P2 program can help local environmental agencies to achieve their compliance and community goals. Additionally, DTSC will present project results to the members of the various local government P2 committees that are part of the California Consortium of Pollution Prevention Committees.

During 2002-2004, local government staff, in partnership with DTSC staff, will continue the data collection projects, building upon the 2000-2002 measurement results. These include municipal fleets as well as independent shops using follow up surveys and site visits in partnership with local governments that have sponsored P2 training workshops. For the fleet project, DTSC will conduct initial and follow up surveys of state agency, local government and private fleets. On-site surveys will be conducted to determine quantifiable results at a small number of facilities and the overall results will be estimated.

The following are measurements that will be used to judge the effectiveness of the outreach and education efforts for the 2002 — 2004 workplan period. Three types of measures will be used as indicators of success:

1. number of shops/fleets reached with the training programs and training materials;

2. number of shops that adopt and implement specific P2 practices; and
3. number of corporate or agency partners who have agreed to adopt the vehicle service and repair P2 program and/or training materials.

### Goals

The training and implementation goals are as follows.

#### **Strategy 1, Outreach To Affiliated Shops:**

- make training available to 3000 affiliated shops and reach 20%; and
- make training available to 500 non-affiliated shops and reach 20%

#### **Strategy 2, Outreach to Private and Public Fleets:**

- work with the 10 state agencies that operate fleets;
- make training available to approximately 100 local government fleets and reach 20%; and
- make training available to 50 private fleets and reach 50%.

#### **Strategy 3, Curricula Distribution:**

- make curricula available to all automotive repair programs at approximately 70 community and technical colleges; and
- fifty percent of community colleges adopt the curricula.

## **Section 3: Mercury Challenge for Hospitals Voluntary Pollution Prevention Program**

Senate Bill 1916 requires that DTSC " develop a low-cost voluntary program to further reduce generation of hazardous waste by large businesses in California . . . designed to promote cooperative relationships between California business and the department, while creating a significant environmental benefit from reduced hazardous waste generation. " DTSC determined, during discussions with the Pollution Prevention Advisory Committee, that a mercury challenge for hospitals would be most appropriate for implementation.

### **Background**

In 1998, DTSC published the " Pollution Prevention Guide for Hospitals. " This was the result of reviewing Source Reduction Evaluation Plans and Reports from twenty-nine hospitals that produced more than 12,000 kilograms (13.2 tons) of hazardous waste or more than 12 kilograms (26 pounds) of extremely hazardous waste in 1990 [Hazardous Waste Source Reduction and Management Review Act of 1989 (SB 14)]. This document discusses pollution prevention for hazardous wastes generated by hospitals, including mercury, which is considered to be an extremely hazardous waste, and also includes case studies.

On June 24, 1998, the American Hospital Association and U.S. EPA, in consultation with Health Care Without Harm, a group representing 80 nongovernmental organizations, reached a landmark agreement to work in voluntary partnership to virtually eliminate mercury waste generated by hospitals by 2005. The American Hospital Association is a national organization that represents and services nearly 5,000 hospitals, healthcare networks, and their patients and communities.

In 1999, the California Department of Health Services, which regulates medical waste, received a Pollution Prevention Incentives for States grant to develop pollution prevention programs at six San Francisco Bay Area hospitals with the intent of transferring the lessons learned to other healthcare facilities. DTSC augmented these efforts with SB 1916 funds by contracting with the Department of Health Services to conduct mercury audits at these hospitals and develop a "Guide to Mercury Assessment and Elimination in Healthcare Facilities. " This guide provides tools for hospitals to conduct their own mercury audits and demonstrates that viable mercury-free substitutions can be made. Removing mercury from incineration is a major goal of eliminating mercury from hospital waste streams.

Since 1999, DTSC has also participated in the Healthcare Pollution Prevention Workgroup that meets monthly in Oakland. Members of this workgroup include nongovernmental organizations (such as Commonweal, Health Care Without Harm, etc.), local governments, U.S. EPA, the California Integrated Waste Management Board, the Air Resources Board, the Department of Health Services, hospitals, consultants, the American Nurses Association, and several other groups. The workgroup shares its knowledge and successes with implementing pollution prevention in hospitals.

## **Project Goal**

The project goal will be the virtual elimination of mercury in California hospitals. The Environmental Leadership Council (American Hospitals Association/U.S. EPA Council) approved definition for virtual elimination (as it applies to mercury under the American Hospitals Association/U.S. EPA memorandum of understanding) is " the elimination of the disposal or improper discharge of mercury from a facility and the replacement of existing products which contain mercury with those that are mercury-free or as mercury-free as possible."

## **Strategy**

DTSC has met with the Department of Health Services because of previous mercury elimination work with them and they are willing to partner with us on this project. Other partnerships will be explored.

A challenge to become a mercury-free facility by 2005 will be issued to California hospitals with a letter and toolkit. DTSC will use the definition for a general acute care hospital under Health and Safety Code Section 1250(a) to define a hospital in this project. The toolkit will contain the "Guide to Mercury Assessment and Elimination in Healthcare Facilities." This guide contains a listing of mercury-containing devices in a healthcare setting, a list of licensed mercury recyclers or other take-back programs and access to a spreadsheet to assist in accounting for specific mercury sources within individual facilities.

Pledges will be issued to those hospitals willing to announce they are working to become a mercury-free facility. The Department of Health Services will certify when a hospital has taken the appropriate actions to become mercury-free. Certificates will be presented to those hospitals that successfully eliminate mercury sources for which there are replacements and a plan for properly dealing with other sources upon removal or when alternatives become available.

## **Timelines**

### *JANUARY 2002 - JUNE 2002*

Explore other partnerships for this project and how they will participate.

### *JULY 2002 - DECEMBER 2002*

Develop challenge letter, mailing list, and toolkits. Mail challenge letter and toolkits.

### *JANUARY 2003 - DECEMBER 2003*

Provide assistance to hospitals, and explore measurement possibilities and data collection.

### *JANUARY 2004 - DECEMBER 2005*

Continue to provide assistance to hospitals and collect data to measure project success. Work to see that all California hospitals are mercury-free by 2005.

## **Measurement**

The project will measure how many hospitals take the initial pledge, how many hospitals become mercury-free, and how much mercury is removed.

## **Section 4: Other DTSC Pollution Prevention Activities**

### **Implementation of The Hazardous Waste Source Reduction and Management Review Act**

The Hazardous Waste Source Reduction and Management Review Act (aka " SB 14 " ) requires that larger quantity generators evaluate source reduction opportunities and report on accomplishments every four years. The most recent SB 14 documents the Source Reduction Plan, the Hazardous Waste Management Performance Report and the Summary Progress Report were due September 1, 1999.

The four-year planning horizon within SB 14 causes DTSC ' s work in this area to be cyclic in nature. During the first two years after the plans are due, DTSC gathers data and assesses industries source reduction efforts. During the year before plans are due, DTSC focuses on outreach to alert the regulated community that plans are again due the following year. Every year, DTSC makes presentations related to SB 14, answers generator questions and/or provides training.

#### *Summary Progress Report Follow-up*

Prior to 1999, facilities subject to SB 14 were not required to submit any source reduction documents to DTSC unless DTSC specifically requested them. In 1998, a statutory change instituted the " Summary Progress Report, " with a requirement for all businesses subject to SB 14 to submit their Summary Progress Report to DTSC. For the first time, generators were required to prepare and submit documents indicating compliance with SB 14. This has enabled DTSC to more accurately determine the number of facilities that are covered by the program, identify facilities that have not complied with SB 14, and identify facilities that are no longer required to report.

For the recently-completed SB 14 reporting period, DTSC used information compiled from the submission of Summary Progress Reports to identify facilities that were not in compliance with SB 14 reporting requirements. DTSC mailed non-compliant generators notices informing them of their SB 14 status and their reporting requirements. The initial letter was sent to approximately 5,200 facilities. A follow-up letter was sent to 3,000 that did not respond to the first letter. (This effort was coordinated with the local-level Certified Unified Program Agency generator inspection activities.)

As part of the effort, staff has responded to hundreds of phone calls, received and logged Summary Progress Reports and prepared correspondence continuing through the first quarter of 2002. Of the 1,100 facilities that remain, the 300 non-compliant businesses generating the largest quantities of waste have been identified for possible future enforcement actions, which may include the assessment of penalties<sup>3</sup>.

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<sup>3</sup> The top 300 non-compliant facilities that have been identified for possible future enforcement action represent approximately 80+ percent of the total hazardous waste generated by the 1,100 current non-compliant facilities. Also, many of the remaining facilities in the group of 1,100 may be exempt from the SB 14 program.

Final SB 14 enforcement results to date are still pending, but currently our records show:

- approximately 1,800 facilities submitted SB 14 documents/Summary Progress Reports;
- approximately 2,300 facilities self-certified as exempt from SB 14 requirements due to closure, exempted waste streams, small quantity generators, etc.

To follow up on self-certified exempt facilities, DTSC has initiated a pilot project within Orange County. The purpose of the project is to determine which claims are valid and take appropriate action to ensure filing or enforce against facilities filing invalid certifications of exemption from SB 14. By evaluating manifest and permitting records, DTSC determined that approximately 15% of the 173 identified facilities' exemption claims are potentially invalid. Further communication with these facilities must be undertaken to determine the basis for the facility's self-certification, and to finally determine whether these facilities' exemption claims are valid. DTSC plans to expand the pilot project to cover all 2,300 generators who claimed exemption by coordinating with the appropriate Certified Unified Program Agency officials to communicate our findings to date and determine their interest in participating in efforts to follow up with these facilities.

As facilities submit their SB 14 documents, DTSC staff conduct completeness reviews. Facilities were contacted regarding these reviews and the SB 14 program. With the current enforcement project nearing completion, three goals have been achieved:

- increased awareness of source reduction and the SB 14 program,
- increased SB 14 compliance, and
- refinement of the SB 14 database.

DTSC intends to continue this enforcement process through the next SB 14 reporting cycle, which begins in September 2003.

#### *Source Reduction Plan Reviews*

A major task under SB 14 is the source reduction plan review process. This involves determining which industries to target for study, developing lists (with names, addresses and phone numbers) of generators within the target industry sectors, and formally requesting submittal of their plans and reports. The purpose of the review is twofold: to assure compliance and to identify viable source reduction alternatives that can be shared throughout the industry. During fiscal year 00/01, DTSC did not call in any industry categories as envisioned in the previous workplan. Formal requests for documents began in the late fall/early winter of 2001 with the review process continuing for the remainder of the fiscal year and the first half of fiscal year 2002/2003. Staff will then prepare fact sheets, reports, and other documents to share findings for the particular industry sector that has been targeted.

#### *New SB 14 Reporting Cycle*

Commencing in fiscal year 02/03, the emphasis of the program will shift from plan review and compliance to preparatory activities associated with the development of the next set of plans,

which are due September 2003. During the fall of 2002, the SB 14 Guidance Manual will be updated and reprinted. It is not anticipated that this will be a major effort as there have been no statutory changes to SB 14 or the implementing regulations during the last four years. The plan reviews conducted during the latter half of 2002 and early 2003 will be "completeness checks" rather than technical reviews to identify pollution prevention opportunities. The generators will be informed of any deficiencies noted in their planning documents and instructed to address these problems in the new plans that must be prepared by 9/1/04. This ensures better-quality planning efforts in the new planning cycle, and eliminates the circumstance that would ask a generator to go back and revise three- to four-year-old documents resulting in "planning" for a time period that is nearly over.

Between January and September 2003, staff will conduct extensive outreach to the regulated community. This will, at a minimum, include sending written notification to every generator subject to SB 14 reminding them of the requirements. These workshops and presentations are designed to alert the regulated community to the SB 14 requirements and remind them of the upcoming compliance date for source reduction plans, hazardous waste management reports, and summary Progress Reports. Staff will also work extensively with and through the local-level hazardous waste program enforcement agencies (Certified Unified Program Agencies, or CUPAs) to make sure this generator requirement is complied with fully.

**Table 1: SB 14 Implementation Workplan Summary**

Activities	Outputs	Comments
<b>1. Outreach &amp; Education</b> -Organize and conduct training -Make presentations -Respond to inquiries	As requested or when DTSC determines need --increased compliance with SB 14 --increased quality of SB 14 efforts	Major efforts start with revisions to the Guidance Manual in the fall of 2002. Extensive outreach Jan-Sept 2003.
<b>2. SB 14 Document Request and Review</b>	--analyze data for targeting --technical review and analysis of approximately 100 source reduction plans --remote and onsite technical assistance, as needed --enforcement follow-up when necessary --results analysis --report preparation and distribution	New Source Reduction Plans and Reports are due Sept 2003
<b>3. CUPA Assistance</b> -Technical assistance -Training	--cooperation of CUPA hazardous waste inspectors to promote P2 and SB 14 compliance --increased CUPA inspector capacity to review/enforce SB 14 plan requirements; --respond to CUPA requests for information, referrals	
<b>4. Summary Progress Reports (SPR)</b> -Summary Progress Report follow-up -Analyze and compile data	--increased compliance with SB 14 --publish results of SPR data analysis	

Following September 2003, efforts will be directed towards compiling the submitted summary progress reports and following up with the larger generators who did not submit the required documentation. Starting around January 2004, DTSC will commence a new round of industry source reduction plan technical review.

### **Local Government Support**

California's regulatory structure places much of the day-to-day work with businesses, especially hazardous waste generators, at the local government level. For this reason, DTSC has consistently placed a high value on building and supporting local government pollution prevention programs. DTSC's efforts in this area focus primarily on information transfer and assistance, especially through work with seven regional pollution prevention committees that have been established to facilitate communications between local programs. Local programs participating on these regional committees include sewerage agencies, local fire departments, air districts, environmental health programs, household hazardous waste collection programs, storm water run-off programs and regional water quality control boards. The regional committees typically meet on a bi-monthly basis. DTSC staff attend the meetings to share information between committees, as well as present information from DTSC and Cal/EPA.

#### **Supporting Local Pollution Prevention Programs**

During 2000-2001, DTSC:

- participated in over 25 workgroup meetings designed to foster and support local government pollution prevention efforts
- co-sponsored National Pollution Prevention Week, in which over 120 local agencies conducted P2 events in their communities. DTSC printed and distributed the very popular P2 Week posters and t-shirts for the event.
- participated in the Cal-CUPA forum and met with over 90% of the 70 Certified Unified Program Agencies to discuss and encourage pollution prevention.
- provided ongoing support for the Bay Area Green Business Program
- participated and co-sponsored the Western Regional Pollution Prevention Network, including co-sponsoring the annual pollution prevention conference, which was attended by over 250 people in 2001.

DTSC also assists in sponsoring and coordinating the annual local government pollution prevention conference. For the last two years, this has been combined with a U.S. EPA Region IX-supported Western Regional Pollution Prevention network conference. In 2001 this event also partnered with the California Water Environment Association.

Pollution Prevention Week (September 16-22, 2002 and September 17-23, 2003) is expected to continue and grow. DTSC will participate by developing and distributing posters, information packets, press releases, and other support materials to local pollution prevention programs.

**Table 2: Local Government Support Workplan Summary**

<b>Activities</b>	<b>Outputs</b>	<b>Comments</b>
<p>1. <b><u>Support Local Committees</u></b>            -Attend regular meetings of 7 regional local govt. P2 committees            -Technical support (publish/distribute minutes, etc.)            -Establish new regional committees when appropriate (e.g., San Diego area)            (Also see Regulatory Integration)</p> <p>2. <b><u>Pollution Prevention Week</u></b>            -Prepare &amp; distribute materials            -Work with East Bay Municipal Utility District on poster; print &amp; distribute            -Prepare DTSC press release,            -Track &amp; catalog events/results</p> <p>3. <b><u>Annual Conference</u></b>            -Work w/ committees on agenda topics            -Coordinate with WRP2Net on event logistics            -Assist in securing speakers            -Attend conference            -Distribute results</p> <p>4. <b><u>Bay Area Green Business Support</u></b>            -Attend periodic meetings            -Provide technical support on targeted industries            -Review industry-specific criteria</p> <p>5. <b><u>Bay Area Capacity Assurance Committee</u></b>            -Participate in Committee meetings            -Assist Association of Bay Area Governments staff in identifying potential projects and/or problem waste streams as candidates for P2 activities</p>	<p>-- support of dozens of California local agencies that provide pollution prevention assistance and information to businesses            --ongoing training for several hundred local P2 staff            -- increased multi-media coordination by working with local and regional P2 programs across all environmental media</p> <p>--publish and distribute 1,500 posters that local govt. staff post in hundreds of public locations statewide            --facilitate and participate in one week of statewide activities during Sept.16-22, 2002, to promote P2 (over 100 events statewide)</p> <p>--training/conference/coordination opportunity for 150 local, state and federal P2 staff across California</p> <p>--strengthened local government efforts to promote P2 to small businesses and to communities by recognizing green businesses.</p> <p>--improved coordination with local government            --shared information</p>	<p>The Bakersfield P2 Committee was added in fall 2001. The San Diego Committee may be multi-national (see Border Activities)</p> <p>DTSC s lead is in the Office of External Affairs</p>

At the DTSC regional level, DTSC has been funded through its RCRA<sup>4</sup> grant to support the Bay Area Green Business Program. This is an ongoing demonstration project managed by the Association of Bay Area Governments to show how market forces can encourage more pollution prevention implementation. Local governments in the San Francisco Bay area have developed industry-specific standards that include both compliance and pollution prevention elements.

"Green businesses " that meet the standards are given recognition by the local government and promoted to the public as a preferable place to conduct business. DTSC provides technical support to the program and assists with technical detail and coordination between various state and local regulatory agencies.

Closely associated with the Green Business Program is our work with the Association of Bay Area Governments ' Tanner Hazardous Waste Capacity Assurance Committee. DTSC works with staff of the Association of Bay Area Governments to identify and recommend possible targets or projects for local governments that could reduce the demand for additional hazardous waste facilities, through reducing the generation of hazardous waste.

### **Integrating Pollution Prevention into Regulatory Programs**

To be successful, pollution prevention must be viewed as a legitimate tool to be used by the regulatory programs to achieve their mission of protecting public health and the environment. One of the biggest challenges for DTSC ' s Office of Pollution Prevention and Technology Development, as well as one of the biggest opportunities, is to help DTSC build P2 into the mainline regulatory programs of DTSC. This includes inspections, enforcement, permitting, regulation development and the activities of the local-level hazardous waste regulatory agencies, which are overseen by DTSC ' s Hazardous Waste Management Program. The challenge is to change the way P2 is viewed and make it a part of the core program activities, making it a tool that can be used at the appropriate time and place, while recognizing that it may not be appropriate for application in all situations. To be fully integrated, P2 cannot be seen as more work that is piled upon the existing workload.

The long-term goal for integrating P2 into DTSC ' s regulatory programs is to assure that every interaction, whether permitting, inspections, enforcement, fee, regulations reform, technical assistance, etc., that DTSC has with the regulated community sends a consistent message about the value P2 as a highly desirable approach for protecting public health and the environment.

A relatively new project is the work between DTSC ' s Hazardous Waste Management Program and its Hazardous Materials Laboratory to investigate and assess the potential health effects of brominated flame retardants. As a part of this effort, DTSC is looking at uses, exposure potential and alternatives. DTSC ' s regional office

#### **Jewelry Marts and P2**

DTSC ' s Office of Pollution Prevention and Technology Development staff are working with DTSC ' s Hazardous Waste Management Program to address compliance problems with jewelry marts in Los Angeles. P2 staff researched and developed a fact sheet on pollution prevention for jewelry marts, including information on cyanide alternatives.

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<sup>4</sup> RCRA, the " Resource Conservation and Recovery Act, " is the federal law governing the classification and management of hazardous waste. States authorized to implement this federal program receive funding through grants, in this case, the RCRA grant.

P2 seniors are working with the Integrated Waste Management Board to keep local and regional government concerns around e-waste collection and recycling at the forefront of national discussions on product stewardship in this sector. Regional seniors are also working to provide information on e-waste handling options to a wide range of local stakeholders, including county and municipal recycling coordinators, household hazardous waste collection facilities, landfill operators, and local elected officials. In addition, regional staff participate in a Cal/EPA multi-agency scientific workgroup and US EPA Region IX project exploring scientific and regulatory issues around the use of polybrominated diphenyl ethers (PBDEs) as flame retardants in consumer electronics. This is a part of a larger issue of electronic waste (e-waste), including computer monitors.

**Table 3: P2 Regulatory Integration Workplan Summary**

<b>Activities</b>	<b>Outputs</b>	<b>Comments</b>
<p><b>1. <u>Regional P2 Support</u></b>            --Provide training and assistance to local-level hazardous waste enforcement agencies (CUPA) and DTSC ' s Hazardous Waste Management Program staff            --Build pollution prevention into CUPA evaluations            --Provide support on supplemental environmental projects.            --Distribute information to regional offices</p> <p><b>2. <u>Inspections and Enforcement</u></b>            --encourage state and local inspectors to discuss and promote P2 during site visits            --Maintain inventory of P2 supplemental environmental projects            --Provide support on individual supplemental environmental projects</p> <p><b>3. <u>Technical Assistance on Regulatory Problems</u></b>            --Work with HWMP to make P2 a part of the solution to regulatory problems            --Continue to work with HWMP on regulation packets to encourage the incorporation of P2            --Work with HWMP and the Hazardous Materials Lab on the issue of brominated flame retardants</p>	<p>--leverage resources; increased utilization of regulatory staff to promote P2            --training as needed and requested            --CUPA evaluations routinely include assessment of SB 14 compliance; P2 activity</p> <p>--CUPA enforcement includes implementation of supplemental environmental projects.            --increased capacity to promote P2 through inspection/enforcement activities            -- supplemental environmental projects. training as requested</p> <p>--inclusion of P2 information in DST ' s Hazardous Waste Management Program s technical reports and outreach materials</p> <p>--P2 staff will work on 3-5 regulation proposals over the 2 year period, but will likely see P2 incorporated into one or two regulations</p>	<p>Examples of this are Mercury Report released fall 2001 and jewelry marts efforts.            During the past two years we worked on the cyanide, and school wastes regulations.            This is related to e-waste and DTSC efforts with IWMB</p>

The last P2 workplan (00/02) discussed the development of a pilot project with DTSC ' s Hazardous Waste Management Program s Permitting Division to coordinate the review of SB 14

plans with permit renewal applications for " on-site facilities " (facilities that treat waste generated on-site, rather than solely treating and managing wastes from off-site clients). The pilot project, for a variety of reasons, did not occur. In the upcoming two-year period P2 staff will continue ongoing efforts to ensure that pollution prevention language is incorporated into DTSC's Permit Guidance Manual. P2 staff will also be available to work with enforcement staff to identify and evaluate supplemental environmental projects for use in settlements<sup>5</sup>.

### Technical Studies & Information Transfer

DTSC conducts, sponsors or participates in a variety of P2 projects designed to develop new information or to transfer existing knowledge to new audiences. During fiscal year 02/03, DTSC will continue to participate and support a partnership of the South Coast Air Quality Management District, the Los Angeles Sanitation Districts, and the Orange County Sanitation Districts designed to encourage businesses to evaluate and implement alternatives to volatile organic solvents. DTSC will work with these partners to distribute information regarding effective solvent alternatives and regulatory requirements.<sup>6</sup>

#### Chlorinated Solvents

DTSC has partnered with the South Coast Air Quality Management District and others to promote alternatives to chlorinated solvents, including co-sponsoring a series of workshops.

Another ongoing partnership project is with the Department of Health Services, which regulates medical waste. This started as a part of a federally-funded pilot project. The results were very positive and the Department of Health Services is now conducting outreach and education on a statewide basis. DTSC continues to serve in a consultative role.

Other activities related to development and transfer of information include providing on-site technical assistance; preparing new or updating existing fact sheets and other technical documents; and providing speakers or making presentations at conferences, meetings, training sessions or college classes.

DTSC's ability to respond to unsolicited requests for on-site technical assistance is limited by the availability of P2 staff. On-site assistance has not been a high priority for the P2 program, because of the high cost of working with individual generators versus the overall benefits to the state in terms of reduced waste amounts. Conversely, we make it a much higher priority to provide speakers and make presentations where we have the potential for reaching a much larger number of generators and on programs that can reach large numbers of generators (e.g., integrating pollution prevention into inspections) or programs such as SB 14 that provide incentives for reductions.

<sup>5</sup> A " supplemental environmental project " allows a facility undergoing enforcement to utilize a portion (no more than 25%) of a monetary penalty to perform specified pollution prevention projects or activities.

<sup>6</sup> The substitution of aqueous cleaners for petroleum-based solvents provides an excellent case-study example of the trade-offs between environmental media that can occur when evaluating and implementing less-toxic alternatives, including the need for the various medium-specific regulatory agencies to work together to come up with the " best" overall environmental solution. In addition, this work has direct applicability to the automotive repair industry project described earlier in this chapter.

**Table 4: Technical Studies & Information Transfer  
Workplan Summary**

<b>Activities</b>	<b>Outputs</b>	<b>Comments</b>
<p><b>1. <u>Solvent Alternatives</u></b>  --Manage contract  --Provide technical input on regulatory issues  --Print and distribute information</p> <p><b>2. <u>Mercury/Hospitals</u></b>  --Provide on-going support to the Department of Health Services on mercury in hospital issues</p> <p><b>3. <u>Internet Access</u></b>  --Format existing/new documents into an internet-compatible format  --Work with DTSC Office of Environmental Information Management to get information posted on DTSC web site  --Put special event notices on web site (i.e., P2 Week materials)</p> <p><b>7. <u>Provide Onsite Technical Assistance</u></b>  --Background literature search  --Conduct visit  --Follow-up recommendations</p> <p><b>8. <u>Technical Document Development</u></b>  --Research issue  --Prepare document  --Work w/ state printer</p> <p><b>9. <u>Presentations</u></b>  --Prepare materials  --Presentations</p>	<p>--identification of solvent alternatives  --resolution of possible regulatory barriers to use of less-toxic alternatives  --published report(s) on solvent alternatives  --increased awareness of alternatives to mercury use, leading to decreased use of mercury in hospitals</p> <p>--increased opportunity for industry and public access to technical P2 documents</p> <p>--5-10 site visits, as assistance is requested  --increased industry ability to reduce waste  --increased DTSC technical knowledge  --improved DTSC relationship with industry</p> <p>--3 documents</p> <p>--10-15 presentations, as requested  --increased awareness of P2 opportunities</p>	<p>Conducted in coordination with Department of Health Services</p> <p>This is in addition to site visits conducted as a part of facility SB 14 plan reviews</p>

DTSC Public Involvement and Outreach

DTSC ' s Pollution Prevention Advisory Committee was established by SB 1916 in fiscal year 1999/2000. During fiscal years 02/03-03/04, the Advisory Committee will continue to meet. It is anticipated that fewer meeting will be conducted in the upcoming years. Staff will also research areas of interest to the Committee and prepare progress reports on the status of efforts to implement this workplan, which was developed with the advice of the committee.

**Table 5: DTSC P2 Advisory Committee Support, Workplan Development, and Public Involvement Planning**

Activities	Outputs
<p>1. <b><u>P2 Advisory Committee staff support</u></b>            --Manage facilitator contract            --Prepare materials for advisory committee            --Facilitate and participate in Advisory Committee meetings            --Data analysis and refinement (for P2 progress measurement and future P2 targeting)</p> <p>2. <b><u>Prepare a report documenting accomplishments under the first two-year SB1916 workplan</u></b>            --Provide documentation on large and small business P2 projects</p>	<p>--ongoing opportunities for public awareness of and involvement in DTSC ' s P2 program            --refined Advisory Committee legislative recommendations            --ongoing staff support to Advisory Committee            -- progress reports on DTSC ' s implementation on the workplan            --research areas of interest to Advisory Committee            --understanding of hazardous waste data for targeting &amp; measurement purposes</p> <p>--Report will be prepared by September 2002</p>

**Other Activities**

DTSC performs a number of activities that do not easily fit into any one of the above categories. In general, these activities tend to be cooperative projects involving commitment of staff time to support projects for which DTSC ' s pollution prevention program is not the lead, but a supporting player. These include:

- coordinating with U.S. EPA Region IX ' s Pollution Prevention Team (quarterly meetings, review and comment on projects and deliverables, serving as speakers at U.S. EPA-sponsored workshops, etc);
- participating as one of the principals of the Western Regional Pollution Prevention Network (a consortium of pollution prevention programs within Region IX);
- attending U.S. EPA-sponsored Merit Partnership meetings (quarterly);
- conducting pollution prevention projects and activities along the California/Mexico Border (conferences, training, technical assistance (funded by the RCRA grant, up to \_ PY); and
- participating in national pollution prevention workgroups (e.g., National Pollution Prevention Roundtable, the Forum on State and Tribal Toxics Actions, the Association of State and Territorial Solid Waste Management Officials, etc.).

**Border P2 Training**

DTSC has conducted seven training session along the California/Mexico Border related to pollution prevention, parts cleaning, and vehicle service and repair.

The Pollution Prevention Branch provides assistance to DTSC ' s Technology Development Branch on certification projects involving P2 technologies, including participating in final review panels. Resources are also expended on reviewing proposed state and federal laws and regulations, preparing federal grant applications (Pollution Prevention Incentives to States, Resource Conservation and Recycling Act, etc.).

Because DTSC is not the lead organization on most of these projects, the level of resources that go into these projects tends to be limited by time and staff availability. Some of these projects may be quite deserving of more significant resource commitments if more staff time were available.

**Table 6: Other DTSC P2 Activities Workplan Summary**

Activities	Outputs	Comments
<p>1. <b><u>Coordination with EPA Region IX</u></b>            -Quarterly meetings            -Provide speakers at EPA events</p> <p>2. <b><u>Western Regional Pollution Prevention Network</u></b>            -Participate in Steering Committee meetings            -Assist in preparing reports for the federal grant            -Assisting in preparing grant applications</p> <p>3. <b><u>Merit Partnership/Strategic Goals Program</u></b>            -Quarterly meetings            -Comment on projects</p> <p>4. <b><u>Mexico Border</u></b>            -Assist DTSC border coordinator            -Attend state and regional committee meetings            -Identify targets            -Organize and conduct training            -Respond to inquiries            -Arrange for translations            -Provide information for grant reports</p> <p>5. <b><u>National Programs</u></b>            -Participate in NPPR conference (2)            -Participate in periodic ASTWMO meetings (2-3 per year)            -Participate in FOSTTA meetings (3 per year)            --For each of the above, review and comment on U.S. EPA proposals</p> <p>6. <b><u>Technology Certification</u></b>            -Participate on certification review teams            -Provide technical reviews and comments</p> <p>7. <b><u>Laws and Regulations</u></b>            -Review proposed laws and regulations from P2 perspective and provide comments</p> <p>8. <b><u>Grant Applications</u></b>            -Prepare grant applications for DTSC pollution prevention funding            -Prepare letters of support for others seeking grant funding</p> <p>9. <b><u>Dept of Commerce Loan Review</u></b></p>	<p>--ongoing coordination/communication with U.S. EPA P2 program</p> <p>--consistent and ongoing availability of P2 information, training and conference opportunities for CA local P2 programs.</p> <p>--increased knowledge of P2 within border facilities            --support to overall DTSC border efforts</p> <p>--consistent effort to include P2 as a primary element of environmental management system pilots.            --increased DTSC knowledge of national efforts            --continuing awareness of trends in environmental management and pollution prevention            --ongoing training opportunities            --DTSC input into national P2 initiatives</p> <p>--ongoing coordination between P2 and technology development            --exploit opportunities to promote P2 technologies</p> <p>--exploit opportunities to provide P2 incentives through regulatory processes</p> <p>--exploit opportunities to fund special DTSC or local-level projects through federal funding</p> <p>--increased availability of funding for facility P2 efforts</p>	<p>DTSC P2 staff work closely with U.S. EPA P2 staff to coordinate activities.</p> <p>This is an integral part of DTSC ' s support to California s local government P2 programs.</p> <p>This includes participation in multi-agency, multi-state or multi-national meetings.</p> <p>Also see regulatory integration</p> <p>--ensure loans are appropriate (P2, not treatment)</p>

## **Part III: Pollution Prevention Advisory Committee Activities**

The responsibilities of DTSC ' s Pollution Prevention Advisory Committee are described in statute:

1. Review and provide consultation and guidance in the preparation of this workplan<sup>7</sup>;
2. Evaluate the performance and progress of DTSC ' s source reduction program; and
3. Make recommendations to DTSC concerning program activities and funding priorities, and legislative changes, if needed.

In addition, Advisory Committee members are interested in a number of issues that are outside the scope of DTSC ' s pollution prevention program. To facilitate discussions in these areas, AC subcommittees were formed to frame specific issues, draft " problem statements, " and bring proposed recommendations to the full committee for discussion and possible ratification and transmittal to DTSC and/or Cal/EPA.

Subcommittees were formed to discuss the following topics:

1. "P2 at agency"
2. Pollutants of concern
3. "Multi-topics " subcommittee:
  - a. Agribusiness pollution prevention (including pesticides)
  - b. Consumer products (including pesticides)
  - c. Chemical use reduction
  - d. Product stewardship
4. Local government pollution prevention

A number of recommendations from the public members of the AC have been provided to DTSC and/or Cal/EPA from the AC through this process. Summaries of these recommendations are provided below; copies of the correspondence can be found in Appendix 1.

### **Emphasizing Pollution Prevention Through Cal/EPA's Strategic Planning Process**

On November 14, 2000, the Advisory Committee commended Cal/EPA Secretary Winston Hickox for stressing the value and need for the agency to include pollution prevention in its approach, as stated in the Cal/EPA Strategic Vision. <sup>8</sup> The Advisory Committee then recommended that the Cal/EPA boards, departments and office integrate pollution prevention into their strategic plans, which were then under development.

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<sup>7</sup> The minutes from AC meetings demonstrate the kinds of discussions, advice, and recommendations DTSC received for the purpose of designing the two-year workplan, evaluating hazardous waste data, and evaluating pollution prevention progress. The minutes are contained in Appendix 2.

<sup>8</sup> Cal/EPA " s July 2000 Strategic Vision document can be found at <http://www.calepa.ca.gov/Publications/Reports/stratplans/2000/>

In response to this recommendation, Undersecretary C. Brian Haddix directed the Cal/EPA boards, departments and office staff on the Cal/EPA " Strategic Vision Implementation Team " to ensure that pollution prevention opportunities are highlighted in this planning process. In addition, DTSC P2 staff served on the team to provide feedback on specific opportunities to highlight P2 activities in the strategic plans, and on further opportunities to use P2 to address program goals.

### **Use Pollution Prevention to Address "Pollutants of Concern"**

During the February 13, 2001 Pollution Prevention Advisory Committee meeting, the Advisory Committee recommended to DTSC that more consideration be given to using pollution prevention strategies to address pollutants of concern, contrasting with DTSC ' s focus on hazardous waste source reduction. Recognizing that DTSC ' s statutory requirements and authorities require it to focus on hazardous waste reduction, the Advisory Committee recommended that an agency-level P2 program be established, as a long-term goal. In the short term, the Advisory Committee recommended that DTSC take steps to give more weight to pollutants of concern in setting P2 priorities.

### **Establish a Pollution Prevention Program at the Cal/EPA Level**

On August 23, 2001, the Advisory Committee made a separate and more detailed recommendation to Cal/EPA Secretary Winston Hickox that a P2 program be established at the agency level. Three guiding principles were suggested to guide Cal/EPA ' s efforts: 1) a prevention mindset, 2) coordination, and 3) an emphasis on multi-media solutions.

A response from Secretary Hickox to the Advisory Committee was sent March 8, 2002. In his response, Mr. Hickox reiterated that pollution prevention is a fundamental principle of the agency, while acknowledging that to date Cal/EPA ' s P2 efforts " cannot yet be regarded as a unified agency-level pollution prevention program. " Mr. Hickox also suggested that a fourth guiding principle, while perhaps implicit in the other three, be added: " pollution prevention is most effective not as an isolated initiative, but as a key component in any integrated management system that supports a sustainable environment."

Mr. Hickox has charged a recently-established Sustainability Steering Committee with promoting sustainable management systems internally and externally. He has asked this Committee to promote and coordinate an agency-wide pollution prevention agenda.

Specifically, the Sustainability Steering Committee will:

- discuss pollution prevention efforts,
- identify ways to improve cross-media and cross-program coordination,
- establish a public participation process, and
- promote sustainable management systems.

### **Use Pollution Prevention Strategies to Improve Agricultural Practices and Reduce Dependence on Pesticides**

The " Multi-topics " subcommittee worked for over a year to frame issues associated with agribusiness practices, and pesticide use in both urban and agricultural settings. Six specific recommendations were developed for full Advisory Committee discussion. The following

recommendations were ratified at the December 4, 2001 Advisory Committee meeting and forwarded to Secretary Hickox on March 8, 2002:

- Recommendation A: Maximize the ability of the pesticide registration process to prevent potential environmental and human health problems associated with pesticide use.
- Recommendation B: Strengthen Cal/EPA and U.S. EPA efforts to promote pesticide alternatives.
- Recommendation C: Expand efforts to promote environmentally sound and sustainable agricultural practices statewide.
- Recommendation D: Strengthen local government capabilities to promote pollution prevention to the agriculture industry.
- Recommendation E: Support and encourage efforts to share information and training opportunities between the Department of Pesticide Regulation (DPR), the California Department of Food and Agriculture (CDFA), and the County Agricultural Commissioners regarding IPM and other biological pest control practices.
- Recommendation F: Determine the needs of the agricultural sector regarding pollution prevention, and create and distribute materials to fill these needs. Anticipated needs include (but are not limited to) information about management of hazardous materials and wastes on farms and sector-specific information on measures to prevent agricultural water pollution. Ideally, materials would be shared for distribution by any of the entities mentioned above, including DPR, CDFA, the California Integrated Waste Management Board, County Agricultural Commissioners, the University of California, and CUPAs.

### **Tools to Strengthen Local Government Pollution Prevention Programs**

The Local Government Subcommittee provided the Advisory Committee with a list of recommendations specific to local P2 programs. A series of meetings in the fall of 2000 were held to gather input from local and state government representatives. The primary need identified was for funding. Other priorities identified included:

1. Increasing marketing and public education on the importance of P2,
2. Increasing the mandate for P2 implementation,
3. Continuing technical support by the state, and
4. Maintaining and improving communication among local and state agencies.

The full Advisory Committee has not discussed the above to date.

### **The Precautionary Principle**

The Precautionary Principle, although not one of the subcommittee topics, remains a strong interest of the Advisory Committee. The Precautionary Principle is embodied in the following statement, which was crafted at the Wingspread Conference Center in Racine, Wisconsin, and signed by 32 scientists, environmentalists, and researchers:

". . . Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, bears the burden of proof. The process of applying the Precautionary Principle must be open, informed and democratic, and must include potentially affected

parties. It must also involved an examination of the full range of alternatives, including no action."

DTSC arranged for experts to conduct a two-hour seminar at the March 20, 2002 Advisory Committee meeting, in order to provide the Advisory Committee with an opportunity to learn about the Precautionary Principle. Ms. Carolyn Raffensperger and Dr. Ted Schettler of the Science and Environmental Health Network provided an excellent overview of the principle.

## **Part IV: Trends in Manifest, Toxics Release Inventory, and Biennial Report System Data in California: 1993 to 2000**

### **Introduction**

An understanding of California ' s hazardous waste trends and the current status of waste generation is essential to designing an effective pollution prevention program. To further this understanding, DTSC staff reviewed available environmental data. Three databases were used for this analysis: the hazardous waste manifest tracking system (Haznet), the Toxics Release Inventory (TRI) data set, and Biennial Generator System (BRS) data.

These three data sets report on different aspects of hazardous wastes and materials. Haznet data reflect off-site hazardous waste management and are based on information contained in shipping documents known as California Uniform Hazardous Waste Manifests (manifests). The Toxics Release Inventory captures information from users of specific hazardous chemicals and includes estimates of releases of those chemicals. The federal Biennial Generator System includes hazardous waste data collected from generators<sup>9</sup> every two years, as the name suggests. In this reporting system, generators report quantities of Resource Conservation and Recovery Act (RCRA) hazardous waste generated that is, waste that is hazardous under the federal regulatory system. A large percentage of waste manifested in California, perhaps over 50%, is nonRCRA waste. NonRCRA wastes are designated hazardous because of California s more stringent hazardous waste classification scheme.

The purpose of this chapter is twofold: to examine hazardous waste trends over time (1993-2000<sup>10</sup>); and to evaluate pollution prevention progress in California. One important point needs to be made before looking at this chapter: none of the data sets allow an assessment of total hazardous waste generated. The most significant reason is that none of the data sets capture quantities of hazardous wastewater that are treated onsite and sent to a publicly owned treatment works. (TRI does include chemicals managed on site; however, TRI quantities are estimates of chemical amounts and cannot be translated into hazardous waste quantities.) Because of this, it is not possible to determine the total amount of hazardous waste generated in California. While we cannot state that manifested waste trends correlate exactly with total waste generated, those trends must serve as surrogates for total waste generation because total waste quantities remain unknown.

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<sup>9</sup> The term " generator " will be used throughout this analysis to describe businesses or public sector entities that produce hazardous waste.

<sup>10</sup>Manifest data are available through 2000; TRI data through 1999.

## A Few Words About the Three Data Sets

To understand the analyses that follow, it is important to note the character, differences, and utility of the three data sets used here.

### Manifest Data

A manifest, a form of shipping document, must be completed by generators when shipping hazardous waste off site for management or disposal. The data within the manifest system come from information entered on manifests by these generators. Manifests contain information on the generator, transporter, and treatment facility, as well as information related to the type of waste (identified by California Waste Code) the quantity of waste, and how it was managed (treated, recycled, or disposed)<sup>11</sup>.

The manifest system is designed as a "cradle to grave" system to ensure that wastes arrive at the destination the generator intended, and is designed to track the movement and ultimate disposition of hazardous waste. DTSC enters data from all manifest copies received into an automated data system known as Haznet. Approximately half a million manifests are processed annually.

### *Manifest Data Limitations*

Interpreting manifest data depends on understanding and accounting for the limitations of this data set. Limitations pertinent to this analysis are listed below.

- This system tracks shipments. Increases in waste amounts do not necessarily equate to increased actual exposures or risk.
- The system tracks waste amounts, not concentration or chemical quantities. Large amounts of low-level contamination may give appearance of high hazard.
- There is potential for double-counting when wastes are collected via milkrun<sup>12</sup> manifest to a transfer station, then shipped again from the transfer station to the treatment or disposal facility.
- The use of milkrun and modified manifests obscures the total number of hazardous waste generators (the total number of generators manifesting hazardous waste, discussed later in this chapter, will be undercounted due to this factor).<sup>13</sup>
- Aqueous hazardous wastes that are treated on a generator's site and subsequently disposed to a POTW (publicly owned treatment works) via an industrial sewer are excluded from these data. However, solid hazardous wastes, such as filter cake or sludge, generated as a result of on-site treatment are included in the data.
- Unit conversion factors may not adequately account for the variance in density of the range of wastes shipped.

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<sup>11</sup>A list of California Waste Code titles is contained in Appendix 4 (page 121).

<sup>12</sup>"Milkrun" manifests are used by hazardous waste haulers to transport smaller amounts of wastes from numerous small quantity generators.

<sup>13</sup>As of 1/01/02, milkrun and modified manifests were combined into a new manifest called a "consolidated manifest." The number of waste streams allowable for shipment under this consolidated manifest is larger than that previously allowed under milkrun and modified manifests. This may result in future analyses of manifest data showing fewer generators of record, with larger volumes per generator.

- There is variability in the use of California Waste Codes when completing the manifest. This includes the inability to clearly discern site clean-up wastes from routinely-generated wastes (discussed in more detail later in this chapter).
- Changes in the definition of hazardous waste and/or the waste code system can affect trends analyses.

### *Hazardous Waste to Treatment, Storage & Disposal Facilities, Including Transfer Stations: Potential to Double-Count Waste Amounts*

Because the manifest system is designed to track shipments of hazardous waste, some waste quantities may be double-counted if wastes are sent to intermediate facilities prior to ultimate disposition. In this analysis, quantities that were identifiable as double-counted waste were subtracted from the total. Despite this, there remains some potential in this analysis to double-count some waste. This means that quantities of manifested waste may be overstated.

### *Data Entry Procedures*

In the previous version of this report (September 2000), DTSC staff looked at data entry procedures to see whether they could have affected the analyses. Data entry procedures changed significantly between 1995 and 1996, which coincides with a decrease in recurrent waste generation. A review of the change in procedures indicated that the new procedures should not have caused the change in quantities shown in the analysis beginning in 1996. For data entered prior to 1996, similar verification procedures were not in place and, therefore, are likely to be less accurate. The new procedures ensured that from 1996 forward, the data are 99.95% accurate. Accuracy, in this context, refers to how accurate data entry personnel are in transferring the information from the actual manifest to the data system. The limitations inherent in the manifest system discussed earlier in this chapter still apply.

### *Excluded Hazardous Waste*

Numerous hazardous wastes, both RCRA and nonRCRA, were excluded from designation as hazardous waste between 1993 and 1998. Some of these exclusions were established in order to conform with exclusions that occurred at the federal level.

Appendix 4 contains a list of wastes that were excluded during the 1990 ' s.<sup>14</sup> The rationales for excluding specific wastes vary. A waste may be excluded because new scientific research indicates that a substance is not as dangerous as previously thought. Another rationale would be to remove regulatory barriers to recycling hazardous wastes within a manufacturing process. Some wastes may be excluded because another agency is adequately regulating the waste. Because these excluded wastes do not correlate with the manifest codes, it is very difficult to evaluate the effect of these exclusions on trends in waste manifested. Such an analysis was deemed outside the scope of this report.

### **Toxics Release Inventory**

The federally-mandated Toxics Release Inventory (TRI) tracks information about chemical releases, and contains information much broader than just hazardous waste. Facilities reporting

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<sup>14</sup> This list was developed for the last P2 workplan and was not updated for this report; therefore, it may not be complete.

under TRI are primarily manufacturers, although a 1998 addition now requires reporting by waste management facilities and utilities.

TRI requires reporting only for specific chemicals, identified in the data by the Chemical Abstract Service (CAS) number or chemical category. Releases to all environmental media are reported, including on-site releases to air, water, and land, and off-site transfers to disposal, treatment, energy recovery and recycling. (Appendix 6 on page 123 contains detailed information on the various reporting categories within TRI.) This analysis will focus on "total chemicals generated" as a surrogate for hazardous waste generation.

Facilities with more than 10 employees that meet the following reporting thresholds are required to report under TRI:

- 1) greater than 25,000 lbs of the listed chemical manufactured or processed on site; or
- 2) greater than 10,000 lbs of the listed chemical otherwise used at the facility.

When reading this chapter, it is important to remember the difference in units; manifest (and Biennial Report System) quantities are in tons, Toxics Release Inventory in pounds.

### *TRI Data Limitations*

TRI is not a comprehensive reporting system; many major industries as well as other important sources of chemical releases are not covered by TRI. Moreover, many toxic chemicals are not included in TRI. TRI only tracks chemical releases or transfers. There is no simple way to compare waste generation information between Haznet and TRI because one includes water and soil, and the other is by chemical type.

The reported chemical releases are based on estimates, rather than actual measurements, and are reported as pounds of pure chemical, not mixtures, as is the case in the manifest and the Biennial Generator System (BRS; discussed below) data.

TRI data may not be available on smaller businesses due to reporting threshold levels being too high to capture the smaller generators. Finally, some chemicals released may not be reported due to not meeting threshold levels.

Finally, it is important here to highlight differences in how the analysis for this report was performed compared to DTSC's September 2000 "Pollution Prevention Report and 2-Year Workplan." At that time, DTSC collected and managed TRI data under an agreement with U.S. EPA. The data were sorted into the major TRI reporting categories such as "off-site releases," "disposing to landfill," etc. However, no other manipulations were made; for example, there was no attempt to correct for or account for changes in the TRI program over time.

Since then, the responsibility for collecting and managing TRI data has been returned to U.S. EPA. U.S. EPA collects and sorts the data and presents it to the public on an internet site called "TRI Explorer." U.S. EPA has attempted to correct for changes in the TRI reporting program over time, in order to make trends analyses more meaningful. For example, 1998 was the first year that U.S. EPA collected information from the commercial hazardous waste treatment sector.

In order to reduce the potential for double-counting chemical quantities due to this change, TRI trend reports do not include wastes from this sector. Also, over time, new management codes have been added, new chemicals have been added, and new industries have been added. Finally, U.S. EPA 's TRI Explorer web site separates the information into three report types: release reports, waste transfer reports, and waste quantity reports with each report category containing a number of additional options for presenting the data.

For these reasons, the data presented here differs from that presented in DTSC 's 2000 report, due to the significantly different manner in which the data were handled.

### **Biennial Report System Data**

Hazardous waste generators are required under federal law to report, every two years, the total amount of hazardous waste generated during specific reporting years.

#### *Biennial Report System Data Limitations*

The federal Biennial Report System (BRS) data set includes only RCRA waste; nonRCRA waste is not included. Many waste types are excluded from this data set, most significantly, wastewater that is treated on site. Only large-quantity generators are required to report BRS data. Finally, note that due to data quality concerns, this analysis will only focus on the BRS data for 1997 and 1999.

### **Trends, 1993-2000**

Trends were evaluated using data from three data sources: DTSC 's Haznet database, U.S. EPA 's Toxic Release Inventory, and the federal Biennial Generator System.

#### **Haznet Data**

Data from DTSC 's Haznet database were used to evaluate trends in hazardous waste manifested from generators. This database captures both RCRA and nonRCRA hazardous waste from all generators. The evaluation initially looks at trends in total annual manifested hazardous waste, then systematically subtracts nonrecurrent waste and potentially double-counted wastes to maintain a focus on routinely-generated wastes.

#### *Trends in Total Hazardous Waste Manifested*

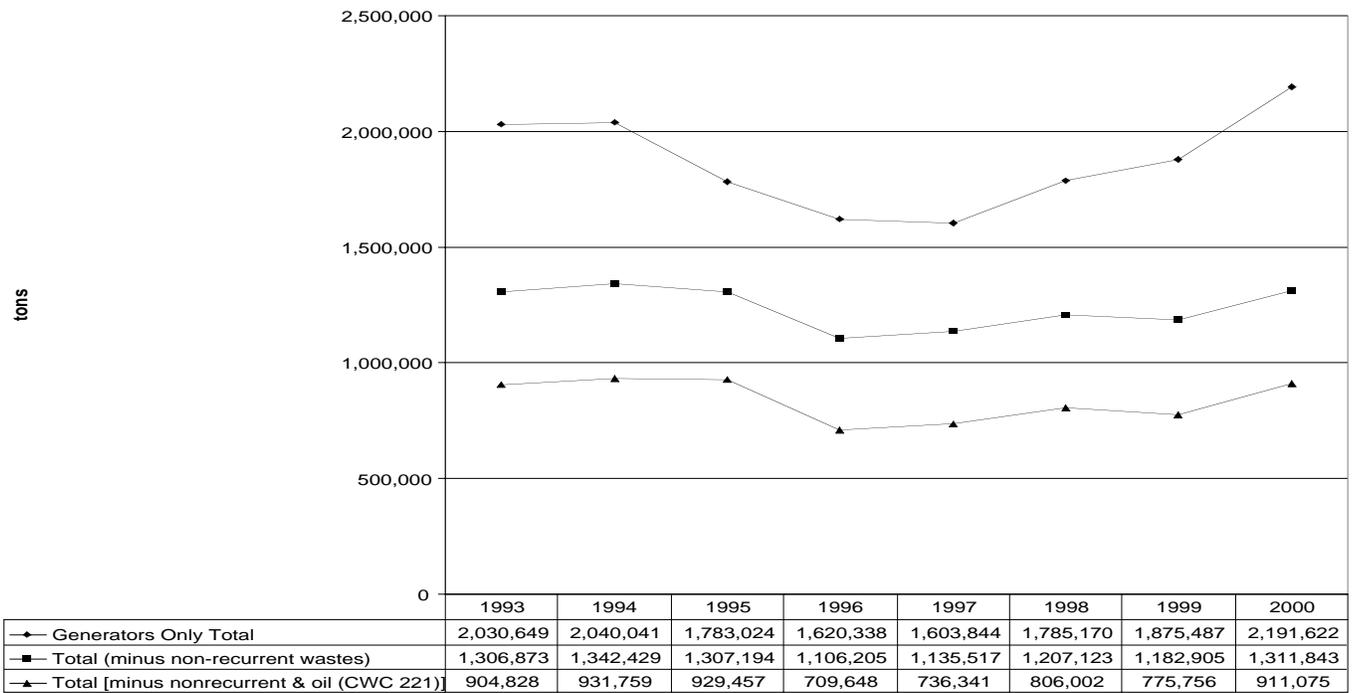
The top line in Figure 1 shows the total amount, in tons, of hazardous waste manifested in California from 1993 through 2000.<sup>15</sup> During the mid-1990s there was a reduction in the amount of waste manifested. The upward trend that began in 1998 has continued. The total amount of waste manifested in 2000 was 8%<sup>16</sup> greater than that in 1993. Total waste generation rose 23% from 1998 to 2000.

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<sup>15</sup> To the extent the data allow, these quantities were adjusted to eliminate double counting of manifested waste handled at an off-site treatment, storage, or disposal facility where it might be shipped for some subsequent handling and/or disposal.

<sup>16</sup> Percentages have been rounded to the nearest whole number.

**Figure 1: Manifested Hazardous Waste, 1993-2000**



### Recurrent Waste Trends

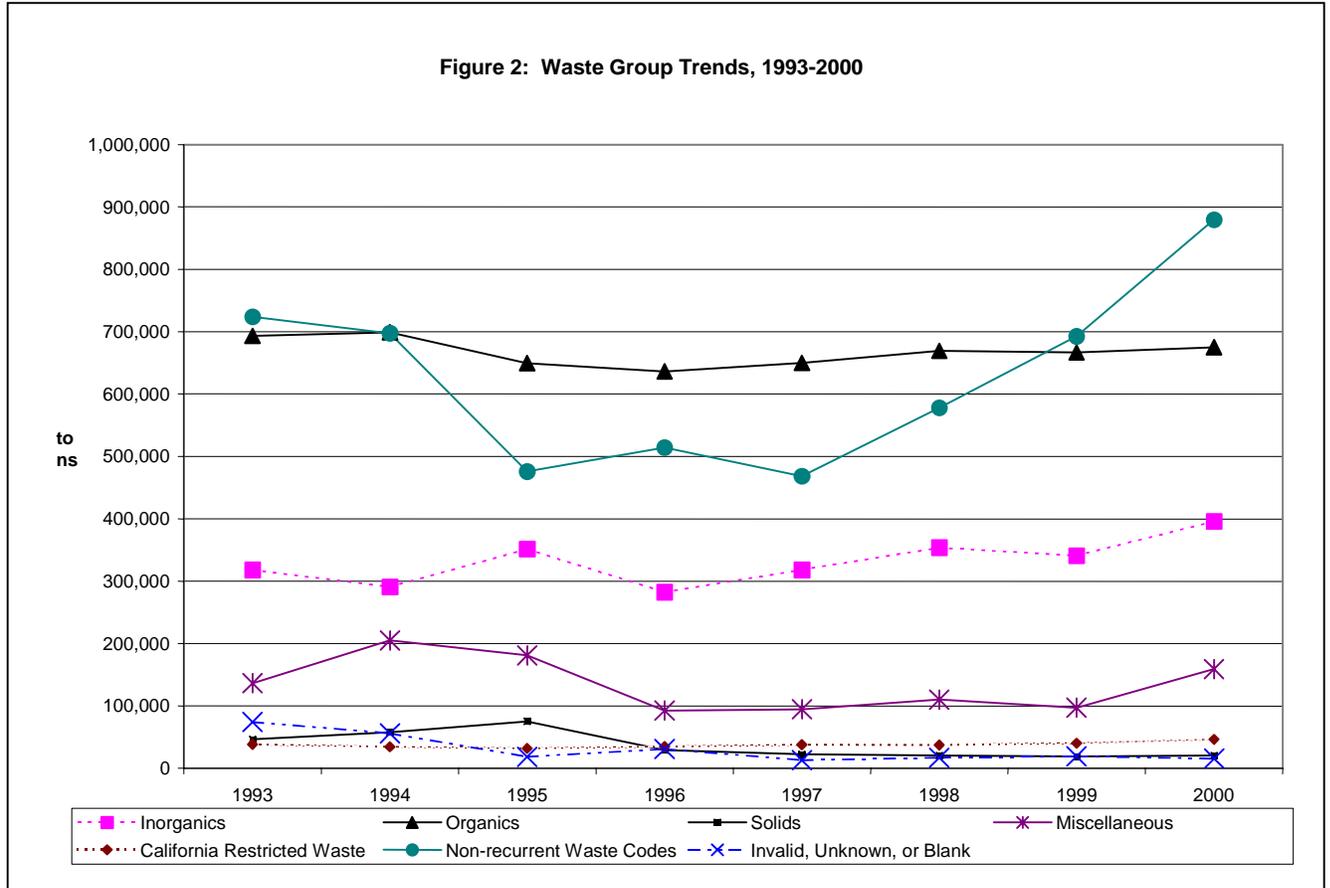
"Nonrecurrent " waste quantities were subtracted from the total to derive the middle trend line in Figure 1. Nonrecurrent wastes are those that are not routinely generated; they are hazardous wastes that come from operations such as contaminated site cleanups, removing PCB-contaminated equipment, and removing asbestos. " Household hazardous waste " was included in this category, in order to focus on commercial and industrial hazardous waste generation. Recurrent waste, then, is the total quantity of manifested waste minus non-recurrent waste.<sup>17</sup>

Recurrent manifested waste increased less than 1% from 1993 to 2000 from 1,307,000 tons in 1993 to 1,312,000 tons in 2000. As seen in Figure 1, total recurrent waste manifested is essentially flat, with a slight upward trend from 1999 to 2000. Figure 1 also shows manifested recurrent waste minus waste oil and mixed oil (bottom line), to more accurately indicate waste generated from the industrial and commercial sectors. Again, there is a dip (-24%) in waste manifested between 1995 and 1996, with continued increases after that time. The 2000 quantity is essentially the same as that in 1993; however, it increased about 6.5% per year from 1996 through 2000.

<sup>17</sup>Wastes included in the non-recurrent category include California Waste Codes (CWC):

- 151 asbestos-containing waste,
- 261 polychlorinated biphenyls and material containing PCBs,
- 611 contaminated soil from site clean-up, and
- 612 household hazardous waste

To more closely evaluate the trends in manifested waste, the waste types were grouped, by California Waste Code, into seven categories: inorganics, organics, solids, miscellaneous, California Restricted Waste,<sup>1</sup> nonrecurrent waste, and “invalid, unknown, or blank.” Figure 2 illustrates the trends for these waste groups.



From 1999 to 2000, organics increased 1% --essentially, no change. When looking at the this figure, remember that this waste group includes waste oil/mixed oil—the largest single hazardous waste stream generated. Waste oil/mixed oil constituted almost 60% of the total organics waste group in 2000.

Solids increased 7%, and “miscellaneous” increased 64%. Two waste types, baghouse waste and auto shredder waste, accounted for the increase in the miscellaneous group. (Note that though this waste group increased by 64%, it only represents 7% of the total waste generated in California in 2000.) California Restricted Waste increased 15%, and “invalid, unknown or blank” decreased by 20%. This last statistic may indicate an increase in users’ understanding of how to complete manifests, resulting in improvements in the manifest data.

<sup>1</sup> “Restricted” wastes cannot be landfilled unless they are treated to certain specifications.

From 1999 to 2000, the inorganics waste group increased 16% (see Figure 2). One waste type, "other inorganic solid waste" (California Waste Code 181) accounted for most of the increase. California Waste Code 181 is also notable in that it is one of only two waste streams that has increased steadily and significantly over time. (The other is California Waste Code 792, "liquids with pH ≤ 2 with metals; this waste type constitutes only 2% of the total recurrent waste quantity.) Finally, note that California Waste Code 181 is an increasing and significant percentage of total recurrent waste (see Table 7 below).

	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Tons CWC 181	112,265	113,355	199,724	125,534	150,043	170,904	183,944	228,160
CWC 181 of recurrent waste	9%	8%	15%	11%	13%	14%	16%	17%

Nonrecurrent waste trends will be discussed in more detail later in this chapter.

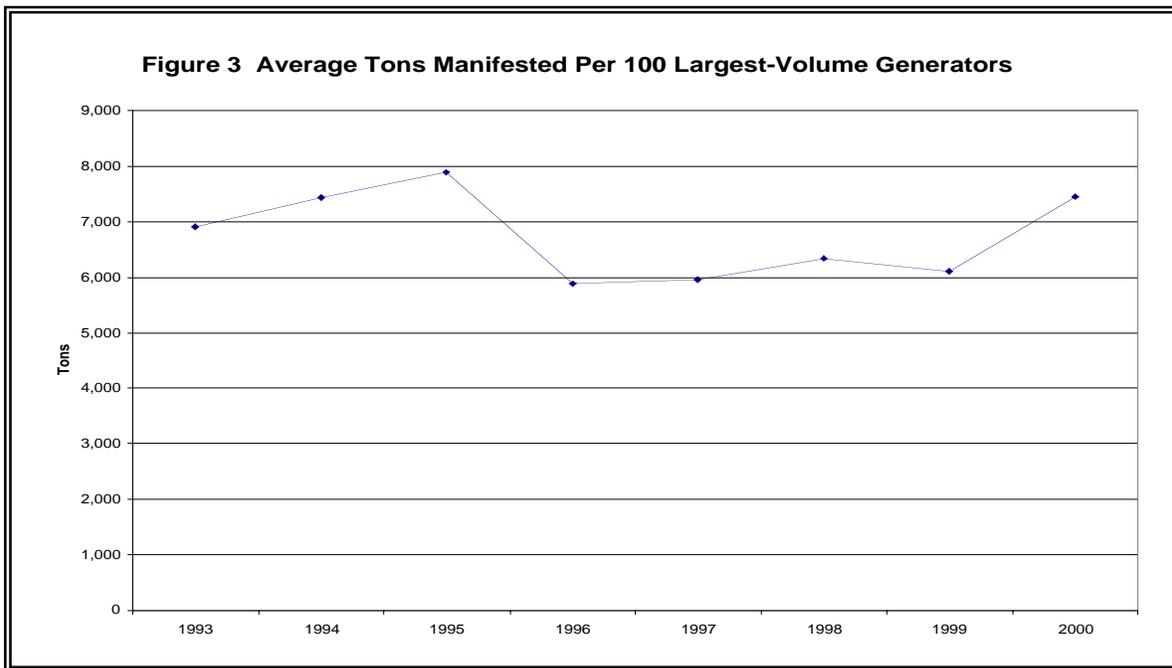
<b>Year</b>	<b># of Generators</b>
1993	42,500
1998	63,000
2000	63,000

*Number of Generators*

The number of hazardous waste generators manifesting waste has not increased since 1998. Remember that, because of milkrun and modified manifesting options, these numbers are understated. In addition, more waste types are now eligible for milkrun manifesting, further reducing the system's ability to accurately identify all hazardous waste generators.

*Trends for Generators Manifesting Large Quantities of Recurring Waste*

The "top one hundred" entities consistently manifest about half of the total recurring waste. Figure 3 shows the average quantity, per generator, of hazardous waste manifested by these 100 generators. (Note that the "top 100" facilities from 1998 were not necessarily the same facilities that were the "top 100" in any other year. A determination of which facilities reappear from year to year was not made for this report.) Since 1993, the state's largest generators have not significantly altered their relative contribution to the total quantity of hazardous waste manifested in California. These generators have contributed between 52% to 61% of the total recurrent hazardous waste manifested in California, with 2000's percentage at 57%.



### *Trends for Generators Manifesting Small Quantities of Hazardous Waste*

Trends for recurrent waste from entities that manifest smaller amounts of hazardous waste are more difficult to ascertain given the limitations of the data. This is primarily because we cannot determine with precision the total number of entities generating waste (largely due to milkrun and modified manifesting procedures). Distributing the 43% of the total recurrent waste manifested in 2000 among the 62,900 known entities not in the "top 100" indicates that these generators have consistently generated an average of 9 tons per year from 1996 to 2000. (This quantity is down from almost 13 tons in 1993). In actuality, the average amount is probably smaller, because there are more entities shipping waste than are contained in the manifest records.

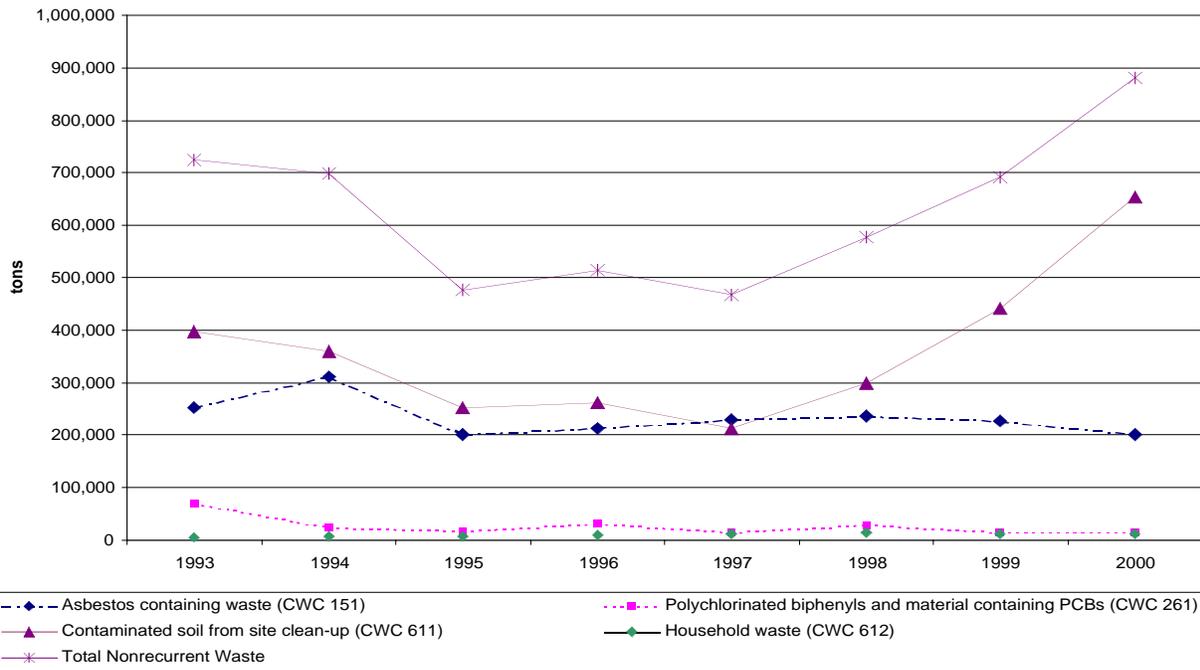
### *Waste Oil and Mixed Oil*

"Waste oil and mixed oil" (California Waste Code 221) is consistently a significant portion of California's total amount of manifested recurrent waste. The percentage of waste/mixed oil manifested relative to the recurrent total ranges from 29% to 36% (1993-1996). In 2000, this percentage was 31%. "Waste oil and mixed oil" is California's largest waste stream.

### **Nonrecurrent Waste and Contaminated Soil**

Nonrecurrent waste is a significant portion of total hazardous waste manifested. These wastes increased 22% from 1993 to 2000. Moreover, as a percentage of California's total manifested waste, nonrecurrent wastes have steadily increased, from 27% in 1995 to 40% in 2000. Figure 4 below indicates that contaminated soil from site cleanup (California Waste Code 611) accounts for this increase in nonrecurrent wastes. The upward trend in site clean-up waste is a positive trend, because it reflects efforts to remediate contaminated properties for re-use, and prevents possible groundwater contamination.

Figure 4: Nonrecurrent Hazardous Waste Trends



These data may undercount the quantity of hazardous waste generated from site clean-up activities. While there is a California Waste Code for "contaminated soil," other wastes generated during cleanup activities may be manifested under other waste codes, making it difficult to assess the total quantity of wastes generated due to cleanup activities. For example, some portion of California Waste Code 181, "other inorganic solid waste," may consist of site remediation waste that is not contaminated soil.

Several factors contribute to the increase in contaminated soil and clean-up waste:

- DTSC's Site Mitigation Program oversees many hazardous waste site clean-ups, including brownfields restoration, voluntary clean-ups, and school site remediations. In addition, approximately 2,000 cleanups of clandestine labs occur per year, contributing to the total quantity of hazardous waste generated in California (although there may be little contaminated soil generated in these clean-ups).
- The federal requirement for facilities to upgrade underground storage tanks, which began to be addressed in 1985, resulted in 20,000 Leaking Underground Fuel Tank (LUFT) sites identified for remediation. The current number of known underground storage tank sites is 21,000, with 16,000 identified as LUFT sites. It is unknown what quantities of contaminated soil are generated in these clean-ups.
- The passage of AB 2784 (Strom-Martin, Chapter 326, Statutes of 1998), which specifies that no waste that contains total lead in excess of 350 parts per million may be disposed to land other than a Class I hazardous waste disposal facility. This includes waste that is not a hazardous waste but that contains lead with a total concentration exceeding 350 parts per million. This bill significantly restricted options for managing lead-contaminated soil, and

has probably resulted in increased disposal of such soil as hazardous waste.

This discussion is significant because it illustrates the concept of "beneficial" hazardous waste generation. For example, when a facility replaces its light ballasts with energy-efficient ones, there is a short-term increase in hazardous waste generation; the environmental benefits of the activity are realized over a longer time frame. In addition, the environmental benefits of these activities are much broader than those related specifically to hazardous waste generation. For example, the environmental benefits of a widespread conversion to energy-efficient lighting systems will result in air quality improvements, reduced need for energy generation, and reduced costs for consumers. The benefits of increased site clean-up activity are also widespread. Rehabilitation of urban properties can reduce exposures of residents to contaminated properties. Such redevelopment has additional benefits, in that it can reduce the need to consume previously-undeveloped land at the edges of urban areas, reduce car and truck traffic, can reduce the need to extend city services such as sewers, and so on.

### Analysis of Toxic Release Inventory Data

Trends in TRI data were evaluated with respect to the number of facilities filing TRI reports, the number of chemicals reported, total chemicals generated, and total releases reported. Remember that reported TRI quantities are estimates of pure chemical. Chemicals managed (e.g., wastewater treatment) on site are included in this report but again cannot be correlated to

quantities of hazardous waste generated.

The number of TRI filers in California decreased from 1987 to 1996, and appears to have leveled off in the last four years, as has the number of chemicals reported, as seen in Table 9 at left.

**Table 9: Number of TRI Filers in California**

Year	# of Facilities Reporting	# of Chemicals Reported
1987	1,915	5,251
1988	2,117	6,119
1989	2,156	6,443
1990	2,161	6,267
1991	2,042	5,939
1992	1,952	5,497
1993	1,852	5,084
1994	1,683	4,509
1995	1,553	4,177
1996	1,375	3,739
1997	1,393	3,844
1998	1,377	4,393
1999	1,406	3,818

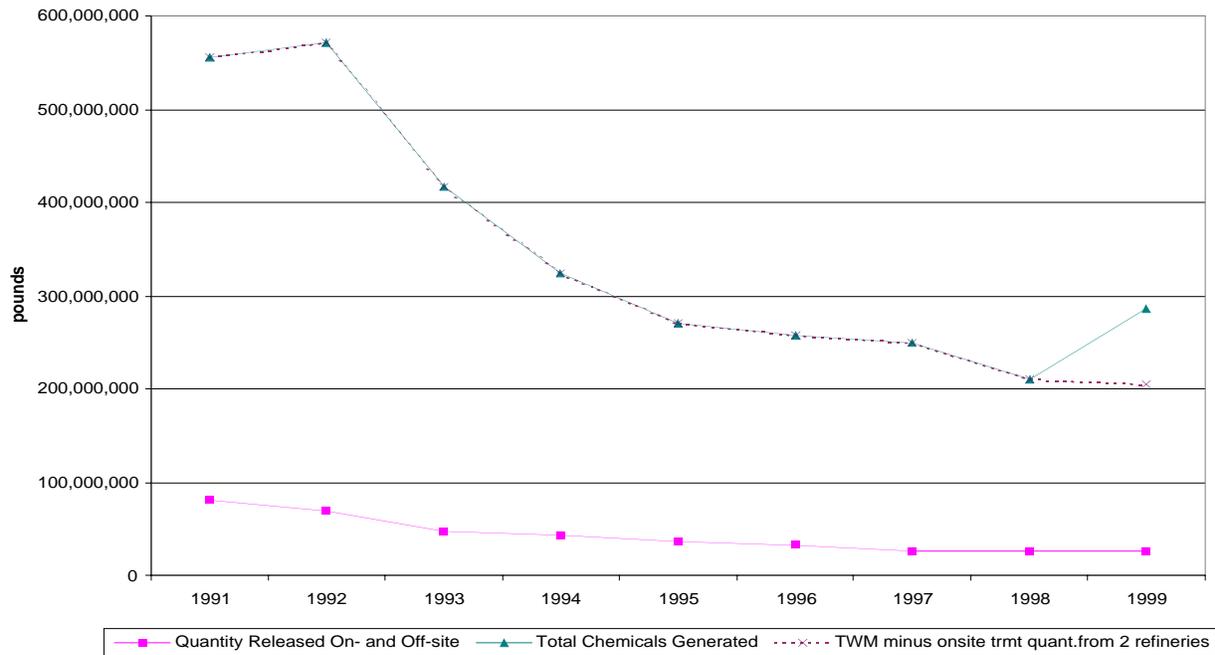
(source: U.S.EPA TRI Explorer web site: <http://www.epa.gov/triexplorer/facilitytransfer.htm>)

### Total Releases

Total TRI releases to all environmental media have decreased over time. In Figure 5, the top line represents "total chemicals generated" - the sum of chemicals recycled on site, recycled off site, energy recovery on site, energy recovery off site, treated on site, treated off site, and quantities released on and off site. This figure also shows "quantity released on and off site," which is the total amount (in pounds) of the toxic chemical released due to production-related events by the facility to all environmental media both on and off site during the calendar year.<sup>19</sup> This figure illustrates the difference between total chemicals generated and those that are released.

<sup>19</sup> Source: U.S. EPA, TRI Explorer, <http://222.epa.gov/triexplorer/reports.htm>.

**Figure 5: TRI "Total Chemicals Generated", 1991-1999 and "Quantity Released On- and Off-site" (8/1/01 TRI Update)**



A special item of interest is the increase in " Total Chemicals Generated<sup>20</sup> for 1999. A closer look at the data revealed that two petroleum refining facilities were responsible for 83,759,678 pounds of this quantity 55% of the total. Most of that quantity- 82,130,028 pounds - was in the " treated on site " management category. To give a better sense of true trends for Figure 5, we subtracted the on-site treatment quantities for these two facilities from the Total Waste Managed total. The result can be seen at the end of the dashed line. The bottom line in Figure 5<sup>21</sup> shows that on- and off-site release totals have decreased 66% from 1991 to 1999. Note however that the downward trend ended in 1997 and has been essentially flat since then.

<sup>20</sup> Source: U.S.EPA, TRI Explorer. " Total Waste Managed is " the sum of recycled on site, recycled off site, energy recovery on site, energy recovery off site, treated on site, treated off site, and quantities released on- and off site."

<sup>21</sup> In the previous version of this report prepared in September 2000, we noted a significant upward tick from 1997 to 1998, with 1998 releases increasing 53% from 1997. The addition of waste management facilities to this data set was responsible for the increase. The new Figure 6, derived from the U.S. EPA 's " TRI Explorer" website, is specific to " 1991 Core Chemicals " and " Original Industries " and so does not include those off-site waste management facilities.

### Biennial Report System Data

As mentioned earlier in this chapter, historic Biennial Report System data are considered unreliable; therefore, we will only attempt to compare the 1997 and 1999 data. According to the U.S. EPA 's evaluation of these data, which only includes reported RCRA nonaqueous waste, California ranks 16th in the nation with regard to total waste manifested (427,302 tons of RCRA waste). Although California has 9.2% of the nation s total RCRA waste generators, it manifested 1.1% of the nation s total RCRA waste.<sup>22</sup> Finally, note that the 1999 RCRA waste quantity is 37% less than that reported in 1997.

Remember though that some wastes are excluded from Biennial Report

System data, most notably, hazardous wastewater that is treated on site. These rankings therefore are inaccurate in that they only provide a picture of RCRA hazardous wastes that are not excluded from Biennial Report System reporting requirements. Because the quantities of wastes that are excluded including and especially wastewater are so large, attempting to interpret Biennial Report System data with respect to how California compares to other states is very difficult.

### Hazardous Waste Source Reduction Progress in California

DTSC is required by statute to " evaluate hazardous waste source reduction in this state, using the data . . . analysis " contained in this report. In this section, two approaches are used to get a sense of California s progress in reducing hazardous waste generation. The first approach looks simply at hazardous waste generation as represented by quantities of waste that are manifested. The second uses California s Gross Domestic Product (GDP) figures from 1993 to 1999<sup>23</sup> to adjust the quantities manifested per changes in California s economic activity.

### Difficulties in Measuring Pollution Prevention

Measuring pollution prevention accurately is difficult, and is best and most accurately done in a disaggregated sense; that is, the more specific and focused the analysis, the more accurate. It also is inherently difficult to measure something that does not exist such as waste or pollution

**Table 10: Comparison of 1997 and 1999 BRS Statistics**

	1997	1999
Quantity of RCRA Waste Reported	672,946 tons	427,302 tons
California rank re: quantity RCRA waste generated	12	16
% of nation s total	1.7%	1.1%
California rank re: # of generators	2	2
# of generators	1,782	1,850
% of U.S. generators	8.8%	9.2%
California RCRA waste imports	270,167 tons	161,748
California RCRA waste exports	207,119 tons	168,722
Source: U.S. EPA s Office of Solid Waste website at <a href="http://www.epa.gov/epaoswer/hazwaste/data/index.htm#brs">http://www.epa.gov/epaoswer/hazwaste/data/index.htm#brs</a>		

<sup>22</sup> EPA Executive Summary, The National Biennial RCRA Hazardous Waste Report (Based on 1999 Data), June 2001, EPA530-S-01-001 PB2001-106318

<sup>23</sup> GDP data for 2000 were not available.

that is never generated, the goal of pollution prevention programs. Some of the problems associated with measuring pollution prevention are discussed below.

### *Normalization*

Normalizing data allows an adjustment of amounts of waste or pollution per some factor, such as production levels. Without normalization, factors such as increases in population, increased (or decreased) production rates, changes in the number of generators, and other similar changes in production patterns may skew the data, rendering interpretation difficult. Making matters more difficult is the lack of a standard normalization factor across industries. What might make sense for one industry type (for example, amount of waste per gallon of paint produced) would be meaningless to another (a job-shop metal plater). The problems inherent in normalizing waste generation make it very difficult to determine causes of changes in waste generation over time.

### *Variable Concentrations Of Chemical Constituents In Waste*

Source reduction isn't just reducing quantities of generated waste. It also includes reducing a waste's toxicity, even if the quantity remains the same. Such reductions cannot be measured via the manifest system as long as the waste remains hazardous, because the manifest system does not include information about concentrations of a chemical, and therefore cannot be used to assess changes in toxicity over time. Only reductions in wastes that are so reduced in toxicity (and other hazardous waste criteria) that they no longer are classified as hazardous waste can appear as source reduction through manifest data analysis.

### *Multiple Chemical Constituents In Waste*

Another confounding factor is the issue of multiple chemicals in waste streams. Many wastes contain mixtures of chemicals. A company's source reduction efforts may reduce or even eliminate one toxic chemical from a waste but because other waste constituents remain, those source reduction accomplishments remain invisible in the data.

### *Changes In The Regulatory Structure*

Changes in the definition of what is a hazardous waste will affect trends data. The data may indicate that California is succeeding in pollution prevention when what really happened is that wastes were declassified (see Appendix 5 for a list of wastes excluded from hazardous waste designation between 1993 and 1998). The opposite can occur as well. In 2001, DTSC reiterated that cathode ray tubes (CRT) in computer monitors and television displays are hazardous waste that must be managed as such. This will very significantly affect future analyses of California's waste generation, because it is estimated that 315 million computers containing a total of 1.2 billion pounds of lead will become obsolete between 1997 and 2004.

### *Incomplete Data*

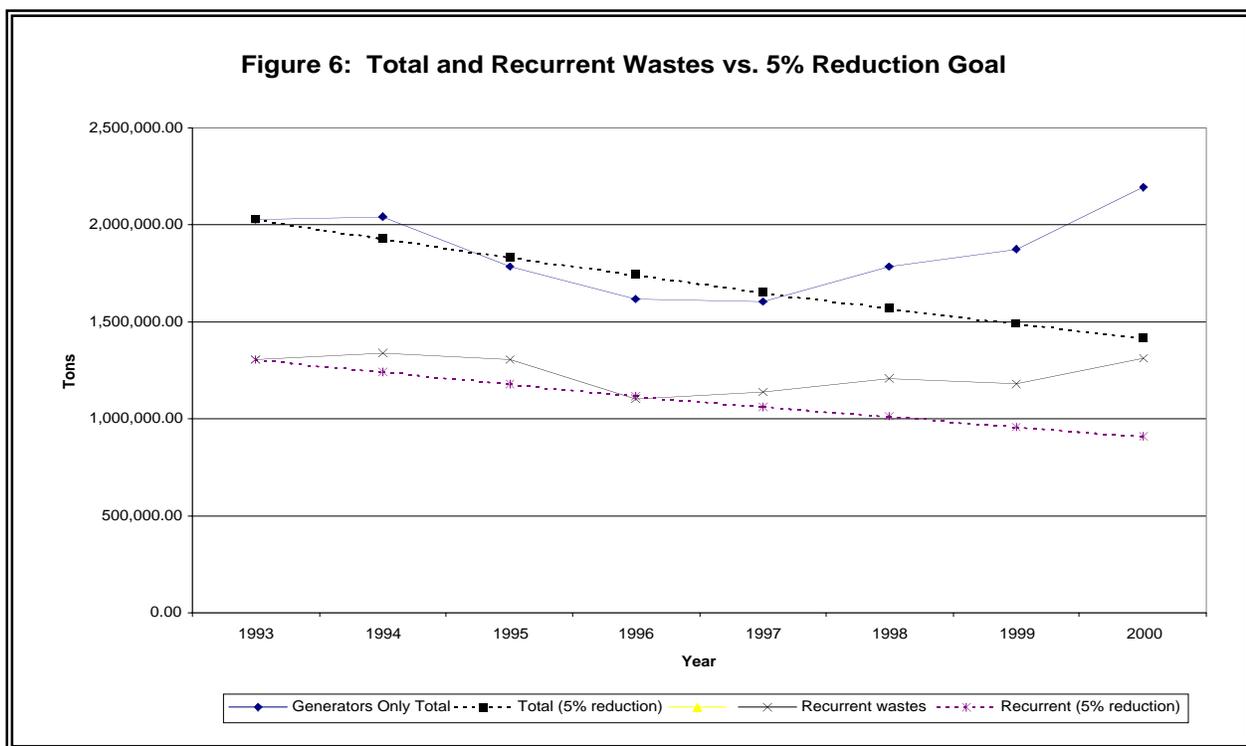
Finally, as mentioned previously, we do not know the total quantity of hazardous waste generated in California. Therefore, we must use waste manifested as a surrogate in evaluating generation trends.

## Source Reduction Progress

Despite these difficulties, and with them in mind, we can get an overall picture of hazardous waste generation over time, and some indication of source reduction progress. Health & Safety Code section 25244.15(e) established a goal for California to reduce its hazardous waste generation 5% per year from 1993 to 2000. While this goal is no longer in effect, we will continue to look at this goal to get a sense of progress in California.

### *Hazardous Waste Generation as Represented by Manifested Waste Quantities*

Figure 6 compares the total manifested waste from 1993 to 1998 to the 5% per year goal stated in law. Although California appeared to be meeting the goal from 1993 through 1997, the increase in waste generation starting in 1998 caused the 5% per year reduction goal to not be met. Figure 6 also shows the comparison to the 5% goal using only recurrent wastes (rather than the total).



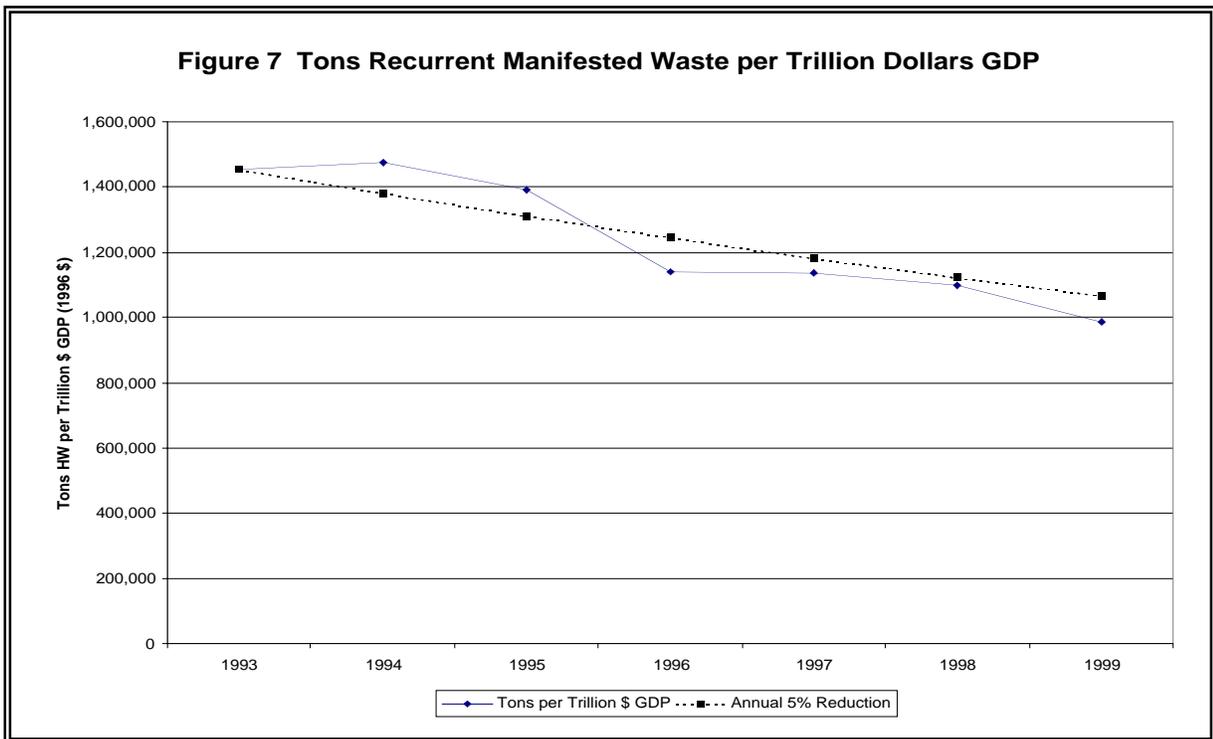
### *Waste Generation Normalized by Gross Domestic Product*

One interpretation is that the increase in waste generation is consistent with the increase in economic activity in California in the late 1990s. To get a sense of California's waste generation trends in relation to economic activity, the hazardous waste data were normalized by Gross Domestic Product data. Table 11 shows California's Gross Domestic Product figures for 1993-1999.

Year	Current Dollars	1996 Dollars
1993	847,879	898,829
1994	879,041	911,249
1995	925,931	941,853
1996	973,395	973,395
1997	1,045,254	1,029,232
1998	1,125,559	1,096,584
1999	1,229,098	1,185,636

Source: CA Department of Commerce  
[http://www.dof.ca.gov/html/fs\\_data/stat.abs/sec\\_D.htm](http://www.dof.ca.gov/html/fs_data/stat.abs/sec_D.htm)

Figure 7 below shows total hazardous waste (minus non-recurrent wastes) from Figure 1, adjusted for the California Gross Domestic Product values (1996 dollars) shown above in Table 11. The figure shows that California as a whole reduced hazardous waste generation by about 6% per year from 1993 to 1999 when adjusted for Gross Domestic Product.



## Conclusion

Reaching absolute conclusions about California ' s progress in reducing hazardous waste generation is difficult, given the limitations of available data and the complexities associated with measuring progress.<sup>24</sup> However, some things can be seen in this chapter. Two hazardous waste groups stand out as possible candidates for pollution prevention effort. First, the "organics " group is about twice as large as the next-largest waste group, and may be an appropriate target for hazardous waste source reduction efforts. However, remember that this waste group contains California Waste Code 221, waste oil the single-largest waste stream in California. Still, the organics waste group minus California Waste Code 221 constitutes a significant quantity of total waste manifested 274,157 tons in 2000. Second, the " inorganics" waste group is on an upward trend. Driving that upward trend is CWC 181 " other inorganic solid waste, " which is steadily increasing and now constitutes 17% of recurrent hazardous waste manifested.

It is clear that total hazardous waste generation, as represented by manifested waste quantities, is trending up. Recurrent hazardous waste generation is essentially flat; the upward trend in all waste was driven mainly by increases in quantities of cleanup waste manifested as hazardous waste. In fact, recurrent waste generation increased less than 1% from 1993 to 2000. Finally, recurrent waste generation normalized per Gross Domestic Product shows a 6% per year reduction from 1993 through 1999.

Total hazardous waste generation continues to increase in California. Much of the recent increase is associated with site clean-up activities; most other hazardous waste types are relatively flat. This indicates a positive trend in California more waste sites being reclaimed for re-use, and fewer sources of unregulated contaminants in the environment.

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<sup>24</sup> Because of DTSC ' s role as regulator of hazardous wastes and substances, only manifest data were used in the conclusion to evaluate progress.



## Part V: Current Status of Hazardous Waste Generation

In Part IV, we looked at the trends in hazardous waste generation and Toxics Release Inventory releases over time. This chapter looks more closely at the situation as it currently exists. Four questions emerged:

- what waste streams are generated?
- what industries generate the waste?
- how are wastes managed?
- which facilities generate the most waste?

This chapter will focus on these four questions. 2000 data will be used to investigate these questions, as it is the last complete year for which these data are available (1999 for Biennial Report System and Toxics Release Inventory data).<sup>25</sup>

### What waste streams were generated?

All hazardous wastes both RCRA and nonRCRA are manifested in California according to California Waste Codes (CWC). As discussed in the previous chapter, these codes range from somewhat specific to very general. The range of materials that are actually manifested in any given California Waste Code may vary widely from facility to facility, or within a single facility over time. Table 12 gives some examples, to illustrate the kinds of wastes that are classified within some of the commonly-used California Waste Codes.

<b>CWC</b>	<b>Waste Code Descriptor</b>	<b>Example Waste Streams</b>
123	Unspecified alkaline solution	ammonium copper chloride, ammonium hydroxide sodium hydroxide copper tetramine dichloride
135	Unspecified aqueous solution	non-RCRA hazardous waste liquid, (non-DOT regulated) hazardous waste liquid NOS ( not otherwise specified ), (cadmium, silver) (chromium, zinc) non RCRA Hazardous waste liquid NOS, (water, oil)
162	Other spent catalyst	non-RCRA hazardous waste, solid (spent catalyst) (spent nickel moly catalyst) self-heating solid, inorganic, NOS (spent catalyst w/arsenic)
181	Other inorganic solid waste	environmentally hazardous waste substance solid NOS (nickel, cadmium) hazardous waste solid, NOS, (mercury) (fluorescent light tubes) (steel and garnet blast)
214	Unspecified solvent mixture	waste flammable liquid, NOS (lead, petroleum distillates) (toluene, xylene) (methanol, toluene) waste paint-related material

<sup>25</sup> Throughout this chapter, the discussions of manifest data refer to the subset with nonrecurrent wastes removed; in other words, the discussion is about recurrent wastes unless otherwise specified.

223	Unspecified oil-containing waste	non-RCRA hazardous waste liquid (oil and water) (mop and deburring water) waste flammable liquid, NOS (gasoline, jet fuel, crude oil)
252	Other still bottom waste	MEK, chromium non-RCRA hazardous waste liquid, still bottoms non-RCRA hazardous waste, liquid paint solids with toluene, xylene
343	Unspecified organic liquid mixture	hazardous waste liquid NOS (ethylene glycol) waste styrene monomer, inhibited waste flammable liquid, corrosive NOS, (alpha picoline) hazardous waste liquid NOS (benzene, tetrachlorethylene)
352	Other organic solids	non-RCRA hazardous waste, solid (rags w/soil and oil) (oily debris)
491	Unspecified sludge waste	hazardous waste solid NOS, (cadmium, chromium) wastewater screenings, filtercake and phosphate sludge, non-hazardous waste solid non-RCRA hazardous waste, solid (filter cake, baghouse debris)

For the top ten waste streams (by quantity), Table 13 shows the relative contribution of each California Waste Code to the total recurrent wastes manifested in 2000.

<b>CWC</b>	<b>Waste type (California Waste Code) Description</b>	<b>Tons</b>	<b>% of Recurrent Waste</b>
221	Waste oil and mixed oil	400,768	31%
181	Other inorganic solid waste	228,160	18%
352	Other organic solids	79,807	6%
613	Auto shredder waste	65,001	5%
223	Unspecified oil-containing waste	63,718	5%
591	Baghouse waste	56,341	4%
135	Unspecified aqueous solution	45,571	4%
134	Aqueous solution with total organic residues less than 10 percent	38,891	3%
222	Oil/water separation sludge	36,278	3%
792	Liquids with pH <= 2 with metals	25,854	2%
171	Metal sludge (see 121)	25,148	2%
343	Unspecified organic liquid mixture	23,526	2%
214	Unspecified solvent mixture	21,217	2%
571	Fly ash, bottom ash and retort ash	20,689	2%
132	Aqueous solution with metals (< restricted levels and see 121)	19,509	2%
133	Aqueous solution with total organic residues 10 percent or more	13,862	1%
212	Oxygenated solvents (acetone, butanol, ethyl acetate, etc.)	11,384	1%
491	Unspecified sludge waste	10,752	1%
331	Off-specification, aged or surplus organics	10,207	1%
241	Tank bottom waste	9,267	1%
	<b>Total for Top 20</b>	<b>1,205,950</b>	<b>96%</b>
	<b>Recurring Wastes</b>	<b>1,297,849</b>	<b>100%</b>

Waste oil (California Waste Code 221, waste oil & mixed oil) dominates recurrent wastes, contributing 31% of the total amount of recurrent waste in California. The next largest waste stream is California Waste Code 181 (Other Inorganic Solid Waste) at 18% of the total. These percentages were 33% and 14%, respectively, in 1998.

### **Which industries generated the waste?**

Understanding which industry types generate more or less waste is important for pollution prevention program planning. Pollution prevention programs can leverage resources by targeting industry types that both generate large quantities of waste (large potential for reduction) and that utilize similar processes across the industry (providing a focal point for research and assistance).

The data available for this analysis were evaluated by Standard Industrial Classification (SIC) codes, to determine which industries generate waste. SIC codes provide information about businesses' primary industrial sectors. It is important to note that SIC Codes are self-assigned by companies. They are not assigned by any government agency.

#### *Manifest Data by Industry Type*

Historically, SIC Codes were not routinely collected and entered into the manifest system. As in the previous report, about half of the generators shipping hazardous waste in calendar year 2000 have reported an SIC Code. This resulted in only about half (52%) of the manifest records in Haznet being associated with an SIC Code, rendering the information in Table 3 incomplete and potentially inaccurate.

There have been a number of changes in managing generator information in 2000 and 2001 that are expected to make the calendar year 2001 and later manifest data more useful with respect to SIC Codes:

- businesses requesting permanent California EPA ID Numbers have been required to provide SIC Code information as a condition of obtaining an ID number;
- the 2001 generator verification notice sent to hazardous waste generators requested SIC Code information be provided. Currently (late 2001), 64% of the generators that have verified their business information have reported SIC Code information;
- Senate Bill 271 (Chapter 319, Statutes of 2001) was enacted in 2001. Part of the bill language gives DTSC greater enforcement power to compel businesses to report their SIC Code as part of the annual verification process;
- Senate Bill 271 created the consolidated manifesting process mentioned in the previous section, which replaces the current milkrun variance regulations and modified manifesting procedures formerly in statute. Approximately 20,000 currently exempt generators (generally generators using consolidated manifests that formerly used milkrun manifests) will be required to obtain ID numbers to ship hazardous waste after January 1, 2002. They will be also be required to provide SIC Code information; and
- the 2002 verification cycle will compel, rather than request, generators to provide this information. This will increase the percentage of businesses with SIC Code information, resulting in further improvements in our ability to identify industry types generating hazardous waste.

Because only 51% of the year 2000 records contain SIC information, it follows that the highest percentage of waste manifested, by quantity, has a blank SIC Code (49%). The next largest percentage of wastes (9%) is generated by SIC Code 4200, Trucking and Warehouse. It is likely, however, that this is not an accurate reflection of this sector 's waste generation. It would be more likely that these wastes are generated by other businesses and are being transported by this sector; i.e., milk run manifests of used oil. Table 14 below shows the contribution of each SIC Code to the total, to the extent that SIC codes are available in this data set.

<b>Table 14: Percent of Each SIC Code to Manifest Total (Recurrent Wastes)</b>			
<b>SIC</b>	<b>SIC Code Description</b>	<b>Tons</b>	<b>%</b>
	Blank	633,950	49%
4200	Trucking and warehousing	122,393	9%
2911	Petroleum refining	68,413	5%
2759	Commercial printing, n.e.c.	47,763	4%
4911	Electric services	41,998	3%
9711	National security	36,456	3%
3672	Cathode ray television picture tubes	32,266	2%
3471	Plating and polishing	14,446	1%
3674	Semiconductors and related devices	13,857	1%
3400	Fabricated metal products	11,960	1%
3721	Aircraft	10,765	1%
4900	Electric, gas, and sanitary services	9,285	1%
3679	Electronic components, n.e.c.	8,241	1%
2821	Plastics materials and resins	7,876	1%
4231	Trucking terminal facilities	7,793	1%
3363	Aluminum die-castings	7,053	1%
3691	Storage batteries	6,284	<1%
2869	Industrial organic chemicals, n.e.c.	6,160	<1%
4131	Intercity highway transportation	5,975	<1%
4011	Railroads, line-haul operating	5,827	<1%
	<b>Total for Top 20</b>	<b>1,098,762</b>	<b>85%</b>
	<b>Grand total</b>	<b>1,297,849</b>	<b>100%</b>

### **California's Toxics Release Inventory Releases by SIC Code**

Table 15 below shows the SIC codes responsible for TRI total waste managed, quantities treated off-site, quantities released on- and off-site, and quantities recycled off-site. The table is ordered by total waste managed, and reported in pounds. Notice that the petroleum sector accounts for 28% of the total chemicals generated. However, it ranks second (17%) in the " quantity released on- and off-site " category, with the " off-site facilities " ranking first in that category (26%).

**Table 15: California's Largest TRI Filers by Industry Type, Sorted by Total Chemicals Generated, 1999 TRI (8/01 update)**

Industry (SIC)	Total Chemicals Generated	%	Treated Off-site	%	Quantity Released On- and Off-site	%	Recycled Off-site	%
29 Petroleum	140,307,682	28%	3,885,489	8%	11,577,994	17%	7,670,907	9%
4953/7389 RCRA/Solvent Recovery	116,723,759	23%	24,012,095	51%	18,411,271	26%	2,095,504	2%
36 Electrical Equip.	50,494,544	10%	2,484,537	5%	1,624,854	2%	32,799,827	37%
28 Chemicals	39,346,010	8%	6,538,790	14%	2,978,039	4%	4,478,320	5%
33 Primary Metals	29,419,471	6%	556,014	1%	2,926,230	4%	18,505,970	21%
34 Fabricated Metals	29,360,037	6%	1,514,019	3%	3,566,629	5%	10,579,450	12%
20 Food	15,202,421	3%	2,839,168	6%	5,688,495	8%	13,500	<1%
Multiple Codes 20-39	13,433,461	3%	633,237	1%	4,263,763	6%	4,144,375	5%
No Reported Codes	9,836,813	2%	35,693	<1%	6,922,839	10%	1,114,793	1%
26 Paper	9,595,471	2%	238,618	1%	1,475,149	2%	357,189	<1%
37 Transportation Equip.	8,343,539	2%	1,001,136	2%	2,079,962	3%	2,564,896	3%
27 Printing	7,357,310	1%	39,833	<1%	550,588	1%	87,902	<1%
30 Plastics	6,577,985	1%	1,071,693	2%	3,053,032	4%	737,267	1%
35 Machinery	4,780,080	1%	1,664,309	4%	92,755	<1%	1,597,805	2%
5171 Petroleum Bulk Terminals	4,759,903	1%	54,738	<1%	389,039	1%	425,270	<1%
10 Metal Mining	3,975,408	1%	0	0	3,173,495	5%	77,700	<1%
32 Stone/Clay/Glass	2,317,567	<1%	15,055	<1%	1,855,886	3%	196,432	<1%
22 Textiles	1,803,732	<1%	78,390	<1%	123,548	<1%	525,885	1%
39 Miscellaneous	1,802,843	<1%	506,612	1%	455,124	1%	314,297	<1%
49 Electric Utilities	884,124	<1%	1,561	<1%	882,563	1%	0	0
38 Measure/Photo.	738,028	<1%	36,163	<1%	67,994	<1%	512,460	1%
24 Lumber	700,562	<1%	1,468	<1%	560,173	1%	702	<1%
25 Furniture	696,034	<1%	79	<1%	137,738	<1%	3,323	<1%
5169 Chemical Wholesalers	640,553	<1%	19,643	<1%	122,814	<1%	32,159	<1%
31 Leather	165,938	<1%	0	0	63,372	<1%	0	<1%
<b>Total</b>	<b>499,263,275</b>	<b>100%</b>	<b>47,228,340</b>	<b>100%</b>	<b>73,043,346</b>	<b>104%</b>	<b>88,835,933</b>	<b>100%</b>

*Biennial Generator Report Data*

The total quantity of waste generated in California in 1999, as reported to this data set, was 427,302 tons. The top 10 generators of RCRA waste are shown in Table 16.

**Table 16: Top Ten RCRA Waste Generators as Reported to the U.S. EPA's Biennial Report System, 1999**

Facility Name	City	Tons	% of Total
Phibro-Tech, Inc.	Santa Fe Springs	71,999	17%
D/K Environmental	Vernon	26,228	6%
Los Angeles County/USC Med Center	Los Angeles	20,544	5%
Quemetco Inc.	City of Industry	19,343	5%
Safety-Kleen (San Jose), Inc.	San Jose	18,132	4%
Romic Environmental Technologies Corp.	East Palo Alto	16,086	4%
Martinez Refining Company	Martinez	13,865	3%
Kinsbursky Brothers	Anaheim	12,332	3%
GNB Technologies Inc.	Vernon	9,936	2%
Tamco	Rancho Cucamonga	9,836	2%
<b>Total for Top 10</b>		<b>218,301</b>	<b>51%</b>
<b>Total</b>		<b>427,302*</b>	<b>100%</b>

Source: "The National Biennial RCRA Hazardous Waste Report (Based on 1999 Data)", accessed on the World Wide Web on 10/5/01 at <http://www.epa.gov/epaoswer/hazwaste/data/brs99/>. See that report for more detail on the management of RCRA wastes reported to this data set.

\*Except for wastes disposed via deepwell/underground injection, U.S. EPA has excluded wastewater from the 1997 and 1999 National Biennial Reports. This quantity therefore does not include aqueous hazardous wastes treated on-site prior to discharge to a publicly owned treatment works; nor does it include such aqueous wastes sent off-site for treatment and disposal.

The top generator on this list, Phibro-Tech Inc., is a major supplier of specialty etchants and related products to the metal finishing, printed wiring and photochemical machining industries, and also supplies recycling services for these etchants.<sup>26</sup>

### How were the wastes managed?

When shipping hazardous wastes under a manifest, generators must include a designation of the type of waste management method that will be used at the final destination. An understanding of existing waste management strategies is essential for understanding hazardous waste issues. In 2000, recycling was the most prevalent method for managing hazardous waste in California, accounting for 47% of the manifested waste total. Table 17 shows each management method's relative percentage of the total.

<sup>26</sup> From Phibro-Tech, Inc.'s website, at <http://www.phibro-tech.com/>, accessed 11/9/01

**Table 17: Hazardous Waste Management Methods in California, 2000 Manifest (Recurrent Wastes)**

Method	Mgmt. Code	Tons of Waste	% Waste Managed
Recycler	R01	613,845	47%
Disposal, landfill	D80	304,534	23%
Transfer station	H01	133,278	10%
		112,035	9%
Treatment, tank	T01	74,375	6%
Disposal, other	D99	41,670	3%
Treatment, incineration	T03	14,593	1%
Invalid disposal code	***	2,793	<1%
Disposal, Land application	D81	479	<1%
Disposal, surface impoundment	D83	228	<1%
Disposal, injection well	D79	20	<1%
<b>Total</b>		<b>1,297,849</b>	<b>100%</b>

Transfer stations accounted for 10% of the total wastes managed in 2000. The majority (61%) of the wastes being received by transfer stations is waste oil (California Waste Code 221), which usually is recycled.

#### *Hazardous Wastes Shipped Out Of State*

Out of state waste shipments are tracked under the manifest system of the state receiving the waste. Not all states, however, maintain their own manifest tracking system. Hazardous wastes sent from California to one of these states (without a tracking system) are tracked under California 's manifest system. The blank " method " in Table 6 may be wastes shipped out of state. DTSC would not necessarily receive the copy of the manifest, which shows management methods, from out-of-state treatment, storage or disposal facilities.

#### *Hazardous Waste Management - Disposal*

Table 18 shows the top five industry types disposing hazardous wastes to landfill<sup>27</sup>. After the 39% of the waste not associated with an SIC Code, the petroleum refining industry remains the largest generator of recurrent hazardous waste, at 13% of the total. However, while the quantity generated by petroleum refineries in 2000 is slightly larger than the quantities generated in 1998 (39,179 tons and 37,680 tons, respectively), the percentage of the total is somewhat less. In 1998 this sector s contribution amounted to 16% of the state ' s total; in 2000 it was 13%.

<sup>27</sup> The tables in this chapter show only what appear to be the significant industries or facilities; therefore, the number of industries or facilities shown may vary from table to table.

**Table 18: Top 25 Industry Types Disposing to Landfill, 2000 Manifest**

SIC	Standard Industrial Classification Description	Tons	%
	blank	117,683	39%
2911	Petroleum refining	39,179	13%
4911	Electric services	33,869	11%
2759	Commercial printing, n.e.c.	29,018	10%
9711	National security	20,033	7%
4231	Trucking terminal facilities	3,338	1%
3312	Blast furnaces and steel mills	3,162	1%
3672	Cathode ray television picture tubes	3,086	1%
3400	Fabricated metal products	3,073	1%
3471	Plating and polishing	2,686	1%
2821	Plastics materials and resins	2,487	1%
3573	Electronic computing equipment	2,411	1%
2999	Petroleum and coal products, n.e.c.	1,887	1%
2869	Industrial organic chemicals, n.e.c.	1,872	1%
3600	Electric and electronic equipment	1,780	1%
3011	Tires and inner tubes	1,722	1%
3721	Aircraft	1,675	1%
2819	Industrial inorganic chemicals, n.e.c.	1,570	1%
3679	Electronic components, n.e.c.	1,393	0%
1321	Natural gas liquids	1,385	0%
3572	Computer storage devices	1,353	0%
3724	Aircraft engines and engine parts	1,298	0%
1311	Crude petroleum and natural gas	1,229	0%
1474	Potash, soda, and borate minerals	1,144	0%
2851	Paints and allied products	1,053	0%
4900	Electric, gas, and sanitary services	1,008	0%
	<b>Total for Top 25</b>	<b>280,393</b>	<b>92%</b>
	<b>Total</b>	<b>304,534</b>	<b>100%</b>

In 2000, the largest recurrent waste stream manifested for disposal was California Waste Code 181 (other inorganic solid waste), accounting to 54% of the total recurrent waste going to disposal. In 1998 this waste stream constituted 46% of the total recurrent waste. Table 19 below lists the top waste codes, representing 98% of the total material going to landfills. All other waste streams were less than 1,000 tons.

**Table 19: Top 15 Waste Codes to Landfill, 2000 Manifest**

CWC	California Waste Code Description	Tons	%
181	Other inorganic solid waste	164,965	54%
352	Other organic solids	41,761	14%
591	Baghouse waste	35,694	12%
571	Fly ash, bottom ash and retort ash	17,923	6%
223	Unspecified oil-containing waste	14,090	5%
491	Unspecified sludge waste	6,001	2%
441	Sulfur sludge	4,205	1%
171	Metal sludge (see 121)	3,418	1%
421	Lime sludge	1,771	1%
512	Other empty containers 30 gallons or more	1,566	1%
133	Aqueous solution with total organic residues 10 percent or more	1,265	0%
241	Tank bottom waste	1,256	0%
321	Sewage sludge	1,120	0%
513	Empty containers less than 30 gallons	1,100	0%
222	Oil/water separation sludge	1,090	0%
	<b>Total for Top 15</b>	<b>297,227</b>	<b>98%</b>
	<b>Total</b>	<b>304,534</b>	<b>100%</b>

**Table 20: Top 15 Facilities to Landfill, 2000 Manifest**

Facility Name	County	Tons	%
Tamco	San Bernardino	29,015	10%
Camp Roberts Training Site	San Luis Obispo	16,068	5%
Wheelabrator Martell Inc.	Amador	14,947	5%
	San Francisco	14,236	5%
Salton Sea Power L P and Brine L P	Imperial	13,735	5%
Central California Power Agency 1	Lake	13,146	4%
Shell Martinez Refining Company	Contra Costa	12,576	4%
Tosco Refining Company	Contra Costa	9,385	3%
Del Ranch Power Plant	Imperial	8,617	3%
Elmore Power Plant	Imperial	6,947	2%
Leathers Power Plant	Imperial	6,546	2%
	Unknown	6,075	2%
	Alameda	5,667	2%
Chevron 1001651-El Segundo Refinery	Los Angeles	5,277	2%
Pacific Gas and Electric	Sonoma	4,031	1%
<b>Total for Top 15</b>		<b>166,269</b>	<b>55%</b>
<b>Total</b>		<b>304, 533</b>	<b>100%</b>

\*a biomass facility

Table 20 presents a listing of the largest quantity generators sending material to land disposal. The top fifteen includes three refineries and seven power plants. The largest generator, Tamco, is a steel manufacturer and recycler.

*Hazardous Waste Management: Incineration*

Environmental and public health advocates are particularly concerned about hazardous waste incineration, largely because of the byproducts that can be released during combustion processes. If not properly controlled, these byproducts can include dioxins and other highly toxic materials.

Tables 21, 22 and 23 below shows the industries, waste types, and facilities involved in hazardous waste incineration.

<b>SIC</b>	<b>SIC Description</b>	<b>Tons</b>	<b>%</b>
2911	Petroleum refining	3,597	25%
	unknown	3,275	22%
3721	Aircraft	2,138	15%
4932	Gas and other services combined	651	4%
2819	Industrial inorganic chemicals, n.e.c.	650	4%
9711	National security	595	4%
2834	Pharmaceutical preparations	429	3%
3674	Semiconductors and related devices	336	2%
4911	Electric services	312	2%
3400	Fabricated metal products	265	2%
2672	Paper coated and laminated, n.e.c.	206	1%
3761	Guided missiles and space vehicles	180	1%
2851	Paints and allied products	130	1%
2891	Adhesives and sealants	128	1%
3573	Electronic computing equipment	120	1%
3728	Aircraft equipment, n.e.c.	113	1%
	<b>Total for Top 16</b>	<b>13,124</b>	<b>90%</b>
	<b>Total</b>	<b>14,593</b>	<b>100%</b>

**Table 22: Top 14 California Waste Codes to Incineration, 2000 Manifest**

CWC	California Waste Code Description	Tons	%
352	Other organic solids	4,224	29%
222	Oil/water separation sludge	1,504	10%
241	Tank bottom waste	1,024	7%
331	Off-specification, aged or surplus organics	990	7%
351	Organic solids with halogens	717	5%
341	Organic liquids (nonsolvents) with halogens	601	4%
181	Other inorganic solid waste	512	4%
731	Liquids with polychlorinated biphenyls >= 50 Mg./L	401	3%
741	Liquids with halogenated organic compounds >= 1,000 Mg./L	385	3%
162	Other spent catalyst	368	3%
551	Laboratory waste chemicals	340	2%
343	Unspecified organic liquid mixture	324	2%
491	Unspecified sludge waste	319	2%
223	Unspecified oil-containing waste	316	2%
	<b>Total for Top 14</b>	<b>12,026</b>	<b>82%</b>
	<b>Total</b>	<b>14,593</b>	<b>100%</b>

**Table 23: Top 20 Facilities to Incineration, 2000 Manifest**

Facility Name	County	Tons	%
Exxon Co USA/Benicia Refinery	Solano	915	6%
Northrop Grumman Corp (WC)	Los Angeles	843	6%
Tosco Refining Co	Los Angeles	656	4%
Calpine-Pittsburg Plant	Contra Costa	651	4%
ARCO Products Company	Los Angeles	642	4%
Chevron Products Company	Contra Costa	604	4%
Allied Signal, Inc. El Segundo Works	Los Angeles	597	4%
Sierra Army Depot	Lassen	458	3%
	Sacramento	433	3%
	Unknown	404	3%
Northrop Grumman Corp	Los Angeles	337	2%
Tosco Refining Company	Contra Costa	297	2%
Northrop Grumman MASD	Los Angeles	274	2%
Rohr Inc. A Subsidiary of the BFGoodrich	Riverside	270	2%
Northrop Grumman Corp (EC)	Los Angeles	253	2%
Reynolds Metals Co-San Francisco Plant	Alameda	222	2%
SO CAL Edison Visalia Poleyard	Tulare	215	1%
Lockheed Martin Missiles & Space	Santa Clara	214	1%
Arlon Adhesives & Films Division	Orange	206	1%
SO CAL Edison Investment & RHMD	Los Angeles	200	1%
<b>Total for Top 20</b>		<b>8,690</b>	<b>60%</b>
<b>Total</b>		<b>14,593</b>	<b>100%</b>

Table 24 below shows TRI " off-site transfers for further management " by industry type.

<b>Table 24: 1999 TRI Transfers Off-site for Further Waste Management (in pounds), All Chemicals By Industry, California, 1999</b>						
<b>Industry (Standard Industrial Classification)</b>	<b>Transfers to Recycling</b>	<b>Transfers to Energy Recovery</b>	<b>Transfers to Treatment</b>	<b>Transfers to POTWs</b>	<b>Other Off-site Transfers</b>	<b>Total Transfers Off-site for Waste Management</b>
20 Food	33,793	3,299	246	3,384,441	.	3,421,779
22 Textiles	525,000	84,886	56,456	22,990	.	689,332
24 Lumber	1,000	.	407	2,606	.	4,013
25 Furniture	3,323	53,124	79	0	.	56,526
26 Paper	125,456	2,752	238,541	500	.	367,249
27 Printing	67,048	64,526	33,526	16,110	.	181,210
28 Chemicals	3,972,442	6,411,883	2,452,473	4,197,858	.	17,034,656
29 Petroleum	7,669,352	4,460	53,006	3,877,781	.	11,604,599
30 Plastics	357,215	63,458	42,086	936,370	.	1,399,129
31 Leather	.	.	.	.	.	.
32 Stone/Clay/Glass	128,123	3,385	.	126,166	.	257,674
33 Primary Metals	17,738,130	60,379	11,136	959,309	.	18,768,954
34 Fabricated Metals	8,672,395	585,081	186,625	2,004,455	.	11,448,556
35 Machinery	1,686,108	6,160	2,792	1,661,618	.	3,356,678
36 Electrical Equip.	32,619,330	405,258	1,141,244	2,699,304	.	36,865,136
37 Transportation Equip.	2,419,677	183,998	217,703	869,568	.	3,690,946
38 Measure/Photo.	405,870	78,555	308,439	20,903	.	813,767
39 Miscellaneous	316,581	47,791	4,001	810,628	.	1,179,001
Multiple Codes 20-39	2,762,836	375,324	500,710	2,507,143	8,474	6,154,487
No Reported Codes	489,017	29,150	135,471	2,421,035	.	3,074,673
<b>Original industry subtotal:</b>	<b>79,992,696</b>	<b>8,463,469</b>	<b>5,384,941</b>	<b>26,518,785</b>	<b>8,474</b>	<b>120,368,365</b>
10 Metal Mining	77,700	.	.	.	.	77,700
49 Electric Utilities	.	0	1,750	694	.	2,444
5169 Chemical Wholesalers	32,270	443,600	6,424	14,733	.	497,027
5171 Petroleum Bulk Terminals	424,597	1,563	61,666	4,549	.	492,375
4953/7389 RCRA/Solvent Recovery	1,357,834	27,046,140	10,432,804	99,186	.	38,935,964
<b>New industry subtotal:</b>	<b>1,892,401</b>	<b>27,491,303</b>	<b>10,502,644</b>	<b>119,162</b>	<b>.</b>	<b>40,005,510</b>
<b>Total</b>	<b>81,885,097</b>	<b>35,954,772</b>	<b>15,887,585</b>	<b>26,637,947</b>	<b>8,474</b>	<b>160,373,875</b>

### Which facilities generated the most waste?

Table 25 below shows the 17 largest quantity hazardous waste generators as identified in the manifest data system for 2000. Note that several of the companies are also " off-site facilities." Such facilities are those that accept waste generated elsewhere for treatment and disposal.

Generally, such facilities were excluded from analyses such as these to avoid double-counting the waste. For this table, however, wastes manifested under these facilities EPA identification number for permitted activities were excluded. The quantities listed here were manifested under a different EPA ID number and may reflect activities associated with milkrun transporter activities.

<b>Facility Name</b>	<b>County</b>	<b>Tons</b>	<b>%</b>
Asbury Environmental Services	Los Angeles	120,852	7%
	Orange	68,573	4%
Evergreen Environmental Services	Alameda	58,444	3%
Tamco	San Bernardino	47,624	3%
	Unknown	37,711	2%
	Los Angeles	29,450	2%
Los Angeles County/Emerg Response Only	Los Angeles	20,836	1%
	San Francisco	19,999	1%
Alviso Independent Oil	Santa Clara	19,126	1%
Salton Sea Power LP and Brine LP	Imperial	18,325	1%
Camp Roberts Training Site	San Luis Obispo	16,495	1%
Wheelabrator Martell Inc	Amador	15,783	1%
Central California Power Agency 1	Lake	14,382	1%
Shell Martinez Refining Company	Contra Costa	13,072	1%
Tosco Refining Company	Contra Costa	12,489	1%
BC Stocking Distributing	Solano	10,311	1%
	Alameda	10,127	1%
<b>Total for Top 17</b>		<b>533,599</b>	<b>29%</b>
<b>Total</b>		<b>1,821,321</b>	<b>100%</b>

### Discussion and Conclusions

The picture of waste generation described in this chapter does not account for a variety of important considerations. BGR and manifest data do not contain information about what chemicals are found loose in the environment. None of these data sets, TRI, manifest or BGR, allow for an accounting of the varying toxicity of wastes. The risks posed by the generation of hazardous wastes cannot be evaluated conceptually. To assess risk, one must know specifically what chemicals and in what concentrations population groups were exposed to, the associated time-frame, and possible routes of exposures. TRI data can give an indication of potential risk due to its focus on pounds of pure chemical. Manifest and Biennial Generator Report data are of little use for this purpose.

A review of this chapter indicates that about two-thirds of the hazardous waste manifested in California consists of oil and oil-contaminated waste; organic and inorganic solids; and auto-shredder waste. Furthermore, the data indicate that a significant portion of the hazardous waste manifested in the state is directly or indirectly related to the production, maintenance, operation and disposal of the automobile. Waste oil and oil-contaminated waste constitute 36% of all manifested waste.

The petroleum refining industry continues as a major contributor to hazardous waste generation in California. This industry:

- contributed 28% of " total waste managed " 1999 TRI releases in California;
- contributed 8% of wastes sent off-site for treatment (1999 TRI);
- contributed 17% quantity released on and off-site (1999 TRI);
- contributed 9% of materials recycled off-site (1999 TRI);
- contributed 5% of the total waste manifested in 2000;
- contributed 7% of manifested waste going to landfill; and
- generated 25% of the wastes to incineration (2000 manifest).

Remember, however, that environmental problems cannot be directly correlated to hazardous waste amounts. In fact, the wastes reported to the manifest and BGR data sets are those that are properly managed and controlled; presumably, these quantities represent materials that do not cause harm, or cause less harm, because they are not released uncontrolled into the environment. However, regardless of the risk or environmental problems, proper hazardous waste management continues to pose a formidable challenge.