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Heavy Burden

A Case Study on Lead Waste Imports Into India

Greenpeace International, Toxics Campaign, March 1997

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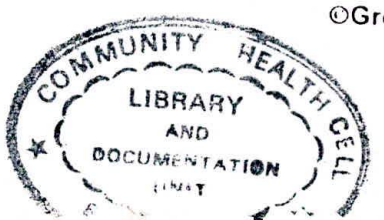
Acknowledgements and thanks to the following:

Angela Stephenson, Basudev, Calcutta Customs, David Santillo, Debi Goenka, DGCIS (Calcutta), Ecologist Asia, Govind Mantry (NAPM Calcutta), Jan Rispens, Kenny Bruno, Kunal Sengupta, Marcelo Furtado, Mithu Mukherjee, Mumbai Customs, Nirmala Karunan, Partho Babu, Prabir Bandhyopadhyay, Pradeep Subramanian, Rachel Kellett, Ravi Agarwal, S. Ganesh, Sabina Voogd, Sarva Shramik Sangh (Thane), Sukhendu Da (NAPM Calcutta), Von Hernandez and West Bengal State Pollution Control Board



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Summary

At the end of this year, the full scope of an international ban on hazardous waste exports to India and other less industrialised countries comes into effect under the Basel Convention on the Transboundary Movements of Hazardous Wastes for the purposes of recycling. India had been a firm supporter of the ban, but since 1995 that support has wavered. Pressure from the waste traffickers and from countries like the U.S.A. and Australia has forced the Indian Government to weaken its commitment to the Basel Ban

Today, the Indian government is under strong pressure from the Supreme and High Courts to resolve the problems of hazardous waste and imports into India. Despite the fact that the highest authorities are involved in the process to effect change, the entry of hazardous waste into the country continues unabated.

The industrialised nations belonging to the Organisation for Economic Cooperation and Development (OECD)[1], all of which -- with the exception of U.S.A. -- are signatories to the Basel Convention, have commited and are legally bound to ban the export of hazardous waste to non-OECD countries. Yet, many of the OECD countries are exploiting the chinks in India's regulatory and monitoring regime to rid themselves of toxic their waste.

India is unable to ebb the tide of hazardous waste imports. The primary responsibility, therefore, should be placed firmly on the shoulders of the developed countries to deal with their own hazardous waste. However, India does have a part to play by categorically rejecting the import of hazardous wastes and ratifying the Basel Ban.

Waste moves for economic reasons, not for environmental ones. Toxic waste follows the path of least resistance, moving towards areas, like India, with the least possible processing and disposal costs and little political and economic clout to resist.

Hazardous wastes, such as lead and battery wastes, have well documented effects on human and environmental health. Lead is one of the most pervasive and toxic of all environmental contaminants. Children are particularly vulnerable to the toxic effects of lead, especially in high levels.

To illustrate the problem of hazardous waste trade for India, Greenpeace has researched the operations of one of the country's leading private sector secondary lead smelting operations, Indian Lead Ltd. This report reveals that industrialised countries continue to export hazardous wastes to India with utter disregard for India's attempts to protect itself from such trade. Further, we document that such imports are a serious threat to the environment of India and the health of its people.

Heavy Burden makes the case that unless India ratifies the Basel Ban and returns to its position as a leading proponent of the Ban in the international arena, any effort that the government may make nationally to clampdown on waste imports is unlikely to serve as a sufficient deterrent to the international waste traffickers.

The report is based on collated import data, visits to Indian Lead Ltd's facilities in Thane, Maharashtra, and Rajerhat-Gopalpur, West Bengal, laboratory analyses of

waste and soil samples taken at those facilities, and interviews with government officials and workers.

Among the findings of this report are:

- Lead acid battery, lead waste and scrap from South Korea, the U.S.A., Australia and several other industrialised countries are entering India in violation of Indian law and with apparent disregard for the authority of the Delhi High Court which in April 1996 issued an order prohibiting hazardous waste imports into the country.

  ⇒ More than 38 companies, none of which have proper licenses, have imported lead and battery wastes between April 1996 and February 1997.

  ⇒ Over 15,000 MT of lead and battery waste came into India from 27 countries between April 1996 and February 1997, a period during which the Delhi High Court ban on waste imports was in place. (See Appendix 1, Table1) Between April 1995 and March 1996, lead and battery scrap imports totalled more than 7000 MT[2] -- the figure has more than doubled in the last year.

  ⇒ Imports from the U.S.A, Australia, South Korea, Germany, the Netherlands, France, Japan and the UK account for some 67 percent of the total imports of lead wastes into India. This is a conservative figure because it does not include transhipments[3] from those same countries through ports like Singapore, Sri Lanka and the United Arab Emirates (UAE).

- Environmental and working conditions at Indian Lead's facilities are hazardous. Workers and residents, especially children, in the vicinity are exposed to significantly high levels of lead and cadmium which could manifest itself as health disorders.

  ⇒ Wastewaters from Indian Lead's Rajerhat-Gopalpur plant contain 615 times more lead than is permissible under Indian regulations. Cadmium and zinc levels were four and 10 times higher respectively than permissible levels.

  ⇒ Sediment samples also show elevated levels of the same three metals, indicating long-term discharge of contaminated waste waters.

  ⇒ Final waste from Indian Lead's Thane plant are simply dumped on private land about 14 km from the smelter. Workers there break up slag blocks with no protective clothing. Children were seen panning for metal, also without protective gear.

- Indian Lead Ltd is commonly cited as one of the best facilities, since it has invested in pollution control devices. Yet the sampling data indicate the potential threats posed by these facilities to the environment and human health. The OECD countries, which would not permit such a unit to function in their own backyards on environmental grounds, are knowingly sending their lead and battery wastes and scrap to facilities with inadequate standards. This is a clear case of double standards.

A: Hazardous Waste Exports: The trend today

"You industrialised countries have been asking us to do many things for the global good - stop cutting down our forests, stop using your CFCs. Now we are asking you to do something for the global good: keep your own waste."

A. Bhattacharja, Head of the Indian delegation, First Conference of Parties to the Basel Convention, Uruguay, November 1992[4]

"Due to strict environmental regulations, U.S. secondary smelters generally have higher processing costs than secondary smelters in other countries. . .foreign secondary smelters can pay higher prices, relative to U.S. smelters."

United States Environmental Protection Agency[5]

In 1986, only three countries in the world had laws prohibiting hazardous waste imports. The figure had risen to 33 by 1988, and to 88 by 1992. Today the number of countries with regional or national waste import bans is well over a hundred.[6] With Africa[7], the Caribbean,[8] Central America[9] and the Pacific countries[10] having shut their doors to toxic wastes, international waste traffickers are increasingly targeting Asia[11]. Asia remains the last dumping ground for international waste traders

According to the United Nations Environment Programme (UNEP), 400 million metric tonnes (MT) or more of hazardous waste was generated around the world in 1990. Of this, 98 percent came from the then 24 member states of the OECD[12]. The generation of such wastes continues unabated. In the USA, for example, annual hazardous waste volumes leapt from 9.1 million MT in 1970 to 241 million MT in 1990.[13]

However, even as hazardous waste generation is increasing, the options for disposing these wastes have reduced. Relatively stringent environmental regulations in some OECD countries has pushed up costs of disposal of hazardous wastes for waste generators there. According to the US Bureau of Mines, "Waste disposal is becoming a very significant expense and it is often a difficult task to perform."[14]

It is hardly surprising that waste generators in these countries find it cheaper to parcel off their hazardous wastes in shipments to developing countries where enforcement of environmental regulations is lax. In short: poorer nations are seen as accessible and inexpensive landfills that compare favourably in economic terms to the ones closer to home.

To provide a semblance of legitimacy to such hazardous shipments, waste traders package them as recyclable materials for further processing. By using the phrase "recycling for further use," waste traffickers are defining waste as a freely tradable commodity. This creates a loophole through which noxious substances can enter countries unregulated. The reality is that when one recycles a hazard, one is left with a hazard.

Greenpeace research in India and Southeast Asia has documented that the facilities which recover material from such toxic wastes are highly polluting and hazardous to workers and nearby residents. Such operations would not be tolerated in the Northern countries that export these wastes.

Clearly, wastes move for economic reasons, not environmental ones, following the path of least resistance where disposal and processing costs can be subsidised at the cost of worker, community and environmental health.

The international trade in lead wastes illustrates the problem well.

Lead is one of the most strictly regulated substances in industrialised countries. Because of lead's well-known ability to harm the development of young children, leaded petrol and paint are banned or severely restricted in most industrialised countries. Many lead battery recycling plants in the USA have closed over the last 12 years and the secondary lead industry has shifted out en masse. According to the Journal of Metals, by 1987 "the inability to economically install emission controls and purchase liability insurance forced the closures of over half the lead smelters in North America." [15]

The few plants left in the UK are threatening to close. They claim they cannot afford the costs of complying with tough environmental regulations on lead.[16] One of two major secondary lead smelters in the UK, H. J. Enthoven in Derbyshire, recently spent 10 million pounds sterling (Rs. 560 million) updating its smelter; 40 percent of this was invested in pollution control.[17]

If Indian importers can pay $180 per MT for lead battery waste, double the average price in Europe,[18] it is because they can externalise the costs during the production process.

B: The Basel Convention: India's position

Until recently, the Indian government was a strong opponent of the international trade in hazardous wastes. Nationally, under the Hazardous Wastes (Management and Handling) Rules, 1989, the Government had legislated to prevent the import of hazardous wastes by Indian companies for final dumping. The import of hazardous wastes "for processing or re-use as raw material" was allowed, but only by companies that had a valid license to import.[19]

Internationally, in its efforts to protect its citizens from "garbage imperialism," India's delegation to the 1992 meeting of the UN's Basel Convention appealed passionately to the Group of 77 (G-77) nations to denounce the flow of hazardous wastes from the rich countries to the less-industrialised countries.

In March 1994, at the Second Basel Conference of Parties, G-77 countries, including India, successfully pushed the parties to the Convention to agree to a ban. The consensus agreement banned exports from OECD to non-OECD countries of hazardous wastes meant for final disposal effective immediately. The agreement also included a committment by all parties to effect a ban on shipments of hazardous waste destined to non-OECD countries for recycling - known as the Basel Ban (Ban); this is to enter into force January 1, 1998.

By September 1995, in the lead up to the Third Conference of Parties, India's stance began to change. Opponents of the Ban, including waste traders, developed countries like the U.S.A. and Australia, and importers in developing countries started pushing India and a few other Asian governments to break ranks with the G-77 and back out of the Ban.

Just weeks before the Third Conference of Parties, the Indian Government announced that it was reconsidering the Basel Ban and might continue to allow hazardous waste imports for recycling into India. An article in a national daily *The Pioneer* quotes a senior Environment Ministry official: "We will see how the situation develops, but we definitely feel that environmentally controlled recycling is not hazardous."[20] Subsequently, officials at India's Ministry of Environment and Forests (MOEF) confirmed that U.S.A and Australian trade representatives had personally urged them to drop their support for the Ban.[21] The lobby efforts met with success.

At the Third Conference of Parties, inspite of India's wavering stance, proponents of the Basel Ban were successful in formally incorporating the committment to ban exports of hazardous waste for the purposes of recycling in the form of an amendment to the Basel Convention. India, which is also a signatory to the Ban, is now obligated to ratify the Ban and implement its provisions into national law.

The Basel Ban marks one of the most significant environmental victories of the decade and India deserves credit for helping achieve it.

In 1997, Greenpeace had meetings with several officials at the MOEF. It was apparent that the MOEF continue to be under pressure from the OECD countries, from within the government and industry lobbies to once again soften its stand against waste imports. Some officials expressed the need for India to deal with its own generation of hazardous wastes before addressing the problem of imports. While Greenpeace certainly appreciates the urgent need for India to reduce its own generation of hazardous wastes, that cannot be an excuse for exacerbating the problem by continuing importation of wastes from abroad. The Government must realise that the issues of domestic hazardous wastes and waste imports should be dealt with simultaneously.

C: The importance of the Basel Ban

The Ban, which was endorsed by all Parties in September 1995, stands as an impressive legal landmark for several reasons. For so long, unscrupulous business interests in rich nations have exploited the less stringent regulations and weak infrastructure in poor countries to avoid the responsibility of minimising their wastes at home. The Basel Ban is the developing world's answer to this disturbing trend, a repudiation of the widespread dumping by developed countries of hazardous wastes. Backed mainly by the G-77 developing countries and China, the Ban not only represented a major victory for environment and justice but was also an overwhelming expression of solidarity among the non-OECD countries.

- It is legally binding: The Basel Ban was adopted as a legally binding instrument with criminal penalties for violators. This is particularly significant in the present political climate of deregulation and voluntary agreements.

- Defeat of the moneyed interests: The Ban was passed despite the staunch opposition of powerful business lobbies, including the International Chamber of Commerce, the U.S.A, the UK and Australia. These opponents stood to profit tremendously if the huge economic liability for toxic waste could be cheaply exported.

- Recognised recycling of hazardous waste as a problem: The Ban closed the recycling loophole through which more than 90 percent of exported hazardous waste was by then flowing.[22] It recognised that recycling of hazardous wastes represents a perpetuation of our waste crisis, not a solution.

- Instrument for Clean Production: By forcing hazardous waste generators to deal with their own wastes, the Ban has provided the much needed disincentive to discourage wasteful and dirty production.

D: Attempts to undermine the Basel Ban

The Basel Ban is essentially an OECD export ban without exceptions for all hazardous waste listed and defined by the Convention. The burden of implementing the Ban rests primarily on the industrialised nations exporting wastes to poorer states which often do not have the infrastructure to test, identify and classify wastes.

To implement the Ban, Parties to the Convention have tasked a Technical Working Group (TWG) to define wastes which are subject to the Ban. To date, the TWG has recommended more than 54 categories of wastes, including lead-acid batteries, lead ash and scrap, which will fall under the ban.

Although the Basel Ban has been agreed upon, there are still efforts to undermine its effectiveness. These efforts have focused on two main areas: the use of bilateral agreements to circumvent the ban, and redefining certain hazardous waste streams to fall outside the scope of the ban.

In past meetings of the Convention, industry representatives have sought to exempt lead waste, particularly used car batteries from the ban list. They argued that issues of workplace health and safety, and poor management should not be allowed to dictate the status of wastes.

This argument makes a mockery of the very reason the Basel Ban was adopted -- to force waste generators to deal with their own wastes and to discourage them from exporting it to unsuspecting, ill-equipped nations. Such arguments only serve to highlight the industry's disregard and contempt for the will of the majority of countries as manifested in the Basel Convention process itself.

In July 1996, the Indian Government came up with a directive freeing the import of various types of waste such as lead battery plates scrap and lugs (battery terminals), while instating import restrictions on lead dross, wastes, and whole, broken, drained and undrained lead batteries. The logic of this definition is elusive; internationally lead battery plates are considered hazardous, in the same league as scrap batteries. In fact, because they are less contained, the potential risk due to

exposure to lead and other heavy metal contaminants is higher during handling, transportation and storage.

E: Judicial Action

As with other issues of political and environmental concern in India, it is the courts who are provoking the Government to confront the issue of hazardous waste. The future of the Basel Convention in India, therefore, depends largely on the processes which the ongoing court cases on hazardous waste imports to India have unleashed. With the two pending cases, the Indian Government has been forced to confront the problem of hazardous waste generation and imports and set procedures in place for effective regulation.

A September 1995 writ petition in the Supreme Court of India challenges the government and a Bhopal-based waste importer Bharat Zinc[23] on the "illegal and unconstitutional decision of the MOEF permitting imports of toxic wastes in India under the cover of recycling knowing fully well that the real purpose of such export to developing countries is to make India a dumping ground for toxic wastes."[24]

Simultaneously, in April 1996, the New Delhi High Court banned the import of toxic waste into the country. Although the case was initiated by a waste importer against the Customs, which had retained the importer's incoming shipment of lead waste, the Court passed an injunction against hazardous waste imports based on the intervention of Non-Governmental Organisations (NGOs) Srishti and WWF-India.[25] On April 10, 1996, Justice Anil Dev Singh said: "The country cannot be made a dumping ground for toxic wastes generated in other countries."[26] The Court also ordered the Indian Government to respond in this case.

According to the import data collated by Greenpeace, this High Court injunction does not seem to have had any effect on hazardous waste imports. (see Appendix 1, Table 1)[27]

The waste trade lobby has pulled all stops to influence government policy. Their goal: to keep hazardous wastes flowing freely into India. Their argument: metal containing wastes are important to India's development . Organised-sector industry representatives admit that the reason they need to import is because the local collection system for lead and battery waste is weak.[28] As the Supreme Court proceedings revealed, there is no documentation of the hazardous wastes, including lead wastes, generated within the country.

F: What is Lead Waste

Among the several forms that lead scrap takes, the most commonly traded categories are used lead acid batteries and battery scrap. Batteries, which are used in automobiles and motorised vehicles including trains and ships, contain a significant proportion (more than 50% of the total battery weight[29]) of lead in addition to sulphuric acid and the hard rubber, polypropylene or PVC cases that contain them. The lead in batteries occurs in the form of terminals and lugs, and plates coated with lead oxides.

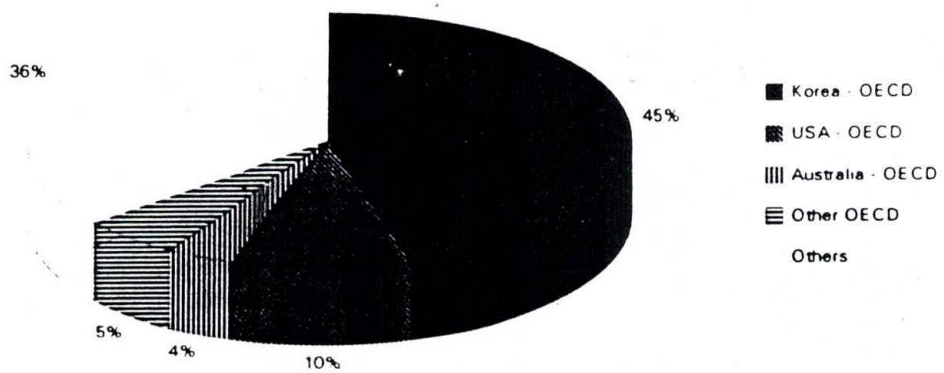
Lead ash, slag, residues and dross, all of which are by-products of the lead smelting and refining operations, make up nearly 20 percent[30] of the hazardous scrap used by recyclers. Besides containing high levels of lead, itself a neurotoxin, these wastes are usually contaminated with other toxic compounds of cadmium, antimony and arsenic.

G: Lead Waste exports to India

Greenpeace investigation of Indian ports and customs data revealed that it is business-as-usual for OECD exporters. Large quantities of lead and battery waste still flood the country to feed the country's dirty and sham recycling operations. Partial import data for the period between April 1996 and February 1997 show that over 15,000 MT of hazardous waste came into India from 27 countries. This is almost double the amount (7,176.4 MT) for the last year. Despite the High Court order,[31] the Government has not been able to stop the exporters from shipping hazardous wastes to India. (See Appendix 1, Table 1)

Between April 1996 and February 1997, exports to India of lead and battery wastes by OECD countries including the USA, Australia, South Korea, Germany, the Netherlands, France, Japan and the UK amount to more than 9,864 MT - nearly 65 percent of the total lead waste imports by India during that period. Between April 1996 and January 1997, South Korea exported more than 7,000 MT of lead ash, dross and scrap; the USA, over 1,499 MT of mainly lead residues and dross; Australia over 565 MT of predominantly lead waste and scrap; Japan exported over 238 MT of lead scrap; France more than 235 MT of drained battery and battery plate scrap; Germany 161 MT of lead scrap and residues; UK over 93 MT of lead residue; the Netherlands in excess of 43 MT of lead scrap and battery plates; and other countries in the European Union shipped more than 24 MT of lead scrap.(See Appendix 1, Table 2)

Exports of hazardous lead and battery waste to India between April 1996 - February 1997. (Source: Informant, Calcutta Customs, Directorate General of Commercial Intelligence and Statistics.)



This is a conservative estimate because figures for all the ports were not available. Since Singapore houses the London Metal Exchange warehouse, shipments from

OECD countries could well be coming in as transhipment exports via Singapore. According to the Mumbai Customs, Sri Lanka is also a potential transhipment point, as is UAE. Import data of lead and battery waste consignments from Singapore, Sri Lanka and UAE alone totalled more than 3,009 MT, lending credence to this hypothesis. (See Appendix 1 Table 3)

H: The Lead Industry in India

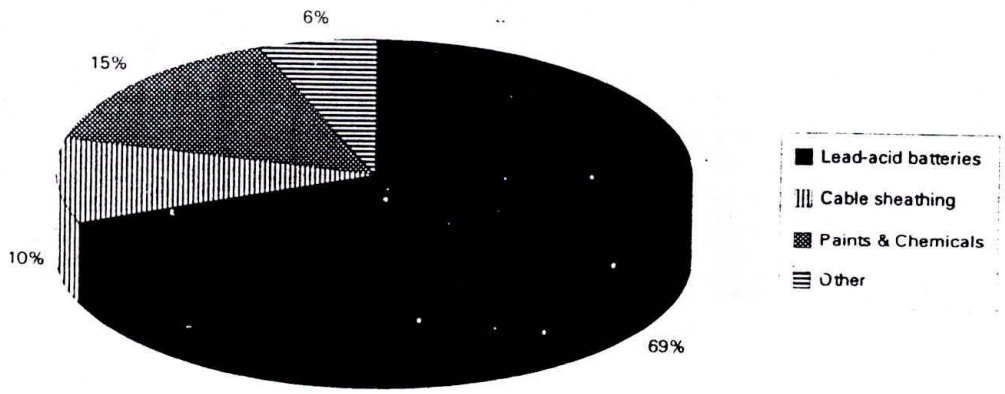
The growth of the Indian lead industry is a tale of haphazard and unplanned development. Against an installed capacity of 109,000 MT, including primary and secondary smelters in the organised sector, production of lead approximated 63,699 MT in 1994-95, according to the India Lead Zinc Information Centre. An additional 21,000 MT of metallic lead was imported that year. Industry sources peg the estimated demand for 1994-95 at 97,000 MT. However, this figure only attributes 8000 MT -- a very conservative amount -- to the backyard smelter sector.

The primary lead resources in the country are used solely by the Government-owned Hindustan Zinc Ltd., Rajasthan, to produce more than a third of the national demand. Except for a handful of larger private sector secondary smelters such as the Mumbai-based Indian Lead Ltd and Associated Pigments Ltd based in Calcutta, the lead supply industry is liberally peppered with small and backyard smelters.

The secondary industry feeds on a wide variety of imported and domestically generated waste and scrap material including battery scrap, sheathing cables, slag, ash, dross and residue. The recovered lead is ploughed back into the manufacturing sector for lead acid batteries, solder wire, cable sheathing, PVC, and for nuclear and defence applications.

The driving force behind this industry is the automobile battery sector, which consumes nearly 70 percent of the production.[32] The rapid growth in the automobile sector since 1993 is expected to put the annual growth of lead demand on a double-digit trajectory. Demand can increase by "about 10 percent every year."[33]

Sectoral consumption of lead in Indian Industry
Source: India Lead Zinc Information Centre, New Delhi



Neither the collection nor the processing of battery waste is anywhere close to being organised, efficient or environmentally sound. Smelters in the organised and unorganised sector have a track record of environmental negligence and mismanagement in India. In 1994, several cattle deaths due to lead poisoning in a village near New Delhi were traced to 23 unlicensed lead smelting units in the vicinity.[34]

Studies analysing ambient contamination around organised medium- to large-size smelters were equally bad. The early 1990s saw an upswell of protest by residents living close to lead smelters (Indian Lead Ltd and an alloy manufacturing unit near Talasari) in two locations in Thane district in the Western state of Maharashtra.[35]

In the absence of legislation to promote efficient retrieval of hazardous wastes like used batteries, battery manufacturers in the country have washed their hands of the responsibility of dealing with their products once they leave their factory premises.

While companies like Indian Lead complain that they are forced to import waste because domestic battery and lead waste collection is inefficient,[36] an important question remains unanswered: Could the lead demand be fulfilled by better collection systems in place?

I: Indian Lead Ltd

Following up on its September 1995 investigation of toxic zinc ash exported by German and Dutch companies to a Bharat Zinc, a dirty recycling operation in Bhopal, Greenpeace has recently conducted a similar investigation into the operations of Indian Lead Ltd.

Indian Lead, a listed company with a Rs. 679.2 million turnover, operates two secondary lead smelters, one each in Rajerhat-Gopalpur, near Calcutta, and at Thane, near Mumbai. The rotary smelting furnaces at both plants are omnivorous in their diet of feedstock, which includes lead concentrates, and wastes and scrap like lead-acid battery plates, battery lugs and lead ash or dross.

The processing technology is referred to as "ferrosilicate slag" technology. A silica-coke-iron millscale charge added to the furnace during the smelting process results in a black, iron-rich slag. The impure lead extracted from the smelter is conveyed to a refiner. The refining process yields the pure lead which is cast in the form of ingots. Waste is generated in the form of slag, ash and dross.

A bulk of the raw material is imported. Between April 1996 and February 1997, Indian Lead imported 1,949.5 MT of lead waste, residues, scrap, battery plates and whole drained batteries. Out of this amount, the USA alone exported 626.07 MT. Exports from the USA to Indian Lead contravenes the Basel Convention which clearly prohibits trade with non-party states like the USA. (See Appendix 1, Table 4)

J: Site visits and affected communities

In March 1997, Greenpeace visited the Indian Lead plants near Calcutta and at Thane, near Mumbai.

1. Calcutta Plant

The plant is located in a largely residential area in the outskirts of Calcutta city. Because it is situated close to the airport, the factory works with an 18-meter high chimney stack against the specified minimum of 30 meters.[37]

Fifteen-foot high piles of slag and other process waste are openly dumped in the factory's backyard. One company spokesperson insisted that most of the piles would dwindle as they are mixed with fresh feedstock and reintroduced into the furnace for further recovery. However, a long-time resident in the area mentioned that the pile-up was "about five years old."

This is cause for alarm because post-refining rejects often contain toxic levels of cadmium, copper and chromium, which could either leach into the environment or escape into the air in the form of dust to affect workers and nearby residents. Greenpeace analysis of the solid waste, which was found heaped in piles within the factory, revealed that it contained 3.18 percent zinc and high levels of lead (5.82 percent) in available form, which means that it leaches out more easily into the environment. (See Appendix 2, Sample No. 3)

A 1990 study of the soil, leaf dust and pond sediments in the vicinity of the Indian Lead factory by the School of Environmental Studies of the Jadavpur University in Calcutta reported that "most of the soils and sediments are contaminated."[38] High levels of arsenic, lead, zinc and cadmium were detected in a soil sample taken from the yard of a nearby house.

2. Thane Plant

Thane is a heavily industrialised and thickly populated area close to Mumbai. The Indian Lead smelter is surrounded by housing colonies and other residences. The nearest large colony is located less than 300 meters from the factory. In the early 1990s, residents living near the factory began complaining of the pollution from the factory.[39]

A subsequent study conducted by the Environment Assessment Division of the Mumbai-based Bhabha Atomic Research Centre (BARC) found that mean lead and cadmium levels in the surface soil samples taken varied between 6000 micrograms/gram of lead near the smelter to 500 micrograms/gram 1.5 kilometre away.[40] The corresponding concentrations of cadmium were 13.4 and 1.24 micrograms/gram.

According to Dr. David Santillo, scientist at Greenpeace Research Laboratories at the University of Exeter in the UK , the presence of such high levels of lead and cadmium in the soil represents a significant source of intake of the contaminants by residents in the vicinity. Children playing in the grounds are particularly vulnerable to the contamination soil, both through inhalation and direct contact.

A range of investigations have found that blood lead levels can increase by 3 to 7 micrograms/decilitre for every 1000 parts per million increase in soil or dust lead concentration.[41]

The BARC study also reported high levels of atmospheric lead and blood lead in children. Ambient lead in air in the residential colony nearest to the smelter was found to average 16.3 micrograms/m^3, nearly 11 times higher than the "National Ambient Air Quality Standards" (24-hour average of 1.5 micrograms/m^3) for industrial areas set by the Central Pollution Control Board.[42] Blood lead levels were found to be as high as 23.4 micrograms/decilitre among children living close to the smelter. Blood lead levels as low as 10 micrograms/decilitre have been associated with impaired neurobehavioural and cognitive development.[43] The lead blood levels among children in lead waste exporting countries like Australia are sought to be maintained below 10 microgram/decilitre.[44]

K: Waste disposal

A major problem with secondary lead smelting operations which use hazardous waste as their raw material is that the final residue remains toxic.

The final waste from the Thane factory's operations is reportedly in the form of ferrosilicate slag. Our investigations led us to a dumpsite about 14 kilometres from the plant where Indian Lead's lead-smelter waste, some of it still smouldering, was haphazardly and openly dumped. Sources knowledgeable about the company revealed that Indian Lead had entered a contractual agreement with the landowner to use his land as a dumpsite. A few workers at the dumpsite were engaged in manually breaking the slag blocks with no protective clothing, not even shoes. We saw two children in their pre-teens who were panning to recover metal.

L: Worker Safety at Indian Lead Ltd

Altogether, the two Indian Lead factories employ about 250 workers in addition to contract workers who are employed periodically. No gloves, suits or masks were in evidence among the workers. In the Thane plant, some of the workers wore helmets. However, employees contacted by Greenpeace at a separate meeting indicated that protective gear was provided only when "outsiders come to inspect the factory."

Indian Lead employees working near the furnace and engaged in furnace loading or tapping operations constantly inhale toxic fumes and flue dust. When asked about the working conditions, one employee half-proudly remarked, "Of course, it's dangerous work. There's still a lot of dust and lead-laden air in the area."[45]

Several of the workers told Greenpeace that they suffered from general malaise, loss of appetite and an inability to move their limbs for a while after resting. These symptoms are consistent with lead poisoning. The workers also refuted the company's claims that worker health was constantly monitored. "Even when medical checks are done, they rarely show us the results," said one employee.[46]

A copy of the results of a company-sponsored medical test of one of the employees turned out to be a regular blood test. This report had no specific tests for lead levels in blood or urine.[47]

Indian Lead does not have a license to import hazardous waste which is on the restricted list (such as whole batteries drained or undrained), and yet has imported close to 400 MT of drained battery scrap between September and October, 1996.[48] According to one employee, these batteries are manually broken by contracted workers, again without protective gear. The employee, who had been assigned to this job last year, recollects: "A cloth around your face is not enough while breaking batteries; I remember I used to get this oily sweet taste in my mouth. I could never wash it out and whatever it was affected my appetite."[49]

In contrast, lead smelter workers in Australia and the USA are required to wear full-body protective gear to shield themselves from hazardous fumes and burning liquids. Moreover, lead processing and recycling operations in the developed world are highly mechanised operations requiring very minimal worker contact with the hazardous materials. All key stages of the recycling operation: battery breaking, acid neutralisation, smelting, refining and casting involve the use of machines.

Hazardous waste processing operations in the less-industrialised countries like India, on the other hand, have the competitive advantage of lax environmental and worker safety norms. This double standard continues to be exploited by lead acid battery brokers who constantly seek out buyers who can afford to pay the highest price for their toxic wastes.

Last year, Australian Refined Alloys (ARA), a leading processor of lead wastes, admitted to Greenpeace that although their company has the capacity to recycle all of Australia's batteries, a significant amount of the country's domestic battery scrap still end up being exported. The reason, ARA admits, is that it cannot compete with foreign buyers who can afford to pay up to $70 AUS higher per MT.

M: Sample results

See Appendix 2 for full data.

1. Calcutta

a) Wastewater

The zinc, lead and cadmium levels in the wastewater collected from the Indian Lead Calcutta plant (see Appendix 2, Sample No 1) indicate severe contamination: cadmium levels are four times higher than the Central Pollution Control Board's standards; zinc levels are 10 times higher, and the lead levels exceed the CPCB standards for lead in effluents by a factor of 615.[50]

Lead, zinc and cadmium are listed under the Dangerous Substance Discharges Directive of the European Economic Community (EEC) legislation.[51] In the Directive dealing specifically with cadmium discharges, the maximum level of cadmium permissible in wastewater discharged from any mining or manufacturing industry is 0.5 milligram/litre. At 7.5 milligram/litre, Indian Lead's discharges contain more than 10 times the level permissible under European legislation.

b) Sediment
The levels of these metals in a sample of the sediment (see Appendix 2, Sample No. 2) taken from an effluent channel running alongside Indian Lead's Calcutta plant indicate severe contamination. Given that lead (5589.3 milligrams/kg), cadmium (672.1 milligrams/kg) and zinc (3165 milligrams/kg) levels are in such high levels, it is very likely that the raw material used is severely contaminated with these metals, according to Dr. Angela Stephenson of Greenpeace Research Laboratories at University of Exeter. Metal impurities will not be destroyed by smelting, they will only be redistributed in the waste.

While there are no set limits for sediment concentrations of lead, cadmium and zinc in India, the significance of the levels found in Indian Lead's above sediment can be appreciated when compared with the most polluted river sediments in the UK. Here, cadmium levels are highest in the River Tyne at 2.17 milligrams/kg. The Indian Lead sample contains 672.1 milligram/kg of cadmium. Lead levels at the Indian waste processor are double the levels found in the River Gannel, Cornwall, which receives acidic drainage from past and present mining activities.[52]

Also, the high levels of contaminants in the sediment indicate that heavily contaminated wastewaters from the smelter have been discharged over quite a long period of time. Even if discharges were to cease, or treatment procedures improved, retention of the metals by the sediment would delay the elimination of contamination for many years, Dr. Stephenson notes.

c) Solid waste (slag)
The slag, which is either dumped at the back of the factory or used to fill potholes in the road nearby, contain between 2 and 6 percent lead (See Appendix 2, Sample No. 3 and 4). The lead is not bound in any complex mineral structure but exists in either an elemental form or as a simple oxide, hence the potential for lead leaching out into the surrounding environment is higher.

2. Thane

a) Wastewater and sediment
Samples of wastewater and sediment taken from Indian Lead's Thane plant also indicate a heavy load of lead. The lead levels in wastewater are in excess of 40 times the Indian permissible level for effluents discharged into inland surface water.[53](Appendix 2, Sample No. 5)

b) Solid waste (slag)
Analysis of the slag collected from an unlined dumpsite used by the company indicated the presence of more than 1.3 percent lead in elemental form or as lead oxide. Lead in these forms is prone to escape into the environment. (Appendix 2, Sample No. 8)

N: Environmental and Human Health Effects

Lead

> "Affects human central nervous system. A poison by ingestion; moderately irritating. A common air contaminant. It is a carcinogen of the lungs and kidneys... Flammable in the form of dust when exposed to heat or flame. When heated, it emits highly toxic fumes; can react vigorously with oxidizing materials... From the point of view of industrial poisoning inhalation of lead is much more important than is ingestion. Lead is a cumulative poison. Increasing amounts build up in the body and eventually a point is reached where symptons and disability occur."[54]

The principal danger from the environmental fallouts of lead smelting is to the workers. Because the raw material (lead and battery wastes) is often contaminated with potentially toxic substances such as cadmium, copper and zinc, workers in unsound facilities like the ones often found in the less industrialised countries are constantly exposed to these toxins.

Lead has no biochemical or nutritional function.

The toxicity of lead depends on the availability, uptake and species sensitivity. Over the last 20 years, there has been increased scientific attention on the impacts of lead at low levels on the intellectual development (IQ) of babies and young children.[55] Even at low levels of exposure, lead can cause behavioural disturbances, neurological damage and other developmental problems. These effects are irreversible, even if lead levels in the child are reduced.[56] In adults, high levels of exposure to lead can cause brain and kidney damage, lead to increased blood pressure in middle aged men, and affect sperm count.[57]

Cadmium

> "Poison to humans by inhalation and other routes. Poison by ingestion, intraperitoneal, subcutaneous, intramuscular and intravenous routes. Dust is moderately flammable and explosive when exposed to heat, flame or by chemical reaction with oxidizing agents."[58]

Like lead, cadmium has no biochemical or nutritional function. It is highly toxic to both freshwater and marine organisms. It is bioaccumulative through the food chain. Exposure to elevated levels of cadmium can lead to severe irritation of the stomach and lungs, kidney diseases, and increased risk of lung cancer. Lung damage, such as emphysema, has occurred in workers in factories where cadmium concentration in air is high.[59]

Zinc

> "Human skin irritant and pulmonary system effects. . .The difficulty arises from oxidization of zinc fumes prior to inhalation or presence of impurities such as Cd, Sb, As, Pb." [cadmium, antimony, arsenic and lead] [60]

Although essential in trace quantities, zinc becomes toxic if increased levels are present. Inhalation of large amounts of zinc dust can cause metal fume fever.[61]

O. Conclusion and Recommendations

Previous Greenpeace research in India and elsewhere, including the 1995 report *Slow Motion Bhopal*,[62] has clearly demonstrated that hazardous waste imports for recycling are exceptionally dangerous and should be banned. This conclusion has been endorsed by the Parties to the Basel Convention in 1994 and again in 1995.

Heavy Burden confirms that import of hazardous wastes into India continues in violation of the Delhi High Court order, and that such imports contribute to the poisoning of India's land and her people.

The sample analyses from Indian Lead's factories and the telling import statistics document the systematic violation of national and international covenants by Indian waste reprocessors and their waste suppliers in countries like the USA, Australia, South Korea, France, Germany, Japan and the UK.

There is only one reason why toxic lead and battery waste should travel all the way from the USA to a smelter in Thane, Maharashtra. That reason has nothing to do with trade as we know it. The United States Environmental Protection Agency explains that due to strict environmental regulations in the U.S.A., secondary smelters there generally have higher processing costs than secondary smelters in other countries.

A bulk of the blame for this 'toxic imperialism' lies with the developed OECD exporters, who together with international waste traffickers, are a strong lobbying force to keep the floodgates of hazardous waste open to the poorer countries.

In India, this pressure has resulted in confusion at the policy level of the Government, including arbitrary classifications, conflicting directives and a maze of import licensing. These regulatory mechanisms have served more to confuse the implementers at the Customs or port level.

Waste traders have taken full advantage of the Indian Government's inability to monitor the ports. Although only licensed importers are allowed to bring in consignments of hazardous wastes, more than 38 Indian companies, none of them with a proper licenses, have imported lead and battery wastes between April 1996 and February 1997. In fact, the flow of lead and battery wastes has more than doubled since last year.

The Indian Government should be clear and unequivocal in its repudiation of the import of toxic waste, such as lead and battery scrap under the guise of recycling. It should support the strongest possible interpretation of the Basel Ban: by stopping all attempts to reverse the Ban decision; by not signing bilateral agreements to circumvent the Ban; and by endorsing and accepting the hazardous waste definitions by the TWG.

Simultaneously, it should work towards improving the collection and recycling of domestically generated battery and lead waste. With the help of trade unions, and citizen and community groups, the Government should ensure the strict enforcement

of environmental and occupational safety standards in all battery recycling operations.

Workers and communities have a right to a livelihood with dignity and a right to healthy living. The Government should not give in to arguments that pitch the health of workers and resident communities against nebulous, industry-led criteria of 'development' that entails wasteful and environmentally hazardous practices. Currently, the people living or working near lead smelters have little or no knowledge on potential health effects that could result from these operations. The Pollution Control Boards should actively make such information available to the public.

Greenpeace sample results revealed that the area surrounding Indian Lead could be so severely contaminated that even if all discharges/emissions to the environment stopped, it would take years for contaminant concentrations to fall to safe levels.

As the date for the permanent ban on such hazardous trade draws near, India's commitment to its citizens and to the international process nurtured by it in the past will once again be tested -- this time, at the Fourth Conference of Parties to the Basel Convention on 6 - 10 October 1997 to be held in Malaysia.

A committed implementation and enforcement of the Basel Ban by India would not only discourage the generation of hazardous wastes worldwide; it would also propel industry to move towards cleaner production by eliminating hazardous inputs.

Instead of giving in to the strong-arm tactics of OECD countries, India should stick to its principled stand exhorting the developed world to deal with its own poisons. The Government should live up to its responsibility of providing its citizens a healthy environment by ratifying the Ban and reflecting its provisions in the national legislation

Greenpeace urges the OECD signatories to the Basel Convention to:

- Respect the Basel Ban by ceasing efforts to sign bilateral agreements with non-OECD signatories.
- Respect Indian law by immediately stopping all lead waste exports and other hazardous waste exports to India.

Greenpeace calls on the USA to:

- Respect Indian law by immediately suspending all exports of lead wastes and other hazardous wastes to India.

Greenpeace urges the Government of India to:

- Support the strongest possible interpretation of the Basel Ban.
- Ratify the Basel Ban on hazardous waste trade exports from OECD to non-OECD countries.

Appendix 1:
Indian Import Data from April 1996 to February 1997

Source: Figures in Appendix 1 are a collation of import data from:
Informant, Mumbai, Calcutta Customs, Directorate General of Commercial Intelligence & Statistics, Calcutta.

Table 1: Lead and battery scrap by category

Battery plate and lug scrap

Month	Importer	Exporter	Qty in MT	Port
Apr-96	Indian Lead	S. Africa	40.00	Mum
Apr-96	Kothari Metals & Alloys	Sri Lanka	20.00	Mum
Apr-96	Indian Lead	Nigeria	88.00	Mum
Apr-96	Indian Lead	Israel	50.23	Mum
Apr-96	Indian Lead	Israel	78.28	Mum
Jul-96	Indian Lead	Nigeria	44.00	Mum
Aug-96	Panoli Metal & Chemicals	Malaysia	66.00	Mum
Sep-96	Indian Lead	Netherlands	22.00	Cal
Sep-96	Kothari Metals & Alloys	Israel	38.83	Cal
Sep-96	Panoli Metals & Chemicals	Singapore	22.00	Cal
Sep-96	Kothari Metals & Alloys	Singapore	20.00	Cal
Sep-96	RD Metal	USA	19.22	Cal
Oct-96	Raj Finoxides	Singapore	20.71	Cal
Oct-96	Gupta Pigments & Chem	France	215.07	Mum
Oct-96	Gupta Pigments & Chem	UAE	21.41	Mum
Oct-96	Gupta Pigments & Chem	UAE	128.17	Mum
Oct-96	RD Metal Co	Jordan	39.33	Mum
Oct-96	Gupta Pigments & Chem	Jordan	62.61	Mum
Oct-96	Accumulators Alloys Ltd	Oman	59.60	Mum
Nov-96	Raj Finoxides	Nigeria	44.00	Cal
Nov-96	Metacon Industries	Sri Lanka	40.00	Cal
Nov-96	RD Metal Co	Nigeria	100.00	Cal
Nov-96	JJ Metal P Ltd	Sri Lanka	21.00	Cal
Nov-96	Gravita India Ltd	UAE	21.00	Cal
Nov-96	Panoli Metal & Chem	Sri Lanka	20.00	Cal
Nov-96	Indian Lead	Singapore	81.50	Cal
Nov-96	Indian Lead	Singapore	21.87	Cal
Dec-96	HP Exports Corp.	Sudan	75.00	Mum
Dec-96	Ravi Metals	Nigeria	44.00	Mum
Dec-96	JJ Metal P Ltd	Sri Lanka	20.00	Mum
Dec-96	Manoj Metal Traders	Sri Lanka	20.00	Mum
Dec-96	Shah Khetaji Dhanaji	Singapore	42.00	Mum
Dec-96	Rinish Overseas P Ltd	Nigeria	44.00	Mum
Dec-96	Shah Khetaji Dhanaji	Sri Lanka	21.50	Mum
Dec-96	Ravi Metals	Nigeria	44.00	Mum

Dec-96	Gravita India Ltd	Jordan	44.00	Mum
Dec-96	Rinish Overseas P Ltd	Nigeria	22.00	Mum
Dec-96	Panoli Metal & Chem	Sri Lanka	20.00	Mum
Dec-96	Indian Lead	Singapore	18.31	Mum
Dec-96	Indian Lead	Singapore	43.04	Mum
Dec-96	Tirupati Chemicals Ltd	UAE	169.68	Mum
Dec-96	Indian Lead	Singapore	20.87	Mum
Jan-97	Panoli Metal & Chem	Sri Lanka	40.00	Mum
Jan-97	Shah Khetaji Dhanaji	Singapore	20.41	Mum
Jan-97	Hind Brass P Ltd	Australia	21.31	Mum
Jan-97	Gravita India Ltd	UAE	59.99	Mum
Jan-97	Azad Metal Works	Nigeria	22.00	Cal
Jan-97	Sige Ram Industries	Singapore	40.87	Cal
Jan-97	Vishnu Metals Ltd	Sri Lanka	20.00	Cal
Jan-97	RD Metal	USA	19.29	Mum
Feb-97	Vijay Metal Works	Nigeria	22.00	Cal
Feb-97	Vijay Metal Works	Nigeria	22.00	Cal
Feb-97	Leadstone Energy Ltd	Nigeria	22.00	Cal
	TOTAL		**2363.30**	

Battery scrap

Month	Importer	Exporter	Qty in MT	Port
Apr-96	Shirin Metals P Ltd	France	20.29	Mum
Apr-96	Kothari Metals & Alloys	Sri Lanka	40.00	Mum
Apr-96	Kothari Metals & Alloys	Sri Lanka	40.00	Mum
May-96	NV Metals & Alloys	Malaysia	22.96	Mum
Jun-96	Hind Brass P Ltd	Bahrain	43.13	Mum
Sep-96	Indian Lead	USA	36.86	Cal
Oct-96	Indian Lead	USA	18.57	Mum
Oct-96	Indian Lead	Sri Lanka	170.50	Mum
Oct-96	Indian Lead	Singapore	107.56	Mum
Oct-96	Indian Lead	Singapore	42.67	Mum
Oct-96	Indian Lead	Singapore	21.51	Mum
	TOTAL		**564.05**	

Battery scrap/scrap battery

Month	Importer	Exporter	Qty in MT	Port
May-96	RD Metal	KSA	104.46	Mum
May-96	NV Metals & Alloys	Ethiopia	49.79	Mum
Sep-96	Shah Khelaji Dhanaji & Co	Singapore	37.39	Cal
Sep-96	Metacon Industries	Sri Lanka	20.00	Cal
Dec-96	Akrum Metallurgical Ltd	Nigeria	88.00	Cal
Jan-97	Hindbrass P Ltd	Singapore	44.57	Mum
Jan-97	Sriyam Impex	Saudi Arabia	20.94	Mum
	TOTAL		**365.15**	

Lead ash, lead ash/dross, lead dross

Month	Importer	Exporter	Qty in MT	Port
Apr-96	RD Metal Co	USA	91.95	Bom
Apr-96	Indian Lead	USA	99.29	Mum
Apr-96	Indian Lead	USA	192.07	Mum
Apr-96	Jugal Metals P Ltd	USA	40.24	Mum
Apr-96	Shirin Metals P Ltd	Kenya	18.00	Mum
May-96	Jugal Metals P Ltd	AUS	99.95	Mum
May-96	RD Metal Co	USA	18.42	Mum
Jun-96	Jugal Metals P Ltd	USA	54.75	Mum
Jun-96	RD Metal Co	USA	18.59	Mum
Aug-96	Associated Pigments Ltd	Korea	352.80	Cal
Aug-96	Associated Pigments Ltd	Korea	3,140.00	Cal
Dec-96	Hind Brass P Ltd	USA	38.49	Mum
Jan-97	Bhavna Metal Co	S. Africa	64.40	Mum
Jan-97	Jugal Metals P Ltd	USA	38.90	Mum
Jan-97	Gupta Pigments & Chem	AUS	21.69	Mum
	TOTAL		**4,289.54**	

Lead residues, lead slag

Month	Importer	Exporter	Qty in MT	Port
Apr-96	Indian Lead	Chile	99.29	Mum
Apr-96	RD Metal Co	Ghana	43.22	Mum
Apr-96	N/A	China	99.00	Mum
Apr-96	N/A	Kenya	18.00	Mum
Apr-96	N/A	Malaysia	43.00	Mum
Apr-96	N/A	USA	13.30	Mum
Apr-96	N/A	UK	93.85	JNPT
Apr-96	N/A	USA	35.45	JNPT
Apr-96	N/A	USA	291.00	Bom
May-96	Nikhil Metal	Ghana	65.00	Mum
May-96	N/A	Australia	113.00	Mum
May-96	N/A	Ghana	65.00	Mum
May-96	N/A	USA	18.00	Mum
May-96	N/A	USA	76.00	JNPT
May-96	N/A	Singapore	21.00	Del
May-96	N/A	USA	6.00	Del
May-96	N/A	AUS	100.00	Bom
Jun-96	N/A	USA	55.00	Bom
Jun-96	Indian Lead	Singapore	193.57	Mum
Jul-96	Nikhil Metal	Ghana	63.83	Mum
Jul-96	N/A	Korea	3,493.00	Cal
Jul-96	N/A	Ghana	63.00	Mum
Jul-96	N/A	Germany	121.00	JNPT

Jul-96	N/A	USA	21.00	JNPT
Aug-96	Indian Lead	UAE	41.98	Mum
Oct-96	Indian Lead	UAE	43.44	Mum
Oct-96	Indian Lead	USA	158.03	Mum
Jan-97	Indian Lead	Singapore	96.33	Mum
Jan-97	Indian Lead	USA	99.25	Mum
	TOTAL		**5,649.54**	

Lead waste/scrap

Month	Importer	Exporter	Qty in MT	Port
Apr-96	N/A	Australia	20.00	Mum
Apr-96	N/A	UAE	83.82	JNP
Apr-96	N/A	UAE	79.00	Kandla
Apr-96	A.R. Mohammed Shaali	UAE	9.15	Mds
Apr-96	Sadan Metal & Alloys	Singapore	42.49	Mds
May-96	RD Metal Co	USA	19.60	Mum
May-96	N/A	Korea	16.00	Cal
May-96	N/A	USA	20.00	Mum
May-96	N/A	Singapore	20.00	JNP
May-96	N/A	UAE	63.34	Del
Jun-96	N/A	Australia	19.56	Cal
Jun-96	N/A	Australia	110.00	Mum
Jun-96	N/A	Bahrain	86.00	Kandla
Jun-96	N/A	Kuwait	241.50	Kandla
Jun-96	N/A	Malaysia	63.00	Kandla
Jun-96	N/A	UAE	321.00	Kandla
Jul-96	N/A	Singapore	103.00	Mds
Aug-96	Simplex Metal & Alloys	Singapore	83.85	Mds
Oct-96	Accumulators & Alloys India	Saudi Arabia	22.31	Mum
Oct-96	Metacon Industries	Australia	39.62	Cal
Oct-96	Tirupati Chems	UAE	40.00	Mum
Oct-96	Raj Finoxides	Singapore	20.97	Cal
Nov-96	Raj Finoxides	Singapore	42.43	Cal
Nov-96	Mahalaxmi Udyog	Singapore	41.16	Cal
Nov-96	Ajay Kumar/Rakesh Kumar	Nigeria	22.00	Cal
Dec-96	Indian Lead	Singapore	20.50	Cal
Dec-96	Kothari Metals & Alloys	Germany	40.00	Mum
Dec-96	Metacon Industries	Japan	15.47	Cal
Dec-96	Raj Finoxides	Singapore	63.40	Cal
Jan-97	Manoj Metal Traders	Netherlands	21.65	Mum
Jan-97	Sing Battery Mfg Co	Australia	20.74	Cal
Jan-97	Associated Pigments Ltd	European Union	24.70	Cal
Jan-97	Associated Pigments	Japan	223.34	Cal
Jan-97	Leadstone Energy Ltd	Singapore	39.25	Cal
Jan-97	Sing Battery Mfg Co	Singapore	20.86	Cal
	TOTAL		2119.74	

Table 2: OECD exports of lead and battery waste

Country	Qty in MT
Australia	565.8
France	235.3
Germany	161.0
The Netherlands	43.6
Japan	238.8
Korea	7,001.8
Other European Union Countries	24.7
UK	93.8
USA	1,499.2
Total	**9,864.2**

Table 3: Exports from known transhipment points

Country	Qty in MT
Singapore	1,414.0
Sri Lanka	513.0
UAE	1,081.9
Total	**3,009.0**

Table 4: Imports by Indian Lead Ltd of lead and battery scrap

Month	Commodity	Exporter	Qty in MT	Port
Apr-96	Lead dross	USA	99.2	Mum
Apr-96	Lead dross	USA	192.0	Mum
Apr-96	Lead residues	Chile	99.2	Mum
Apr-96	Battery plates scrap RAILS	S. Africa	40.0	Mum
Apr-96	Battery plates scrap RAILS	Nigeria	88.0	Mum
Apr-96	Battery plates scrap RAILS	Israel	50.2	Mum
Apr-96	Battery plates scrap RAILS	Israel	78.2	Mum
Jun-96	Lead residues	Sing	193.5	Mum
Jul-96	Battery plates scrap RAILS	Nigeria	44.0	Mum
Aug-96	Lead residues	UAE	41.9	Mum
Sep-96	Battery plates scrap RAILS	Holland	22.0	Cal
Sep-96	Drained battery scrap Rains	USA	36.8	Cal
Oct-96	Lead residues	UAE	43.4	Mum
Oct-96	Lead residues	USA	158.0	Mum
Oct-96	Drained battery scrap Rains	USA	18.5	Mum
Oct-96	Drained battery scrap Rains	Sri Lanka	170.5	Mum
Oct-96	Drained battery scrap Rains	Sing	107.5	Mum
Oct-96	Drained battery scrap Rains	Sing	42.6	Mum
Oct-96	Drained battery scrap Rains	Sing	21.5	Mum
Nov-96	Battery plates scrap RAILS	Sing	81.5	Cal
Nov-96	Battery plates scrap RAILS	Sing	21.8	Cal
Dec-96	Battery plates scrap RAILS	Sing	18.3	Mum
Dec-96	Battery plates scrap RAILS	Sing	43.0	Mum
Dec-96	Battery plates scrap RAILS	Sing	20.8	Mum
Dec-96	Lead scrap RADIO	Sing	20.5	Cal
Jan-97	Lead residues	Sing	96.3	Mum
Jan-97	Lead residues	USA	99.2	Mum
	TOTAL		**1,949.5**	

Appendix 2: Sample Analyses

All samples have been analysed at the Greenpeace Research Laboratories, at the University of Exeter, U.K.
The samples were analysed by the following methods
1) Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES), following sample drying, sieving and acid digestion; or
2) Scanning Electron Microscopy X-ray diffraction (SEM X-ray).

Inorganic analytical results of effluent and solid waste samples from Indian Lead Ltd, Calcutta in March 1997, and Thane, in July 1996 and March 1997.

Sample 1

Indian Lead Ltd. Calcutta
Sample type: Industrial wastewater
Sampling date: 08/03/97
Lab code: MI7021

Sample of waste water collected from open channel running along the factory front wall.
Three drains from the factory discharge waste water into the open channel.
Analysis method: ICP-AES

Metal	Concentration microgram/litre
Manganese	4080
Chromium	240
Zinc	50860
Copper	<10
Lead	61500
Nickel	200
Cobalt	70
Cadmium	7590

Sample 2

Indian Lead Ltd. Calcutta
Sample type: Sediment
Sampling date: 08/03/97
Lab code: MI7022

Sample of black sediment collected from open channel running along the factory front wall.
Three drains from the factory discharge wastewater into the channel.
Analysis method: ICP-AES

Metal	Concentration milligram/kg
Manganese	256.40
Chromium	21.40
Zinc	3165.00
Copper	151.40
Lead	5589.30
Nickel	20.00
Cobalt	6.40
Cadmium	672.10

Sample 3
Indian Lead Ltd. Calcutta
Sample type: Solid waste
Sampling date: 12/03/97
Lab code: MI7026

Black vitreous post-furnace slag. Found in piles within factory
Analysis method: SEM / X-ray analysis

METAL	Weight % as Oxide
Silicon	32.16
Aluminium	7.73
Iron	20.82
Sodium	8.08
Calcium	11.10
Lead	5.82
Potassium	0.71
Magnesium	8.66
Titanium	0.45
Manganese	0.53
Zinc	3.18
Sulphur	0.76

Sample 4

Indian Lead Ltd. Calcutta
Sample type: Solid waste
Sampling date: 08/03/97
Lab code: MI7027

Black vitreous rock (post-furnace slag). Found in pothole in the road which runs adjacent to the side wall of the factory.
Analysis method: SEM/X-ray analysis

METAL	Weight % as Oxide
Silicon	35.99
Aluminium	11.16
Iron	13.14
Sodium	9.83
Calcium	13.49
Lead	2.58
Potassium	0.78
Magnesium	9.71
Titanium	0.49
Manganese	0.50
Zinc	1.50
Sulphur	0.84

Sample 5

Indian Lead Ltd. Thane
Sample type: Industrial wastewater
Sampling date: 16/07/1996
Lab code: MI6058a

Lead acid battery recycling plant. Effluent sample from an open channel frequently seen to overflow onto factory site.
Analysis method: ICP-AES

Metal	Concentration microgram/liter
Manganese	230
Chromium	<10
Zinc	910
Copper	<10
Lead	4090
Nickel	<10
Cobalt	<10
Cadmium	10

Sample 6

Indian Lead Ltd. Thane
Sample type: Solid residue
Sampling date: 16/07/1996
Lab code: MI6058b

Solid oily waste sample from open channel
Analysis method: ICP-AES

Metal	Concentration milligram/kg
Manganese	Not detected
Chromium	Not detected
Zinc	65.80
Copper	Not detected
Lead	323.30
Nickel	Not detected
Cobalt	Not detected
Cadmium	0.90

Sample 7

Indian Lead Ltd. Thane
Sample type: Solid waste/soil
Sampling date: 16/07/1996
Lab code: MI6059

Solid waste from adjacent to the open channel.
Analysis method: ICP-AES

Metal	Concentration milligram/kg
Manganese	763.60
Chromium	115.70
Zinc	7055.60
Copper	468.20
Lead	17777.80
Nickel	86.90
Cobalt	32.60
Cadmium	1165.20

Sample 8

Indian Lead Ltd. Thane
Sample type: Solid waste
Sampling date: 20/03/97
Lab code: MI7028

Solid waste found at a private dumpsite 14 km from the plant. The site is used as a dumpsite by Indian Lead Ltd.
Analysis method: SEM / X-ray analysis

Metal	Weight % as Oxide
Silicon	23.56
Aluminium	9.64
Iron	29.69
Sodium	0.84
Calcium	12.42
Lead	1.35
Potassium	0.32
Magnesium	6.19
Titanium	0.80
Manganese	0.57
Zinc	12.42
Chromium	0.22
Chlorine	0.12
Sulphur	3.40

References

[1] Organisation for Economic Cooperation and Development, an organisation comprising the most industrialised and developed nations. The OECD currently consists of the following member states: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America.

[2] Informant, Mumbai. April 1995 to March 1996. "Non-ferrous metals"

[3] Transhipment point is the intermediary between export and import countries

[4] Vallett, Jim, "Basel 'Dumping' Convention still Legalises Toxic Terrorism" Greenpeace Toxic Trade Update, 6.1, First Quarter 1993

[5] US EPA (1992) "States' Efforts to Promote Lead-Acid Battery Recycling." EPA/530-SW-91-029, pp. 21. January 1992.

[6] Spalding, Heather, Greenpeace Toxic Trade Project, Greenpeace USA.

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[8] The Lome IV Convention: Article 39, Adopted 15 December 1989. 69 African, Caribbean and Pacific nations (ACP) agreed a waste trade ban with the European Union as part of their negotiations for the Lome IV Convention. The agreement prohibited the EU from exporting nuclear or hazardous wastes to the ACP countries, while the ACP agreed to prohibit such wastes from any other country.

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