



CONTAMINATION OF GROUNDWATER & SURFACE WATER BY MERCURY

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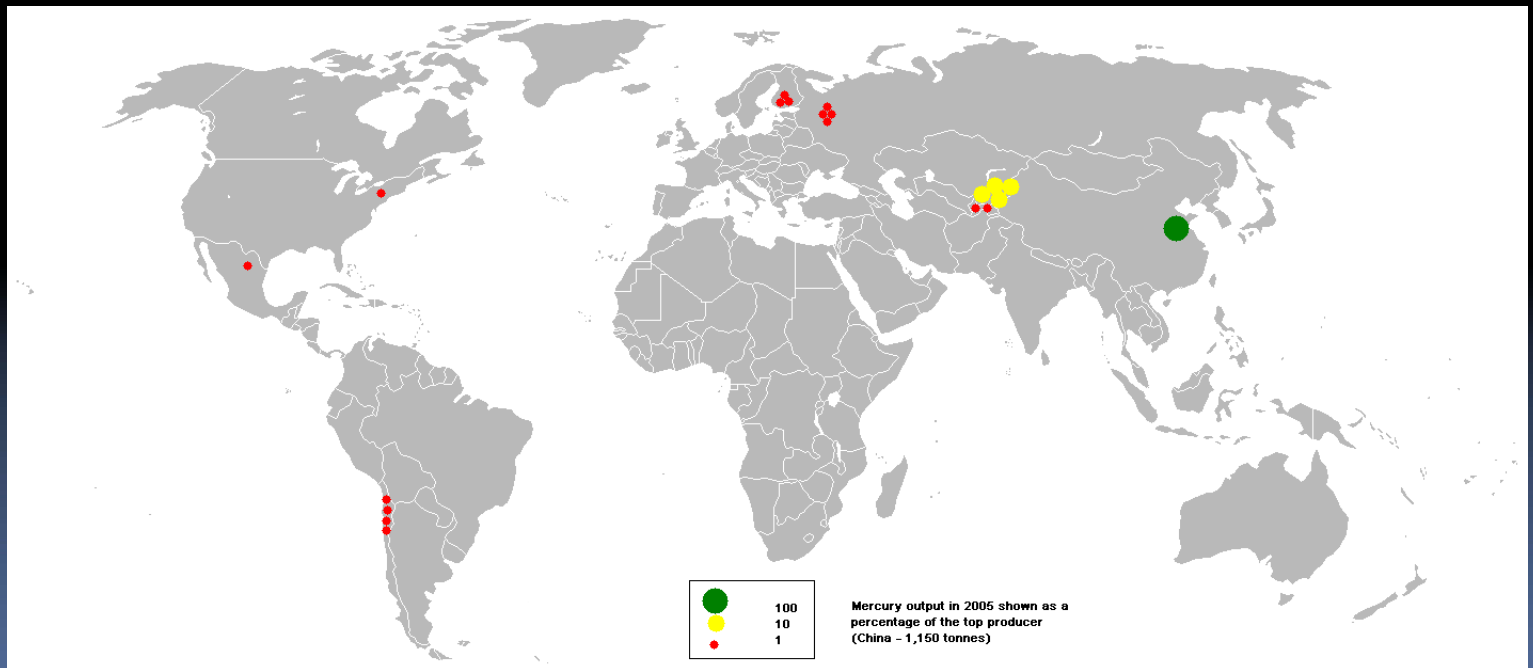
INTRODUCTION

- Mercury is a heavy, silvery-white metal; a rather poor conductor of heat, as compared with other metals, and a fair conductor of electricity.
- A heavy, silvery d-block metal, mercury is one of six elements that are liquid at or near room temperature and pressure



Occurrence

- Mercury is an extremely rare element in the Earth's crust, having an average crustal abundance by mass of only 0.08 parts per million (ppm)
- It is found either as a native metal (rare) or in cinnabar, corderoite, livingstonite and other minerals



Applications

- industrial chemicals or for electrical and electronic applications
- thermometers,
- fluorescent lamps,
- Medicine
- Mercury manometer



Mercury in the environment

- Coal fired power plants
- Smelters, Gold production(minning)
- Cement production
- Waste diposal(municipal and hazardous waste)
- Caustic soda production
- Volcanic Eruption
- Pig iron and steel production



Mercury in Ground water

- Dissolution of minerals and ores
- Industrial effluents
- Mercury in the air eventually settles into water or onto land where it can be washed into water



Health effects of mercury

High exposures to inorganic mercury may result in damage to the gastrointestinal tract, the nervous system, and the kidneys

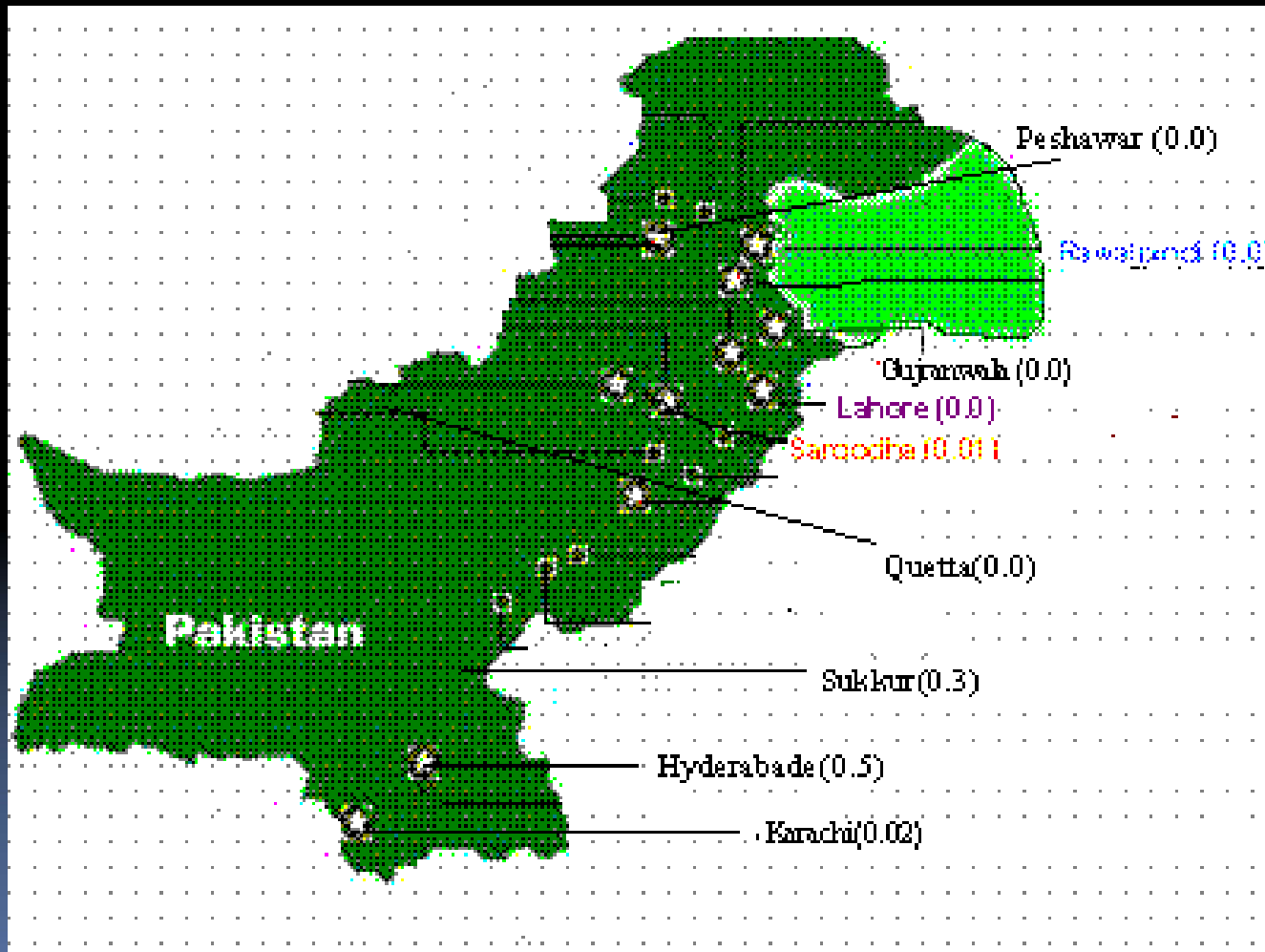
- Impairment of the peripheral vision
- Disturbances in feelings, numbness) usually in the hands feet and sometimes around the mouth
- Lack of coordination of movements, such as writing
- Impairment of speech, hearing, walking;
- Muscle weakness
- Skin rashes
- Mood swing
- Memory loss
- Mental disturbance
- sensations ("pins and needles"



WHO'S ACTIVITIES ON MERCURY

- The 1958 and 1963 WHO international Standards for Drinking water did not mention mercury
- Mercury was first mentioned in the 1971 International Standards, which gave the tentative upper concentration limit for mercury as 0.001 mg/l
- The 1993 Guidelines also retained the guideline value for total mercury of 0.001 mg/l.

Mercury IN GROUND WATER OF Pakistan



Sampling & Methodology

- Grab sampling was carried out for mercury. Composite sampling was carried out for industrial effluents.
- Plastic Bottles of 200ml were used for sampling.
- The water samples were collected in accordance to SOPs (Standard operating procedures) based on methods of United State Environmental Protection Agency (USEPA) and American Public Health Administration (APHA) methods for sampling and analysis



Hg in Ground Water of Lahore

Lahore	Values in mg/L	Sample Sources
Baghbanpura	0.01	Tube Well
UET	BDL	Hand pump
China Town	BDL	Tube Well
Model Town	BDL	Tube Well
Mustafa Town	BDL	Tube Well

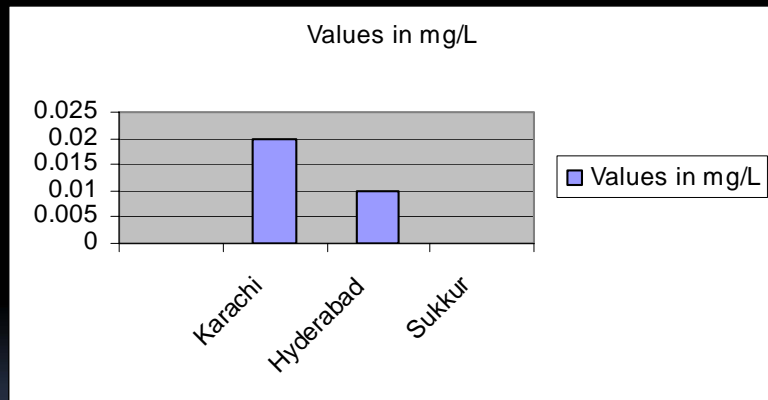
Hg in Ground Water of Gujranwala

Gujranwala	Values in mg/L	Sample Sources
People Colony	BDL	Tube Well
Professor Colony	BDL	Tube Well
Jinnah Market	BDL	Hand Pump

Hg in Ground Water of Rawalpindi

Rawalpindi	Values in mg/L	Sample Sources
Saddar Bazar	BDL	Tube Well
Hati Chowk	BDL	Tube Well
Raja Bazar	BDL	Tube well
Laiqat Bagh	BDL	Tube Well

Hg in Ground Water Sindh



	Values in mg/L	Sample Sources
Sindh		
Karachi	0.02	Tube Well
Hyderabad	0.01	Tube Well
Sukkur	BDL	Hand Pump

Hg in Ground Water of NWFP

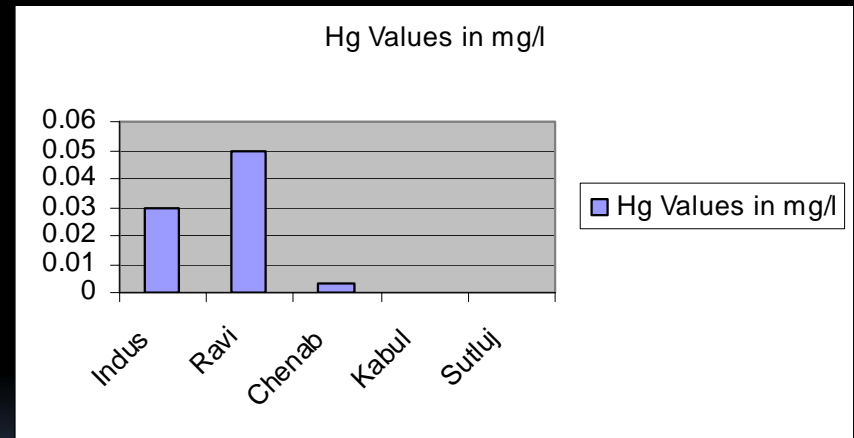
NWFP	Values in mg/L	Sample Sources
Peshawar	BDL	HandPump

Hg in Ground Water of Balochistan

Balochistan	Value in mg/l
Quetta	BDL

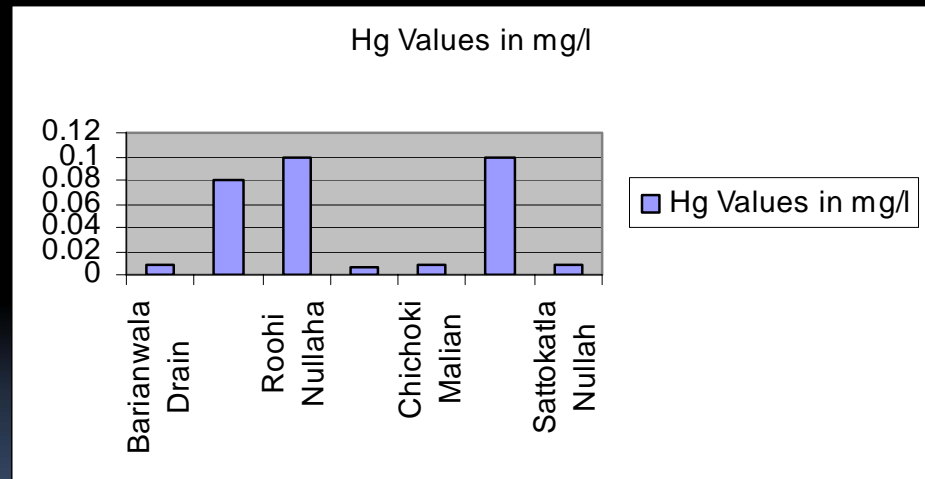
Hg in Surface Water Sources

Rivers	As Values in mg/l
Indus	0.03
Ravi	0.05
Chenab	0.003
Kabul	BDL
Sutluj	BDL



Hg in Industrial Drains & Nullahs

Rivers	Hg Values in mg/l
Barianwala Drain	0.009
Hudiara Nullah	0.08
Roohi Nullaha	0.1
Deg Nullaha	0.007
Chichoki Malian Drain	0.009
Pharan Drain	0.1
Sattokatla Nullah	0.008



Prevention and Control

- Provision of Safe drinking water
- People concerned about their exposure to inorganic mercury should consult their physician.
- Discrimination between high-mercury and low-mercury sources
- Hg can be removed by treatment technologies like
 - Coagulation/filtration
 - Lime softening
 - reverse osmosis



CONCLUSION