Institute for Financial Management and Research

Centre for Development Finance

Working Paper Series

November 2009

Toxic Release Inventory for India:

A Discussion Paper

Carishma Gokhale-Welch

Carishma Gokhale-Welch is a Consultant with CDF. The views expressed in this paper are entirely those of the author drawing from experience of other Senior Researchers at CDF, and not necessarily those of the institutions with which she is associated.

Acknowledgments

The author would like to acknowledge the contribution of Gopal Krishna, Ban Asbestos Network of India; Madhumita Dutta, Corporate Accountability Desk; Dr. D. B. Boralkar, member of the Supreme Court Monitoring Committee; Michael Mazgaonkar, Paryavaran Suraksha Samiti; Nityanand Jayaraman, writer and researcher; Prakash Bhog, attorney and activist; and Rajesh Rangarajan, Senior Researcher CDF.

1. Background

The release of methyl isocyanate at a Union Carbide pesticide plant in Bhopal, India in 1984, followed by another serious chemical release at a sister plant in West Virginia, USA, led to communities and industrial workers in both countries demanding information on toxic chemicals being released outside industrial facilities.

In the U.S., in the wake of these events, the Emergency Planning and Community Right-to-Know Act was passed in 1986. Under the Act, industries are required to report the location and quantities of chemicals stored on-site to both state and local governments in order to assist communities to be suitably prepared to respond to chemical spills and other accidents. The US Environment Protection Agency (USEPA) compiles the information collected from various facilities and makes it available to the public in the form of a database referred to as a Toxics Release Inventory (TRI). The availability of such data not only serves to empower communities but also encourages industry to manage and dispose toxic chemicals responsibly. The existence of such a database also provides a benchmark for the comparison of environmental progress over the years. [1]

The process of creating a TRI in India has been slow and perhaps even a non-starter. In 1995, the Research Foundation for Science, Technology and Natural Resource Policy Vs. Union of India and Others, inter-alia filed Writ Petition No. 657 in the Supreme Court. The petition raised concerns about the possible contravention of the Basel Convention, to regulate movements of hazardous waste between countries, and the illegal dumping of hazardous wastes by industrialized counties in India. In response, in October 2003, the Supreme Court passed a far-reaching order that included the preparation of a toxic inventory for the generation of hazardous wastes by the State Pollution Control Boards (SPCBs). The Central Pollution Control Board (CPCB) was charged with compiling these data, and passing a National Toxic Inventory[2] and the SPCBs were tasked with ensuring that industries dealing with hazardous wastes make available data on the *"quantity and nature of hazardous chemicals being used in the plant, water and air emissions and solid wastes generated within the factory premises"*[3].

[1] Paragraph excerpted from the information available on the US EPA website - http://www.epa.gov

[2] SC Order dated 14 October 2003: "70.3. (3) Inventory:- We direct that toxic inventory prepared by SPCBs regarding the generation of hazardous wastes, after its verification by CPCB shall be filed in this Court within 4 months so that order for its conversion into National Toxic Inventory can be passed."

[3] While the SC order does not explicitly call for a TRI, Section 70.11 (11) directs industries to make certain data publicly available, much like the USEPA TRI or the European Pollutant Release and Transfer Register. Such

2. Scope

This report examines the directives set forth by the October 2003 Supreme Court order, and it reviews the current status of implementation of the directives with a specific focus on information dissemination and the creation of a Toxics Release Inventory for India. It also identifies the possible bottlenecks and reasons for non-implementation of a TRI. The methodology used includes an analysis of available literature (reports, existing legislation and case law, newspaper and magazine articles), and interviews conducted with experienced professionals. The issue of accurate information dissemination to the public has been repeatedly discussed within the Indian legislative framework, and steps are being taken towards this goal. In spite of this, this report finds that the process for creation, collation and dissemination of information regarding hazardous wastes in India needs to be strengthened.

3. Supreme Court Order 2003

Writ Petition 675/1995 raised some significant issues not only regarding contravention of the Basel Convention, but also regarding the number of hazardous waste generators in the country, the quantity of hazardous waste generation, the steps being taken to regulate production and disposal of hazardous waste, the status of environmentally sound management systems, and the safeguards in place for India in regard to trade.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was designed, as the name implies, to regulate movement of hazardous waste between countries. While the Convention sought to reduce the movement of hazardous wastes from developed to less developed countries, and to address the issue of indiscriminate dumping of hazardous waste by developed countries, it places other obligations on signatory countries. These include minimizing generation of hazardous waste, ensuring availability of adequate disposal facilities, and requiring environmentally sound and efficient management of waste. These requirements minimize impacts to human health and environment. India, as a signatory nation that has ratified the Basel Convention, is obliged to fulfill the objectives of the Convention.

In response to WP 657/1995, the Supreme Court appointed a High Powered Committee (HPC) under the chairmanship of M.G.K. Menon in 1997 with 14 Terms of Reference. The HPC was to carry out a thorough investigation of the principal issues related

---

information as required from industries dealing with hazardous wastes could constitute a portion of a TRI for India. This issue is discussed further in the paper.

to hazardous waste. A final report was submitted in 2002, and on 14th October 2003, the Supreme Court passed an order with far reaching directives on the management and treatment of hazardous waste.

The Supreme Court issued notices to all the State Governments as well as Central and State Pollution Control Boards to "*identify the problem, identify the extent of such waste, availability of the disposal sites and various other aspects relevant to minimizing the generation, its proper handling and disposal with a view to safeguard the environmental degradation*". It also deemed that the current system had not satisfactorily implemented the Hazardous Waste Rules, 1989 (HW Rules)[4]. In view of the disregard for the HW Rules, the Supreme Court stated that the *"problem is not as much of absence of the Rules as it is of implementation".* The Court agreed with the Menon Committee's conclusion that the *"MOEF made no concerted or consistent efforts which necessarily have to be of a promotional, educational and coordinating nature – to show the implementation of H.W. Rules, 1989*." It acknowledged the non-compliance with the HW Rules by industry and by the other legislative authorities in the country (SCMC Report March 2007).

The Supreme Court constituted a Monitoring Committee with a mandate "*to oversee that the directions of this Court order are implemented in letter and spirit and without any laxity or delay in the matter*" and to ensure timely implementation of the directives of the Court order. The far-reaching directives included a call for the creation of a National Toxics Inventory regarding generation of hazardous wastes, hazardous waste dump sites, and for rehabilitation of hazardous waste dump sites. It also emphasized on the importance of community participation and dissemination of information regarding toxics emissions (see excerpt below).

3.1 SC Order and implications for a TRI

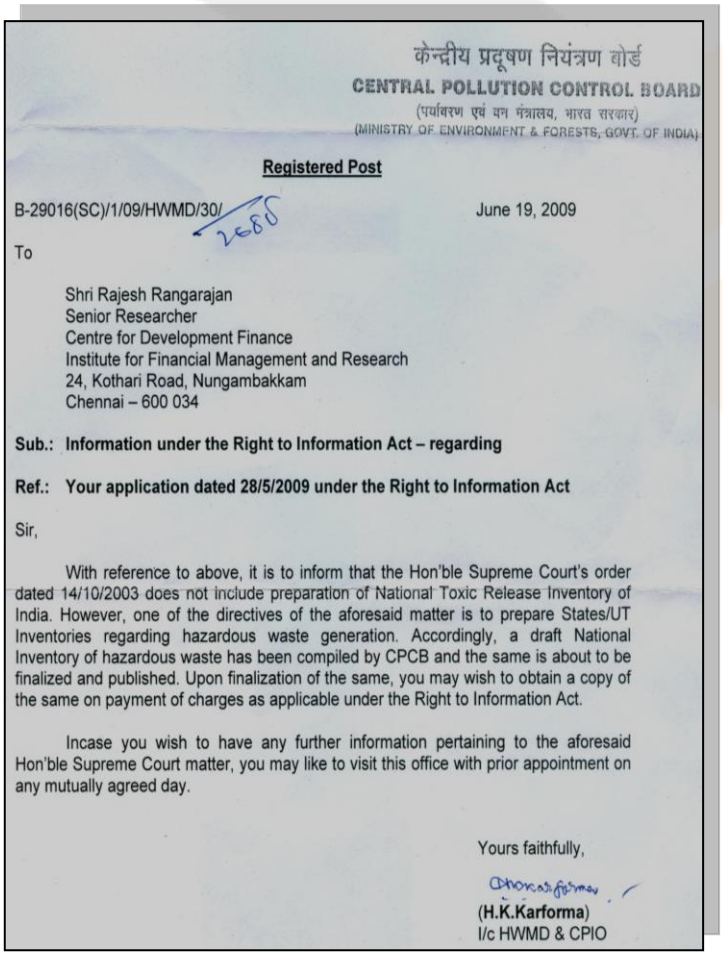
A closer reading of the court order and particularly of Section 70.11 (11) reveals that while not explicitly mentioned, it is abundantly clear that the order calls for a Toxics (Release) Inventory distinct from a hazardous waste inventory. Requiring industries to make information regarding toxic emissions released into the water and air public is in effect a call for a TRI.

[4] The HW Rules have since been amended over the years in 2000 and 2003. They were further amended to Hazardous Materials (Management, Handling and Transboundary) Rules in 2008. India enacted Hazardous Waste Rules in 1989 under the Environment (Protection) Act to regulate hazardous wastes generated within the country, as well as the import and export of such wastes. With the exception of importing material to be reused as raw material, HW Rules bans the import of waste into the country for dumping and disposal.

Below is an excerpt from the above mentioned section and a response from the CPCB to a Right to Information application in this matter. Herein is exposed a fundamental difference in understanding the requirements of the order. The perceived ambiguity in the Court order needs to be urgently addressed. (For more details of the Court order, see Annexure A for a table with directives of the 2003 Supreme Court order.)

Section 70.11 (11) Publication of Toxic Inventory & Community Participation states that:

"SPCBs take steps to ensure that relevant important information on Hazardous Wastes should be displayed on notice boards and newspapers and communicated through radio, television and the Internet. SPCBs should ensure that all industries involved in hazardous chemicals and generating hazardous wastes display online data outside the main factory gate, on quantity and nature of hazardous chemicals being used in the plant, water and air emissions and solid wastes generated within the factory premises. If such data is not made available, the unit should be asked to show cause or even be asked to close down."



केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
(पर्यावरण एवं वन मंत्रालय, भारत सरकार)
(MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

Registered Post

B-29016(SC)/1/09/HWMD/30/2680 June 19, 2009

To

Shri Rajesh Rangarajan
Senior Researcher
Centre for Development Finance
Institute for Financial Management and Research
24, Kothari Road, Nungambakkam
Chennai – 600 034

Sub.: Information under the Right to Information Act – regarding

Ref.: Your application dated 28/5/2009 under the Right to Information Act

Sir,

With reference to above, it is to inform that the Hon'ble Supreme Court's order dated 14/10/2003 does not include preparation of National Toxic Release Inventory of India. However, one of the directives of the aforesaid matter is to prepare States/UT Inventories regarding hazardous waste generation. Accordingly, a draft National Inventory of hazardous waste has been compiled by CPCB and the same is about to be finalized and published. Upon finalization of the same, you may wish to obtain a copy of the same on payment of charges as applicable under the Right to Information Act.

Incase you wish to have any further information pertaining to the aforesaid Hon'ble Supreme Court matter, you may like to visit this office with prior appointment on any mutually agreed day.

Yours faithfully,

(H.K.Karforma)
I/c HWMD & CPIO

4. Dissemination of information and community involvement

In regard to public participation and the dissemination of information, the October 2003 Supreme Court order acknowledged the HPC's suggestions to appoint "wardens for environmental surveillance", allow public access to records under Article 21, display information regarding the nature and quantity of hazardous waste, ensure protection of "whistle-blowers", and to make third-party audits of hazardous wastes standard practice. The Order further specified the role of SPCBs in ensuring that relevant information regarding

hazardous waste generated by industry (the basis for a TRI for India) be exhibited on notice boards and communicated through mass media, including newspapers, radio, television and Internet. Furthermore, information on display boards should include the quantity and nature of hazardous chemicals being used in the plant, and water and air emissions and solid waste generated within the factory property.

Other legislations that support the dissemination of accurate information to the public in regard to hazardous waste include The Factories Act, 1949 and The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996; below is a brief discussion.

Section 41B of The Factories Act, 1949 mandates "*Compulsory disclosure of information by the occupier*". It requires factories involved in a hazardous process to disclose information regarding the risks involved from exposure and handling, including health risks. More specifically, sub-section (3) of 41B states that: *"The occupier of a factory involving a hazardous process shall, with the previous approval of the Chief Inspector, lay down measures for the handling, usage, transportation and storage of hazardous substances inside the factory premises and the disposal of such substances outside the factory premises and publicise them in the manner prescribed among the workers and the general public living in the vicinity."* Sub-section (7) of 41B requires that *"The information furnished…shall include accurate information as to the quantity, specifications and other characteristics of wastes and the manner of their disposal"*. Without doubt, the Factories Act, 1949 supports the Supreme Court's directives with regard to creating public awareness concerning the treatment of hazardous wastes.

Section 13 of the Chemical Accidents (Emergency Planning, Preparedness, and Response Rules, 1996 is titled "*Information to the Public*", and it deals with the provision of information regarding the prevention, preparedness and mitigation of chemical accidents to the public. It requires that, *"The Local Crisis Group [to] assist the Major Accident Hazard installations in the industrial pocket in taking appropriate steps to inform persons likely to be affected by a chemical accident."*

In addition to the Right to Information Act, 2005, these Acts present a formidable collection of regulatory support for the Indian citizens' right to full disclosure of information regarding hazardous waste production and management. They also inform the kind of information necessary to be disseminated to the community. Despite this, the collection and dissemination of information regarding hazardous wastes remains underwhelming.

5. Review of various models of information dissemination

Given the number of small and medium scale industries, the creation of an inclusive and representative TRI for India would not be without challenges, but it is an urgent and important step in the right direction. Below is a brief overview of the emission and pollutant registry systems used in the EU and the US. While a hazardous waste inventory is distinct from a TRI, the methodology used by the Maharashtra Pollution Control Board (MPCB) to create a hazardous waste inventory for the state is noteworthy, and is reviewed below.

5.1 European Pollution Emission Register[5]

European Pollution Emission Register (EPER) is a register of industrial emissions into air and water that is maintained Europe-wide. It requires Member States to produce a report every three years that states the emissions of 50 pollutants if the set threshold values are exceeded. The first reporting year was 2001, and the collated data was made available on the European Environment Agency website in 2004 (http://eper.ec.europe.eu/), providing access to data reported by about 9200 industrial facilities. The information reported in 2004 consisted of data collected for about 12000 industrial facilities. These data are classified by pollutant, industrial sector, air and water, and country on the user friendly website.

5.2 European Pollutant Release and Transfer Register[6]

In 2007, EPER will be succeeded by the European Pollutant Release and Transfer Register (E-PRTR). Additional facilities are included in the E-PRTR, with an annual reporting requirement, as well as a requirement for public participation. Among others, obligation of reporting facilities include additional substances to report, further coverage of releases to land, and releases from diffuse sources. The first set of data under E-PRTR should be available in the fall of 2009.

REACH[7] is a new European Community Regulation that entered into force on 1 June 2007. It deals with the Registration, Evaluation, Authorization, and Restriction of Chemical substances. It aims at improving human health and environmental protection through

[5] Based on information available at European Commission website at http://ec.europa.eu/environment/air/pollutants/stationary/eper/index.htm
[6] Based on information available at European Commission website at http://ec.europa.eu/environment/air/pollutants/stationary/eper/index.htm
[7] Based on information available at the European Commission website at http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm

identifying the intrinsic properties of certain chemicals. While the benefits of REACH will be attained only gradually, the Regulation shifts the responsibility of providing safety and risk information to industry. It also encourages substitution of the most dangerous chemicals with suitable alternatives, where identified. Manufacturers will be required to gather and collate information, and then register it with the European Chemicals Agency (ECHA), Helsinki. ECHA will manage the system, organize evaluation of suspicious chemicals, and operate a separate database accessible to the public. The provisions of REACH have been developed with stakeholder participation, and will be phased-in over a period of 11 years.

5.3 U.S. Environmental Protection Agency TRI[8]

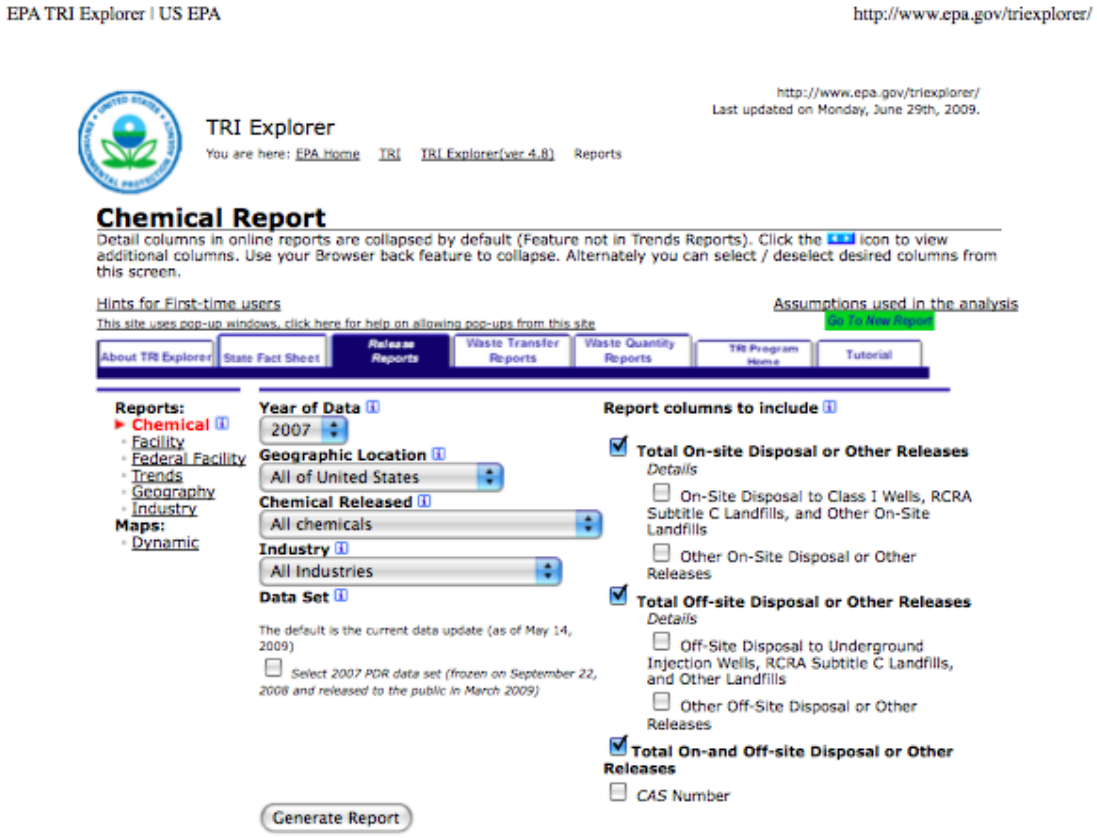
The Toxics Release Inventory (TRI) is an Environmental Protection Agency (EPA) database that contains detailed, nation-wide information on toxic chemical releases and other waste management activities. The data reported is submitted annually to the EPA by certain industry groups as well as federal facilities, covering nearly 650 chemicals and chemical categories that over 23,000 industrial and other facilities manage through disposal or other releases, recycling, energy recovery, or treatment. The data are collected from various industrial sectors, including manufacturing, metal and coal mining, electric utilities, and commercial hazardous waste treatment. The data are available to the public, and in addition to empowering communities, it encourages industries to manage and dispose their toxic chemicals responsibly. It also provides a benchmark to compare environmental progress over the years.

The data submitted by industries is then compiled by the EPA and made available to the public through several online data access tools, including the TRI Explorer and Envirofacts. Other organizations like the non-profit Environmental Defense also make the data available to the public through their own data access tools (Scorecard). The EPA provides industry-specific, chemical-specific, and general TRI guidance for the public and the regulated industries. For reporting purposes, industries and facilities can use TRI-ME, an interactive and user-friendly software tool that works as a guide through the TRI reporting experience.

The current TRI chemical list is available on the US EPA website and currently contains 581 chemicals. Communities can use TRI Explorer to identify chemicals being

[8] Based on the information available on the US EPA website (http://www.epa.gov).

generated and released in their neighborhood. A sample screenshot of TRI Explorer is shown below:



The user can further select the reporting year, enter a pin code, select a state, or choose to generate a report for the entire U.S. for a specific chemical, a core group of chemicals, or a specific chemical group for various industries. For instance, below is a screen shot of the drop down option to select a specific industry.

The report below is generated for the year 2007 for the state of Colorado's Boulder County for all chemicals and all industries.

EPA TRI Explorer Report(COCH) | US EPA http://www.epa.gov/cgi-bin/broker?view=COCH&trilib=TRIQ...

TRI Explorer

You are here: EPA Home TRI TRI Explorer(ver 4.8) Reports

Last updated on Monday, August 17th, 2009.

Releases: Chemical Report

Detail columns are collapsed by default. Click the icon to view additional columns. Use your Browser back feature to collapse.

Data source: 2007 Data Update as of May 14, 2009 See Note Go To New Report

TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for facilities in All Industries, for All Chemicals, Boulder County, Colorado, 2007

Row #	Chemical	Total On-site Disposal or Other Releases	Total Off-site Disposal or Other Releases	Total On- and Off-site Disposal or Other Releases
1	1,4-DIOXANE	1,000	0	1,000
2	ACETONITRILE	7,559	0	7,559
3	BARIUM COMPOUNDS	267,633	.	267,633
4	BENZO(G,H,I)PERYLENE	0	0	0
5	CERTAIN GLYCOL ETHERS	5,108	11	5,119
6	CHROMIUM	0	59	59
7	CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	0	223	223
8	COPPER	0	331	331
9	COPPER COMPOUNDS	.	.	0
10	DICHLOROMETHANE	12,500	.	12,500
11	DIISOCYANATES	5	0	5
12	HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	2,773	0	2,773
13	HYDROGEN FLUORIDE	5,751	0	5,751
14	LEAD	5	4	8
15	LEAD COMPOUNDS	6,616	0	6,616
16	MANGANESE	0	6	6
17	MANGANESE COMPOUNDS	13,744	0	13,744
18	MERCURY COMPOUNDS	1,275	0	1,275
19	METHANOL	20,893	0	20,893
20	METHYL TERT-BUTYL ETHER	8,100	.	8,100
21	N,N-DIMETHYLFORMAMIDE	500	.	500
22	N-HEXANE	10,100	.	10,100
23	N-METHYL-2-PYRROLIDONE	500	.	500
24	NICKEL	10	45	55
25	NICKEL COMPOUNDS	0	172	172
26	NITRATE COMPOUNDS	0	0	0
27	POLYCYCLIC AROMATIC COMPOUNDS	1	0	1
28	TETRACYCLINE HYDROCHLORIDE	.	.	0
29	TOLUENE	1,950	.	1,950
30	ZINC COMPOUNDS	255	1,000	1,255
	Total	**366,277**	**1,851**	**368,128**

Back to top

Export this report to a text file

Create comma-separated values, compatible with spreadsheet and databases.

Download all records

View other report type:

Transfers Off-site for Further Waste Management; or

Quantities of TRI Chemicals in Waste (waste management)

Note: Reporting year (RY) 2007 is the most recent TRI data available. Facilities reporting to TRI were required to submit RY 2007 data to EPA by July 1, 2008. TRI Explorer is using an interim data set that includes revisions submitted to EPA as of May 14, 2009 for the years 1988 to 2007 (i.e., revisions submitted to EPA after this time are not reflected in TRI Explorer reports). TRI data may also be obtained through EPA Envirofacts

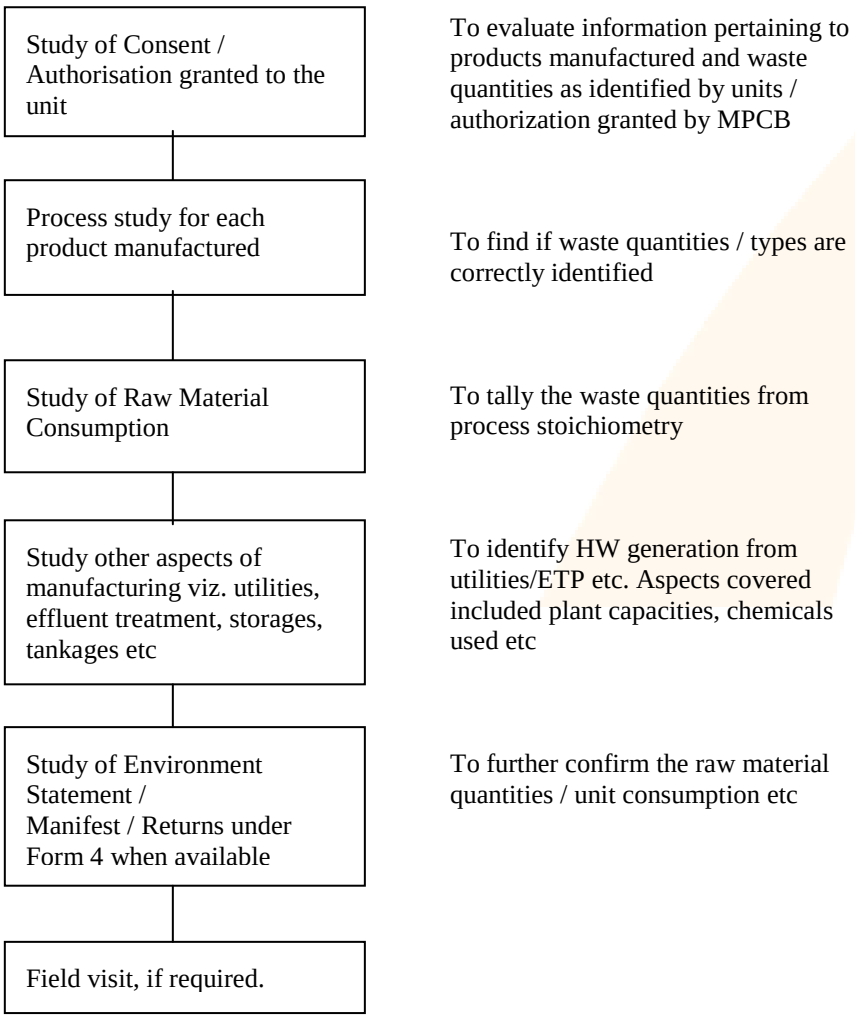
Off-site disposal or other releases include transfers sent to other TRI Facilities that reported the amount as on-site disposal or other release because not all states and/or not all industry sectors are included in this report.

On-site Disposal or Other Releases include Underground Injection to Class I Wells (Section 5.4.1), RCRA Subtitle C Landfills (5.5.1A), Other Landfills (5.5.1B), Fugitive or Non-point Air Emissions (5.1), Stack or Point Air Emissions (5.2), Surface Water Discharges (5.3), Underground Injection to Class II-V Wells (5.4.2), Land Treatment/Application Farming (5.5.2), RCRA Subtitle C Surface Impoundments (5.5.3A), Other Surface Impoundments (5.5.3B), and Other Land Disposal (5.5.4). Off-site Disposal or Other Releases include from Section 6.2 Class I Underground Injection Wells (M81), Class II-V Underground Injection Wells (M82, M71), RCRA Subtitle C Landfills (M65), Other Landfills (M64, M72), Storage Only (M10), Solidification/Stabilization - Metals and Metal Category Compounds only (M41 or M40), Wastewater Treatment (excluding POTWs) - Metals and Metal Category Compounds only (M62 or M61), RCRA Subtitle C Surface Impoundments (M66), Other Surface Impoundments (M67, M63), Land Treatment (M73), Other Land Disposal (M79), Other Off-site Management (M90), Transfers to Waste Broker - Disposal (M94, M91), and Unknown (M99) and, from Section 6.1 Transfers to POTWs (metals and metal category compounds only).

5.4 Maharashtra Pollution Control Board

While a Toxics Release Inventory is yet to be implemented in the country, several SPCBs have successfully addressed the Supreme Court's directive, and have compiled Hazardous Waste inventories for their respective states.[9] A brief examination of the methodology used by MPCB to generate its inventory of hazardous waste generation from industrial sources follows. A similar methodology could be used to compile a TRI for India, which would include additional information pertaining to the exact nature and quantity of toxics being released on site.

Approach Adopted for Preparation of Inventory of HW Generation from Industrial Sources[10]



[9] The CPCB recently published the *National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India*, February 2009. Among other data, this document contains state-wise statistics on status of authorization to various industries, category wise hazardous waste generation (recyclable, land fillable, incinerable), and information on treatment, storage and disposal facilities. It does not, however, contain industry-wise data, or information based on product manufactured (dyes, fertilizer, etc.) or data based on the scale of the industry (red, orange, green/SSI, MSI, LSI).

[10] Available on the MPCB website.

The format used by the MPCB for data collection is given below:

Hazardous Waste Inventory	**SRO**	

Category	**RED / ORANGE / GREEN**	File No.
	LSI / MSI / SSI	

Name of Industry	Plot No.

Consent to:	Operate / Establish / Recommended for Operate	Validity:	

Type of Industry	Adhesives / Chemical / Distillation / Dyes / Metal Finishing / Pharma / Pesticide / Petrochemical / Petroleum / Resin / Textile / Other

Product/s	Quantity
1)	
2)	
3)	
4)	
5)	
6)	
7)	

Trade effluent		m^3/d

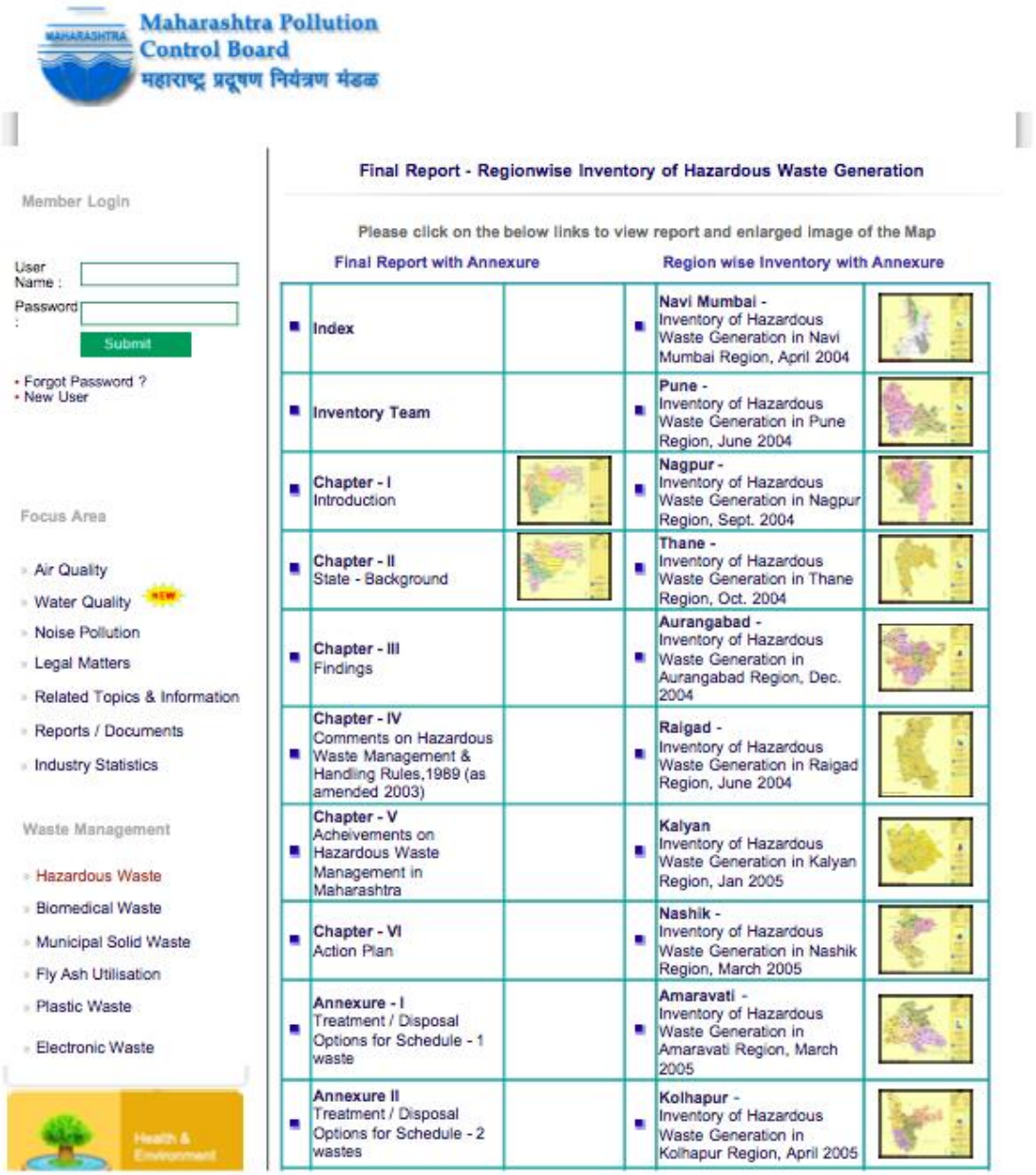
Non Hazardous Waste		

Hazardous Waste						
Category Schedule		Details	Quantity	Disposal		
I	II					
				SLF	INC	RCL
				SLF	INC	RCL
				SLF	INC	RCL
				SLF	INC	RCL
				SLF	INC	RCL
				SLF	INC	RCL

RM	
Details	Quantity
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

Annexure - III Industries

Below is a screen shot of data available on the MPCB website according to different regions. A sample page from the Mumbai region follows.



Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Member Login

User Name :

Password :

Submit

• Forgot Password ?
• New User

Focus Area

- Air Quality
- Water Quality
- Noise Pollution
- Legal Matters
- Related Topics & Information
- Reports / Documents
- Industry Statistics

Waste Management

- Hazardous Waste
- Biomedical Waste
- Municipal Solid Waste
- Fly Ash Utilisation
- Plastic Waste
- Electronic Waste

Health & Environment

Final Report - Regionwise Inventory of Hazardous Waste Generation

Please click on the below links to view report and enlarged image of the Map

Final Report with Annexure		Region wise Inventory with Annexure	
Index		**Navi Mumbai -** Inventory of Hazardous Waste Generation in Navi Mumbai Region, April 2004	
Inventory Team		**Pune -** Inventory of Hazardous Waste Generation in Pune Region, June 2004	
Chapter - I Introduction		**Nagpur -** Inventory of Hazardous Waste Generation in Nagpur Region, Sept. 2004	
Chapter - II State - Background		**Thane -** Inventory of Hazardous Waste Generation in Thane Region, Oct. 2004	
Chapter - III Findings		**Aurangabad -** Inventory of Hazardous Waste Generation in Aurangabad Region, Dec. 2004	
Chapter - IV Comments on Hazardous Waste Management & Handling Rules,1989 (as amended 2003)		**Raigad -** Inventory of Hazardous Waste Generation in Raigad Region, June 2004	
Chapter - V Acheivements on Hazardous Waste Management in Maharashtra		**Kalyan** Inventory of Hazardous Waste Generation in Kalyan Region, Jan 2005	
Chapter - VI Action Plan		**Nashik -** Inventory of Hazardous Waste Generation in Nashik Region, March 2005	
Annexure - I Treatment / Disposal Options for Schedule - 1 waste		**Amaravati -** Inventory of Hazardous Waste Generation in Amaravati Region, March 2005	
Annexure II Treatment / Disposal Options for Schedule - 2 wastes		**Kolhapur -** Inventory of Hazardous Waste Generation in Kolhapur Region, April 2005	

MAHARASHTRA POLLUTION CONTROL BOARD

INVENTORY OF HAZARDOUS WASTE GENERATION IN MUMBAI REGION, APRIL 2005

(ESTIMATES BASED ON INFORMATION AVAILABLE ON RECORD)

Sl. No.	Name and Address of the Unit	Products manufa-ctured	HAZARDOUS WASTE generating Process as per Schedule 1	HW generating streams as per (Please indicate waste stream/ characteristics numbers only)		HW Generation (in MTA) as per		Total Quantity of HW in MTA	Quantity of HW in MTA		
				Sch. 1	Sch. 2	Sch. 1	Sch. 2		Disposal in landfills	Recy-clable	Incine-rable
4288	Amritlal Chemoux Ltd. Rang Udyan , Sitladevi Temple Road, Mahim , Mumbai-400016 CO: BO/ Mumbai-165 /PC-756 dated: 22/11/99. Valid date: 31/8/04	Dyes	Process Residue	26.1		0.72		0.72	0.72		
			ETP Sludge	26.2		3.6		3.6	3.6		
			Process Dust	26.3		0.6		0.6	0.6		
			Discarded Containers	33.3		1200 nos		1200 nos		1200 nos (+)	
			Fuel Tank Sludge	3.3		3		3		3	
4289	Alankar Industries F/8, Shrepal Indl Estate, Oshiwara, S.V. Road, Jogeshwari (W), Mumbai CO:BO/MUMBAI-PC-825 Dt. 27.12.99 VALID UPTO: 31.10.08	Metal Finishing	Acid Residue	12.1		0.6		0.6	0.6 (+)		
			ETP Sludge	12.9		1.2		1.2	1.2		
			Discarded containers	33.3		600 nos		600 nos		600 nos (+)	
4290	Adlabs Film Ltd., Film City Complex, Goregaon (E), Mumbai CO:BO/ROM/MUMBAI-1/R/ CCHWA-9 Dt. 3.1.02 VALID UPTO:31.7.06	Other (Film Processing)	Process Residus Bromide Containg		B26		2.4	2.4	2.4 (+)		
4291	ABB Ltd, Andheri (W)	Electrical Components	ETP Sludge	34.3		6		6	6		
4292	Ashratia Traders Shop No. L.H. 337/C LBS Marg, Kurla Galli No. 3, Chhatrapati Shivaji Kutir Mondal, Mumbai CO:BO/ROM/M-25/O/CCHWA-86 Dt. 10.1.02 VALID UPTO: 31.12.05	Other (Scrap Dealers)	Mixture of Solvents	20.1		2400		2400		2400	
			Spent Catalyst	35.2		300		300		300	

6. Review of current status of implementation

After functioning for three years, the Supreme Court Monitoring Committee (SCMC) chaired by Dr. G. Thyagarajan submitted its final report in November 2006 (here after 2006 Report). In March 2007, two members of the SCMC (Dr. D. B. Boralkar and Dr. Claude Alvares) submitted a separate final report (here after 2007 Report). There were several reasons for filing the separate report including the inability of the two members to attend the final meeting of the SCMC, and differences in opinion regarding certain issues. Both reports are a culmination of the SCMC's monitoring over three years, and they provide an understanding of the events that followed the Supreme Court order of 2003 and the status of compliance in regard to the 29 directives issued. Several reports and articles were also published in leading newspapers and magazines over the last six years. An analysis of these documents and associated literature and interviews with key players, inform the following section of this report.

In the foreword to the November 2006 report, Dr. Thyagarajan asserts that the SCMC has been successful in increasing awareness in industry about the Supreme Court directives, and the consequences of non-compliance. He further states that the momentum generated by

the SCMC would need to be sustained in order to tackle the management of hazardous waste efficiently. He highlights two significant issues that would "influence an enduring solution to the problem of hazardous waste management in the country".

First, Dr. Thyagarajan recommends a five-year performance review of SPCBs/PCCs, stating that the performance of each SPCB varies widely. He attributes this to a variety of factors including

> a) professional leadership, b) independence of thinking and action by the Board, c) exposure to best practices, d) upkeep of knowledge in the relevant subject, e) absence of a periodical review and assessment of the Boards/Committees, f) ability to take advantage of new technological tools for monitoring, especially information technology.

Second, he underscores the SCMC's over-arching concern of the need for a national policy that regulates environmental planning of chemical industries.

The SCMC report gives a state-wise compliance status for each of the directives in the Supreme Court order. Information regarding the status of compliance of the directives is based on Action Taken Reports submitted by SPCBs/PCCs/other organizations. See Annexure B for the status of compliance for Maharashtra and Tamil Nadu.

7. Status review of SC directions[11]

Regarding the display of relevant information on hazardous wastes by industry, the SCMC's 2006 Report states that there is "almost universal compliance with this direction". The report states that the Committee "insisted" on strict interpretation of the word "on-line" in the Supreme Court order, and that several industries have begun to successfully erect electronic displays relaying data concerning ambient air quality within and outside the factory gate. This has been done, for example, by SPIC at Tuticorin & Barauni Refinery in Bihar. Though the SCMC has taken a decision to request all large units to ensure such on-line display of information outside their factory gates, it has yet to issue notices to large units to do the same (2007 Report). Such information to be publicly disclosed by industry should be comprehensive and should include more than just ambient air quality data (such as data regarding the releases of toxics on site, etc.). These data reported by industry could inform a TRI for India.

[11] With a focus on information creation and dissemination

The 2007 Report states that several PCBs do not have an online presence, and most that are online, do not maintain updated websites. Since the MPCB maintains an updated website with comprehensive information regarding hazardous wastes, it has offered to share their information management software system with other SPCBs at no cost. It is, however, unclear whether any SPCBs have taken advantage of MPCB's offer. If adopted, this would be an important step towards actualizing the framework for information on a TRI.

According to the 2007 Report, Local Area Environment Committees (LAEC) in accordance with the 2003 order were set up in 10 cities (2007 Report). MPCB was the first to set up a LEAC at Maharashtra Industrial Development Corporation, Tarapur[12]. According to a member of the SCMC, LEACs serve as a decision-making support system and an additional tool that assists SPCBs to enforce the Supreme Court directives. In addition, LEACs encourage public participation and operate as watchdog organizations. Given the success of the Tarapur LEAC, states like Kerala and Tamil Nadu, and UT of Delhi also established LEACs. Each Committee was comprised of PCB officials, industry representatives, and civil society representatives. LEACs have played a critical role in supporting the efforts of the regulatory agencies, by monitoring the management of hazardous waste. The 2007 report further recommends that all SPCBs/PCCs set up LEACs, and involve the community in the effort to protect the environment.

The 2007 Report states that very little action has been taken towards the preparation and publication of a national inventory of hazardous wastes and dump sites. The SCMC's 2006 Report laments the failure of authorities to quantify hazardous wastes. It states that such an inventory is being completed, and it should make for "reasonably accurate" national inventory of hazardous waste generated. The 2006 Report lists the states that have collected information regarding the number of units producing hazardous wastes, and the quantities produced (see Annexure C).

The 2006 Report recommends that SPCBs/PCCs inventory hazardous wastes once in five years, and also publish inventory reports. It calls for more awareness programs. The 2007 Report goes further to recommend that inventories be made available on SPCB websites, and that reporting should include the quantity and quality of hazardous waste generated and details regarding treatment and disposal of such wastes. The use of the MPCB website (http://mpcb.gov.in) as a model is suggested for other states to follow. The report considers Maharashtra, Gujarat, and Andhra Pradesh to be exemplary for work in this regard.

[12] It subsequently set up another LEAC for the industrial area in Dombivili.

A member of the SCMC stated that efforts to carry out the work relating to hazardous waste management had slowed down significantly since the SCMC dissolved upon submission of the report in 2006.

While all the directives issued by the Supreme Court have not been addressed satisfactorily, some information and awareness has been created since the Supreme Court order. Although a Toxic Release Inventory is yet to be implemented in the country, the CPCB recently published the *National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India*, February 2009.

Most recently, in March 2009, the MoEF issued a *Draft National Hazardous Waste Management Strategy* with three principal objectives: effective management of hazardous waste; development of a strategy for regulatory bodies, generators, recyclers and operators of HW so as to minimize, recycle, treat and dispose hazardous waste in an environmentally sound manner; fulfill India's obligations as a signatory to the Basel Convention, and to facilitate the implementation of the action plan in the National Environment Policy 2006. According to the Strategy document, its principal purpose is to reach a "Zero Disposal of Hazardous Waste" target. This goal is to be met by waste avoidance and minimization, reuse, recovery and recycling of hazardous wastes, and through the use of innovative technology.

8. Focus areas for improvement

The Supreme Court of India recognized the failure of regulatory authorities to efficiently manage and monitor hazardous waste in the country in the 14th October 2003 Supreme Court order. It found information regarding quantities, production, releases and handling of hazardous wastes to be inadequate. It also found enforcement of existing legislation to be lacking. To address these critical problems, the Supreme Court issued 29 directives in its 2003 order, several of which call for the preparation of a National Toxics Inventory and for the compilation of data by industry regarding toxics released on site (TRI), a subject discussed at length in the previous sections.

The benefits of a Toxics Release Inventory that includes region-wise, industry-specific, chemical-specific data, would be beneficial to communities living within reach of hazardous waste manufacturing, storing, and handling facilities. It would also be useful to factory workers in understanding the extent of risk they are subject to, and to enable policy makers for appropriate decision-making. Building on the recently published *National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in*

India, February 2009, using the MPCB methodology mentioned earlier in the report as a starting point, and including chemical-specific data (like that made available by the EPA TRI Explorer), would ensure reasonable content for a TRI for India.

Today, six years after the historic court order, limited progress has been made towards addressing these directives. A significant amount of work still remains to be undertaken. The reasons for non-implementation of the Supreme Court directives on the preparation of a TRI are summarized below.

First, at the institutional level, implementing authorities are strapped for resources, restrained by insufficient manpower and little money dedicated to training and capacity building programs. For example, none of the implementing authorities have a satisfactory online presence, which would serve as a better public interface, and may be considered a basic for improved transparency. Of the states that do have a website, most are poorly maintained, and are not updated often. The website hosted by MPCB has been referred to as a good model to follow by the 2007 Report. Data regarding the management of hazardous wastes should be uploaded to the different SPCB websites. This would support dissemination of information, which is currently not undertaken effectively. These websites need to be user friendly and easily navigable by the public.

While systemic changes that support the better handling of the information from monitoring of emissions and waste may take longer, there are other important changes that can be implemented in the short-term to ensure a TRI becomes a success. An immediate area of focus should be to get ‘static’ display boards set up for all hazardous waste generating units. While several facilities have taken such steps, according to Jayaraman, the information on display is often inadequate and is not beneficial to factory workers or the public. The boards should make comprehensive and appropriate information available to the public. This would form the basis for visualizing the extent of information and data that are available for public scrutiny, and would be a step towards a much needed TRI for India.

Second, the lack of enforcement machinery is another reason for non-implementation. Hazardous Material (Management, Handling and Transboundary) Rules 2008 is the regulatory regime for hazardous waste. Under this regime, the generators of hazardous wastes have to obtain authorization from SPCBs. Based on the guidelines laid down by the CPCB, while granting authorization, SPCBs are supposed to stipulate such conditions required for environmentally sound management of hazardous wastes. Since the dissolution of the SCMC,

there is a need for an enforcement mechanism[13]. As mentioned earlier in this report, LEACs are an additional tool to assist SPCBs in enforcement. LAECs have been formed in some cities, but there is scope to revive the work of LEACs and to create several more. No LEACs are currently functioning, and it appears that in some instances SPCBs have attempted to do away with LEACs that have performed well[14]. Where LEACs have been successful, Supreme Court directives have been carried out more effectively. Ensuring that LEACs are set up and allowed to fulfill their role would strengthen the implementation of the Supreme Court directives. Compliance with existing legislation is only as good as enforcement. One of the next steps to support the monitoring of a TRI would be to revive the LEAC model of monitoring, which presents a community-involved system of checks and balances in sharing information on toxic releases from industries.

Finally, the lack of political will, and the lack of insulation for implementing authorities from political interference, is a major bottleneck in the process of hazardous waste management. Implementing authorities require autonomy from political pressure in order to effectively manage hazardous wastes, and implement its lawful mandate. A 2008 report of the Parliamentary Committee makes certain important observations and recommendations towards this end, and the CPCB would do well to action the recommendations. Further, a recent proposal to create a National Environment Protection Authority (NEPA) has been mooted. A systematic evaluation of the earlier models of enforcement and the learning from it is mandatory if NEPA is expected to improve the environmental governance regime.

In sum, the questions that should guide the future establishment of the TRI are: what are the basic information components (other than regular monitoring information) that need to be shared with civil society to help them better understand the dynamics of industrial environmental releases? What are the methods and incentives needed to engage industry in preparation of a TRI? And, how can a TRI be customized to the Indian context?

[13] 2007 Report
[14] Email correspondence with Jayaraman 22.09.09

9. Annexures

Annexure A: Directives of the Supreme Court in the matter of Writ Petition No. 657 of 1995 dated 14 October 2003.

Sl. No.	Activity	Time Frame	Agency
1	Proposed change in the HW Rules, 1989 as amended in 2003 for compliance	4 months	MoEF
2	Review of list "A" Schedule VIII Items in BASEL Convention other than 29 banned items already include[d] in the HW Rules, 2003	4 months	MoEF
3	Review of waste materials like used edible oil, cow dung, plastic scrap, used PVC in any form, PET bottles etc. which are required to be banned	4 months	MoEF
4	Directions regarding compliance of Recycled Plastics, Manufacture and Usage Rules, 1999 and the Batteries (management and Handling) Rules, 2001	4 weeks	MoEF
5	Directions to be issued regarding collection and transportation of used oil from different sources to be sold and recycled by registered refiners with requisite undertaking from refiners	4 weeks	MoEF/CPCB
6	Closure directions to the units operating without any authorization or in violation of conditions of operations issued under HM Rules, 1989 as amended	3 weeks	SPCBs/PCCs
7	Directions to SPCBs/PCCs bringing to their notice the latest cleaner technology and requiring the said Boards/Committees to ensure compliance thereof by concerned units within the fixed time frame	3 months	CPCB
8	Preparation and issuance of check-list and ensuring its compliance by SPCBs/PCCs	3 months	CPCB
9	Transportation of HWs (Preparation of Guidelines)	3 weeks	CPCB
10	Amendment in the Rules incorporating the principles of Article 9 of the BASEL Convention-Affidavit to be filed	4 months	MoEF
11	Upgradation of Laboratories at Port/Docks/ICDs (Gateways) with quarterly reports	12 months	MoEF/Nodal Ministries
12	Uniform Testing Procedure to be followed by the labs	6 weeks	CPCB
13	Direction regarding display of relevant information on HW by concerned units	4 weeks	SPCBs/PCCs
14	Awareness Programme in Media regarding HWs	8 weeks	MoEF/CPCB
15	Preparation of State/UT Inventories re. HW generation by SPCBs/PCCs	3 months	SPCBs/PCCs
16	Random check-up of the inventories by CPCB	4 months	CPCB
17	Submission of the State/UT Inventories regarding HW generation before this Hon'ble Court for preparation of National Inventory	5 months	CPCB/SPCBs/ PCCs
18	Preparation of States/UT Inventories regarding Waste Dump Sites and Rehabilitation Plan	3 months	SPCBs/PCCs
19	Cross check by the CPCB and evaluation of the Rehabilitation Plan	4 months	CPCB
20	Submission of the said Inventory and Rehabilitation Plan before this Hon'ble Court	5 months	CPCB/SPCBs/ PCCs
21	Preparation and publication of National Inventory of HW generation and HW Dump Sites	7 months	MoEF/CPCB

22	Fixing time frame for implementation of Rehabilitation Plan by SPCBs/PCCs	3 months	SPCBs/PCCs
23	National policy for landfill sites	4 months	MoEF/CPCB
24	Guidelines for proper functioning and upkeep of disposal sites	3 months	CPCB
25	Guidelines of HW Incinerators	8 weeks	MoEF/CPCB
26	Institutional Reforms MoEF/CPCB/SPCBs/PCCs	3 months	MoEF/Nodal Ministries
27	National Policy Document on HW	9 months	MoEF/CPCB
28	CPCB to do research and take up the matter with MoEF for requisite regulatory measures in regard to import of dirty technologies in industries – steps to be taken	3 months	MoEF/CPCB
29	Various directions with regard to ship-breaking	1 month	MoEF/State Maritime Boards/SPCBs

Annexure B: State-wise Action Taken Reports of SPCBs/PCCs/Other Organizations on the Hon'ble Supreme Court's directives in the matter of Writ Petition (Civil) No.657 of

Supreme Court's Direction Number	Supreme Courts Directions	Status of Compliance				
		Complied	Not Complied	Partially complied	Action initiated or under progress	Remarks
(15) Maharashtra Pollution Control Board						
6	Closure directions to the units operating without any authorization or in violation of conditions of operations issued under HW Rules, 1989 as amended.	□		-	-	823 defaulting units were issued closure directions and out of these, directions issued to 716 units revoked after they have complied with the directions issued to them whereas 107 units are still under closure.
13	Direction regarding display of relevant information on HW by concerned units.	□	-			3800 Industries have displayed the boards. Some industries are closed due to various reasons.
15	Preparation of State/UT Inventories HW generation by SPCBs/PCCs.	-	-	-	□	The HW Inventory Report prepared by the Board has been submitted to SCMC on 25.8.2005. The report also has been sent to CPCB, in compliance of the direction of the Hon'ble Supreme Court of India. There are 4571 HW generating units in the State. Total quantity of HW generation is 14,07,480 TPA. Recyclable: 153998 TPA; Incinerable: 627531 TPA; Disposal to TSDF: 625950 TPA.
17	Submission of the State/UT Inventories regarding HW generation before this Hon'ble Court for preparation of National Inventory.	-	-	-	-	-

18	Preparation of States/UT inventories regarding Waste Dump Sites and Rehabilitation Plan.	-	-	-	□	Waste dump sites were found at Tarapur & at Golden Chemicals at Dahisar, Mumbai. The Tarapur dumpsite has been converted into one time SLF and capped. The Golden Chemical waste dump has been cleared and disposed of in TSDF, Taloja. The small illegal dumps in and outside MIDC areas & the wastes in the CETP sumps were also identified and reported in the ATRs submitted to SCMC. Those illegal dumps & CETP sludge and sump wastes were removed by MIDC on direction from MPCB and disposed of in TSDF at Taloja. Action also initiated for identification of illegal dumpsites with the help of NRSA, Hyderabad. Study under progress.
20	Submission of the said Inventory and Rehabilitation Plan before the Hon'ble Court	-	-	-	-	-
22	Fixing time frame for implementation of Rehabilitation Plan by SPCBs/PCCs.	-	-	-	-	-
26	Institutional Reforms Ministry of Environment and Forests/ CPCB/SPCBs/PCCs	-	-	-	-	-
29	Various directions with regard to ship breaking.	-	-	-	-	The ship breaking activities in Maharashtra have been reported from time to time in ATRs submitted to SCMC. MPCB has directed the Mumbai Port Trust not to expand the ship breaking activities further. Maharashtra Maritime Board has been directed not to permit ship breaking activity on any other coastal stretches in Maharashtra.
(24) Tamil Nadu Pollution Control Board						
6	Closure direction to the units operating without any authorization or in violation of conditions of operations issued under HW Rules, 1989 as amended.	□	-	-	-	Closure directions have been issued to defaulting units. So far closure orders have been issued to 28 units which were operating in violation to the provisions of the Hazardous Waste (Management & Handling) Rules, 1989 as amended in 2003. Closure orders issued to 24 units were revoked after compliance.

13	Direction regarding display of relevant information on Hazardous Waste by concerned Units.	□	-	-	-	Directions have been issued to all existing units for erecting display board indicating the hazardous waste handled as well as hazardous wastes used by them. Relevant information was communicated to the units by issuing directions and press releases. Display Board has been installed by all hazardous waste generating units.
15	Preparation of State/UT Inventories regarding HW generation by SPCBs/PCCS.	-	-	-	□	Preliminary Inventorisation of hazardous waste generating units has been finalized and furnished to CPCB. There are 2422 HW generating units in the State. Total quantity of Hazardous waste generation is 1.909 Lakh TPA i.e. Recyclable: 0.310 Lakh TPA; Incinerable: 0.102 Lakh TPA and Disposable: 1.297 Lakh TPA. Further, the data base is being validated based on the suggestion of the SCMC and it is being verified with returns received in Form 4.
17	Submission of the States/UT Inventories regarding HW generation before this Hon'ble Court for preparation of National Inventory	-	-	-	-	
18	Preparation of States/UTs Inventories regarding waste Dump Sites and Rehabilitation Plan.	-	-	-	□	Two HW dumpsites identified. NEERI has been entrusted with the task of preparing report for site remediation and containment in case of TCCL, Ranipet as suggested by SCMC. As far as HLL is concerned, decontamination of the plant and machinery parts that has come in contact with mercury has been completed on 07 Mau 2006. The soil remediation risk study is being carried out by NEERI.
20	Submission of the said Inventory and Rehabilitation Plan before this Hon'ble Court.	-	-	-	-	-
22	Fixing time frame for implementation of Rehabilitation Plan by SPCBs/PCCs	-	-	-	□	Proposals for Assessment of contamination and preparation of remedial plans have been received from various organizations

						NEERI has been entrusted with the task of preparing report for site remediation and containment. NEERI has carried out the field survey and requisite study has been initiated. Hydro-geological study has been carried out by NGRI. NGRI's findings will be incorporated in NEERI report. Security guards have been posted. Specifications for the cover required to cover the dump is awaited from NEERI, SIPCOT and industries Department have been requested to take necessary steps for covering the dump. However, SIPCOT has requested that the cost of covering the dump may be borne by the unit. The present management of the unit has been addressed in this regard.
						Letter has been sent to CPCB to take this contaminated site as model project for south India to carry out decontamination for remediation and rehabilitation activity through World Bank fund. NGRI has furnished a proposal to carry out hydro-geological study upto Palar Riverbed. As far as HLL is concerned, decontamination of the plant and machinery parts that has come in contact with mercury has been completed on 7.5.2006. Authorisation issues under HW Rules. Soil remediation risk study is being carried out by NEERI.
26	Institutional Reforms Ministry of Environment & Forests/ Central Pollution Control Board/SPCBs/ PCCs.	□	-	-	-	Additional Chief Environmental Engineer and an Assistant Engineer have been posted in the section. Work related to authorization of HW generating and handling industries dealt by all technical sections.
29	Various directions with regard to ship breaking.	-	-	-	-	TNPCB has not granted permission for any ship breaking activities.

1995 for Maharashtra and Tamil Nadu (SCMC, Nov 2006)

Annexure C: State-wise Inventory of Hazardous Waste Generating Units and Total Quantity of Hazardous Waste Generation

S. No.	Name of the State/UT	As per Hazardous Waste (Management & Handling) Rules, 2003	
		Number of Units	Quantity in TPA
1	Andhra Pradesh **	1583	495985
2	Arunachal Pradesh****	0	0
3	Assam ***	53	16038
4	Bihar **	34	3967
5	Chhattisgarh ***	152	73001
6	Delhi**	2411	18600
7	Goa **	204	10274
8	Gujarat ***	5739	1276027
9	Haryana **	1458	19240
10	Himachal Pradesh ***	880	33,517[†]
11	Jammu & Kashmir **	147	41353
12	Jharkhand *	352	181227
13	Karnataka ***	1621	71625
14	Kerala ***	530	88794
15	Madhya Pradesh **	1085	1,21,537 [††]
16	Maharashtra **	4571	1407480
17	Manipur ****	0	0
18	Mizoram ****	0	0
19	Meghalaya***	39	29493
20	Nagaland *	3	11
21	Orissa **	257	83915
22	Punjab ***	2189	113248
23	Rajasthan ***	588	3557323
24	Sikkim ****	0	0
25	Tamilnadu **	2422	190924
26	Tripura *	135	264
27	Uttaranchal **	51	7759
28	Uttar Pradesh **	1777	117572
29	West Bengal **	640	236000
30	Andaman & Nicobar****	0	0
31	Chandigarh **	111	836
32	Daman, Diu, D & NH**	598	30862
33	Lakshadweep ****	0	0
34	Pondicherry ***	86	34768

Note: *The data is only based on preliminary inventory completed by the SPCBs/PCCs on HW generating units and the HW generation. Hence, the figures may vary on submission of the final inventory reports by the SPCBs/PCCs.*

* *States/Union Territories which have not completed the inventory as per 2003 amendment.*
** *States/Union Territories which have completed the inventory as per 2003 amendment.*
*** *States/Union Territories which have updated the inventory as per the CPCBs observations after random checks (pertaining to category (2) above.*

**** *States/Union Territories which have reported that there are no HW generating units.*

† *Excluding the Empty Drums: 45079 Nos.*
†† *Excluding empty drums: 207935 Nos and assumed KL waste taken as I Tonne.*

10. References

1. Basel Convention 1989 *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*; Basel, Switzerland
2. CPCB website 2009
   <http://www.cpcb.nic.in/>
3. CPCB 2009 *National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India*; India
4. ENVIS Centre on Hazardous Waste Management.
   < http://www.envis.nic.in/>
5. EPA website 2009
   <http://www.epa.gov/tri/index.htm>
6. European Commission website 2009
   <http://ec.europa.eu/environment/air/pollutants/stationary/eper/index.htm>
   <http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm
7. Interview with Mazgaonkar, Michael. 21 July 2009
8. Interview with Member, Supreme Court Monitoring Committee. 22 July 2009
9. Interview with Jayaraman, Nityanand. 20 July 2009
10. Ministry of Environment and Environment and Forests website 2009
    < http://www.envis.neeri.res.in/index.php>
11. Ministry of Environment and Forests 1996 *The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules*. India.
12. Ministry of Environment and Forests 2008 *Hazardous Materials (Management, Handling and Transboundary) Rules*; India.
13. Ministry of Environment and Forests 2009 *Draft National Hazardous Waste Management Strategy*; India.
14. MPCB website 2009
    < http://mpcb.gov.in/>
15. Indira Gandhi Institute of Development Research. *State of Environment Report: Maharashtra (Final Draft).* Sponsored by MPCB and MoEF.
16. Parikh, Sanjay 2007. *Hazardous Waste: a legal perspective*. Indian Journal of International Law, Vol. 39, 1999
17. Supreme Court Monitoring Committee 2006 *Report of the Supreme Court Monitoring Committee on Management of Hazardous Vol. I & II*; India

18. Supreme Court 2003 *Research Foundation v. Union of India & Others, WP 657/1995(2003.10.14) (Hazardous Wastes)*; Supreme Court of India.

19. Supreme Court 2003 Monitoring Committee 2007 *Report of Dr. D. Boralkar and Dr. Claude Alvares*; India