

MERCURY INVENTORY PILOT PROJECT IN PAKISTAN

BY

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**GOVERNMENT OF PAKISTAN
MINISTRY OF ENVIRONMENT**

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Objectives of the project

- To develop the basic data about the inventory of mercury and mercury products in Pakistan.
- To identify the mercury exposure resources in the country.
- To identify the groups of people at more risk.
- To create the awareness in the general public regarding the toxicity of mercury.
- To attempt the replacement of mercury containing commodities.
- To develop strategies to reduce the risk of mercury exposure.

Methodology of the Project

- Creation of Stakeholders Team.
- Identification of mercury and mercury products uses and releases by federal/provincial EPA's.
- The selection of areas susceptible/effected for mercury contamination in the country.
- Collection of samples of water, air and soil from the country with the help of federal/provincial EPA's.
- Analysis of the samples in the laboratories of Institute of the chemistry, University of the Punjab, Lahore.
- Data collection of mercury and mercury products from mercury usage markets/industries in the country.
- Technical working group and consultation meetings of all stakeholders.
- Training of Stakeholders Team by UNEP expert.
- Preparation of baseline data/inventory of mercury and mercury products about the current situation in the country.

Creation of Stakeholders team

S.#	Department/Organization
1	Ministry of Environment
2	Pak-EPA, Islamabad
3	EPA – N.W.F.P, Peshawar
4	EPA – Balochistan, Quetta
5	EPA – Sindh, Karachi
6	EPD – Punjab, Lahore
7	Revenue Division, Federal Board of Revenue, Islamabad
8	Institute of Chemistry, University of the Punjab, Lahore

Meetings

1. Meeting of Project Manager and Project Coordinator– Mercury Project with Director General EPA Sindh & EPD Punjab

Decisions

- EPA Sindh & EPD Punjab will collect data and identify areas and will supervise the activities and coordinate with Ministry of Environment.
- A team of officers and official was formed in this respects to act as focal point in Sindh & Punjab for mercury project.

Meetings

2. Meeting of Project Coordinator – Mercury Project with Project Manager, Kasur Tannery Waste Management Agency, Kasur

Decision

- Kasur Tannery Waste Management Agency , Kasur (Operating 2nd largest common tannery effluent treatment plant of the world capacity 12700 M³/day) will collect data and identify areas in solid waste disposal sites and 237 tanneries and coordinate with Ministry of Environment.

Meetings

3. First Technical Working Group Meeting of Stakeholders in office of Project Manager – Mercury Project, Ministry of Environment, Islamabad

Decisions

- DG, EPA- N.W.F.P & Director, Institute of Chemistry, Punjab University, Lahore will prepare sampling criteria.
- Secretary Customs Tariff-I, FBR will provide the list of importers.
- EPA-Sindh, Punjab, N.W.F.P, Balochistan and Pak-EPA will identify 200, 200, 125, 125 and 50 sampling points respectively as per toolkit and will give in written form to this Ministry till March, 2008.
- Each EPA will open a new desk for this project.
- Analysis of samples will be conducted in the Institute of Chemistry, Punjab University, Lahore.

Meetings

4. Second Technical Working Group Meeting of Stakeholders in office of Project Manager – Mercury Project, Ministry of Environment, Islamabad and training of stakeholders by UNEP Expert, Mr.Guibert

Decisions

- All federal/provincial EPA's will collect samples from priority points as agreed and indicated by UNEP Expert till 15th June, 2008.
- Ministry of Environment in collaboration with Federal Board of Revenue will formulate regulations to control informal import of mercury (Hg) and its products.
- Sindh EPA will provide the report/study conducted by SEPA and Centre of Excellence, Jamshoro regarding Menchar Lake.

Meetings

5. National Consultative Meeting of Stakeholders, Islamabad

Participants

- Federal and Provincial EPAs
- UNDP, UNIDO, PMRC, NDMA
- Ministry of Science & Technology
- Ministry of Labour and Manpower
- Ministry of Petroleum & Natural Resources
- Research Institutes and Academia

Decisions

- Public awareness on environmental and health impacts of mercury should be disseminated by media like TV, Newspaper etc.
- Formulation of policies/laws/regulations on mercury (Hg) and their enforcement/implementation.
- Research & Development with stakeholder's coordination.
- Mercury (Hg) alternatives should be encouraged.

Meetings

6. Third Technical Working Group Meeting of Stakeholders in office of Project Manager – Mercury Project, Ministry of Environment, Islamabad

Decisions/Recommendations

- Technology & infrastructure for disposal of mercury waste should be imported from developed countries.
- Recollection of mercury waste and its reuse/recycle especially from manufactures of lighting source like tube lights, bulbs etc.
- Technology/treatment system/guidelines to control the smoke emitted by coal combustion, medical waste incineration etc. to protect workers in the vicinity of the activity.
- Introduction of *cleaner production technologies* especially in hazardous waste like mercury .

Cont'

Meetings

Decisions/Recommendations

- Mercury free alternatives should be encouraged .
- National Environmental Quality Standards (NEQS) of mercury should be introduced for air emission.
- To strengthen awareness and education on mercury toxicology, exposure pathways and use & release in products & processes.
- Laws/legislations posed by Government should be encouraged for reduction of mercury in products. These laws must be enforced strictly.
- Products in which mercury is used during manufacturing (thermometers, thermostats measuring devices/gauges etc) should be discouraged.

Cont'

Meetings

Decisions/Recommendations

- Medical societies should be encouraged to lead in the promotion of mercury free health care.
- Industries must be asked to;
 - a. Safe/control management of mercury waste to avoid environment damage.
 - b. Allocate funds for research & development on mercury free products
- Incentives by the Government for manufacturers for non-mercury containing products.

Identification of Sampling Points for Mercury Inventory in Pakistan

S.#	Name of Province	Main Sampling Points
1	Punjab	Chlor-alkali plant, cement industries, power plants, glass, ceramic, steel re-rolling mills, waste incinerators etc
2	Sindh	Sugar Mills, pulp & paper industry, paint and pharmaceutical, cosmetic, informal dumping sites etc
3	N.W.F.P	Cement, chip board, mining, lamps manufacturing, fiber etc
4	Balochistan	Quetta and Hub Industrial zones, waste incinerator etc
5	Islamabad Capital Territory	Industrial area, steel re-rolling mill, marble cutting, pharmaceutical, plastic etc

Sampling Procedure

Liquids:

Streams/ waste drain channels:

One litre liquid sample should be taken from three depth levels, well mixed in a polyethylene container and filled in a 120 ml sample bottle (polyethylene), containing 20 drops of dilute HNO₃.

Stagnant liquid reservoirs:

One litre liquid sample should be taken from three depth levels at four points in 10 meters rectangle, well mixed in a polyethylene container and filled in a 120 ml sample bottle (polyethylene), containing 20 drops of dilute HNO₃.

Sampling Procedure

Solids:

Dry samples:

200 gms of the soil or other dried mass be collected in a zipper bag and sealed immediately.

Sludge:

Sludge underneath a water channel, 200 gms sample should be taken and be packed in dual zipper bags or if possible filled in 120 ml polyethylene bottle using a funnel containing 20 drops of dilute HNO₃.

Labeling:

All the sample bottles/ bags must be immediately labeled using a permanent ink marker over a small strip of paper tape.

Results of Samples from Punjab (Lahore, Sheikhupura, Faisalabad etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
1	Near taj company ravi road	1.26
2	Shahdra village bridge ravi raod	0
3	Azadi chowk ravi road	0
4	Kotlakhpat industrial waste	0
5	Main ferozpur road hudarian drain	0
6	ARC sock near Kahna hudarian drain	0
7	Badian road hudarian drain	1.59
8	Town ship waste drain	0.59
9	Dharam pura canal	0
10	Near shafi reso chem hudarian drain	0

Cont'

Results of Samples from Punjab (Lahore, Sheikhupura, Faisalabad etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
11	Residual Waste of Incinerated children Hospital Waste	1.52
12	Shikhupura Municipal Drain	2.1
13	Sitara chemicals 1	1.1
14	Sitara chemicals 2	1.3
15	Sitara chemicals 3	0.89
16	Sitara chemicals 4	1.34
17	Sitara chemicals 5	2.7
18	Drain Near Sitara chemicals	2.4
19	Sitara chemicals Solid Waste 1	0.4
20	Sitara chemicals Solid Waste 2	0.5

Cont'

Results of Samples from Punjab (Lahore, Sheikhupura, Faisalabad etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
21	Sitara chemicals Solid Waste 3	1.2
22	Ittehad chemicals Outlet 1	2.3
23	Ittehad chemicals Outlet 2	0.4
24	Ittehad chemicals Outlet 3	3.1
25	Ittehad chemicals Outlet 4	2.7
26	Ittehad chemicals Solid Waste 1	0.77
27	Ittehad chemicals Solid Waste 2	0.4
28	Ittehad chemicals Solid Waste 3	0
29	Nimir chemicals 1	0
30	Nimir chemicals 2	0
31	Nimir chemicals 3	0

Cont'

Results of Samples from Punjab (Lahore, Sheikhpura, Faisalabad etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
32	Municipal Sewrage Okara	0
33	Yusaf Sugar mill Shahpur	0
34	Supra Tannery	0
35	Mehmood Booti Drain	3.9
36	Leachate Mehmood Booti Dumping Site Bund Road 1	4.1
37	Leachate Mehmood Booti Dumping Site Bund Road 2	3.7
38	Leachate Mehmood Booti Dumping Site Bund Road 3	2.8
39	Mehmood Booti Dumping Site 1	1.2
40	Mehmood Booti Dumping Site 2	0.6

Results of Samples from Sindh (Karachi etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
1	PSL Sludge	0.85
2	Municipal sludge	0.0
3	Municipal effluent	0.0
4	Leachatae	2.73
5	Inlet	2.41
6	Zubair Afzal Tannery	9.26
7	Modern Tannery	0.0
8	Serri Sugar Mill (Tando Mohammad Khan)	0
9	Tando Muhammad Khan Sugar Mill (Tando Mohammad Khan)	0
10	Digri Sugar Mill (Digri)	0
11	Mehran Sugar Mill (Talhar)	0

Cont'

Results of Samples from Sindh (Karachi etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
12	Haji Naimutlah Tannery	0
13	Shaheen Tannery	0
14	Subhanullah Tannery	0
15	Faran Sugar Mill (Badin)	0.58
16	Malir river wet land sludge	0
17	Korangi waste drain (Left)	0
18	Korangi waste drain (Right)	0
19	Malir river wet land water	2.05
20	Civil hospital korangi	0
21	Hasan square drain	0.05
22	Korangi dumping waste "A"	8.83
23	Korangi dumping waste "B"	0.02
24	Korangi dumping waste "C"	1.49
25	Korangi dumping waste "D"	3.48

Results of Samples from Baluchistan (Quetta)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
1	Lime fuel source (coal)	5.26
2	Lime stone raw material	2.95
3	Lime product	0
4	Waste incinerator	1.80
5	Informal dumping site "1"	3.48
6	Informal dumping site "2"	7.15
7	Quetta municipal waste sludges	0
8	Quetta municipal waste water	0.02

Results of Samples from N.W.F.P (Peshawar etc)

S/No	Sampling Point	Concentration of Mercury in ppb or ug/kg
1	Waster Water Industrial Estate Hyatabad	3.1
2	Mohsin Match Hayatabad Waste water	2.4
3	Taj Ghee	1
4	Hasan Pharma Hayatabad Waste water	3.4
5	Musarat Shaukat Hospital Complex Dir	2
6	Sludge Industrial Estate Hyatabad	4
7	Chinoti Gul Ghee WW	1
8	Khyber Match	2.1
9	Afghan Match Hyatabad	2.7
10	Hayatabad Treatment Plant	3.5
11	PCSIR Env Lab	<0.8
12	Fouji Corn Complex swabi	3.4
13	Volta Battery Hattar	3.7

Cont'

Results of Samples from N.W.F.P (Peshawar etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
14	Hayatabad Labor colony	0
15	Sardar Begum Dental College Ghandara University	0
16	Sufi Foods	0
17	Rapid Car Wash	0
18	Pakistan Tobacco Company	1.9
19	Khyber Lamps	3.6
20	Chashma sugar Mill D.I. Khan	0
21	Ganda Nala Peshawar	5.4
22	Hattar Rending	2.1
23	Sarhad Board Hayatabad	1.5
24	Midway Hotel	0
25	Lateef Ghee	1.5

Cont'

Results of Samples from N.W.F.P (Peshawar etc)

S/No.	Sampling Point	Concentration of Mercury in ppb or ug/kg
26	Khyber Teaching Hospital	2.4
27	Ashraf Match	2
28	Treatment Plant Gulbahar Peshawar	3.1
29	Buddhni Nala Bacha Khan Chowk Pesahwar	6.8
30	Neelam Paper	2.6
31	Permanent Paper Hattar	3.6
32	Ferrous Waste Unreacted	<0.5
33	Ferrous Waste Procdunt	<0.5
34	Hayatabad Dumping site 1 (Labor colony)	6.4
35	Hayatabad Dumping site 2	5.7
36	Royal PVC Hayatabad Raw Material	1.3

SUMMARY OF IMPORT DATA FOR THE PERIOD JUL-2005 TO JUN-2006

S.#	IMPORTER NAME	QUANTITY (KG)
1	MERCK (PRIVATE) LIMITED	3
2	REHAN AHMED AND COMPANY	7
3	PHILIPS ELECTRICAL INDUSTRIES OF PAKISTAN LIMITED	345
4	SITARA CHEMICAL INDUSTRY	2,146
5	FAUJI FERTILIZER COMPANY LIMITED	1
6	NAEEM ALI SHAH	400
7	CROWN LIGHTING (PVT.) LIMITED	690
8	TAYYABA FABRICS	50
9	CROWN LIGHTING (PVT.) LIMITED	30
TOTAL		3,672

SUMMARY OF IMPORT DATA FOR THE PERIOD JUL-2006 TO JUN-2007

S.#	IMPORTER NAME	QUANTITY (KG)
1	MERCK (PRIVATE) LIMITED	9
2	MARI GAS COMPANY LIMITED	4
3	PHILIPS ELECTRICAL INDUSTRIES OF PAKISTAN LIMITED	1,031
4	ITTEHAD CHEMICALS LIMITED	21,735
5	FAUJI FERTILIZER COMPANY LIMITED	4
6	UNIVERSAL DENTAL (PVT.) LIMITED	40
7	CROWN LIGHTING (PVT.) LIMITED	53
TOTAL		22,876

SUMMARY OF IMPORT DATA FOR THE PERIOD JUL-2007 TO FEB-19-2008

S.#	IMPORTER NAME	QUANTITY (KG)
1	PHILIPS ELECTRICAL INDUSTRIES OF PAKISTAN LIMITED	345
2	ITTEHAD CHEMICALS LIMITED	200
3	UNIVERSAL DENTAL (PVT.) LIMITED	20
TOTAL		565

MERCURY CONTAINING PRODUCTS IN MARKETS OF PAKISTAN

S.#	Source	Mercury Content
1	Barometers and Vacuum Gauges	Mercury content generally ranges from 300 to 600 grams. Rare old collectable barometers have been found to contain as much as 6 kilograms mercury.
2	Batteries	<p>Mercury-containing batteries generally consist of the button cell type found in wrist watches, hearing aids, calculators and various types of applications in labs, hospitals, military and commercial facilities</p> <p>Batteries generally contain between 5 and 25 milligrams of mercury per battery. Specially batteries for labs, hospitals and military and commercial applications may have higher mercury content</p>
3	Dental Amalgam	Silver coloured dental amalgams generally contain about 50% mercury.
4	Flame Sensors	Sensors contain about 1 gram of mercury.

Cont'

MERCURY CONTAINING PRODUCTS IN MARKETS OF PAKISTAN

S.#	Source	Mercury Content
5	Flowmeters	Flowmeter can contain up to 5000 grams of mercury
6	Hydrometers	Content can range from 0.002 grams to 1 gram depending on the application and size of instrument
7	Hyrometers/Psychrometers	Content generally ranges from 3 to 7 grams
8	Compact Fluorescent Lamps	Mercury content is generally between 1 and 25 milligrams.
9	Fluorescent U-Tubes	Mercury content is approximately 3 to 12 milligrams
10	Fluomeric Lamps	Content is approximately 2 milligrams per lamp
11	Linear Fluorescent Lamps	Content ranges from 3 to 12 milligrams (mercury-reduced lamps) to 10 to 50 milligrams (non-mercury reduced lamps).

Cont'

MERCURY CONTAINING PRODUCTS IN MARKETS OF PAKISTAN

S.#	Source	Mercury Content
12	Mercury Vapor Lamps	Content varies with wattage from 25 milligrams in a 75-watt lamp) to 10 to 50 milligrams (non-mercury reduced lamps).
13	Sodium Vapor Lamps	Mercury mass varies with wattage from 20 milligrams (35-watt lamp) to 145 milligrams (1000-watt lamp)
14	Manometers	Milking system manometers contain approximately 340 grams of mercury other manometers may contain from 100 to 500 grams or more
15	Esophageal Dilators	Esophageal dilators may contain more than 1000 grams of mercury
16	Gastrointestinal Dilators	These devices may contain approximately 1000 grams when filled to capacity
17	Sphygmomanometers	Content can vary from 20 to 60 grams of mercury

Cont'

MERCURY CONTAINING PRODUCTS IN MARKETS OF PAKISTAN

S.#	Source	Mercury Content
18	Mercury Compounds	Mercury can be found in a variable range in the following chemicals, mixtures of chemicals and waste. Chemical examples include: <ul style="list-style-type: none"> • Arsenic-calcium reagent • Elemental mercury • Mercuric sulfate • Mercurous Chloride • Merthiolate (Thiomersal)
19	Pyrometers	Content ranges from 5 to 10 grams
20	Relays	The device is sealed and found mainly in molding machines, large battery charges, and industrial electric heaters. Other applications include mining and refineries Mercury content can vary, but can be in the range of 150 grams

Cont'

MERCURY CONTAINING PRODUCTS IN MARKETS OF PAKISTAN

S.#	Source	Mercury Content
21	Wetted Reed Relays	Mercury wetted reed relays are used for a variety of switching applications and are found in computers, business machines, machine tool control systems and laboratory equipment Content is approximately 1 gram
22	Switches	Mercury switches can also be found in common thermostats. Mercury is found in switches for cooking application, such as mercury use in gas & electric cooking ranges & other cooking equipment
23	Float Switches	Mercury content can vary significantly depending on the size of switch. Normally, the content is below 1 gram per switch; however, float switches can have as much as 15 grams per switch.
24	Pressure Switches	Content ranges from 1 to 20 grams depending on the application

Cont'

MERCURY CONTAINING PRODUCTS IN MARKETS OF PAKISTAN

S.#	Source	Mercury Content
25	Temperature Switches	Ampoules contain 1 to 20 grams depending on the application
26	Tilt Switches	The mercury content of the tilt switch varies from 0.4 to 71 grams depending on application and design
27	Fever Thermometers	The average mass of mercury used in an industrial thermometer is 5 grams
28	Laboratory Thermometers	The average mass of mercury in a laboratory thermometer is around 5 grams.
29	Thermostats	Ampoules generally contain 3 grams of mercury. There may be one to six ampoules depending on the model and application of the thermostat
30	Thermostat Probes	Thermostat probes contain approximately 1 grams of mercury

The status of chlor-alkali industry in Pakistan regarding use of mercury

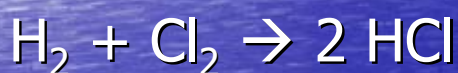
S.#	Name of Industry	Capacity (tons)	Basis
1	Sitara Chemicals	180,000	100% Production is based on Membrane Cell
2	Ittehad Chemicals	132,000	60% Production is based on Membrane Cell and 40% production is based on mercury cell
3	Nimir Chemicals	10,000	100% Production is based on Membrane Cell

10,000 M.Tons of Caustic Soda consumes Mercury (Hg) = 2.5 M. Tons

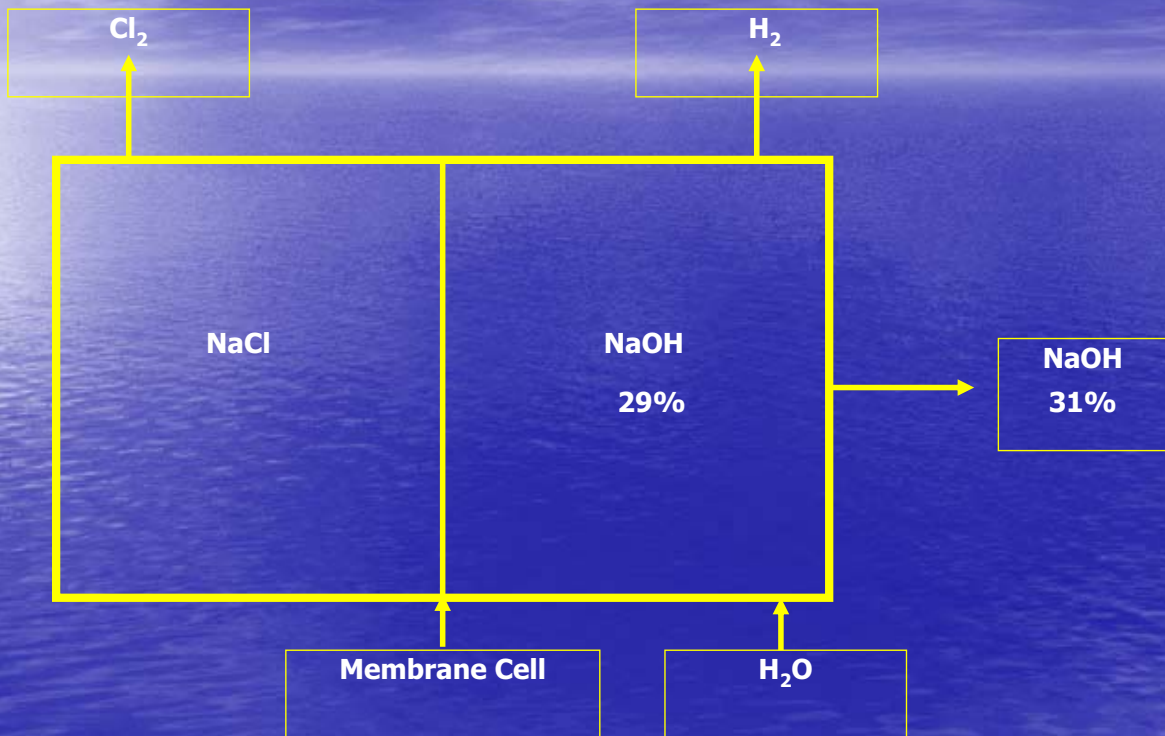
1 M. Tons of Caustic Soda consumes Mercury (Hg) = $2.5/10,000=0.00025$ M. Tons

0.00025 Ton Or 0.25 Kg per Metric Tons of Caustic Soda

Chemical Reaction in Mercury Cell Technology



Membrane Cell Technology



Mercury and Mercury Products in the Field of Health in Pakistan

Hospital Instruments:

The hospital instruments, which contain mercury, are give below;

Thermometers

Body temperature thermometers
Heating & cooking system
thermometers
Incubator, water bath thermometers
Calibration thermometers

Sphygmomanometers

Blood pressure monitoring devices
Gastrointestinal tubes
Cantor tubes
Esophageal dilators
Feeding tubes
Miller Abbott tubes

Dental Amalgams

Pharmaceutical supplies

Contact lens solutions
Ophthalmic products containing
thimerosal
Phenylmercuric acetate
Phenylmercuric nitrate
Diuretics with mersalyl and mercury salts
Pregnancy test kits with Hg containing
preservatives
Merbromin water solution
Nasal spray with thimersol

Cont'

Mercury and Mercury Products in the Field of Health in Pakistan

Cleaners & detergents with Hg containing caustic soda or chlorine

Medical use Batteries

Alarms
 Blood analyzers
 Defibrillators
 Hearing aids
 Meters
 Monitors
 Pacemakers
 Pumps
 Scales
 Telemetry transmitters
 Ultrasound
 Ventilators

Non – medical uses Batteries

Lamps
 Fluorescent
 Germicidal
 High intensity discharge or high pressure sodium, mercury vapor metal hoders

Electrical equipment

Tilt switches, Airflow control, Building security, Chest freezer lids, Fire alarms, Laptop computers, Pressure control, Silent light switches, Temperature control, Washing machines

Cont'

Mercury and Mercury Products in the Field of Health in Pakistan

Flout control

Septic tanks
 Sump pumps
 Thermostats (non-digital)
 Thermostant probes
 Read relays analytical equipment
 Plunger or displacement relays

Thermostant probes in gas

Appliances
 Flame sensors
 Base safety valves

Pressure gauges

Barometers
 Manometers
 Vacuum gauges

Hospital Devices

Blood gas analyzer
 Cathod – ray oscilloscope
 Electron microscope
 Flow meters
 Generators
 Hitachi chem. Analyzers
 ESA lead analyzer
 Sequential multi channel-auto analyzer
 Vibration meters

Cont'

Mercury and Mercury Products in the Field of Health in Pakistan

Laboratory chemicals

- Stone analysis kits
- Antibody test kits
- Antigens
- Antiserums
- Buffers
- Acetic acid
- Ammonium reagent
- Calibration kits
- Diluents
- Conjugate kits
- Enzyme immunoassay test kits
- Enzyme tracers
- Ethanol
- Extraction enzymes
- Immuno- sol
- Phenobarbital reagent
- Positive & negative control kits
- Phenyloin reagent
- Potassium hypochlorite
- Lab stains
- Substance abuse test kits
- Sulfuric acid
- Fixatives
- Hematology reagents
- Hormones
- Thimersol
- Tracer kits
- Urine test kits
- Immuno electrophoresis reagent
- Immuno fixation phoresis reagent

DATA FROM THE MARKETS OF
LAHORE, KARACHI, QUETTA,
KASUR, RAWALPINDI AND
RESEARCH INSTITUTES

Cheap Chemicals Store, Lahore

S.#	Mercury Compounds	Qty
1	Mercury (Hg) (commercial)	10 kg
2	Mercuric Chloride (HgCl ₂)	10 kg
3	Mercuric Iodide (HgI) (red)	15 kg
4	Mercuric Nitrate (HgNO ₃)	5 kg
5	Mercuric Oxide (HgO) Yellow & Red	15 kg
6	Mercuric Sulphate (HgSO ₄)	10 kg
7	Mercuric Sulphide (HgS) (red)	800 gm
8	Mercurous Acetate (C ₄ H ₆ Hg ₂ O ₂)	10 kg
9	Mercurochrome	20 kg

Akbari Chemicals Store, Lahore

S.#	Mercury Compounds	Qty
1	Commercial Mercury 99.9%	100 kg

Merck (Pvt.) Ltd, Lahore

S.#	Mercury Compounds	Qty
1	Mercuric Chloride (HgCl ₂)	1kg
2	Mercuric Sulphate (HgSO ₄)	2.5 kg
3	Mercuric Bromide (HgBr)	1 kg
4	Mercuric Nitrate (HgNO ₃)	750 gm

Nawab Chemical Store, Karachi

S.#	Mercury Compounds	Qty
1	Commercial Mercury 99.9%	100 kg

Dawawala Chemical Corporation , Karachi

S.#	Mercury Compounds	Qty
1	Mercuric Chloride (HgCl ₂)	15 kg

Mohammad Jamil Sons, Karachi

S.#	Mercury Compounds	Qty
1	Commercial Mercury 99.9%	60 kg

Rahat Chemicals , Quetta

S.#	Mercury Compounds	Qty
1	Mercuric Chloride (HgCl ₂)	500 gm
2	Mercuric Sulphate (HgSO ₄)	3 kg
3	Mercuric Nitrate (HgNO ₃)	1 kg

Alam Instruments & Chemicals , Quetta

S.#	Mercury Compounds	Qty
1	Mercuric Chloride (HgCl ₂)	2 kg
2	Mercuric Sulphate (HgSO ₄)	5 kg

Kasur Tannery Waste Management Agency (KTWMA), Kasur

S.#	Mercury Compounds	Qty
1	Mercuric Sulphate (HgSO ₄)	1.5 kg

Pakistan Council for Scientific and Industrial Research (PCSIR), Lahore

S.#	Mercury Compounds	Qty
1	Mercuric Sulphate (HgSO ₄)	2 kg

Data from the Markets of Rawalpindi

1. Shalimar Scientific Store

S.#	Mercury & Mercury Containing Products	Qty
1	Analitical Grade Pure Mercury	20 kg
2	Normal Grade Pure Mercury	20 kg
3	Thermometer 110 c	100
4	Barometer	5

2. Scientific Home

S.#	Mercury & Mercury Containing Products	Qty
1	Analitical Grade Pure Mercury	13 kg
2	Normal Grade Pure Mercury	18 kg
3	Mercuric Bromide (HgBr)	4 kg
4	Mercuric Sulphate (HgSO ₄)	2 kg
5	Mercuric Chloride (HgCl ₂)	3 kg

Cont'

Data from the Markets of Rawalpindi

3. Nobel Scientific Traders

S.#	Mercury & Mercury Containing Products	Qty
1	Analitical Grade Pure Mercury	7 kg
2	Normal Grade Pure Mercury	10 kg
3	Mercuric Sulphate (HgSO ₄)	1 kg
4	Mercuric Chloride (HgCl ₂)	2 kg
5	Thermometer 110 c	60
6	Barometer	4

4. Medi Plus Chemist

S.#	Mercury & Mercury Containing Products	Qty
1	Master Thermometer	72
2	Safety Thermometer	12
3	B.P Apparatus	4

Cont'

Data from the Markets of Rawalpindi

5. Shaheen Chemist

S.#	Mercury & Mercury Containing Products	Qty
1	Master Thermometer	100
2	Safety Thermometer	35
3	B.P Apparatus	7

6. Khattak Chemist

S.#	Mercury & Mercury Containing Products	Qty
1	Master Thermometer	500
2	Safety Thermometer	300
3	B.P Apparatus	15

7. City Surgical

S.#	Mercury & Mercury Containing Products	Qty
1	Master Thermometer	40
2	B.P Apparatus	5

Cont'

Data from the Markets of Rawalpindi

8. The Mall Chemist

S.#	Mercury & Mercury Containing Products	Qty
1	Master Thermometer	100
2	Safety Thermometer	30
3	B.P Apparatus	5

9. W. Watson Chemist

S.#	Mercury & Mercury Containing Products	Qty
1	Master Thermometer	200
2	Safety Thermometer	800
3	B.P Apparatus	4

Institute of Chemistry University of the Punjab, Lahore

In Stock

Chemical Name	Qty
Mercury Metal	24.5 Kg
Mercury Chloride	600 gm
Mercury Cyanide	165 gm
Mercury Iodide	1.7 kg
Mercury Iodide (red)	750 gm
Mercury Oxide (Yellow)	300 gm

Seldom Used (on Demand)

Chemical Name
Mercury Acetate
Mercury Bromide
Mercurous Chloride
Mercury Oxide (red)
Mercuric Sulfate
Mercuric Thiocyanate

Local Production of Coal in Pakistan (July 07 to 31st June, 2008)

S.#	Name of Province	Quantity (in metric tons)
1	Balochistan	222845
2	Punjab	553453
3	Sindh	1072053
4	N.W.F.P	23570
5	FATA	219389
TOTAL		2091310

Natural Gas Consumption in Pakistan

Sectors	2007-2008 (Cubic Foot)	2007-2008 (Cubic Meter)	%age
Power	425,138	11903.864	33.5
Fertilizer	199,845	5595.66	15.7
G. Industries	322,510	9030.28	25.4
Cement	12,725	356.3	1.0
CNG/Transport	72,019	2016.532	5.7
Commercial	33,753	945.084	2.7
Domestic	204,138	5715.864	16.1
Total	1,270,128	35563.584	100.0
Average per Day	3,480	97	

Natural gas - consumption: 29.54 billion cu m (2005 est.)

CEMENT PRODUCTION

Year	Quantity (in millions tons)
2006-07	22.73
2007-08	26.75

Custom import data of thermometers with quantity

CN	Designation	Qty
9025 19	Thermometers and pyrometers, not combined with other instruments (excl	310,365 NO.

Custom import data of fluorescent lamp with quantity

Custom code	Designation	Qty
8539 31	Discharge lamps, fluorescent, hot cathode	5,613,181 NO.
8539 32	Mercury or sodium vapour lamps; metal halide lamps	360,866 NO.
8539 49 10	Ultraviolet lamps	8,064 NO.
8539 90 10	Lamp bases for filament or discharge lamps and other lamps of heading	124,109 KG

Custom import data of fluorescent lamp with quantity

Custom code	Designation	Qty
8539 31	Discharge lamps, fluorescent, hot cathode	5,613,181 NO.
8539 32	Mercury or sodium vapour lamps; metal halide lamps	360,866 NO.
8539 49 10	Ultraviolet lamps	8,064 NO.
8539 90 10	Lamp bases for filament or discharge lamps and other lamps of heading	124,109 KG
8539 90 90	Parts of electric filament or discharge lamps, sealed beam lamp units,	295,036 KG

Custom import data of batteries

Custom code	Designation	Qty
8506 10	Manganese dioxide cells and batteries (excl. spent)	52,439,559 NO.
8506 30	Mercuric oxide cells and batteries (excl. spent)	1,554 NO.
8506 40	Silver oxide cells and batteries (excl. spent)	162,946 NO.
8506 50	Lithium cells and batteries (excl. spent)	2,392,840 NO.
8506 60	Air-zinc cells and batteries (excl. spent)	2,570 NO.
8506 80	Primary cells and primary batteries, electric (excl. spent, and those	12,979,026 NO.
8548 10 10	Spent primary cells and spent primary batteries, electrical	617,146 KG

Custom import data of Biocides and pesticides with quantity

Custom code	Designation	Qty
3808 92 90	Fungicides put up in forms or packings for retail sale or as preparati	492,982 KG
3808 91 10	Insecticides based on pyrethroids, put up in forms or packings for ret	1,323,514 KG
3808 91 20	Insecticides based on chlorinated hydrocarbons, put up in forms or pac	475 KG
3808 91 40	Insecticides based on organophosphorus compounds, put up in forms or p	450,000 KG
3808 92 10	Fungicide preparations based on copper compounds, inorganic (excl. goo	1,234,427 KG

Custom import data of Dental Amalgams with Quantity

Custom code	Designation	Qty
2852 00 00	Compounds, inorganic or organic, of mercury (excl. amalgams)	5,779 KG

Custom import data of Paint with quantity

Custom code	Designation	Qty
5907 00	Impregnated, coated or covered textile fabrics; painted canvas being t	835,736 KG
3205 00 00	Colour lakes (other than Chinese or Japanese lacquer and paints); prep	36,200 KG
3208 10 90	Paints and varnishes, incl. enamels and lacquers, based on polyesters,	619,102 KG
3208 20 90	Paints and varnishes, incl. enamels and lacquers, based on acrylic or	282,216 KG
3210 00 10	Oil paints and varnishes, incl. enamels and lacquers	1,813 KG
3210 00 90	Paints and varnishes, incl. enamels, lacquers and distempers (excl. th	73,935 KG
3213 10 00	Sets of artist's, student's or signboard painter's colours, modifyi	130,921 KG
3213 90 00	Artist's, student's or signboard painter's colours, modifying tints	21,694 KG
3214 10 90	Painter's fillings	823,245 KG
3814 00 10	Organic composite solvents and thinners and prepared paint or varnish	145,449 KG

Quantity of Medical Waste Incinerated per Year

S.#	Name of Hospital	Mass of Waste Incinerated/Year
1	Shahlimar Hospital, Lahore	480 Tons
2	Sheikh Zaid Hospital, Lahore	225 Tons
3	Shaukat Khanam Memorial Hospital, Lahore	60 Tons
4	National Hospital, Faisalabad	7.50 Tons
5	Sanate Rafeel, Faisalabad	7.50 Tons
6	Allied Hospital, Faisalabad	120 Tons
7	Holy Family Hospital, Rawalpindi	94.50 Tons
8	Attock Refinery Hospital, Rawalpindi	75 Tons
9	Fatma Medical Hospital Khanewal, Road Multan	4.5 Tons
Total		1074 Tons

INPUTS STATS MAX VALUES

Hg input calculation		
Sub category name	No File	Total
Chlor-alkali production with mercury-technology	4	21 120
Total Chlor-alkali production with mercury-technology		21 120
Mineral oils - extraction, refining and use	1	0
	2	568
Total Mineral oils - extraction, refining and use		568
Waste water system/treatment	13	188
Total Waste water system/treatment		188
Controlled landfills/deposits (a	12	1 900
Total Controlled landfills/deposits (a		1 900
Incineration of medical waste	11	165
Total Incineration of medical waste		165
Miscellaneous product uses, mercury metal uses, and other sources	10	5 779
Total Miscellaneous product uses, mercury metal uses, and other sources		5 779
Batteries with mercury	8	393
	9	148
Total Batteries with mercury		541

Cont'

INPUTS STATS MAX VALUES

Light sources with mercury	6	56
	7	9
Total Light sources with mercury		65
Thermometers with mercury	5	466
Total Thermometers with mercury		466
Natural gas - extraction, refining and use	3	12
Total Natural gas - extraction, refining and use		12
Cement production (a	15	2 500
Total Cement production (a		2 500
Informal dumping of general waste (b	14	2 550
Total Informal dumping of general waste (b		2 550
Coal combustion in large power plants	0	1 046
Total Coal combustion in large power plants		1 046
Total maximum quantity (in kg)		36 898

Total input with min values

INPUTS STATS

Hg input calculation		
Sub category name	No File	Total
Chlor-alkali production with mercury-technology	4 min	1 320
Total Chlor-alkali production with mercury-technology		1 320
Mineral oils - extraction, refining and use	1 min	0
	2 min	6
Total Mineral oils - extraction, refining and use		6
Waste water system/treatment	13 min	188
Total Waste water system/treatment		188
Controlled landfills/deposits (a	12 min	1 900
Total Controlled landfills/deposits (a		1 900
Incineration of medical waste	11 min	33
Total Incineration of medical waste		33
Miscellaneous product uses, mercury metal uses, and other sources	10 min	5 779
Total Miscellaneous product uses, mercury metal uses, and other sources		5 779
Batteries with mercury	8 min	393
	9 min	148
Total Batteries with mercury		541

Cont'

Total input with min values

Light sources with mercury	6 min	56
	7 min	9
Total Light sources with mercury		65
Thermometers with mercury	5 min	155
Total Thermometers with mercury		155
Natural gas - extraction, refining and use	3 min	1
Total Natural gas - extraction, refining and use		1
Cement production (a)	15 min	500
Total Cement production (a)		500
Informal dumping of general waste (b)	14 min	250
Total Informal dumping of general waste (b)		250
Coal combustion in large power plants	0 min	105
Total Coal combustion in large power plants		105
Total minimum quantity (in kg)		10 842

Summary of mercury release from all categories

No	Category and Sub-category	Activity rate	Input factor		Amount (Kg Hg/y)	
			Min	Max	Min	Max
1	Extraction and use of fuel/energy sources					
1.1	Coal combustion in large power plants	2091310 T/y	0.05 g Hg/T	0.5 g Hg/T	104.5655 Kg/year	1045.655 Kg/year
1.2-a	Mineral oils - extraction, refining and use	1610762 T/y	0.01 mg Hg/T	0.01 mg Hg/T	0.01610762 Kg/year	0.0161076 Kg/year
1.2-b	Use of gasoline, diesel and distillates	567182.5 T/y	1 mg Hg/T	100 mg Hg/T	5.676182 Kg/year	567.6182 Kg/year
1.2-c	Natural gas - extraction, refining and use	29540000000 m3/year	0.03 µg Hg/Nm3 gas	0.4 µg Hg/Nm3 gas	0.8862 kg/year	11.816 kg/year
2	Production of other minerals and materials with mercury impurities					
2.1	Cement production	25000000 T/y	0.02 g Hg/T	0.1 g Hg/T	500 Kg/year	2500 Kg/year
3	Intentional use of mercury in industrial purposes					
3.1	Chlor-alkali production with mercury-Technology	52800 T/y	25 g Hg/T	400 g Hg/T	1320 Kg/year	21120 Kg/year

Summary of mercury release from all categories

No	Category and Sub-category	Activity rate	Input factor		Amount (Kg Hg/y)	
			Min	Max	Min	Max
4	Consumer products with intentional use of mercury					
4.1	Thermometers with mercury	310.365 items/y	0.5 items/y	1.5 items/y	155.1825 Kg/year	465.5475 Kg/year
4.2-a	Light sources with mercury (fluorescent tube)	5613180 items/year	10 mg Hg/item	10 mg Hg/item	56.1318 Kg/year	56.1318 Kg/year
4.2-b	Light sources with mercury (metal halide lamps)	360866 items/year	25 mg Hg/item	25 mg Hg/item	9.02165 Kg/year	9.02165 Kg/year
4.3-a	Batteries with mercury (alkaline, other than button cell shapes)	1573 T/year	0.25 kg Hg/T	0.25 kg Hg/T	393.25 Kg/year	393.25 Kg/year
4.3-b	Batteries with mercury {mercury oxide (all sizes)} also called mercury-zinc cell}	0.462 t/year	320 kg/T	320 kg/T	147.84 Kg/year	147.84 Kg/year
5	Custom import data of Biocides and pesticides with quantity					
5.1	Misc. Product uses, mercury metal uses, and other sources	5779 T/year	1 kg Hg/T	1 kg Hg/T	5779 Kg/year	5779 Kg/year

Cont'

Summary of mercury release from all categories

No	Category and Sub-category	Activity rate	Input factor		Amount (Kg Hg/y)	
			Min	Max	Min	Max
6	Waste incineration					
6.1	Incineration of medical waste	4118 T/year	8 g Hg/T	40 g Hg/T	32.944 Kg/year	164.72 Kg/year
7	Waste deposition/land filling and waste water treatment					
7.1	Informal dumping of general waste	255000 T/year	1 g Hg/T	10 g Hg/T	255 Kg/year	2550 Kg/year
7.2	Control land fills/deposits	1900000 T/year	1 g Hg/T	1 g Hg/t	1900 Kg/year	1900 Kg/year
7.3	Waste water treatment	93776724 cm ³ /year	2 mg Hg/m ³	2 mg Hg/m ³	187.553448 Kg/year	187.553448 Kg/year
TOTAL					10846 Kg/year	36 898.77 Kg/year

OUTPUTS MAX VALUES

		Emission (in kg)						
Sub category name	No File	E air	E water	E land	T product	T waste	T disposal	Total
Batteries with mercury	8	79	157	157	0	0	0	393
	9	30	59	59	0	0	0	148
Total Batteries with mercury		108	216	216	0	0	0	541
Chlor-alkali production with mercury-technology	4	0	0	0	0	21 120	0	21 120
Total Chlor-alkali production with mercury-technology		0	0	0	0	21 120	0	21 120
Controlled landfills/deposits (a)	12	0	190	1 710	0	0	0	1 900
Total Controlled landfills/deposits (a)		0	190	1 710	0	0	0	1 900
Incineration of medical waste	11	165	0	0	0	0	0	165
Total Incineration of medical waste		165	0	0	0	0	0	165
Light sources with mercury	6	11	22	22	0	0	0	56
	7	2	4	4	0	0	0	9
Total Light sources with mercury		13	26	26	0	0	0	65

Cont'

OUTPUTS MAX VALUES

		Emission (in kg)						
Sub category name	No File	E air	E water	E land	T product	T waste	T disposal	Total
Mineral oils - extraction, refining and use	1	0	0	0	0	0	0	0
	2	568	0	0	0	0	0	568
Total Mineral oils - extraction,refining and use		568	0	0	0	0	0	568
Miscellaneous product uses, mercury metal uses, and other sources	10	1 156	2 312	2 312	0	0	0	5 779
Total Miscellaneous product uses, mercury metal uses, and other sources		1 156	2 312	2 312	0	0	0	5 779
Natural gas - extraction, refining and use	3	12	0	0	0	0	0	12
Total Natural gas - extraction, refining and use		12	0	0	0	0	0	12
Thermometers with mercury	5	93	186	186	0	0	0	466
Total Thermometers with mercury		93	186	186	0	0	0	466

Cont'

OUTPUTS MAX VALUES

		Emission (in kg)						
Sub category name	No File	E air	E water	E land	T product	T waste	T disposal	Total
Waste water system/treatment	13	0	188	0	0	0	0	188
Total Waste water system/treatment		0	188	0	0	0	0	188
Cement production (a)	15	2 500	0	0	0	0	0	2 500
Total Cement production (a)		2 500	0	0	0	0	0	2 500
Informal dumping of general waste (b)	14	1	1 274	1 275	0	0	0	2 550
Total Informal dumping of general waste (b)		1	1 274	1 275	0	0	0	2 550
Coal combustion in large power plants	0	1 046	0	0	0	0	0	1 046
Total Coal combustion in large power plants		1 046	0	0	0	0	0	1 046
Total emission (in kg)		5 661	4 392	5 725	0	21 120	0	36 898

OUTPUTS MIN VALUES

		Emission (in kg)						
Sub category name	No File	E air	E water	E land	T product	T waste	T disposal	Total
Batteries with mercury	8 min	79	157	157	0	0	0	393
	9 min	0	0	0	0	148	0	148
Total Batteries with mercury		79	157	157	0	148	0	541
Chlor-alkali production with mercury-technology	4 min	0	0	0	0	1 320	0	1 320
Total Chlor-alkali production with mercury-technology		0	0	0	0	1 320	0	1 320
Controlled landfills/deposits (a)	12 min	0	190	1 710	0	0	0	1 900
Total Controlled landfills/deposits (a)		0	190	1 710	0	0	0	1 900
Incineration of medical waste	11 min	33	0	0	0	0	0	33
Total Incineration of medical waste		33	0	0	0	0	0	33
Light sources with mercury	6 min	11	22	22	0	0	0	56
	7 min	2	4	4	0	0	0	9
Total Light sources with mercury		13	26	26	0	0	0	65

OUTPUTS MIN VALUES

		Emission (in kg)						
Sub category name	No File	E air	E water	E land	T product	T waste	T disposal	Total
Mineral oils - extraction, refining and use	1 min	0	0	0	0	0	0	0
	2 min	6	0	0	0	0	0	6
Total Mineral oils - extraction, refining and use		6	0	0	0	0	0	6
Miscellaneous product uses, mercury metal uses, and other sources	10 min	1 156	2 312	2 312	0	0	0	5 779
Total Miscellaneous product uses, mercury metal uses, and other sources		1 156	2 312	2 312	0	0	0	5 779
Natural gas - extraction, refining and use	3 min	1	0	0	0	0	0	1
Total Natural gas - extraction, refining and use		1	0	0	0	0	0	1
Thermometers with mercury	5 min	31	62	62	0	0	0	155
Total Thermometers with mercury		31	62	62	0	0	0	155

Cont'

OUTPUTS MIN VALUES

		Emission (in kg)						
Sub category name	No File	E air	E water	E land	T product	T waste	T disposal	Total
Waste water system/treatment	13 min	0	188	0	0	0	0	188
Total Waste water system/treatment		0	188	0	0	0	0	188
Cement production (a)	15 min	500	0	0	0	0	0	500
Total Cement production (a)		500	0	0	0	0	0	500
Informal dumping of general waste (b)	14 min	250	0	0	0	0	0	250
Total Informal dumping of general waste (b)		250	0	0	0	0	0	250
Coal combustion in large power plants	0 min	105	0	0	0	0	0	105
Total Coal combustion in large power plants		105	0	0	0	0	0	105
Total emission (in kg)		2 173	2 935	4 267	0	1 468	0	10 842

MAIN SOURCES CATEGORIES AND SUB CATEGORIES

No Category	Category name	Sub category no	Sub category name
51	Extraction and use of fuels/energy sources	511	Coal combustion in large power plants
		513	Mineral oils - extraction, refining and use
		514	Natural gas - extraction, refining and use
53	Production of other minerals and materials with mercury impurities	531	Cement production (a)
54	Intentional use of mercury in industrial processes	541	Chlor-alkali production with mercury-technology
55	Consumer products with intentional use of mercury	551	Thermometers with mercury
		553	Light sources with mercury
		554	Batteries with mercury
56	Other intentional product/process use	565	Miscellaneous product uses, mercury metal uses, and other sources
58	Waste incineration	583	Incineration of medical waste
59	Waste deposition/landfilling and waste water treatment	591	Controlled landfills/deposits (a)
		594	Informal dumping of general waste (b)
		595	Waste water system/treatment

Phases of life cycle

Sub category name	Phase of life cycle		
	Production	Use	Disposal
Coal combustion in large power plants		X	
Mineral oils - extraction, refining and use	X	X	
Natural gas - extraction, refining and use		X	
Cement production (a)	X		
Chlor-alkali production with mercury-technology	X		
Thermometers with mercury		X	X
Light sources with mercury		X	X
Batteries with mercury	X	X	X
Miscellaneous product uses, mercury metal uses, and other sources		X	
Incineration of medical waste			X
Controlled landfills/deposits (a)			X
Informal dumping of general waste (b)			X
Waste water system/treatment			X

TYPE OF RELEASE PER CATEGORY

Sub category no	Sub category name	air	water	land	product	waste
511	Coal combustion in large power plants	x				
513	Mineral oils - extraction, refining and use	x				
514	Natural gas - extraction, refining and use	x				
531	Cement production (a)	x				
541	Chlor-alkali production with mercury-technology					x
551	Thermometers with mercury	x	x	x		
553	Light sources with mercury	x	x	x		
554	Batteries with mercury	x	x	x		
565	Miscellaneous product uses, mercury metal uses, and other sources	x	x	x		
583	Incineration of medical waste	x				
591	Controlled landfills/deposits (a)		x	x		
594	Informal dumping of general waste (b)	x	x	x		
595	Waste water system/treatment		x			

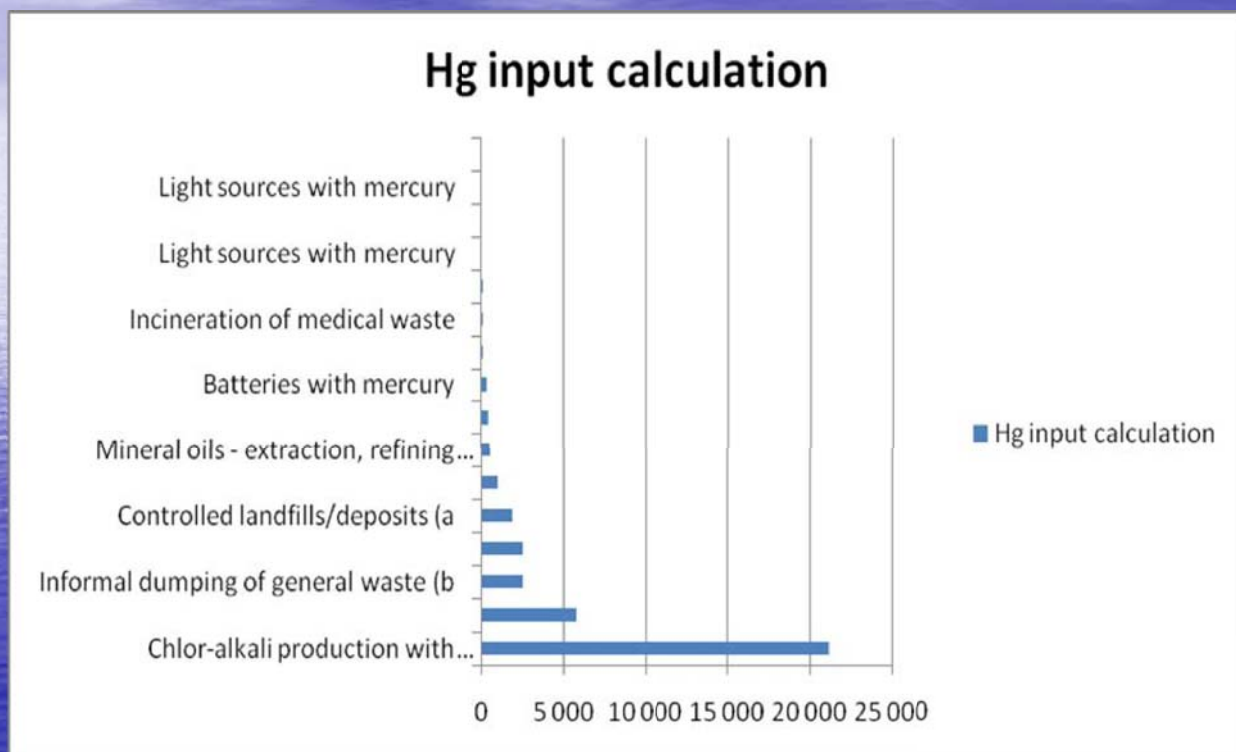
Hg Inputs per Main Categories (kg per year)

No Category	Category name	Total Max	Total Min
51	Extraction and use of fuels/energy sources	1 625	111
53	Production of other minerals and materials with mercury impurities	2 500	500
54	Intentional use of mercury in industrial processes	21 120	1 320
55	Consumer products with intentional use of mercury	1 072	761
56	Other intentional product/process use	5 779	5 779
58	Waste incineration	165	33
59	Waste deposition/landfilling and waste water treatment	4 638	2 338
Total quantity (in kg)		36 898	10 842

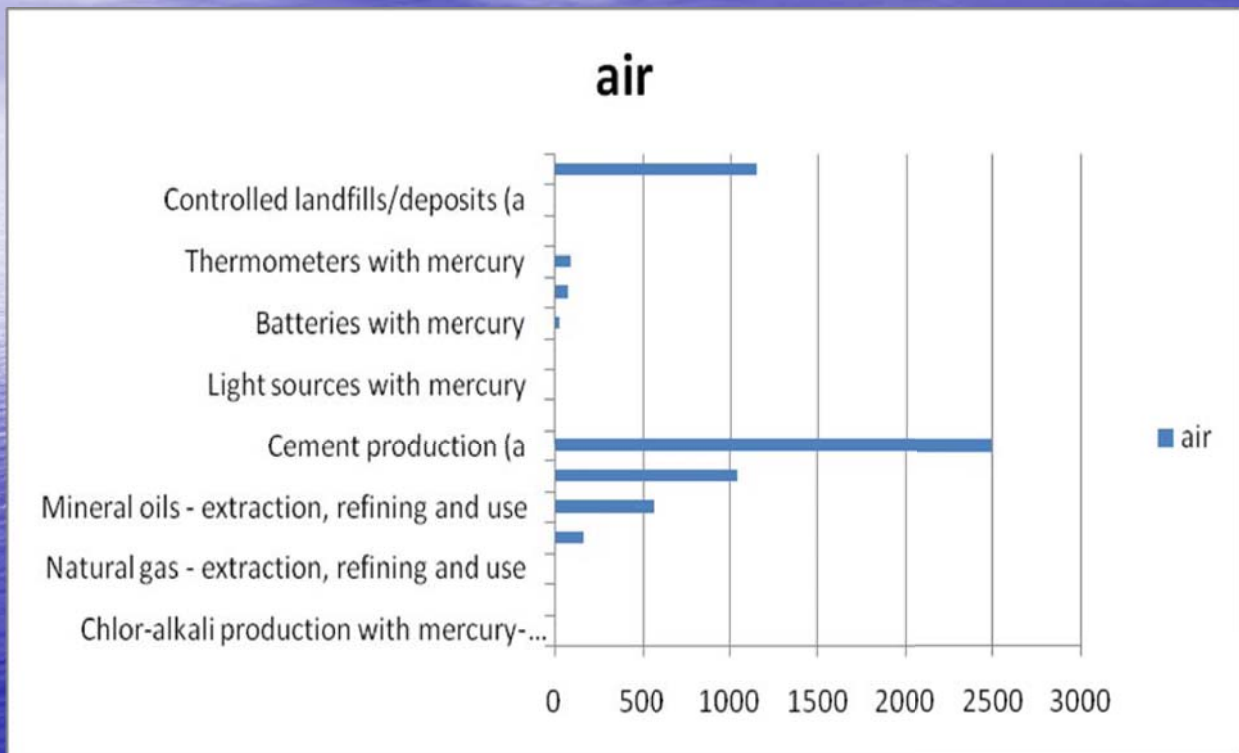
Hg Inputs per sub categories

No Category	Category name	Sub category no	Sub category name	Max input	Min input
51	Extraction and use of fuels/energy sources	511	Coal combustion in large power plants	1 046	105
		513	Mineral oils - extraction, refining and use	568	6
			Mineral oils - extraction, refining and use	0.016	0.016
		514	Natural gas - extraction, refining and use	12	1
53	Production of other minerals and materials with mercury impurities	531	Cement production (a)	2 500	500
54	Intentional use of mercury in industrial processes	541	Chlor-alkali production with mercury-technology	21 120	1 320
55	Consumer products with intentional use of mercury	551	Thermometers with mercury	466	155
		553	Light sources with mercury	9	9
			Light sources with mercury	56	56
		554	Batteries with mercury	148	148
Batteries with mercury	393		393		
56	Other intentional product/process use	565	Miscellaneous product uses, mercury metal uses, and other sources	5 779	5 779
58	Waste incineration	583	Incineration of medical waste	165	33
59	Waste deposition/landfilling and waste water treatment	591	Controlled landfills/deposits (a)	1 900	1 900
		594	Informal dumping of general waste (b)	2 550	250
		595	Waste water system/treatment	188	188
Total				36 898	10 842

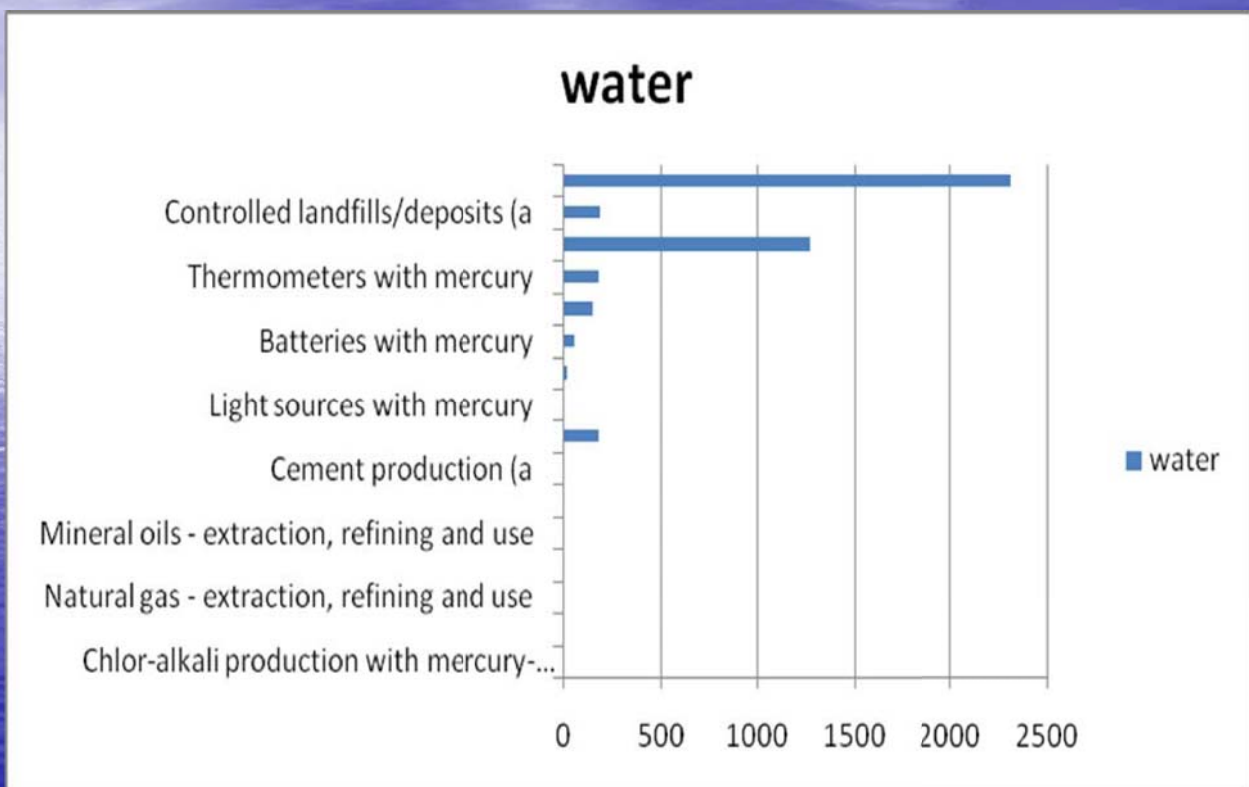
GRAPH OF INPUTS



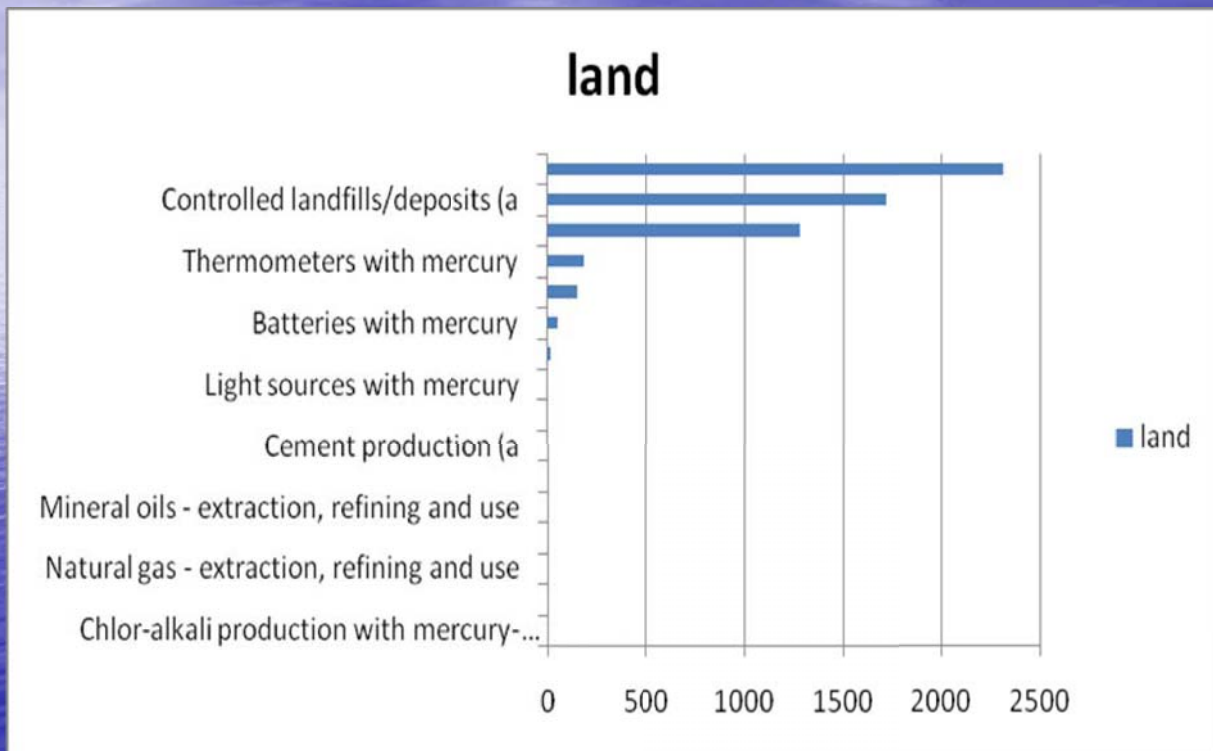
GRAPHS OF RELEASES IN KGS PER YEAR



GRAPHS OF RELEASES IN KGS PER YEAR



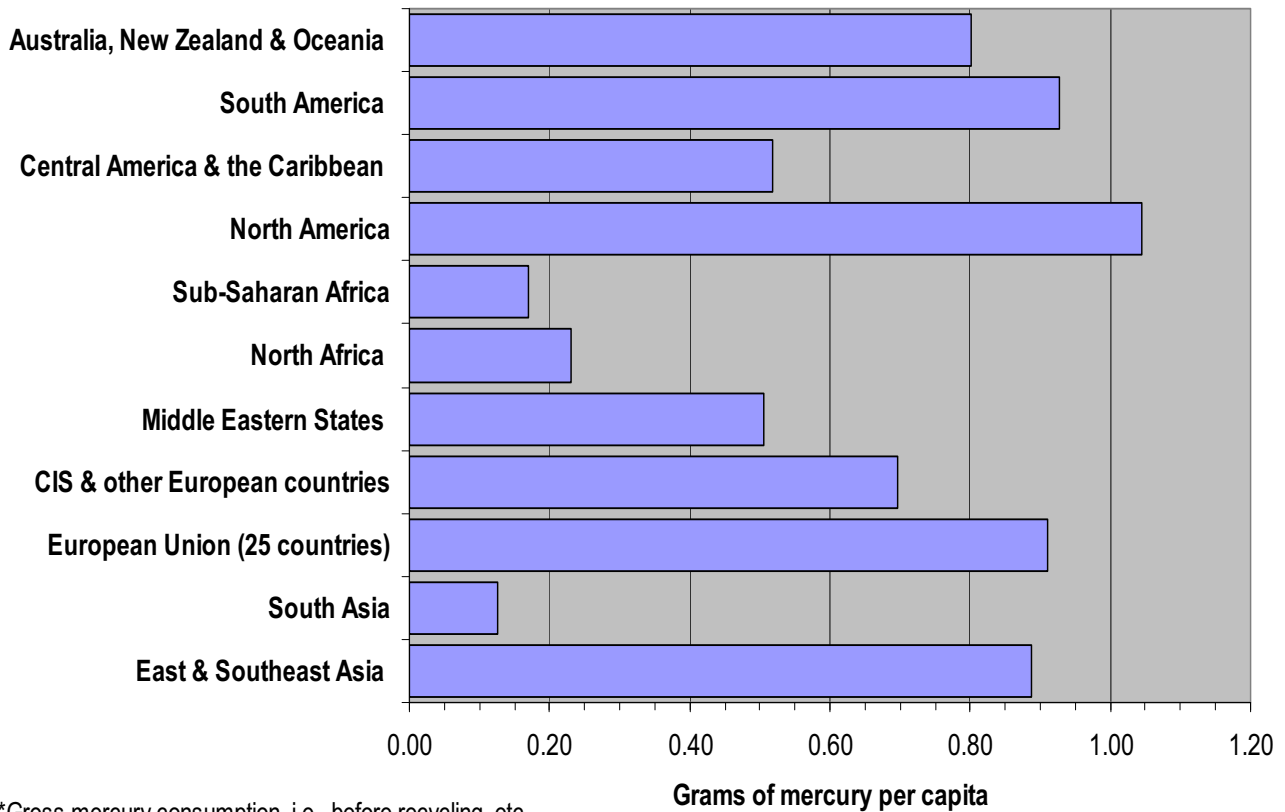
GRAPHS OF RELEASES IN KGS PER YEAR



Comparison of Inventory results with world Hg consumption

- Average consumption of Hg per capita and per year in South Asia : 0.12g
- Population of Pakistan: 173 000 000 hab.
- Estimated Hg consumption per year: 20,000 kgs
- Average value between Min and Max inputs: 23870 kg

Specific (per capita) regional mercury consumption* (2005)



**Pictures of
Meetings,
Industries
and
Sampling Points**

















Thanks