Mechanisms for Tracking United States Mercury Imports and Exports

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1. INTRODUCTION

1.1 Background

In 1997 the governments of Canada, Mexico, and the United States committed to the North American Regional Action Plan on Mercury under the auspices of the Commission for Environmental Cooperation (CEC). The Regional Action Plan provides a path forward in domestic and trilateral efforts to reduce the mercury exposure of North American ecosystems, fish and wildlife, and humans through the prevention and reduction of anthropogenic mercury releases. The ultimate goal is to achieve a reduction in releases of mercury through appropriate national and international initiatives.

This project deals with two aspects of Phase II of the North American Regional Action Plan on Mercury as they relate to the U.S. – a review of national regulations/policies regarding: 1) import/export of mercury for processing, and 2) recycling or final disposal of mercury waste.

1.2 Objectives

The objectives of this study are:

- Identify and discuss U.S. methodologies and processes for tracking imports and exports of mercury destined for use in manufactured goods or use in products or processes;

- Identify and discuss U.S. reporting mechanisms used to track the ultimate fate of mercury-containing wastes, particularly wastes transported across national boundaries for storage, handling, processing, disposal, or long-term containment;

- Recommend improvements to these tracking and reporting systems.

1.3 Methodology

The major legislative and administrative tools available to the U.S. government potentially relevant to the tracking of the import and export of elemental mercury and mercury compounds, finished goods containing mercury, and hazardous waste containing mercury were reviewed during the course of this project. Interviews were conducted with government agency personnel and affected industry to determine how relevant regulatory programs function in actual practice.

The U.S. regulatory and administrative tools that contain some direct or indirect mechanisms for tracking imports/exports of elemental mercury, mercury-bearing commodity goods, and mercury-containing hazardous waste have been evaluated against the following criteria:

- Data comprehensiveness, including the degree to which the regulatory/administrative tools can be expected to capture all imports/exports based on reporting *de minimus* levels and industrial operations covered;

- Data reliability and quality, including whether data is gathered as a result of a regulatory requirement, with penalties for non-compliance, or on a voluntary basis, and whether the data is subject to any quality control reviews; and

- Data usability, including whether data is submitted and assessed in a timely manner and is stored in format that facilitates access and analysis, such as electronic databases, as opposed to hard copy records requiring manual searches.

Recommendations to address the existing limitations of these regulatory/administrative tools are also provided in this report.

The evaluation of each regulatory/administrative tool is summarized in a table using the criteria of comprehensiveness, quality and reliability, and usability for analysis as described below:

Mechanism	**Comprehen-siveness**	**Quality / Reliability**	**Usability/ Feasibility of Analysis**	**Comments**
(e.g. TRI reporting requirements)	How complete is the information provided by the mechanism (e.g. what portion of imports, exports, and uses are likely covered, as a result of such factors as reporting thresholds or sectoral coverage)?	Are there any factors that compromise the reliability of the source (e.g. is the data collected as a result of a regulatory mandate or on a voluntary basis; is the data checked for accuracy and completeness)?	Does the form of information allow for efficient tracking and analysis (e.g. is the data stored in electronic databases which facilitate access and analysis, or would manual searches of records be required to generate useful information?)	Synthesis of the preceding columns and any additional relevant information.

1.4 Mercury Import/Export Trends in the U.S.

Industrial use of mercury in the U.S. has been on the decline in recent years. Mercury is no longer produced from mercury ore in the United States. The last mercury ore mine closed in 1990. However, mercury is still produced as a byproduct from the mining of gold ores and from secondary (recycle) mercury production. Nearly all of the mercury used in the United States is derived from secondary sources. Common secondary sources include spent batteries, chlor-alkali wastewater sludges, mercury vapor and fluorescent

lamps, dental amalgams, electrical apparatus, and measuring instruments. Secondary producers typically use high-temperature roasting and retorting to recover mercury from the materials and distillation to purify contaminated liquid mercury metal. Major stockpiles of mercury are also maintained in the U.S. The Department of Defense (DoD) strategic mercury stockpile (4 separate sites) is the predominant source of stockpiled mercury. Industrial stocks are also located at manufacturing plants, laboratories, and hospitals around the country. Table 1 summarizes the quantities of mercury produced or in-stock in the United States in 1998. All values shown are in metric tons (mT).

Table 1. U.S. Production/Stockpiles of Elemental Mercury in 1998

Primary Hg Production (mT/yr)	Secondary Hg Production (mT/year)	U.S. Dept. of Defense Stockpile (mT)	Industrial Stockpiles (mT)
< 100	~ 360	4,437	~180

Current domestic primary and secondary mercury production exceed domestic demand in the United States. Table 2 compares quantities of elemental mercury (HTS 280540) imports/exports from 1998 – 2000 (U.S. Census Bureau data via U.S. International Trade Commission)

Table 2. Comparison of U.S. Imports/Exports of Elemental Mercury, 1998 – 2000

	1998	1999	2000
U.S. Mercury Imports (mT)	128	62	103
U.S. Mercury Exports (mT)	63	181	182

Currently, the Department of Defense stores 4,437 metric tons of commodity grade, elemental mercury at four separate sites: Somerville, New Jersey; New Haven, Indiana; Warren, Ohio; and at the U.S. Department of Energy (DOE) Y-12 National Security Complex in Oak Ridge, Tennessee. The Defense National Stockpile Center (DNSC), a field activity of the Defense Logistics Agency (DLA), manages the mercury stored at all these sites. This mercury inventory was declared excess to national defense needs and authorized for disposition, generally by sales. DNSC voluntarily suspended sales of its elemental mercury in 1994 following concerns expressed by members of Congress and the Environmental Protection Agency about the global accumulation of mercury and its environmental affects.

DNSC is currently preparing an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) to decide the ultimate disposition of its excess elemental mercury. The alternatives under consideration in the EIS are:

- X No Action B status quo; as currently stored;
- X Consolidation B consolidated storage at one or more existing depots or at one consolidation facility;
- X Treatment and Disposal B treating the mercury to make it safe for disposal in accordance with EPA regulations;
- X Sales B resuming sales at a level which would not unduly disrupt the market.@

1.5 Information Sources Surveyed

United States legislation and administrative procedures relevant to tracking of mercury imports, exports, and domestic shipment are listed in Table 3 and summarized in subsequent paragraphs:

Table 3. Tracking of Mercury Shipments – Summary of Relevant U.S. Legislation and Administrative Procedures

Legislation or Administrative Procedure	Date Enacted
U.S. Environmental Protection Agency:	
Resource Conservation and Recovery Act (RCRA) • Land Disposal Restriction Rule • Universal Waste Rule • Mercury-Containing and Rechargeable Battery Management Act • Mercury-Containing Lamps Rule	1978 • 1988 • 1995 • 1996 • 1999
Comprehensive Environmental Response, Compensation, and Liability Act, 1980 (CERCLA, aka "Superfund")	1980
Emergency Planning and Community Right-To-Know Act (EPCRA), Section 313	1986
Pollution Prevention Act (PPA), Section 6607	1990
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	1947, Amended 1980, 1988
Clean Air Act (CAA)	1970, Amended 1977, 1990
Toxic Substances Control Act (TSCA)	1976
U.S. EPA, Office of Solid Waste, RCRA Program automated hazardous waste shipping manifest program	2002
U.S. Department of Transportation:	
Federal Hazardous Materials Transportation Law	1993
U.S. Treasury Department:	
U.S. Customs Service, automated import/export manifest requirements	2002
U.S. Department of Commerce:	
Census Bureau, administration of "Schedule B" trade codes for export goods, compilation of trade statistics from Customs Service shipping manifests	ongoing
Bureau of Export Administration, licensing and tracking exports of goods with national security significance. Participates in approval/denial of DOD strategic stockpile mercury sales through the Market Impact Committee.	ongoing
International Trade Administration, participates in approval/denial of DOD strategic stockpile mercury sales through *Market Impact Committee*	ongoing

U.S. International Trade Commission:	
Administration of import trade codes, addition of new classifications as necessary	ongoing
U.S. Department of Defense:	
Defense Logistics Agency, management of strategic mercury stockpile	ongoing
U.S. Department of State:	
Department of State, Participates in approval/denial of DOD strategic stockpile mercury sales through the Market Impact Committee.	ongoing

Resource Recovery and Conservation Act, 1978 (RCRA) – The purpose of RCRA is to regulate the manner in which hazardous waste is recycled or disposed. RCRA prescribes very specific procedures for identifying, storing, containing, labeling, and disposing of a wide variety of hazardous waste. Generally mercury-containing waste must be processed in a retort or roaster to reduce mercury concentration in the waste to a level below the toxicity threshold value prior to disposal. RCRA includes universal waste standards, know as the *Universal Waste Rule - UWR*, that simplify storage and recordkeeping requirements for three types of mercury-containing waste: batteries, thermostats, and lamps. Mercury-containing UWR waste may not be exported without prior consent by the intended foreign recipient.

Mercury-Containing and Rechargeable Battery Management Act, 1996 – Two goals of the *Act* are to limit mercury content in consumer batteries and to promote recycling and proper disposal of used rechargeable nickel cadmium batteries. The *Act* requires uniform labeling and requires that collection, storage, and transportation be in accordance with UWR standards. The *Act* prohibits the importation of batteries that contain mercury.

Mercury-Containing Lamps Rule, 1999 – EPA issued a final rule in March 1999 to add mercury-containing lamps to the UWR.

Comprehensive Environmental Response, Compensation, and Liability Act, 1980 (CERCLA, aka "Superfund") – CERCLA provides mechanisms for identifying contaminated industrial sites that are no longer in operation, categorizing the degree of contamination, and implementing site remediation procedures. The disposal procedures defined in RCRA for mercury-contaminated waste are also applicable to mercury-contaminated media at CERCLA sites.

Emergency Planning and Community Right-To-Know Act (EPCRA), 1986, Section 313, and Pollution Prevention Act (PPA), 1990, Section 6607 – These two statutes mandate that a publicly accessible toxic chemical database be developed and maintained by the EPA. This database, known as the Toxics Release Inventory (TRI), contains information concerning waste management activities and the release of toxic chemicals by facilities that manufacture, process, or otherwise use toxic chemical materials.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) – FIFRA requires EPA to regulate the sale and use of pesticides in the United States through registration and labeling of the estimated 21,000 pesticide products currently in use. The Act directs EPA to restrict the use of pesticides as necessary to prevent unreasonable adverse effects on people and the environment, taking into account the costs and benefits of various pesticide uses. FIFRA prohibits sale of any pesticide in the United States unless it is registered and labeled indicating approved uses and restrictions. FIFRA governs the import and export of pesticides from the United States.

Clean Air Act Amendments, 1990 – The 1990 amendments to the CAA were intended in large part to meet insufficiently addressed problems such as acid rain, ground-level ozone, stratospheric ozone depletion, and air toxics. Air toxics control standards, known as "Maximum Achievable Control Technology" (MACT) standards, have been developed for a number of industrial source categories under the air toxics component of the 1990 amendments to the CAA. MACT standards for mercury control have been developed or proposed for the following source categories:

- Mercury cell chlor-alkali plants
- Municipal solid waste incinerators
- Hospital waste incinerators
- Hazardous waste incinerators
- Coal-fired power plants

Toxic Substances Control Act, 1976 (TSCA) – TSCA authorizes the EPA to screen existing and new chemicals used in manufacturing and commerce to identify potentially dangerous products or uses that should be subject to control. EPA may require manufacturers and processors of chemicals to conduct and report the results of tests to determine the effects of potentially dangerous chemicals on living things. Based on test results and other information, EPA may regulate the manufacture, importation, processing, distribution, use, and/or disposal of any chemical that presents an unreasonable risk of injury to human health or the environment.

Federal Hazardous Materials Transportation Law, 1993 – The purpose of the *Law* is to provide adequate protection against the risks to life and property inherent in transporting hazardous materials in commerce by improving the regulatory and enforcement authority of the Secretary of Transportation. The *Law* covers hazardous materials definition/classification, hazard communication, packaging requirements, operational rules, and training. The *Law* applies to interstate, intrastate, and foreign commerce. The *Law* applies to transportation in commerce by aircraft, railcars, vessels, and any motor vehicle. A bill sent to Congress by the Secretary of Transportation in October 2001 would reauthorize the *Federal Hazardous Materials Transportation Law* while upgrading the inspection and enforcement authority of the *Law.*

Department of Defense, Defense Logistics Agency – Procedures regarding management of mercury in the National Defense Stockpile. DNSC is responsible for safe maintenance and storage of mercury within the National Defense Stockpile. Before any material may be bought or sold, Congress must enact specific enabling legislation. After receiving

Congressional authority, DoD develops the Annual Materials Plan (AMP) that limits the maximum quantity of each commodity that may be sold or bought by the Defense National Stockpile Center in a given fiscal year. The AMP is submitted to Congress by February 15th each year. Prior to submission, the AMP is coordinated with the Market Impact Committee (MIC), an interagency committee that advises DoD on projected domestic and foreign economic impacts of proposed Stockpile transactions. The MIC is comprised of representatives from seven Federal agencies and co-chaired by the Departments of State and Commerce.@

Department of Treasury, Customs Service – Automated import and export manifest procedures.

Department of Commerce, Census Bureau – Administration of Schedule B import codes (using the Harmonized Trade Schedule (HTS) system established by the World Trade Organization) assigned to goods imported to the United States, and compilation of mercury import/export statistics from Customs Service shipping manifests.

U.S. International Trade Commission – Oversight of mercury sales from DoD stockpile, administration and revision of HTS codes applied to goods being imported to the United States.

2. SURVEY AND ASSESSMENT OF POTENTIAL DATA SOURCES

2.1 Overview and Limitations of Existing U.S. Waste Tracking Systems[1]

RCRA and its regulations in 40 CFR Part 260 specify procedures for pre-notification and consent prior to exporting hazardous waste and manifesting hazardous waste shipments within the U.S. and across borders. At the national level the U.S. maintains five separate systems to track potential and actual transborder movements of hazardous waste and requires periodic reports of waste imports: 1) EPA's Waste Import Tracking System (WITS) database for tracking notices of intent to import hazardous waste *before shipment*, 2) EPA's Hazardous Waste Export database for tracking notices of intent to export hazardous waste *before shipment* as well as actual shipments (manifests) and annual reports of RCRA-permitted hazardous waste generators and shippers (so-called, "primary exporters") summarizing waste exported during the year, 3) Hazardous Waste Tracking System (HAZTRAKS) for tracking *maquiladora* shipments of hazardous waste across the United States-Mexico border, 4) annual reports to EPA prepared by facilities managing imported PCBs pursuant to 40 CFR 761.180(b)(3), and 5) biennial reports submitted to EPA by RCRA-permitted treatment, storage, or disposal (TSD) facilities managing imported (and domestic) hazardous waste.

2.1 Quality, Quantity, and Timing of Information

These tracking systems have been characterized as deficient with respect to quality, quantity and timing of information. Some information is required, but not submitted because of a lack of enforcement of reporting requirements. Other data, which are simply not managed at all or not linked to waste tracking systems, could be particularly helpful to enforcement efforts if they were explicitly linked to existing tracking systems or otherwise made available for planning and targeting of enforcement efforts:

- waste generation statistics of generators across borders;
- actual transport manifest data from generators across borders;
- compliance records of generators, transporters, importers, and treatment, storage and disposal
- facilities;
- information provided by informants on specific shipments or companies;
- prosecution tracking reports and "tricks of the trade" used by the waste management/transport
- community to circumvent laws;
- requests for information from waste brokers and generators; and
- information held by U.S. Custom Service (Customs) in the Numerically Integrated Profiling System (NIPS) database, which records information on each

[1] This entire section is excerpted directly from the 1999 CEC report "*Tracking and Enforcement of Transborder Hazardous Waste Shipments - A Needs Assessment.*" The discussion pertains to hazardous waste shipments between the U.S., Canada, and Mexico, although virtually all points are also applicable to the more specific case of tracking mercury and mercury waste import/exports to and from the U.S.

shipment entering the U.S.

Issues of confidentiality will become difficult to address if more information is made available or accessibility to existing information is enhanced without proper controls.

2.2 Compatibility Among Domestic and International Tracking Systems and Data Sources

The most critical limitation of existing tracking systems identified is their inability to track a single shipment "from cradle to grave" when the cradle is in one country and the grave is in another. Sources of this inability emanate from:

Differences in definitions of hazardous waste - Fully two-thirds of the hazardous waste shipped as hazardous from Mexico to the U.S. is unregulated in the U.S. and is not captured in U.S. tracking mechanisms. This is also true of lead-acid batteries and waste oils shipped to the U.S. from Canada.

Timing of information submission to centralized keepers of waste shipment data. Currently, no tracking systems operate in "real time." Immediate enforcement response to tracking information is not impossible. Some information arrives and is entered two to three years after shipment has taken place.

The lack of a uniform numbering system that assigns unique shipment numbers to each shipment regardless of whether it crosses a border. Without such a number, enforcement officials must resort to matching manifests and/or notices, which appears to be problematic. Loss of identity of shipments at transfer/bulking operations further obscures U.S., Canadian and Mexican ability to trace shipments from cradle to grave.

Non-compliance with foreign manifest systems - Canadian operators and shippers report that U.S. waste management facilities at times refuse to complete the Canadian manifest requirement of issuing a "certificate of destruction." Similar procedures also appear to be violated for Mexican shipments to the U.S.

Another problem is that the US and Canadian regulatory schemes and definitions do not in all cases require the identification of the "cradle" or the "grave." For example, export notices under RCRA can be completed by the "primary exporter," who need not be the generator of the hazardous waste. U.S. notice regulations require identification of the final destination (where known). In contrast, Canadian law allows identification of the receiving facility, which may or may not be the disposal/recycling site.

2.3 Responsiveness to Enforcement Needs

Existing tracking systems do not adequately support enforcement. Tracking systems and the procedures for transfer of information appear to meet the needs of the relevant bilateral agreements *for shippers that want to comply with their obligations under these agreements*. Systems do exist to assure that pre-notification and consent takes place for those who enter the system and that this information is retained for future use. But tracking systems designed to accomplish these goals do not necessarily accomplish the

broader goals of:

- tracking *all* transborder shipments of hazardous waste;
- identifying illegal traffic;
- ensuring that all waste that should be shipped across borders actually is shipped;
- ensuring that waste shipped across borders is handled in an environmentally safe manner.

Weaknesses in existing systems appear to offer opportunities to circumvent domestic laws and international agreements. One example is that *maquiladora* waste shipped from Mexico to the U.S. cannot be traced back to the Mexican generator, so there is no way to enforce provisions of Mexican law that require waste generated by U.S.-owned companies in Mexico (*maquiladora* plants) to be returned to the U.S. for management. Another example is that the U.S. cannot ensure that waste generated in the U.S. and shipped to Mexico for recycling actually is recycled. The U.S. receives no information on the ultimate disposition of waste once it crosses the U.S.-Mexico border. Tracking system information is generally not designed to address the issue of illegal shipments of hazardous waste. Border sweeps are undertaken independently of tracking efforts and results of sweeps are not entered into tracking databases, since information so obtained often is confidential. Enforcement officials generally resort to other types of information, more appropriately thought of as " intelligence " information, for purposes of identifying and stopping illegal shipments of hazardous waste across borders.

2.4 Summary of Proposed Improvements

Increase the effectiveness of enforcement efforts - Sharing existing data among relevant U.S. agencies would appear to be the most productive short-term action to enhance enforcement efforts. Two key suggestions for improvement are:

- Link waste tracking databases to media compliance databases through EPA identification codes for individual generators and TSD facilities.
- Improve access to databases on imports and exports of waste enforcement agencies and Customs.

Institute true origin to destination tracking by linking existing databases - Use a standard system of numbering for all transborder waste shipments, regardless of their origin or destination. A standardized shipment numbering system would be the first step toward linking the four key hazardous waste tracking systems in place in North America: HAZTRAKS, Exports, WITS, and Canadian Notice and Manifest Tracking System (CNMTS). The ability to link information in these databases by shipment number would greatly facilitate systematic searches of information, increase the number and quality of checks, and facilitate computerized flagging of abnormalities and inconsistencies.

Harmonize differences in definitions of hazardous waste – U.S. tracking systems rely on domestic legal definitions of hazardous waste which are different from those used by the rest of the world.. The U.S. has intentionally created an elaborate scheme of incentives based on these domestic legal definitions. This results in some waste flows that exit U.S. tracking systems when they cross borders, thereby escaping U.S. ability to track waste

flow from "cradle to grave." Common procedures should be established to track all wastes classified internationally as hazardous. Alternatively, common procedures could be established to track waste according to a "harmonized" system appropriate to the definitions of hazardous waste on an international level. One option is the OECD red-amber-green waste classification system. Using both the OECD waste classification scheme *and* domestic waste classification schemes for purposes of tracking waste flows is a viable alternative. It would also coordinate U.S. conventions with those of Europe and other industrialized nations.

Improve completeness, accuracy and timing of tracking data – Information on waste manifests sometimes is incomplete, inaccurate and untimely. This can frustrate enforcement officials' ability to track waste shipments from "origin to destination " and can result in circumvention of both domestic waste management laws and international agreements regarding transborder movement of hazardous waste. The U.S. should consider:

- incrementally moving toward more real-time waste tracking as resources allow;
- instituting new technologies (electronic manifests, bar-codes, scanners, etc.) to reduce data entry errors and reduce the time needed to maintain waste tracking systems;
- harmonizing regulatory requirements for tracking of imports and exports to help ensure cross-border compliance with foreign requirements.

Add certain key information to tracking systems – The U.S. should consider adding appropriate data to existing tracking systems or linking tracking information to other sources of data to improve the usefulness of tracking information for enforcement. Examples include:

- Adding information to hazardous waste tracking databases on compliance histories of regulated entities with all applicable environmental regulations. Such information could be added directly or linked to such databases through ID codes of specific waste generators, shippers, and treatment, storage and disposal facilities.
- Adding other types of data, such as Customs import manifests, public complaints about specific generators that result in adverse judgements (i.e. substantiated complaints) against the generators, shippers, or management facilities, information about detained shipments of hazardous waste, or financial performance data at the firm level as "modules" to existing hazardous waste tracking databases.
- Limiting access to these data or by hiding certain fields and linking to "read-only" versions of certain databases to ensure confidentiality.

Increase resources for tracking transborder waste shipments – Serious needs exist for better hardware, software, and training of individuals in the use of data on waste movements. Investments in these areas should be increased to strengthen enforcement efforts, for example, by improving existing systems focused on compliance.

Improve results of enforcement actions by using tracking databases in conjunction with

other key information – The effectiveness of tracking databases, indeed monitoring and enforcement efforts in general, can be improved with supplemental information such as:

- monitoring and detection of illegal traffic;
- compilation of intelligence information; and
- measurement of the relative effectiveness of alternative enforcement actions and efforts.

2.2 U.S. Legislative and Administration Tools for Tracking Mercury

The legislative and administrative tools currently available in the U.S. to track mercury commodity shipments and mercury waste shipments are examined in detail in this section. A narrative summary of the limitations and potential usefulness of each legislative/administrative tool relative to "cradle to grave" tracking of mercury-containing goods and mercury-containing waste is also provided.

A tabular summary is also provided at the end of this section for each legislative/ administrative tool examined.

2.2.1 Resource Recovery and Conservation Act

U.S. Federal solid waste law has gone through four major phases. The Solid Waste Disposal Act (passed in 1965 as title II of the Clean Air Act of 1965) focused on research, demonstrations, and training. It provided for sharing with the states the costs of making surveys of waste disposal practices and problems, and of developing waste management plans. The Resource Recovery Act of 1970 changed the whole tone of the legislation from efficiency of disposal to concern with the reclamation of energy and materials from solid waste. It authorized grants for demonstrating new resource recovery technology, and required annual reports from the Environmental Protection Agency (EPA) on means of promoting recycling and reducing the generation of waste. In a third phase, the federal government embarked on a more active, regulatory role, embodied in the Resource Conservation and Recovery Act of 1976. RCRA instituted the first federal permit program for hazardous waste and prohibited open dumps. In a fourth phase, embodied in the Hazardous and Solid Waste Amendments of 1984, the federal government attempted to prevent future cleanup problems by prohibiting land disposal of untreated hazardous wastes, setting liner and leachate collection requirements for land disposal facilities, setting deadlines for closure of facilities not meeting standards, and establishing a corrective action program. Major federal solid waste/hazardous waste legislation is summarized in Table 4.

Table 4. Solid Waste Disposal/Resource Conservation and Recovery Act and Major Amendments (42 U.S.C. 6901-6991k)

Year	Act	Public Law Number
1965	Solid Waste Disposal Act	P.L. 89-272, title II
1970	Resource Recovery Act of 1970	P.L. 91-512
1976	Resource Conservation and Recovery Act of 1976	P.L. 94-580

1980	Used Oil Recycling Act of 1980	P.L. 96-463
1980	Solid Waste Disposal Act Amendments of 1980	P.L. 96-482
1984	Hazardous and Solid Waste Amendments of 1984	P.L. 98-616
1988	Medical Waste Tracking Act of 1988	P.L. 100-582
1992	Federal Facility Compliance Act of 1992	P.L. 102-386
1995	Universal Waste Rule of 1995	
1996	Land Disposal Program Flexibility Act of 1996	P.L. 104-119
1996	Mercury-Containing and Rechargeable Battery Management Act of 1996	
1999	Mercury Containing Lamps Rule of 1999	

2.2.2 Regulation of Hazardous Waste Under RCRA

Subtitle C of RCRA created the hazardous waste management program. A waste is hazardous if it is ignitable, corrosive, reactive, or toxic, or appears on a list of about 100 industrial process waste streams and more than 500 discarded commercial products and chemicals. The 1976 law expanded the definition of "solid waste," of which hazardous waste is a subset, to include *"sludge . . ., and other discarded material, including solid, liquid, semi-solid, or contained gaseous material."* The broadened definition is particularly important with respect to hazardous wastes, at least 95 percent of which are liquids or sludges. Some wastes are specifically excluded, however, including irrigation return flows, industrial point source discharges (regulated under the Clean Water Act), and nuclear material covered by the Atomic Energy Act.

Under RCRA, hazardous waste generators must comply with regulations concerning recordkeeping and reporting; the labeling of wastes; the use of appropriate containers; the provision of information on the wastes' general chemical composition to transporters, treaters, and disposers; and the use of a manifest system. Facilities generating less than 1,000 kilograms of waste per month were initially exempt from the regulations; the 1984 amendments to RCRA lowered that exemption to 100 kilograms per month, beginning in 1986.

EPA conducted a pilot effort in 1993-1995 to explore the obstacles to cross-border exchange of hazardous waste information between the U.S., Canadian, and Mexican governments and to facilitate the electronic reporting of transboundary industrial shipments of hazardous waste. The EPA contact for this pilot project is Evi Huffer at huffer.evi@epamail.epa.gov.

The EPA Office of Solid Waste, Generator and Recycler Branch, is not currently developing an electronic manifest system. EPA is developing standards under which private waste vendors or information technology vendors may develop private systems for tracking waste shipments with electronic manifests. The Agency received comments recommending a centralized, EPA-hosted e-manifest system, and is currently conducting an analysis of the resulting costs and benefits.

The link to the electronic manifest webpage is: www.epa.gov/epaoswer/hazwaste/gener/manifest/index.htm. All hazardous waste shipments are currently manifested, although the manifest may be hardcopy only and is not used for realtime tracking. An electronic manifest cannot proceed legally until existing regulations specifying hard copies of Form 8700-22 and requiring hand signatures on manifests are changed, and the regulatory standards for e-manifest formats and electronic signatures adopted.

The current manifest is used to establish a paper "chain-of-custody" trail establishing positively that waste shipments placed in commerce have in fact been received by the waste management facility designated on the manifest. About 24 states currently collect manifest copies from waste handlers. These collected manifests support compliance monitoring, program management, capacity planning, and reporting on waste management and import/export among the states. The states further raise revenues by assessing waste management or waste import fees on entities that manage hazardous wastes or bring hazardous wastes into the states. Manifest data are used as the basis for these assessments, and waste receipt data from manifests are also used by waste management firms and states to generate their Biennial Reports of hazardous waste activities.

The objective of the pending e-manifest regulation is not currently to develop a centralized electronic database of waste shipments. The May 2001 proposal did not include a proposal for a centralized database. Electronic manifests would be submitted to those states that desired to collect and track manifest data. This part of the proposal is under review at EPA. EPA is also considering comments that advised EPA that it should develop a centralized system.

EPA just recently (March 2002) reactivated the regulatory workgroup after analyzing the comments received in response to the May 2001 proposed rule. EPA may find it necessary to re-propose several aspects of the e-manifest program. In that case, a final rule would not likely be published until mid-2004 at the earliest. This will be an optional program for the waste handlers, not a mandatory program. *(Richard Lashier, project manager, lashier.rich@epamail.epa.gov, 703-308-8796)*

Wastes regulated by RCRA are identified according to the EPA hazardous waste code number listed in 40 CFR Part 261. The following general hierarchy applies to waste that has not been assigned a process-specific code:

1) Ignitability	(D001)
2) Corrosivity	(D002)
3) Reactivity	(D003)
4) Toxicity	(D004-43)

If the waste is a combination of more than one listed waste with different waste numbers, the following hierarchy applies to select the proper category:

1)	Acutely hazardous	(P-Listed)
2)	Dioxin related	(F020-23, F026-28)
3)	Leachate	(F039)
4)	Electroplating related	(F006-12, F019)
5)	Spent solvent	(F001-5)
6)	Toxic	(U-Listed)
7)	Industrial process	(K-Listed)

2.2.3 Land Disposal Restrictions (LDR) of Mercury Waste

EPA established treatment standards for mercury-bearing wastes as part of two rulemakings. The LDR First Third final rule (53 FR 31166, August 17, 1988) established standards for RCRA hazardous waste code K071 *(brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used)*, and the LDR Third Third final rule (55 FR 22569, June 1, 1990) established standards for five additional RCRA mercury-bearing waste codes: D009, *characteristic mercury wastes*; K106, *wastewater treatment sludge from the mercury cell process in chlorine production*; P065, *mercury fulminate wastes*; P092, *phenyl mercuric acetate wastes*; and U151, *miscellaneous mercury wastes*.

For all of these wastes, EPA established two treatment subcategories: a high mercury subcategory, which includes wastes with a total mercury concentration greater than or equal to 260 mg/kg; and a low mercury subcategory, which includes wastes with a total mercury concentration less than 260 mg/kg.

- High mercury wastes are required to be roasted or retorted (RMERC), or incinerated (IMERC) if organics are present. RMERC residues must then meet a numerical treatment standard of 0.20 mg/L prior to land disposal, as measured by the toxicity characteristic leaching procedure (TCLP). IMERC residues must meet a numerical treatment standard of 0.025 mg/L TCLP.

- Low mercury wastes are not subject to a specific technology for treatment but must meet a numerical treatment standard of 0.025 mg/L TCLP.

EPA is re-examining the 40 CFR Part 268 Land Disposal Restrictions treatment standards applicable to mercury-containing wastes. The revisions under consideration by the EPA involve a comprehensive re-evaluation of the treatment standards for mercury-containing wastes. EPA is re-examining the LDR mercury treatment standards because 1) the supply of recycled mercury has increased to where it exceeds the demand for mercury; 2) retorting may not be appropriate for certain wastes for which it is currently a required method of treatment (i.e., mixed waste, high-mercury subcategory); 3) there are concerns over emissions from incinerating mercury-containing wastes; and 4) the Agency wants to further investigate source reduction.

Transporters of hazardous waste must meet certain federal hazardous waste transportation standards, as described in 40 CFR Part 263. Transport regulations were coordinated by EPA with existing regulations of the Department of Transportation (DOT). A manifest system, in effect since 1980, is used to track wastes from their point of generation, along their transportation routes, to the place of final treatment, storage, or disposal.

Treatment, storage, and disposal (TSD) facilities are required to have permits, to comply with operating standards, to meet financial requirements in case of accidents, and to close their facilities in accordance with EPA regulations. The 1984 amendments imposed a number of new requirements on TSD facilities with the intent of minimizing land disposal. Bulk or non-containerized hazardous liquid wastes are prohibited from disposal in any landfill, and severe restrictions are placed on the disposal of containerized hazardous liquids, as well as on the disposal of non-hazardous liquids in hazardous waste landfills. The land disposal of specified highly hazardous wastes was phased out over the period from 1986 to 1990. EPA was directed to review all wastes that it has defined as hazardous and to make a determination as to the appropriateness of land disposal for them. Minimum technological standards were set for new landfills and surface impoundments requiring, in general, double liners, a leachate collection system, and groundwater monitoring.

2.2.4 Universal Waste Rule (UWR), 1995

RCRA includes universal waste standards, known as the UWR (40 CFR 273), that simplify storage, transport, and recordkeeping requirements for three types (as of December 2001) of mercury-containing waste: batteries, thermostats, and lamps. EPA is currently proposing to expand the UWR to include the following mercury-containing equipment: manometers, barometers, relay switches, regulators, meters, pressure and temperature gauges, and sprinkler system contacts.

Universal wastes are still considered to be hazardous wastes, although subject to reduced management requirements aimed at encouraging consolidation of these wastes after end use. Many states have still not adopted the UWR in their authorized RCRA programs. In these states, the mercury containing wastes must be managed under full Subtitle C requirements.

Mercury-containing UWR waste may not be exported without prior consent by the intended foreign recipient.

The requirements for transporters of universal waste are found in 40 CFR Part 263. Transporters are persons who transport universal waste from handlers of universal waste to other handlers, destination facilities, or foreign destinations. A transporter may be an independent shipper contracted to transport the waste, or may be a handler who self-transports the waste. A universal waste handler who self-transports his waste becomes a transporter for those self-transportation activities and is subject to the requirements of subpart D of this rule.

The UWR does include some specific requirements for transporters. However, the basic approach to transportation under the universal waste system is that no hazardous waste manifests are required. Transporters must comply with the Department of Transportation (DOT) requirements that would be applicable to the waste if it were being transported as a product. For example, if transporting universal waste batteries, the transporter must comply with the appropriate DOT requirements, which are based on whether the particular battery type is a DOT hazardous material, and if so, which DOT hazardous material requirements apply to the specific battery type.

For example, if mercury oxide cell batteries are being discarded under the UWR, the DOT description on the bill of lading would read:

> *Universal Waste Batteries - Mercury contained in manufactured articles, 8, UN2809, D002/D009, PG III, ERG No. 172 (Mercury Oxide Cells)*

UN2809 is the United Nations Dangerous Goods code for "mercury metal." D002 and D009 are the EPA Hazardous Waste codes for "corrosive waste" (D002) and "characteristic mercury wastes" (D009), respectively.

UWR waste may be shipped off-site to designated UWR handlers, destination facilities or foreign destinations. The receiving UWR handler must agree to accept the shipment before the generator ships the universal waste. No records of small quantity universal waste shipments (< 5,000 kg.) need to be kept.

2.2.5 Mercury-Containing and Rechargeable Battery Management Act, 1996

Two goals of the *Act* are to limit mercury content in consumer batteries and to promote recycling and proper disposal of used rechargeable nickel cadmium batteries. The *Act* requires uniform labeling and requires that collection, storage, and transportation are in accordance with UWR standards. The *Act* prohibits the importation of batteries that contain mercury.

The *Mercury Battery Rule* was passed for three reasons: 1) to phase out mercury in batteries, 2) to implement a national uniform system for the recycling and collection of batteries, and 3) to provide for a uniform labeling system for batteries. States were the first entities to determine that landfills, because they contained a large amount of batteries, were the primary source of large amounts of the mercury and heavy metals found in the landfill waste streams. States estimated that 70 percent of the mercury in landfill waste streams could be attributed to batteries.

Since batteries were contributing to a large amount of the problems in landfills, the states decided to implement recycling and collection programs as a solution to the problem. RCRA regulations represented a major barrier to the collection and recycling of batteries. Those engaged in collection efforts were subject to very rigorous RCRA Subtitle C hazardous waste handling/disposal requirements. Many facilities did not want to subject

themselves to RCRA Subtitle C. As a result they opted not to engage in recycling and collection efforts. It was for this reason that batteries remained in landfills

The *Mercury Battery Rule* is divided into two parts: 1) the *Rechargeable Battery Recycling Act*, and 2) the *Mercury Containing Battery Management Act*. The *Rechargeable Battery Recycling Act* requires that batteries be labeled when they are manufactured and that manufacturers of consumer products make batteries easily removable in order to ensure their proper disposal and recycling. This part of the rule also applies the *Universal Waste Rule* to the collection, handling, and recycling of rechargeable batteries. The UWR differs from RCRA in that it allows generators and collectors of batteries to store them for up to a year. The RCRA Subtitle C regulations provide for 90 days of generator accumulation without a permit for large quantity generators, and 180 days of non-permitted accumulation if a small quantity generator.

The *Rule* takes away the manifesting requirements for hazardous waste batteries. In other words, it takes the responsibility of adhering to RCRA Subtitle C away from those generating and collecting batteries. The UWR does not help recyclers, and they are still subject to RCRA Treatment, Storage, and Disposal (TSD) requirements.

The second part of the bill pertains to the *Mercury Containing Battery Management Act*. This *Act* deadlines for phasing out the use of mercury in batteries, and affects different varieties of batteries.

EPA has the authority to sue a retailer of batteries if the retailer knowingly imports batteries that contain mercury or if batteries are modified before being sold. Despite EPA's authority to file suit, the bill for the most part protects retailers, focusing instead on the manufacturers of batteries.

Mercury-Containing Lamps Rule, 1999 – EPA issued a final rule in March 1999 to add mercury-containing lamps to the UWR.

2.2.6 Limitations – RCRA Domestic Hazardous Waste Tracking

- While the manifest system has been an element of the Subtitle C program since 1980, the current Uniform Manifest was adopted jointly by EPA and DOT in 1984, to preclude the situation where shipments needed to be accompanied by multiple manifests issued by various states. The manifest system is used to track wastes from their point of generation, along their transportation routes, to the place of final treatment, storage, or disposal.

- The electronic manifest program will not likely be operational until 2004 at the earliest, and it will be an optional program for waste handlers to use the e-manifest. It remains to be seen whether all e-manifests will be integrated within a centralized, national tracking database. The EPA project manager is Richard Lashier at lashier.richard@epa.gov.

- Facilities generating less than 1,000 kilograms of waste per month were initially exempt from the regulations; the 1984 amendments to RCRA lowered that exemption to 100 kilograms per month, beginning in 1986. This means that relatively large amounts of mercury waste generation could go unmanifested due to a high waste manifest threshold of 100 kilograms per month. This is an exemption from manifesting, rather than reporting. In fact, Small Quantity Generators of up to 1,000 kg/mo are exempt in many states from reporting waste generation to the Biennial Reporting System, a source of data on mercury waste management distinct from the manifest.

- The basic approach to transportation under the UWR is that no hazardous waste manifests are required from those generating and collecting UWR waste. The intent is to streamline the paperwork burden and promote recycling of these products. UWR wastes originally included batteries, pesticides, and mercury-containing thermostats. Mercury-containing batteries and fluorescent lamps have since been added to the UWR. The EPA has a proposed rule under review that would add the following mercury-containing equipment to the UWR: manometers, barometers, relay switches, regulators, meters, pressure and temperature gauges, and sprinkler contact systems.

- The mercury in products covered by the UWR represents the majority of the mercury currently consumed in the U.S. The lack of manifest data for individual shipments means that any tracking system will have to rely exclusively on records maintained at recycling centers receiving UWR waste to track the "cradle to grave" flow of mercury in these product types.

2.2.7 Import/Export Regulations Under RCRA

Section 3017 of RCRA provides authority for exports of hazardous waste. Regulations implementing Section 3017 are codifed at 40 CFR Part 262 Subparts E and H. Section 3017 also provides the specific authorities required to be included in bilateral and multilateral agreements the U.S. government may enter into with foreign governments covering exports of hazardous waste. Currently, the U.S. is party to five bilateral agreements (with Canada, Costa Rica, Mexico, Malaysia, and Philippines) and one multilateral agreement (OECD Council Decision C(1)107). The agreements themselves are legally-binding only on the U.S. government. However, their terms are implemented through the regulations at Subparts E and H, which are legally-binding on the U.S. regulated community. Subpart H regulations, which implement the terms of the prior OECD Council Decision C(92)39, will be amended to incorporate the new requirements of C(1)107. This multilateral agreement also applies to imports of hazardous waste.

Section 3017 provides no authority for imports of hazardous waste; however, other parts of RCRA provide certain narrow authorities applicable to imported hazardous waste. These narrow authorities are codified at 40 CFR Parts 262 Subpart F, 264.12, and 265.12. In addition, all other regulatory requirements applicable to RCRA hazardous waste are applicable to imported RCRA hazardous waste. In this regard, imported hazardous waste

is identical to domestically-generated hazardous waste in terms of its treatment upon entry into the U.S.

The U.S. has not yet ratified the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* and is not subject to it. However, because the Basel Convention prohibits imports and exports of Basel-covered hazardous waste between Parties and non-Parties, the U.S. is indirectly affected by Basel. As a non-Party, the U.S. has no legal obligation to prohibit exports of RCRA- and Basel-covered hazardous waste to Basel Parties (except as provided under current RCRA export regulations). However, Basel Parties are legally bound to prohibit importing Basel-covered hazardous waste from the U.S. Therefore there is an indirect effect on U.S. hazardous waste exports. It should be noted that the so-called "ban amendment" to the Basel Convention is not yet in force internationally. It will enter into force once 62 Parties present and voting at the Third Conference of Parties ratify it. Currently only 29 Parties have ratified the ban amendment, and only 28 of the 29 count toward its entry-into-force.

EPA's Office of Solid Waste (OSW) has primary responsibility for the RCRA hazardous waste regulations. Implementation of the paperwork requirements applicable to imported and exported hazardous waste is the responsibility of EPA's Office of Enforcement and Compliance Assurance (OECA). These requirements are outlined below.

Exports of Hazardous Waste
40 CFR Part 262 Subparts E and H includes:

- Notification of Intent to Export
- Acknowledgment of consent
- Special manifest requirements
- Exception Reports
- Annual Reports
- Special regulatory requirements applicable to exports to OECD countries of hazardous waste destined for recovery operations

Imports of Hazardous Waste
40 CFR Part 262 Subparts F and H, 40 CFR Part 264.12, 40 CFR Part 265.12 include:

- Special manifest requirements
- Foreign source notification applicable to treatment, storage, and disposal facilities
- Special regulatory requirements applicable to imports from OECD countries of hazardous waste destined for recovery operations

2.2.8 Hazardous Waste Import/Export Program

EPA's Import/Export Program, implemented by the OECA, reviews export notifications, manifests, and annual reports pertaining to international trade in hazardous waste and tracks these documents in a database, the Hazardous Waste Export Systems (HWES). It also issues Acknowledgments of Consent. Import notifications are reviewed and tracked in the WITS database. Acknowledgments of Receipt and consent/objections are issued.

The Import-Export Program prepares reports, monitors transactions for regulatory requirements, provides compliance assistance, and refers apparent violations of law for appropriate enforcement action.

The WITS database is PC-based, LAN-served, and relational (using Visual Basic). When fully operational with reporting functionality and graphics, it will be available in read-only access throughout EPA headquarters and regional offices.[2]

Within OECA, the RCRA Enforcement Division works with the Regions and the states in enforcing the RCRA program. The International Enforcement and Compliance Division (IECD) assists in developing and handling international and border aspects of civil RCRA enforcement matters and provides training for U.S., Mexican, and Canadian customs officials -- as well as other state, local, and tribal officials -- on hazardous waste compliance monitoring at the border. IECD working closely with the National Enforcement Training Institute and the states to provide this training.

2.2.9 OECA Case Study: Denial of Importation - Formosa Plastics Corporation

18,000 barrels of hazardous sludge produced by Formosa Plastics Corporation (FPC), one of Taiwan's largest businesses. Each barrel is contaminated with a mix of different chemicals including mercury. In 1998 the waste was illegally shipped in sacks to a crude dump in Cambodia where panic broke out when two men died after being exposed to the waste. One had used the shipping sacks as bedding and the other had been cleaning the cargo freighter. Thousands of people fled the area and soldiers in chemical protection suits had to seal the material into 18,000 double walled metal barrels. The barrels were returned to Taiwan.

An attempt to import the FPC barrels to a California hazardous waste processing facility was rejected in 1999. This effort was rejected after non-governmental organizations revealed analytical data about the waste that showed that it was clearly more toxic than had been previously described by the importer. EPA's Hazardous Waste Import-Export Program rescinded approval to import the waste into California, stating ". . . the (new) analytical data call into question the chemical composition of the waste, the concentration of mercury, and the accuracy of the K071 waste code assigned to the waste stream."

Permission was rescinded based on technical issues related to accurate information on the chemical composition and quantity of the waste. EPA had no authority to consent or object to waste shipments from Taiwan, as there is no notice-and-consent arrangement between Taiwan and the U.S. The only reason the U.S. received a notice for the waste was because Taiwanese domestic law conditions an export permit on the willingness of the receiving country to receive the waste. Accurate analysis and waste code classification is all that is required prior to importation under current regulations. The government of Taiwan and FPC decided in January 2002 that the FPC mercury-bearing hazardous waste will be disposed of in Taiwan.

[2] 1999 CEC. "*Tracking and Enforcement of Transborder Hazardous Waste Shipments - A Needs Assessment*"

2.2.10 U.S. - Mexico HAZTRAKS Database

In November 1990, the United States and Mexico agreed to develop an Integrated Border Environmental Plan (IBEP) to monitor transborder movements of hazardous waste. An important component of IBEP was to be the creation of a database to provide electronic support for transborder tracking and enforcement activities. In October 1992, the EPA in partnership with the Mexican Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP, now Mexican Secretariat of Environment and Natural Resources - SEMARNAT) developed the HAZTRAKS to facilitate the tracking of transborder movements of hazardous wastes. HAZTRAKS tracks volumes and types of hazardous waste crossing the U.S.-Mexican border, and enables the EPA and the SEMARNAT to monitor data through an automated system. By correlating data from U.S. and Mexican waste manifests (and other sources), HAZTRAKS provides an integrated system for tracking waste between the two countries. Differences in national tracking systems previously meant that hazardous shipments lost their identity at the border.

Article 55 of Mexican Environmental General Law requires that hazardous waste generated by maquiladoras (U.S. manufacturing plants in Mexico) using duty-free "in bond" raw materials, must be returned to the country of origin for disposal. As a result of the 1983 bilateral La Paz Agreement, U.S. consents to the importation of hazardous waste from Mexico when the shipment complies with U.S. laws. Also, other (non-maquiladora) Mexican generators often ship their hazardous waste to the U.S. for disposal. Currently, the only waste the U.S. is shipping to Mexico is from U.S. steel companies. This waste is shipped to *Zinc Nacional* located in Monterrey and is recycled for zinc recovery.[3]

HAZTRAKS uses various documents for tracking the hazardous waste exchange between the U.S. and Mexico:

- *U.S. hazardous waste manifests* - Preliminary copies of manifests are received monthly from CUSTOMS ports along the U.S.-Mexico border. Final copies of the manifests are received monthly from state agencies in EPA Regions 6 and 9.
- *U.S. TSD facility notifications of intent to receive hazardous waste* - Notifications are received monthly from state agencies in EPA Regions 6 and 9.
- *Mexican Avisos de Retorno* - For generators located in Mexican border states, *Avisos de Retorno* are entered into HAZTRAKS by the SEMARNAT subdivisions located in these states. For generators located in the interior states, *Avisos de Retorno* are entered into HAZTRAKS by INE in Mexico City. The U.S. and INE exchange HAZTRAKS data on a monthly basis.

There is a significant lag time between the time when manifested waste crosses the border and when it is entered into the HAZTRAKS database. One to two years typically pass between the time the manifest is submitted and when the data is input into the

[3] HAZTRAKS homepage, US EPA Region 9

electronic database. Data is input based on funding availability (data input is performed by a subcontractor).[4]

There is not currently a requirement that copies of manifests be left with CUSTOMS for waste imports from either maquiladora or non-maquiladora generators. The collection of manifests by CUSTOMS is a voluntary process by some ports, and not routinely administered. Not all Region 6 and Region 9 states collect manifests, and the copies of import manifests that are collected by the states would likely be an incomplete set. It is unlikely that HAZTRAKS could generate "correct" numbers even if it were receiving adequate resources and attention.[5]

HAZTRAKS compiles information only for waste shipments and not for shipments of hazardous or toxic substances. This may present an opportunity to circumvent domestic laws or international agreements on hazardous waste shipments by mislabeling waste as raw materials.

The quality of information provided and missing data were both cited frequently as hampering both tracking and enforcement efforts. Specific examples include missing manifest information supposedly supplied by Customs to EPA and vague language on Mexican *Avisos de Retorno*.

Updating HAZTRAKS software is reported to be problematic, since it is a PC-based utility and multiple users exist in the field. There appears to be no standard procedure for version control or assuring that all users have the latest version of the software with appropriate updates to the user manual.

2.2.11 Limitations – Import/Export of Hazardous Waste Under RCRA

- As noted earlier, there are few explicit import requirements and no restrictions on imports of mercury-bearing hazardous waste. However, imported mercury-bearing hazardous waste must comply with all RCRA requirements applicable to domestically-generated hazardous waste once it enters the U.S. EPA maintains an electronic database of imported and exported hazardous waste shipments; however there are limitations on the import data. Because EPA only receives notifications for hazardous waste imports when the foreign government is required to notify the U.S. (and only then if the foreign government is complying with its obligations), the import data is limited to that which EPA is notified of. EPA expects that imports may be considerably less than quantities reflected in the import database. The principal reason for this is that, given the import database includes estimated maximum volumes of imports taken from notices and in some cases no shipments occur under a notice, the figures in the database may be high.

[4] Adolphus Talton, EPA Region 6, January 9, 2002.
[5] EPA comment on draft document dated March 19, 2002.

- U.S. tracking systems do not interact well with each other**.** According to U.S. enforcement officials that maintain and/or use the WITS and Exports databases, WITS is not linked to any manifest information and or to the HAZTRAKS database. The process for sharing information among WITS, Exports, HAZTRAKS, and annual/biennial reports appears to be informal at best. A Memorandum of Understanding (MOU) has been signed between EPA and Customs, whereby Customs would collect manifests from importers and pass them on to OECA in Washington.[6]

- The computing hardware and software (the "platform") for each of the U.S. databases and sources are different. This is one of the principle reasons why data on imports are not linked to data on receipt by facilities, data on expected shipments are not linked to data on actual shipments, and data on one side of the border are not linked to data on the other. HAZTRAKS, for example, is a PC-based system written on FoxPro 2.6 for Windows. WITS is a mainframe system written in Visual Basic. The Exports database also is a mainframe Clipper-compiled system. Annual and biennial reports are not computerized at all.[7]

- HAZTRAKS compiles information only for waste shipments and not for shipments of hazardous or toxic substances. This may present an opportunity to circumvent domestic laws or international agreements on hazardous waste shipments by mislabeling waste as raw materials.

- The environmental community maintains that HAZTRAKS is not yet a successful program. *"The U.S. and Mexico can't agree on whether the numbers are correct, information on the flow of hazardous waste from the U.S. to Mexico is limited, and the input of hazardous waste information from Mexico to HAZTRAKS has often been sporadic,"* indicated Cyrus Reed of the Texas Center for Policy Studies.[8]

2.3 Emergency Planning and Community Right-to-Know Act, 1986

2.3.1 Overview of EPCRA

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of SARA (42 U.S.C. 11001 et seq.), was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards. To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). The SERC's were required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district.

[6] 1999 CEC. "*Tracking and Enforcement of Transborder Hazardous Waste Shipments - A Needs Assessment*"
[7] Ibid.
[8] Cyrus Reed, Texas Center for Policy Studies, June 1998 interview, Austin, Texas

EPCRA, Section 311 requires facilities covered by the Occupational Safety and Health Act to submit a Material Safety Data Sheet (MSDS) for each "hazardous chemical" or a list of such chemicals to the LEPC, the SERC, and the local fire department. EPA has authority to establish categories of health and physical hazards and to require facilities to list hazardous chemicals grouped by such categories in their reports. An MSDS need only be submitted once, unless there is a significant change in the information it contains. An MSDS must be provided in response to a request by an LEPC or a member of the public. "Hazardous chemicals" are defined by the Code of Federal Regulations, Title 29, at Section 1910.1200(c).

EPCRA, Section 312 requires the same employers to submit annually an emergency and hazardous chemical inventory form to the LEPC, SERC, and local fire department. These forms must provide estimates of the maximum amount of the chemicals present at the facility at any time during the preceding year; estimates of the average daily amount of chemicals present; and the general location of the chemicals in the facility. Information must be provided to the public in response to a written request. EPA is authorized to establish threshold quantities for chemicals below which facilities are not required to report.

Section 313 mandates development of the Toxic Release Inventory (TRI), a computerized EPA database of "toxic chemical" releases to the environment by covered facilities, which includes manufacturing and industrial facilities. It requires covered facilities that manufacture, use, or process "toxic chemicals" to report annually to EPA on the amounts of each chemical released to each environmental medium (air, land, or water) or transferred off-site. EPA makes TRI data available as submitted by the facilities to the general public. The public may obtain specific information (e.g., about a particular manufacturing facility) by submitting a request in writing to EPA. EPA distributes written and electronic, nationwide and state-by-state summaries of annual data. The TRI data and summaries also are available over the Internet.

EPCRA Section 313 requires a report to EPA and the state from each manufacturer with 10 or more employees who either uses 10,000 pounds or manufactures or processes 25,000 pounds of any "toxic chemical" during the reporting year. For chemicals that are classified as persistent, bioaccumulative and toxic (PBT), EPA has established a lower reporting threshold of 100 pounds for the 2000 reporting year. For a subset of PBT chemicals that are highly persistent and highly bioaccumulative, such as mercury and mercury compounds, the threshold is 10 pounds. For dioxin and dioxin-like compounds the threshold is 0.1 gram. EPCRA enumerates the following data reporting requirements for each covered chemical present at each facility:

- whether it is manufactured, processed, or otherwise used, and the general category of use;
- the maximum amount present at each location during the previous year;
- treatment or disposal methods used; and
- amount released to the environment or transferred off-site for treatment or disposal.

Trade Secrets: Section 322 authorizes reporting facilities to withhold the identity of a chemical if it is a trade secret and they follow procedures established by EPA.

Right to Know: Section 324 directs EPA, Governors, SERCS, and LEPCs to make emergency response plans, MSDSs, lists of chemicals, inventory forms, toxic chemical release forms, and follow up emergency notices available to the general public.

Chemical Transport: Chemicals being transported or stored incident to transport are not subject to EPCRA requirements, according to Section 327.

2.3.2 Limitations – EPCRA Toxics Release Inventory

- The limitations of the EPCRA Toxics Release Inventory are discussed below under "Toxics Release Inventory."

2.4 Pollution Prevention Act

2.4.1 Overview of PPA

The Pollution Prevention Act of 1990 (PPA), 42 U.S.C. 13101 and 13102 s/s et seq., requires the EPA to establish an Office of Pollution Prevention, develop and coordinate a pollution prevention strategy, and develop source reduction models. In addition to authorizing data collection on pollution prevention, the Act requires owners and operators of manufacturing facilities to report annually on source reduction and recycling activities.

The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and because the industrial resources required for compliance focus primarily on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control. Pollution prevention also includes other practices that increase efficiency in the use of energy, water, or other natural resources, and protect our resource base through conservation. Practices include recycling, source reduction, and sustainable agriculture.

Owners and operators of many industrial facilities are required to report annually on their releases of toxic chemicals to the environment (under the *Emergency Planning and Community Right-to-Know Act of 1986*, Section 313). The Pollution Prevention Act requires these reports to include information about the facility's efforts in source reduction and recycling. Specifically, reports must include:

- quantities of the toxic chemicals entering any waste stream (or released to the environment) prior to recycling, treatment, or disposal;
- quantities of toxic substances recycled (on- or off-site);
- source reduction practices used;

- quantities of toxic chemicals expected to enter waste streams and to be recycled in the two years following the year for which the report is prepared;
- ratio of production in the reporting year to production in the previous year;
- techniques used to identify opportunities for source reduction;
- amounts of toxic chemicals released in a catastrophic event, remedial action, or other one-time event; and
- amounts of toxic chemicals treated on- or off-site.

All collected information is available to the general public.

2.4.2 Limitations – PPA Toxics Release Inventory

- The limitations of the PPA Toxics Release Inventory are discussed below under "Toxics Release Inventory."

2.5 Toxics Release Inventory

2.5.1 Overview of TRI

Section 313 of EPCRA and Section 6607 of PPA require certain industrial facilities to submit reports each year to EPA's Toxics Release Inventory (TRI) on the amounts of toxic chemicals released or managed as a waste. A facility is required to report if it (1) has 10 or more full-time employees, (2) manufactures or processes over 25,000 pounds (11,338 kg) of the approximately 600 designated chemicals or 28 chemical categories specified in the regulations, or uses more than 10,000 pounds (4,535 kg) of any designated chemical or category, and (3) is classified under certain industrial categories. Starting with the 1998 reporting year, this list of TRI industry categories has expanded beyond the manufacturing sector to include coal mining, metal mining, electricity generating, petroleum bulk storage, solvent recovery, chemical wholesale, and Resource Conservation and Recovery Act (RCRA) Subtitle C treatment, storage and disposal (TSD) facilities.

EPA has recently reduced the reporting threshold for mercury and mercury compounds to 10 pounds (4.5 kg) for the reporting year 2000. TRI information reflecting the new threshold for mercury and mercury compounds will be publicly available starting in mid-2002.

TRI does require reporting whether a listed chemical was imported into the Customs Territory of the United States by a facility. "Importing" includes the facility directly importing the chemical or requesting a broker or other party to obtain the toxic chemical from a foreign source. Facilities also must indicate if the chemical was produced or imported by the facility and then further processed or otherwise used at the same facility.

TRI site location maps and summary data available for mercury and mercury compounds for 1999, the reporting year before the lower reporting threshold of 10 pounds became effective, is provided in **Appendix A**. The maps show both the value and limitations of

TRI data from a tracking standpoint. TRI is a potentially good tool for identifying what sites are releasing mercury, transferring amounts to off-site locations, or recycling amounts on-site. Confidentiality safeguards built into the TRI reporting requirements limit the tracking value of the database. For example, gold mines in Nevada show very high quantities of on-site mercury storage (mercury is a by-product of gold production), though these mines are not required to report the quantity of mercury transferred off-site The 1999 TRI for Nevada is provided in **Appendix B**. The production of mercury from gold mines in Nevada and California is estimated at 50 to 100 tons per year.[9] Because this mercury is shipped offsite for direct reuse, it is not considered a waste and is not reported under TRI, even though the substance is a TRI-listed toxic.[10]

2.5.2 TRI Database Limitations

- The purpose of the TRI database is to provide the public with information on the quantity of toxic chemical releases (air, land, water), the quantity of toxic chemicals transferred off-site for release, treatment, energy recovery or recycling, and the quantity of toxic chemicals treated, combusted for energy recovery and recycled on-site at manufacturing and industrial sites. As a result, the TRI database is an excellent tool for identifying those manufacturing and industrial sources that contain significant amounts of mercury in raw materials (coal for use in coal-fired power plants) or use significant amounts of mercury in the manufacturing process (mercury cell chlor-alkali plants).

- The database is not intended to track the Acradle to grave@ flow of toxic chemicals. Chemicals that are incorporated into products are not reported to TRI. However, the TRI database is a good tool for determining how a facility manages its chemicals. By reporting for the amount of each chemical released to each environmental media and the amount that is otherwise managed as waste either on-site or off-site, the public can learn if the facility is relying on releases or if it is taking steps to treat or recycle the chemical.

- TRI does not encompass area (non-point) and mobile sources of toxic chemicals. The TRI program applied only to the manufacturing sector within Standard Industrial Classification (SIC) Codes 20 through 39 until 1998, when a variety of industrial categories were added, included metal mining and electric generation plants. As a result of the inclusion of metal mining operations, 14,000 pounds of airborne mercury emissions were reported for the 1998 reporting year from gold mines in Nevada. The reporting threshold for mercury and mercury compounds dropped to 10 pounds (4.5 kg) for the reporting year 2000. The lower threshold will greatly add to the value of the TRI as a comprehensive inventory of significant industrial producers, emitters, and consumers in the U.S.

- Data quality limitations - reporting may be based on actual monitored data or on estimated data. While TRI does not mandate that facilities monitor their releases, those that do monitor must consider this monitored data. The statute allows facilities

[9] 1997 USGS. *Minerals Information Yearbook - Mercury*
[10] Adam Browning, EPA Region 9, June 18, 2002.

that do not monitor to provide reasonable estimates, subject to enforcement verifications. Variations between facilities can result from the use of different estimation methodologies.

- Facilities may also vary in their interpretation of the waste management reporting requirements. Therefore differences in quantities of chemicals in waste may reflect not only differences in actual quantities, but also differences in interpretations of reporting requirements.

2.6 Federal Insecticide, Fungicide, and Rodenticide Act

2.6.1 Overview of FIFRA

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. 136-136y, requires EPA to regulate the sale and use of pesticides in the United States through registration and labeling of the estimated 21,000 pesticide products currently in use. The Act directs EPA to restrict the use of pesticides as necessary to prevent unreasonable adverse effects on people and the environment, taking into account the costs and benefits of various pesticide uses. FIFRA prohibits sale of any pesticide in the United States unless it is registered and labeled indicating approved uses and restrictions, and governs the export and import of pesticides to and from the United States. FIFRA is a Federal program with limited delegation given to the states. Principal legislation under FIFRA is shown in Table 5.

Table 5. Federal Insecticide, Fungicide, and Rodenticide Act and Amendments

Year	Act	Public Law Number
1947	Federal Insecticide, Fungicide, and Rodenticide Act	P.L. 80-104
1964	Federal Insecticide, Fungicide, and Rodenticide Act Amendments	P.L. 88-305
1972	Federal Environmental Pesticide Control Act	P.L. 92-516
1975	Federal Insecticide, Fungicide, and Rodenticide Act Extension	P.L. 94-140
1978	Federal Pesticide Act of 1978	P.L. 95-396
1980	Federal Insecticide, Fungicide and Rodenticide Act Amendments	P.L. 96-539
1988	Federal Insecticide, Fungicide, and Rodenticide Amendments of 1988	P.L. 100-532
1990	Food, Agriculture, Conservation, and Trade Act of 1990	P.L. 101-624
1991	Food, Agriculture, Conservation, and Trade Amendments of 1991	P.L. 102-237
1996	Food Quality Protection Act of 1996	P.L. 104-170

FIFRA Definition of Pesticide: Pesticides are broadly defined in FIFRA Section 2(u) as chemicals and other products intended to kill, repel, or control pests. Familiar examples include pesticides used to kill insects and weeds that can reduce the yield and sometimes harm the quality of agricultural commodities, ornamental plantings, forests, wooden structures, and pastures. But the broad definition of "pesticide" in FIFRA also applies to products with less familiar "pesticidal uses." For example, substances used to control mold, mildew, algae, and other nuisance growths on equipment, in surface water, or on stored grains are pesticides. The term also applies to disinfectants and sterilants, insect repellents and fumigants, rat poison, mothballs, and many other substances.

Exporting Pesticides Under FIFRA: Pesticides intended solely for export are not required to be registered provided that the exporter obtains and submits to EPA, prior to export, a statement from the foreign purchaser acknowledging that the purchaser is aware that the product is not registered in the US and cannot be sold for use there. EPA sends these statements to the government of the importing country. Such unregistered pesticides must be labeled "Not Registered for Use in the United States." All exported pesticides, whether registered or unregistered, and devices, must meet certain minimal labeling requirements, and must have certain labeling language in English and in the language(s) of the imported country(ies). All exported pesticides and devices must also comply with FIFRA establishment registration and production reporting requirements, and with FIFRA recordkeeping requirements. The enforcement policy for exports is codified at 40 CFR 168.65, 168.75, and 168.85.

Importing Pesticides Under FIFRA: Imported pesticides and devices must comply with U.S. pesticide law. Except where exempted by regulation or statute, imported pesticides must be registered if intended for sale and distribution in the US. Pesticides must not be adulterated or otherwise violative. All pesticides and devices must be properly labeled. FIFRA section 17(c) requires that EPA be notified of the arrival of imported pesticides and devices. This is accomplished through the Notice of Arrival (NOA; EPA Form 3540-1), which is filled out by the importer prior to importation and submitted to the EPA regional office applicable to the intended port of entry. U.S. Customs regulations prohibit the importation of pesticides without a completed NOA. The NOA indicates the identity and amount of the product, the arrival date, and where the product can be inspected. The EPA-reviewed and signed form is returned to the importer for presentation to U.S. Customs when the shipment arrives in the U.S. After arrival, EPA may inspect the shipment for compliance with U.S. pesticide laws.

Registration of Pesticide Products: When pesticide manufacturers apply to register a pesticide active ingredient, pesticide product, or a new use of a registered pesticide under FIFRA Section 3, EPA requires them to submit scientific data on pesticide toxicity and behavior in the environment. The registrations of most mercury compounds for use in pesticide applications were cancelled in the 1970s, with the remaining uses voluntarily cancelled between 1990 and 1993.

Public Disclosure, Use, and Trade Secrets: Section 3 directs EPA to make the data submitted by the applicant publicly available within 30 days after a registration is

granted. However, applicants may claim certain data are protected as trade secrets under Section 10. If EPA agrees that the data are protected, the Agency must withhold that data from the public, unless the data pertain to the health effects or environmental fate or effects of the pesticide ingredients. Information may be protected if it qualifies as a trade secret and reveals information related to: 1) manufacturing processes; 2) details of methods for testing, detecting, or measuring amounts of inert ingredients; or 3) the identity or percentage quantity of inert ingredients or other commercial information.

The Toxics and Pesticides Enforcement Division (TPED) within the Office of Regulatory Enforcement is responsible for case development, policy and enforcement issues for the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Toxic Substance Control Act (TSCA), and the Emergency Planning and Community Right-to-Know Act (EPCRA).

2.6.2 Limitations – FIFRA Import/Export Procedures

- EPA must be notified of the arrival of imported pesticides and devices. This is accomplished through the Notice of Arrival (NOA) form. U.S. Customs regulations prohibit the importation of pesticides without a completed NOA. The NOA indicates the identity and amount of the product, the arrival date, and where the product can be inspected.
- Pesticides intended solely for export are not required to be registered provided that the exporter obtains and submits to EPA, prior to export, a statement from the foreign purchaser acknowledging that the purchaser is aware that the product is not registered in the United States and cannot be sold for use there.
- Most registrations of mercury compounds for use in pesticide applications were cancelled in the early 1970s. Mercury-containing pesticides can not be manufactured for domestic use or imported for domestic use in the United States.

2.7 Clean Air Act (1970) and Amendments (1977, 1990)

2.7.1 Overview of CAA

The Clean Air Act (CAA), 42 U.S.C. s/s 7401 et seq., is the comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

The goal of the Act was to set and achieve NAAQS in every state by 1975. The setting of maximum pollutant emission standards for stationary and mobile sources was coupled with directing the states to develop state implementation plans (SIP's) applicable to appropriate industrial sources in the state. The Act was amended in 1977 primarily to set new goals (dates) for achieving attainment of NAAQS since many areas of the country had failed to meet the 1975 deadline. The 1990 amendments to the CAA in large part were intended to meet un-addressed or insufficiently addressed problems such as acid rain, ground-level ozone, stratospheric ozone depletion, and air toxics. Air toxics control

standards, known as "Maximum Achievable Control Technology" (MACT) standards, have been developed for a number of industrial source categories under the air toxics component of the 1990 amendments to the CAA. MACT standards for mercury control have been developed or proposed for the following source categories:

- Coal-fired power plants
- Municipal solid waste incinerators
- Hospital waste incinerators
- Hazardous waste incinerators
- Mercury cell chlor-alkali plants

2.7.2 CAA - National Toxics Inventory

The CAA Amendments of 1990 includes a list of 188 Hazardous Air Pollutants (HAPs). Mercury is one of the 188 HAPs. The CAA requires the EPA to identify HAP sources, quantify the emissions by source category, develop regulations for each source category, and assess the public health and environmental impacts after regulations are implemented. The air toxic data being collected cover major, area, and mobile sources, and include estimates of emissions at the national, regional, county, and facility-specific and process-specific levels. In 1993, EPA began developing the National Toxics Inventory (NTI), a national repository of emission inventory data for HAPs. The 1996 NTI is a model-ready emissions inventory for use in dispersion and exposure modeling that is used to predict ambient air concentrations and resultant risk to the U.S. population, as well as to measure progress under the CAA in reducing HAP emissions. The 1996 NTI was compiled with estimates of the 188 HAPs. The 1996 NTI serves as the base year for comprehensive, facility-specific HAP emissions data and source-specific parameters. NTI contains estimates of emissions from major sources, area sources, on-road and off-road mobile sources. NTIs are created every three years.

2.7.3 CAA - MACT for Mercury Cell Chlor-Alkali Plants

EPA is developing a rule that would limit air emissions of mercury from plants that produce chlorine using the mercury cell method. The rule will include emissions limits based on MACT and on management practices. The final rule is expected in 2002. Mercury cell chlor-alkali plants are by far the largest current consumer of mercury in the U.S. domestic market, as a result of dramatic reductions in mercury consumption in other U.S. industries over the last thirty years. The relative importance of mercury cell chlor-alkali plant consumption is shown in Table 6.

Table 6. Comparison of Mercury Consumption by US Industry in 1970 and 1997

Industry Type	1970 (approximate tonnage)	1997
Chlor-Alkali	500	160
Batteries	500	~ 0
Paint (fungicide)	370	0
Pesticides	100	0
Slimicides (pulp and paper)	20	0
Industrial Catalysts	110	see "Other"
Lighting	10	29
Switches	70	57
Instruments	150	24
Laboratory	60	see "Other"
Dental	60	40
Other	300	36

Much of the reduction in industrial mercury use from 1970 to 1997 is related to Federal legislation or actions banning the use of mercury in: 1) paints as a fungicide (1993), 2) pesticides (1972), and 3) batteries (1996). In addition, the mercury cell chlor-alkali industry has been under increasing pressure to minimize mercury losses to the environment. The Chlorine Institute has committed to a 50 percent reduction in mercury used in the chlor-alkali industry by 2005.

In 1990 the private stocks of mercury held by the chlor-alkali industry were approximately 3,600 tons. These stocks had been reduced to 3,050 tons by 1996. Closure in 2000 of two mercury cell chlor-alkali plants, Holtrachem's Orrington, Maine and Riegelwood, North Carolina plants, have further reduced active US chlor-alkali mercury stocks.

These mercury cell chlor-alkali plant closures have created a dilemma regarding how to properly recycle large quantities of mercury in a domestic market with little mercury demand. One hundred thirty (130) tons of mercury where left onsite when the HoltraChem plant at Orrington, Maine closed in September 2000. The U.S. State Department, identifying the mercury as a legal trade commodity, permitted a U.S. mercury reseller to sell this mercury to private manufacturing companies in India. Protests by environmental groups brought attention to the sale. The government of India refused the mercury as a hazardous material and the shipment was returned to the U.S.

2.7.4 Limitations – CAA MACT Standards

- Air quality requirements such as the MACT for mercury cell chlor-alkali plants are not directly linked to domestic or import/export tracking of mercury or mercury waste. Air quality requirements and the voluntary chlorine industry commitment to reduce mercury use by 50 percent by 2005 serve as an indicator that U.S. imports of mercury should continue to decline and exports continue to increase. This trend can

be expected unless environmental protection legislation or treaty obligations limit the exportation of elemental (commodity) mercury in the future.

2.8 Toxic Substances Control Act

2.8.1 Overview of TSCA

The Toxic Substances Control Act (TSCA) of 1976, 15 U.S.C. s/s 2601 et seq., was enacted by Congress to provide authority for identifying and controlling unreasonable risks to human health and the environment associated with chemical substances produced, imported, distributed, used, or disposed in the United States. Under TSCA, EPA has authority to, *inter alia*: require recordkeeping and reporting on a broad range of information on chemicals; require testing of chemicals; require premanufacture notification to facilitate the screening and appropriate regulation of new chemicals before they enter into commerce; and regulate production, import, distribution in commerce, use, and disposal of chemicals to the extent that they present unreasonable risks. TSCA supplements other Federal statutes in providing authority to protect against risks associated with chemical substances, including among others, the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, and the Environmental Protection and Community Right-to-Know Act (including the Toxic Release Inventory requirements).

Cornell University has developed a convenient TSCA Chemical Substances Inventory search engine. The search engine permits quick identification of the universe of mercury compounds listed as toxic chemicals under TSCA. The TSCA search engine is located at msds.pdc.cornell.edu/tscasrch.asp. Fifty (50) mercury compounds were identified when the TSCA chemical inventory was queried for "mercury" compounds. The results of this query are provided in **Appendix C**.

Please note that the Cornell file may not always be current. EPA publishes the latest version of the non-confidential Inventory through the National Technical Information Service (NTIS) twice a year. The public can obtain a copy by contacting NTIS. There are also many commercial databases that carry the latest version of the Inventory. For example, the Chemlist file in the Scientific and Technical Information Network (STN International) operated by the Chemical Abstract Service carries the latest version of the Inventory.

Regulatory Controls: TSCA section 6 allows EPA through notice and comment rulemaking to regulate manufacture, distribution, use, and/or disposal of chemical substances if there is a reasonable basis to conclude that regulation will prevent unreasonable risk of injury to health or environment. AUnreasonable risk@ is a risk-benefit standard. In order to regulate under section 6, EPA must consider risks, costs and benefits of substance to be regulated and its alternatives. Section 6 includes a menu of possible regulatory options, ranging from a total ban of a chemical substance to requiring notices and warnings. TSCA requires that EPA impose the Aleast burdensome@ regulatory measure that provides adequate protection.

Information Gathering: Section 8(b) of TSCA requires EPA to develop and maintain an inventory of all chemicals, or categories of chemicals, manufactured, or processed in the U.S. The first version of this inventory identified approximately 62,000 chemicals in commerce in 1979. Today, there are over 81,000 chemicals on the inventory. Chemical substances not on the inventory are, by definition, "new" and subject to the premanufacture notification provisions of Section 5. See 40 CFR 720 for the implementing regulations. Chemicals must be added to the inventory if they enter commerce.

To aid EPA in its duties under TSCA, section 8(a) of TSCA provides authority to require manufacturers and processors of chemical substances to keep records and report information to EPA. Specifically, EPA may require maintenance of records and reporting of information including: chemical identities, names, and molecular structures; categories of use; amounts manufactured and processed for each category of use; descriptions of byproducts resulting from manufacture, processing, use, and disposal; environmental and health effects; number of individuals exposed; number of employees exposed and the duration of exposure; and manner or method of chemical disposal.

Confidential Business Information: Section 14 provides broad protection of proprietary confidential information about chemicals in commerce. Disclosure by EPA employees of such information generally is not permitted except to other federal employees or when necessary to protect health or the environment. Data from health and safety studies of chemicals is not protected unless its disclosure would reveal a chemical process or chemical proportion in a mixture. Wrongful disclosure of confidential data by federal employees is prohibited and may result in criminal penalties.

Import Certification: Customs regulation requires importers of chemical substances and mixtures to certify on the invoice at the port of entry that either: the shipment is subject to TSCA and complies with all applicable rules and orders thereunder; or, the shipment is not subject to TSCA. Certification for chemical substances/mixtures imported as part of articles is not presently required. A shipment may be detained or refused entry if certification is not made or if the shipment is believed not to be in compliance with TSCA. Certification is required for substances that are imported and are received by mail or commercial carrier, including those intended for research and development.

Export Notification: Under Section 12(b) of TSCA, any person who exports or intends to export a chemical substance or mixture must notify the EPA Administrator if for such chemical substance or mixture: the submission of data is required under Sections 4 or 5(b), an order has been issued under Section 5, a rule has been proposed or promulgated under Sections 5 or 6, or with respect to which an action is pending, or relief has been granted under Sections 5 or 7. Unless EPA finds that a chemical substance will present an unreasonable risk in the U.S., generally, TSCA section 12(a) excludes chemicals manufactured for export from TSCA requirements, except for testing requirements under section 4, and reporting and recordkeeping requirements in section 8.

EPA contacts for additional TSCA information include: Peggy Reynolds (202-260-3965), Chris Blunck (202-564-8078) and Henry Lau (202-564-8572) in EPA=s Office of Pollution Prevention and Toxics. EPA=s web site, http://www.epa.gov/opptintr/chemtest/sct8main.htm contains general descriptions of TSCA 8(a), 12(b) export notification, and Section 13 import certification authority.

2.8.2 Limitations – TSCA

! TSCA does not include explicit mechanisms for tracking the import and export of toxic chemicals.

! Elemental mercury is a naturally occurring substance and as such is automatically on the TSCA inventory even if not explicitly listed (see 40 CFR 710.4(b); inorganics and naturally occurring substances are not subject to Inventory Update Rule). Several mercury and mercury compounds are included on the TSCA inventory. Under section 8(a) of TSCA, EPA has the authority to gather information from manufacturers and processors on the amount of each of these substances that are manufactured and stored, as well as methods of disposal, although the agency is not required to gather this data. EPA can also control the manufacture or importation of those chemicals that pose an unreasonable risk.

2.9 Hazardous Materials Transportation Law – DOT

2.9.1 Overview of Hazardous Materials Transportation Law

The *Federal Hazardous Materials Transportation Law* (Federal Hazmat Law), 49 U.S.C. 5101 et seq., (formerly the Hazardous Materials Transportation Act, 49 App. U.S.C. 1801 et seq.) is the basic statute regulating hazardous materials transportation in the United States. The purpose of the law is to provide adequate protection against the risks to life and property inherent in transporting hazardous materials in commerce by improving the regulatory and enforcement authority of the Secretary of Transportation.

The Secretary of the Department of Transportation (DOT) has the authority under the *Law* to designate a material or a group or class of materials as hazardous when the Secretary determines that transporting the material in commerce in a particular amount and form may pose an unreasonable risk to health and safety or property. The Secretary issues hazardous materials regulations to ensure the safe transportation of these hazardous materials.

Hazardous Materials Regulations (HMR: 40 CFR 171-180) – The HMR covers six areas:

1. Hazardous materials definition/classification (Part 172, Subparts A-B, Part 173);
2. Hazard communication (Part 172, Subparts C-G);
3. Packaging requirements (Parts 173, 178, 179 and 180);
4. Operational rules (Parts 171, 173-177);
5. Training (Part 172, Subpart H);
6. Transportation (Part 181).

DOT regulation HMR 181 regulates the transportation of hazardous materials via highway, air, vessel or railroad. The regulation requires that all shipments of hazardous materials using a hired vehicle or one's own vehicle be packaged, labeled, and manifested in accordance with Federal requirements. Drivers are required to receive special certification and training.

Retention of Shipping Papers for each Hazardous Materials Shipment: The *Hazardous Materials Transportation Authorization Act of 1994* amended the Federal hazardous materials transportation law on August 26, 1994 to require shippers and carriers to retain shipping papers for a period of one year [49 U.S.C. § 5110(e)].

Retention of Hazardous Material Bills of Lading: The Research and Special Programs Administration of the DOT has issued a Notice of Proposed Rulemaking (Federal Register of September 12, 2001) that would, if made final, require shippers and carriers to retain a copy, or its equivalent electronic image, of each hazardous material shipping paper for a period of 375 days from the date that the carrier accepts the hazardous material shipment.

2.9.2 DOT "Model Regulation" Proposal – UN Recommendations on the Transport of Dangerous Goods

The United Nations Recommendations on the Transport of Dangerous Goods (TDG) provides a uniform basis for development of harmonized regulations for all modes of transport, in order to facilitate trade and the safe, efficient transport of hazardous materials. The UN Recommendations were first published in 1957 establishing minimum requirements applicable to the transport of hazardous materials by all modes of transport. Since then the UN Recommendations have gained global acceptance as the basis for most international, regional, national and modal transportation regulations. Mercury/mercury compounds with UN Dangerous Goods codes are listed in **Appendix D**.

The UN Recommendations enhance safety, improve enforcement capability, ease training requirements and enhance global trade and economic development. Safety is enhanced primarily because harmonized requirements simplify the complexity of the regulations, simplify training efforts, and decrease the likelihood of non-compliance. The Recommendations provide economic benefits by eliminating the costs of complying with a multitude of differing national, regional and modal regulations. The UN Recommendations facilitate compatibility between modal requirements so that a consignment may be transported by more than one mode without intermediate reclassification, marking, labeling or repackaging.

The UN Recommendations cover all aspects of transportation necessary to provide international uniformity. They include a comprehensive criteria based classification system for substances that pose a significant hazard in transportation. Hazards addressed include explosivity, flammability, toxicity (oral, dermal and inhalation), corrosivity to human tissue and metal, reactivity (e.g., oxidizing materials, self reactive materials, pyrophoric substances, substances that react with water), radioactivity, infectious substance hazards and environmental hazards. They prescribe standards for packaging

and multimodal tanks used to transport hazardous materials. They also include a system of communicating the hazards of substances in transport through hazard communication requirements which cover labeling and marking of packages, placarding of tanks and freight units, and documentation and emergency response information that is required to accompany each shipment.

Based on a proposal from the United States DOT, the UN Recommendations were reformatted in the form of a "*Model Regulation*". Many national, regional and modal regulations governing the transport of dangerous goods are now based on the UN Recommendations; some of the regulations were structured differently requiring consignors of dangerous goods to be familiar with the unique structure of all applicable regulations. The lack of structural harmony of regulations can frustrate compliance and to the extent that it results in non-compliance is detrimental to safety. Furthermore, a *Model Regulation* can easily be adopted in national legislation of countries throughout the world eliminating the need for countries to reissue the regulations in the format of their national regulations.

In the past, the process of incorporating amendments to the UN Recommendations is resource intensive. In the case of international organizations, each change to the Recommendations was re-evaluated before being introduced into the various international regulations. In some cases the amendments had to be re-proposed by governments participating in these meetings. The fact that each of these issues was rediscussed, reworded and reorganized by each of the affected regulatory bodies increased the likelihood for disharmony. The *Model Regulation* is serving to reduce the necessity for the majority of these efforts and in turn is enhancing harmonization. The tenth revised edition of the Recommendations was the first edition to be published in the format of a *Model Regulation*. Additional regulatory requirements (e.g. packing instructions rationalized portable tank requirements) were included in the eleventh revised edition of the Model Regulation. The eleventh revised edition of the UN Recommendations was published in 1999. Work continued toward enhancing the Model regulation in the TDG Committee's 1999-2000 biennium.

The U.S. DOT Research and Special Programs Administration (RSPA) represents the U.S. at these meetings and formulates U.S. positions based on feedback from U.S. industry, the public and other government agencies. The work of the TGD Committee has become increasingly important to both international and domestic transportation of hazardous materials to, from and within the U.S. Virtually all hazardous materials imported to or exported from the U.S. are transported in accordance with international regulations based on the UN Recommendations.

Additional information on the responsibilities and functions of the UN Committee of Experts on the Transport of Dangerous Goods is available at the **UN Economic and Social Council (ECE) Transport of Dangerous Goods** web site. The title of the document is "Information on the United Nations Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods and on the Mechanisms for Implementation of the UN Recommendations on the Transport of Dangerous Goods."

2.9.3 Limitations – DOT Hazmat Transportation Requirements

- The primary objectives of DOT hazmat transportation requirements is to ensure that the shipper is properly packaging the hazardous material for transit and emergency personnel have a clear understanding of the chemical hazards involved should an accident occur. Shippers and carriers must maintain a copy of the bill of lading, either hardcopy or electronic form, for one year for each shipment. Tracking the movement of hazardous chemicals is not currently a component of domestic hazmat transportation requirements. Hazardous materials laws require shipping papers and bills of lading to be retained for one year or 375 days, respectively. In cases of mercury waste shipments that are hazardous wastes, the shippers and carriers would be required to retain copies of their manifests (which are also DOT shipping papers) for at least three years under RCRA authority.

2.10 Tariff Codes and Import/Export Tracking

Schedule B Codes (for exports) and Harmonized Tariff Schedule (HTS) Codes (for imports): All of the imports and export codes used by the United States are based on the Harmonized Tariff System (HTS). The HTS assigns 6-digit codes for general categories. Countries which use the HTS are allowed to define commodities at a more detailed level than 6-digits, but all definitions must be within that 6-digit framework. Mercury/mercury compounds listed in Schedule B are shown in **Appendix E**.

The U.S. defines products using 10-digit HTS codes. Export codes (which the U.S. calls Schedule B) are administered by the U.S. Census Bureau. Import codes are administered by the U.S. International Trade Commission (USITC). Web sites for U.S. import and export HTS codes:

- Export (Schedule B, administered by U.S. Census)
- Import (HTS, administered by USITC)

Harmonized Tariff Schedule of the United States (Imports): The USITC (Office of Tariff Affairs and Trade Agreements) is responsible for publishing the *Harmonized Tariff Schedule of the United States Annotated* (HTSA). The HTSA provides the applicable tariff rates and statistical categories for all merchandise imported into the United States; it is based on the international *Harmonized System*, the global classification system that is used to describe most world trade in goods. The USITC is responsible for continually reviewing the HTS, a list of all the specific items that are imported into and exported from the United States, and for recommending modifications to the HTS that it considers necessary or appropriate. U.S. mercury imports/export totals by country, 1998 – 2000, are summarized in **Appendix F**. The Customs is responsible for administering the tariff and for processing import entries.

Products containing mercury are found in number of commodity categories in the HTSA. Chapter 28, *"Inorganic chemicals; organic or inorganic compounds of precious metals,*

of rare earth metals, of radioactive elements or of isotopes," contains elemental mercury, with Code 280540. The first two digits represent the chapter number in the HTSA. Mercury-bearing products span a wide variety of product categories, as shown in the query for "mercury" in the HTSA database provided in Appendix E.

The purpose of the HTSA is to establish tariffs for specific goods, not identify constituents such as mercury in the goods. For this reason there are a number of product descriptions for products known to contain mercury that give no indication of mercury content. For example, liquid-filled thermometers are identified by Code 902511. Many liquid-filled thermometers use mercury, though the thermometers are not currently classified in the HTSA by the type of liquid in the thermometer.

Based on input from Cathleen Barnes (barnes.cathleen@epa.gov, 703-305-7101) , the Office of Pesticide Program=s representative to the Prior Informed Consent negotiations, the World Trade Organization is moving towards more general, broader categories. Without the specific codes, it is hard to track shipments.

2.11 Bureau of Export Administration

The Bureau of Export Administration (BXA) is the primary licensing agency for dual use exports (commercial items that could have military applications). Other departments and agencies have regulatory jurisdiction over certain types of exports and re-exports. For example, the State Department licenses the export of defense articles and services, while certain nuclear materials and equipment are licensed by the Nuclear Regulatory Commission.

The export control provisions of the Export Administration Regulations (EAR), are intended to serve the national security, foreign policy, nonproliferation, and short supply interests of the United States and, in some cases, to carry out its international obligations. Some controls are designed to restrict access to dual use items by countries or persons that might apply such items to uses inimical to U.S. interests. These include controls designed to stem the proliferation of weapons of mass destruction and controls designed to limit the military and terrorism support capability of certain countries. The effectiveness of many of the controls under the EAR is enhanced by their being maintained as part of multilateral control arrangements. Multilateral export control cooperation is sought through arrangements such as the Nuclear Suppliers Group, the Australia Group, and the Missile Technology Control Regime. The EAR also include some export controls to protect the United States from the adverse impact of the unrestricted export of commodities in short supply.

Commodities, software, and technology that have been exported from the United States are generally subject to the EAR with respect to re-export. Many such re-exports, however, may go to many destinations without a license or will qualify for an exception from licensing requirements.

Of those exports and re-exports subject to EAR, a relatively small percentage require the submission of a license application to the Department of Commerce. License requirements are dependent upon an item's technical characteristics, the destination, the end-use, and the end-user, and other activities of the end-user. Five pieces of information are needed to determine obligations under the EAR: What is the item intended for export or re-export; Where is it going; Who will receive it; What will they do with it; and, What other activities are they involved in?

The first step in determining if an export license is requirement under the EAR is to classify the product against the Commerce Control List (CCL). Many items are not on the Commerce Control List (CCL) (Supplement No. 1 to §774.1 of the EAR), or, if on the CCL, require a license to only a limited number of countries. The CCL contains thousands of sensitive export items. Only one commodity that includes mercury is currently on the CCL, mercury cadmium telluride crystals & epitaxial wafers.

However, a number of metals, including beryllium metal alloys, nickel alloys, and zirconium metal alloys, are also included in the CCL. These metal alloys are on the CCL for national security reasons. Clearly the CCL list could be revised to include mercury, assuming the definition of national security is expanded to include environmental security, and subject export of mercury to the EAR licensing system developed to track the export and re-export of CCL items. The EAR licensing system is an "off-the-shelf" export tracking system specifically developed to make certain that sensitive export items are tracked "from cradle to grave".

2.12 Import/Export Tracking - Department of Treasury/Customs Service

2.12.1 Exports

The Automated Export System (AES) is a joint venture between the Customs, the Foreign Trade Division of the Bureau of the Census (Commerce), the Bureau of Export Administration (Commerce), the Office of Defense Trade Controls (State), other Federal agencies, and the export trade community. It is the central point through which export shipment data required by multiple agencies is filed electronically to Customs. AES provides an alternative to filing paper Shipper's Export Declarations (SEDs). Export information is collected electronically and edited immediately, and errors are detected and corrected at the time of filing. AES is a nationwide system operational at all ports and for all methods of transportation. It was designed to assure compliance with and enforcement of laws relating to exporting, improve trade statistics, reduce duplicate reporting to multiple agencies, and improve customer service.

A study by the Census Bureau revealed that one out of every two paper SEDs is incomplete or contains inaccurate data. AES has demonstrated the ability to collect complete and accurate data due to immediate feedback to the user when data is omitted or is incorrect.

AES – Electronic Filing: In July 2001, the Bureau of the Census, Foreign Trade Division, issued a Notice of Proposed Rulemaking in the Federal Register. The proposed rule would require the mandatory electronic filing, through AES or AESDirect, of Shipper's Export Declarations covering shipments of goods found within the Commerce Control List (CCL) and the U.S. Munitions List, whether or not a license is actually required for the particular export. Should the proposed rule be made final, the effective date will be sometime in March, 2002.

2.12.2 Imports

The Customs Automated Commercial System (ACS) is the system used by the Customs to track, control, and process all commercial goods imported into the U.S. The Customs Automated Commercial System (ACS) electronically receives and processes entry documentation and provides cargo disposition information. Cargo carriers, customs brokers, and importers may use the system, which reduces clearance time from days to hours or even minutes. Persons entering into the importing trade who intend to file their own entry documentation with Customs are encouraged to explore this method of transacting business. Also, those importing merchandise either for their own use or for commercial transactions may use a customs broker who transacts customs business using the Automated Broker Interface (ABI) in combination with ACS.

The 2001 edition of the guidance document "*Importing Into the United States"* contains material brought about pursuant to the Customs Modernization Act (Title VI of the North American Free Trade Agreement Implementation Act [P.L. 103-182, 107 Stat. 2057], which became effective on December 8, 1993). These modernization provisions have fundamentally altered the relationship between importers and the Customs by shifting to the importer the legal responsibility for declaring the value, classification, and rate of duty applicable to entered merchandise.

A prominent feature of the *Mod Act*, as it is known, is a relationship between Customs and importers characterized by "informed compliance," discussed in Section Three of *Importing Into the United States*. A key component of informed compliance is the shared responsibility between Customs and the import community, wherein Customs communicates its requirements to the importer, and the importer uses reasonable care to assure that Customs is provided accurate and timely data pertaining to his or her importations.

2.12.3 Limitations – Export/Import Manifests for Commodity Mercury

- Customs import and export shipping manifests data should be fully electronic by the end of 2002. This will greatly enhance the ability of Customs to perform "real time" tracking of mercury and mercury-containing products entering and leaving the U.S. Identification of goods is based on the Harmonized Trade System (HTS) codes developed by the World Trade Organization. HTS codes were developed for assessing tariffs, not for identifying toxic chemicals that may be a component of the good in question. As a result, the HTS code system as it pertains to mercury-

containing goods requires revision and/or refinement to realize its potential for effectively tracking mercury contained in internationally traded goods.

- According to a representative of International Trade Administration[11] of the Department of Commerce, the U.S. can update HTS tariff codes each year. The U.S. International Trade Commission (ITC) is the entity responsible for adding new classifications and can do so quickly. The World Customs Organization, international body that established the HTS system, is amenable to incorporating new designations, although the international HTS is only updated every seven years. ITA representatives have given presentations to EPA personnel regarding procedures for adding new HTS classifications for environmental tracking purposes. To date no new HTS classifications have been proposed by EPA to the U.S. ITC.

2.13 Compiling of Import/Export Statistics – Census Bureau

The U.S. Census Bureau is responsible for compiling all statistics on U.S. imports/exports. Export data is gathered in realtime through the ACS for exports. Imports are logged-in electronically by U.S. Customs and available for immediate retrieval and analysis by the Census Bureau.

U.S. trade data is not released for 45 days after the month in which the transaction takes place. The data is normally released with the monthly trade balance summary. Information on shipments by individual companies is proprietary to prevent competitors from calculating unit prices on the goods being shipped. For this reason all data reported by the Census Bureau is aggregated prior to public dissemination.

One administrative tool, known as a "National Interest Determination" or NID, is available through the Census Bureau to allow realtime tracking of individual import/export transactions [see 15 CFR 30.91(e)]. To date NID requests have come almost exclusively from law enforcement agencies such as the Drug Enforcement Agency (DEA). The purpose of an NID in the case of the DEA might be to track specific drug-making chemicals.

2.14 Basel Ban – Impact on U.S. Hazardous Waste Exports

At the second Conference of Parties to the Basel Convention in 1994, over the objections of the United States, Canada, and Australia, the G-77 group representing developing nations joined with the European Union in adopting by consensus a full, no-exceptions ban on the export of hazardous wastes from countries of the Organization for Economic Cooperation and Development (OECD) to non-OECD countries. In 1995 the ban was transcribed into a decision to amend the convention accordingly. The amendment today has so far been ratified by 22 of the necessary 62 parties needed to enter into force.

The U.S. does not prohibit the export of mercury-containing waste to OECD or non-OECD countries. There are no legal grounds under RCRA to do so. Whether a country

[11] Anthony Ranzulli, U.S. International Trade Administration, December 10, 2001.

has ratified the Basel Ban or not does not affect this stance. The U.S. is not a Party to Basel and is thus not legally bound by the Convention. However, when a U.S. entity wants to export RCRA hazardous waste to a Basel Party, including mercury hazardous waste, a cable is sent to the proposed importing country reminding them of their obligation under Basel to not accept waste from a non-Party. To the knowledge of EPA OSW, no developing country has consented to a waste import from the U.S. in years. This consent is required under RCRA. In practice, the exports from the U.S. to a developing country do not happen (officially at least) because EPA does not ever receive the necessary consent. The only affect the Ban would have is that, in the U.S. communication to a proposed importing country which ratified the ban, EPA OSW would probably also remind the country that it is a Party to Basel.[12]

[12] EPA Office of Solid Waste March 29, 2002 comments on draft report.

3. DATA SOURCE ASSESSMENT SUMMARY TABLES

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
Toxic Release Inventory	Provides data on mercury and mercury compound releases from manufacturing, mining, and power generation industries Provides information on quantity of mercury imported for use at plant site as well as off-site transfers to waste broker, recycling facility, or POTW. If mercury is shipped offsite for direct reuse, it is not considered a waste and is not reported under TRI. Covers all fates of mercury wastes (releases, transfers and disposal). 10 pound threshold from 2000 reporting year onward. High reporting threshold in previous years, 25,000 pounds, limited effectiveness of TRI for tracking mercury.	Data quality generally considered reasonably good. Data flows from legal reporting mandate, although a variety of emission estimation techniques can be used to estimate release rates. Data reviewed by U.S. EPA or delegated state agency. No known active enforcement/auditing program to date.	Good – data is collected and managed in electronic format. One significant gap is inability to track receivers of transfers except through manual searches of records. A major drawback is the time lag between actual events, such as amount transferred off-site, and report generation. Typically TRI data is publicly available eighteen months after the end of the year for which the data has been compiled. Another drawback is that commodity mercury transfers are not reported (meaning mercury produced as byproduct at gold mines is not reported under TRI).	Best coverage on fates of mercury wastes and recyclables. Very limited information on use.

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
RCRA	Detailed manifests generated for all mercury-containing hazardous waste shipments other than *Universal Waste Rule* (UWR) items. Only bill of lading, no manifest, required for UWR shipments. Wastes shipped in "conditionally exempt small quantity generator" amounts (<100 kg/mo) in states recognizing the CESQG exemption may be exempt from the manifest, as might other shipments of <1000 kg/mo shipped pursuant to reclamation agreements.	Variable – improper codification of waste carries potential criminal liability penalties. Legal remedies for misrepresentation under RCRA are strong. Misidentification of waste has been an issue for waste imports to the US from Mexico.	Uneven – All current manifests are hardcopy, since the regulations do not currently allow electronic transmissions. States (24) collect manifests, enter the data manually into their data management systems, and use the data for various program management, compliance monitoring, and revenue generation purposes. The new electronic manifest system will not likely be operational before 2004. It will be optional for waste shippers and receivers to use the electronic format.	There appears to be no advantage gained by maintaining three essentially unlinked U.S. waste tracking systems: HAZTRAKS, WITS and Exports. A single tracking system tied to existing Customs tracking systems would appear to be a promising possibility. The disadvantage of this approach is the need to add tariff codes that explicitly identify mercury waste products in a manner consistent with RCRA mercury waste codes.
Waste Import/Export Program	Waste must include a manifest identifying waste type (by EPA hazardous waste code) and destination. Recipient of waste must be identified and acknowledge intent to receive waste.	Good – lab analysis of U.S. export waste. Fair – lab analysis of imported waste, especially from non-OECD countries.		

Regulatory Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
FIFRA	All pesticides sold in U.S. must be registered for use in U.S. Registrations for mercury-bearing pesticides were cancelled in 1970s. Pesticides not registered for use in the U.S. may be manufactured in the U.S. and sold for export. *Action: confirm no mercury-containing pesticides are made for export in the U.S. and what is controlling regulation.*	Imports - Good: FIFRA section 17(c) requires that EPA be notified of the arrival of imported pesticides. This is accomplished through the Notice of Arrival (NOA; EPA Form 3540-1), which is filled out by the importer prior to importation and submitted to the EPA regional office applicable to the intended port of entry. U.S. Customs regulations prohibit the importation of pesticides without a completed NOA. Exports - Fair: Pesticides intended solely for export are not required to be registered. Exporter must obtain importer acknowledgement of pesticide registration status and submit to EPA prior to export.	Imports – Good: The EPA reviews and approves all pesticide imports prior to their arrival in the country. However, no mercury-containing pesticides are registered for use in the U.S., therefore no mercury-containing pesticides can legally be imported for use in the U.S. Exports – Good: A statement from the foreign purchaser acknowledging that the purchaser is aware that the product is not registered in the U.S. and cannot be sold for use there is required by the EPA prior to export. EPA sends these statements to the government of the importing country.	

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
CAAA – MACT for mercury cell chlor-alkali plants	EPA is developing a rule that would limit air emissions of mercury from plants that produce chlorine using the mercury cell method. The rule will include emissions limits based on MACT and on management practices. The final rule is expected in 2002.			

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
Department of Treasury: U.S. Customs Service	Customs import and export shipping manifests data should be fully electronic by the end of 2002. This will enhance the ability of Customs to perform "real time" tracking of mercury and mercury-containing products entering and leaving the U.S. U.S. exporter must indicate on Customs shipping document (either SED or AES) the final destination of goods if known. Exporter can request letter from buyer certifying the identity of the ultimate end user.	Variable - Identification of goods is based on the Harmonized Trade System (HTS) codes developed by the World Trade Organization. HTS codes were developed for assessing tariffs, not for identifying toxic chemicals that may be a component of the good in question.	HTS code system as it pertains to mercury-containing goods requires revision and/or refinement to realize its potential for effectively tracking mercury contained in internationally traded goods.	The United States can update HTS tariff codes each year. The U.S. International Trade Commission (ITC) is the entity responsible for adding new classifications and can do so quickly. The World Customs Organization, international body that established the HTS system, is amenable to incorporating new designations, although the international HTS is only updated every seven years.

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
TSCA	Can provide aggregate information on manufacturing and storage (by manufacturers and processors) and use of mercury compounds. Facilities manufacturing or selling mercury compounds might be identified, but company- or facility- specific information on quantities produced cannot be provided to public or other government agencies unless with the consent of the manufacturer.	TSCA does not include explicit mechanisms for tracking shipments of toxic chemicals. TSCA is intended to provide EPA with the regulatory tools to track the production of toxic chemicals, assess the severity of toxic chemical exposures, and to limit the production and use of highly toxic chemicals.	Elemental mercury and mercury compounds are included on the TSCA Inventory (either automatically or explicitly). EPA is authorized by TSCA to gather information on the amount of each of these chemical substances that are manufactured, as well as methods of disposal, although the agency is not required to gather this data.	EPA is authorized to gather this information for chemicals being produced for export as well. EPA can also ban the manufacture or importation of those chemicals that pose an unreasonable risk.

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
Department of Commerce: BXA/Commerce Control List	The Bureau of Export Administration (BXA) is the primary licensing agency for dual use exports (commercial items which could have military applications). Thousands of sensitive export items are included on the Commerce Control List (CCL) maintained by the BXA.	Only one commodity that includes mercury is currently on the CCL, mercury cadmium telluride crystals & epitaxial wafers, although according to BXA staff member"mercury and mercury alloys" were listed on the CCL in the past.	The United States can effectively control the export and re-export of goods listed on the CCL.	The CCL represents an established system to track the flow of sensitive export materials. To date the items listed on the CCL are items with potential military applications. If the concept of national security is expanded to include environmental security, mercury and mercury-containing goods good potentially be tracked through the CCL system.

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
Department of Commerce: • U.S. Census Bureau	The Census Bureau is responsible for compiling all statistics on U.S. imports/exports. Export data is gathered in realtime through the ACS for exports. Imports are logged-in electronically by U.S. Customs and available for immediate retrieval and analysis by the Census Bureau.	U.S. trade data is not released for 45 days after the month in which the transaction takes place. The data is normally released with the monthly trade balance summary. Information on shipments by individual companies is proprietary to prevent competitors from calculating unit prices on the goods being shipped. For this reason all data reported by the Census Bureau is aggregated prior to public dissemination.	One administrative tool, known as a "National Interest Determination" or NID, is available through the Census Bureau to allow realtime tracking of individual import/export transactions [see 15 CFR 30.91(e)].	To date NID requests have come almost exclusively from law enforcement agencies such as the Drug Enforcement Agency (DEA).

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
Department of Commerce: • International Trade Administration	An ITA representative sits on the oversight committee that determines when sales from the DLA mercury stockpile may take place.			

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
U.S. International Trade Commission	The U.S. ITC is the entity responsible for adding new export good classifications and can do so quickly.	Variable – There are specific HTS codes for elemental mercury and a number of mercury-containing commodity goods. There are no mercury-specific HTS codes for a number of products that contain mercury, such as some forms of thermometers and batteries.	Good/Incomplete – Tracking the flow of elemental mercury, the raw material input to mercury-containing commodity goods, is the most important "first step" in an effective tracking system. Additional mercury-specific commodity good HTS sub-codes must be added to allow comprehensive tracking of mercury-containing commodity goods.	

Regulatory or Administrative Tool	Comprehensiveness	Data Quality and Reliability	Data Usability	Comments
DOT Hazmat Transportation Law	The primary objective of DOT hazmat transportation requirements is to ensure that the shipper is properly packaging the hazardous material for transit and emergency personnel have a clear understanding of the chemical hazards involved should an accident occur.	Variable - Shippers and carriers must maintain a copy of the bill of lading, either hardcopy or electronic form, for one year for each shipment.	Low - Tracking the movement of hazardous chemicals is not currently a component of domestic hazmat transportation requirements.	

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Mercury Waste Tracking Systems

Waste manifests are often incomplete, inaccurate and untimely. This frustrates the ability of enforcement officials to track waste shipments from "cradle to grave" and can result in the circumvention of both domestic waste management laws and international agreements regarding the transborder movement of hazardous waste.

Lack of a "harmonized" system of hazardous waste identification make it difficult to track international shipments of mercury waste from "cradle to grave." This also holds true for a number of forms of commodity mercury and mercury products. One option for mercury waste is the OECD red-amber-green waste classification system.

A standardized numbering system for transborder waste shipments would greatly simplify "cradle to grave" tracking and linking of existing tracking systems. A standardized numbering system for transborder waste shipments would be a major improvement over the current system, which has no sequential numbering of any kind. Standardized numbering systems are commonplace in the package delivery business. There is no practical constraint on imposing such a system on waste shipments. One unique situation with regard to waste shipments, however, is bulking and transshipment. Where waste shipments are combined at a storage/bulking facility, new shipping numbers of the bulked shipment would have to be linked to all originating numbers of the individual shipments comprising the bulked shipment.[13]

Electronic filing and scanning of documents also can reduce compliance costs for the regulated community and reduce paperwork burdens on government entities. Options include electronic manifests, bar codes, and specialized hardware to read and enter data, query status of shipments, and update files on individual shippers or customers. Package and document shipping companies (FedEx and UPS for example) use these technologies currently for realtime tracking of shipments and have demonstrated their effectiveness.[14]

It is not certain that the new EPA electronic waste manifest system will be supported by a national waste tracking database. The proposed rule included standardized electronic formats and other measures, but assumed that electronic manifests would be developed by private firms and not centralized within a national system. This policy is under review currently, based on comments received on the May 2001 proposed rule.

The Customs will have a fully electronic import/export tracking system in place by the end of 2002. One purpose of the fully electronic database tracking systems is to permit Customs representatives to make on-the-spot "go/no go" decisions on: 1) goods that are subject to export controls, 2) goods that are banned or restricted in some manner from importation to the U.S.

[13] 1999 CEC. *Tracking & Enforcement of Transborder Hazardous Waste Shipments – A Needs Assessment.*
[14] Ibid.

A rigorous manifest system is in place for domestic shipments of hazardous waste, although the current patchwork of recordkeeping databases (hardcopy, electronic) make it difficult/impossible to track domestic hazardous waste shipments in realtime. One complicating factor for domestic tracking of some forms of mercury waste is the streamlined UWR recordkeeping structure. Shipments of common forms of waste mercury-containing goods, such as batteries, fluorescent lamps, thermometers, do not require written (or electronic) manifests under the UWR.

The U.S. could consider imposing a series of fees and penalties on waste shipments to help ensure that information is complete and accurate. Even if all information is complete, accurate and timely on a manifest, a portion of each pre-shipment performance bond would be retained to cover the costs of processing waste tracking information. One disadvantage of this recommendation is that waste shippers will have incentives to circumvent the regulatory system to the extent that costs of entering the system increase.[15]

Some critical information, such as company enforcement and compliance history, is not available or linked to existing databases that track pre-notifications and consents and/or actual waste shipments (manifests). Linking the current tracking systems to other sources of relevant information regarding the environmental and economic performance of firms that participate in transborder shipping of hazardous waste would be of value in identifying potentially suspect shipments.[16]

The current U.S. ad hoc "freeze" on international sales of large quantities of elemental mercury, from either closure of domestic mercury cell chlor-alkali plant(s) or the DLA strategic mercury stockpile, is providing a two- to three-year window of opportunity to put an effective international tracking and control program in place that will potentially reduce or eliminate the potential environmental damage caused by bulk sales of this type.

4.2 Import/Export of Mercury-Containing Commodity Goods

Realtime electronic tracking of import/export of mercury-containing commodity goods is currently carried out by the Customs. This information is proprietary, primarily to protect importers/exporters from competitors who could use the manifest information to determine unit prices of goods and gain a competitive advantage. Public dissemination of aggregate data on each HTS code is available approximately 45 days after the end of the month in which the data was collected. Existing administrative tools, including the CCL and NID, are potentially available that would permit realtime tracking on a shipment-specific basis.

[15] Ibid.
[16] Ibid.

4.3 Domestic Shipments of Mercury-Containing Commodity Goods

DOT hazmat regulations were not developed to track the flow of hazardous materials. The intent is to accurately identify the hazardous material, ensure that the material is properly packaged for shipment, and provide emergency personnel with sufficient chemical information to effectively address accidental spills or releases of the material. There are a relative handful of companies handling significant amounts of mercury on a routine basis in the US. A more fruitful approach to tracking domestic mercury shipments might be to establish a mandatory registry of companies that use/handle/recycle mercury above some *de minimus* level and require prior notification through a dedicated electronic database tracking system of all domestic mercury shipments.

4.4 Recommendations

1. There is compelling reason to maintain three essentially unlinked U.S. waste tracking systems: HAZTRAKS, WITS and Exports. A single uniform electronic database is necessary to eventually attain realtime shipment tracking capability. One possibility is utilizing the Customs import/export tracking system. A major potential hurdle to this approach is the timely incorporation of customs tariff codes that are consistent with U.S. mercury and mercury waste identification codes.

2. Adoption of the OECD waste identification system would harmonize waste tracking systems in the U.S. with those of most of Europe and many other industrialized nations. The U.S. should request additional tariff codes via the U.S. ITC that effectively identify commodity and waste mercury substances that do not currently have unique tariff codes.

3. A standardized numbering system for transborder waste shipments would be a major improvement over the current system, which has no sequential numbering of any kind. Standardized numbering systems are commonplace in the package delivery business. There is no practical constraint on imposing such a system on waste shipments.

4. The U.S. could consider imposing a series of fees and penalties on waste shipments to help ensure that information is complete and accurate. Even if all information is complete, accurate and timely on a manifest, a portion of each pre-shipment performance bond would be retained to cover the costs of processing waste tracking information.

5. Linking the current tracking systems to other sources of relevant information regarding the environmental and economic performance of firms that participate in transborder shipping of hazardous waste would be of value in identifying potentially suspect shipments.

6. EPA should establish an interagency committee with the U.S. ITC and develop/establish a comprehensive list of HTS codes for mercury-containing commodity goods. This should be a relatively straightforward assignment, as the number of mercury-containing commodity goods is relatively limited and many are already specifically identified or indirectly identified (liquid-containing thermometers) by HTS codes. A number of refinements to existing HTS codes, as well as a few new codes, should be sufficient to cover the vast majority of commodity goods containing mercury.

7. EPA should establish an interagency committee with Commerce, Treasury, State, and Defense to develop ground rules for adding environmentally sensitive materials, such as elemental mercury and mercury-containing goods, to the CCL. Addition of elemental mercury and mercury-containing goods to the CCL would allow the EPA to take advantage of a sophisticated existing export tracking system, and potentially restrict the flow of these goods to countries with adequate in-country mercury handling and disposal infrastructure. The NID administrative tool is also potentially available to conduct realtime tracking of mercury exports. A very persuasive case would have to be made to obtain an NID on environmental security grounds.

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7. GLOSSARY OF ACRONYMS

ABI	Automated Broker Interface.
ACS	Automated Commercial System
AES	Automated Export System
AMP	Annual Materials Plan
BXA	Bureau of Export Administration
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CCL	Commerce Control List
CEC	Commission for Environmental Cooperation
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
CNMTS	Canadian Notice and Manifest Tracking System
DEA	Drug Enforcement Agency
DLA	Defense Logistics Agency
DNSC	Defense National Stockpile Center
DOD	Department of Defense
DOE	U.S. Department of Energy
DOT	Department of Transportation
EAR	Export Administration Regulations
ECE	UN Economic and Social Council
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-To-Know Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
HAP	Hazardous Air Pollutants
HAZTRACKS	Hazardous Waste Tracking System
HTS	Harmonized Trade Schedule
HTS	Harmonized Tariff System
HTSA	Harmonized Tariff Schedule (of the United States) Annotated
HWES	Hazardous Waste Export Systems
IBEP	Integrated Border Environmental Plan
IECD	International Enforcement and Compliance Division
IMERC	Incinerated MERCury
INE	Mexico's National Institute of Ecology
ITC	U.S. International Trade Administration
LDR	Land Disposal Restrictions
LEPC	Local Emergency Planning Committee
MACT	Maximum Achievable Control Technology

Mod Act	Customs Modernization Act
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NID	National Interest Determination
NOA	Notice of Arrival
NTI	National Toxics Inventory
NTIS	National Technical Information Service
OECA	Office of Enforcement and Compliance Assurance
OECD	Organization for Economic Cooperation and Development
OSW	Office of Solid Waste
PBT	Persistent, Bioaccumulative and Toxic
PPA	Pollution Prevention Act of 1990
RCRA	Resource Conservation and Recovery Act
RMERC	"Roasted or Retorted" MERCury
RSPA	Research and Special Programs Administration
SED	Shipper Export Declarations
SEMARNAT	Mexico's Secretariat of Environment and Natural Resources
SERC	State Emergency Response Commission
SIC	Standard Industrial Classification
SIP	State Implementation Plan
STN	Scientific and Technical Information Network
TCLP	Toxic Characteristic Leaching Procedure
TDG	Transport of Dangerous Goods
TPED	The Toxics and Pesticides Enforcement Division
TRI	Toxics Release Inventory
TSCA	Toxic Substance Control Act
TSD	Treatment, Storage, or Disposal
USITC	U.S. International Trade Commission
UWR	Universal Waste Rule
WITS	Waste Import Tracking System