



Mercury emission from Indian Thermal Power Plants

1. Introduction

Mercury (Hg), a potential contaminant to the environment is of global concern because of its toxic nature, trans-boundary movement and ability of bioaccumulation etc. The residence time of elemental Hg in the atmosphere is from five months to two years. Coal consumption is one of the prime anthropogenic sources of Hg in the biosphere. Hg content in the coal varies from place to

place (0.01-0.5 mg/kg) and depends upon the coal-type in the world.

Globally, coal is used for energy and the annual coal consumption has doubled in last three decades (from 2780 Mt to ~5000 Mt from 1980 to 2008 respectively) in the World. The consumption of coal is highest in Asia (2610 Mt) followed by North America (1050 Mt), others (540 Mt), and Europe (400 Mt) in year 2004. India is the third-largest producer of coal in the world. Coal production in India has risen from less than 1 Mt in 1880 to 456.4 Mt in 2007/08. Coal consumption and demand have grown enormously in India, primarily dominated

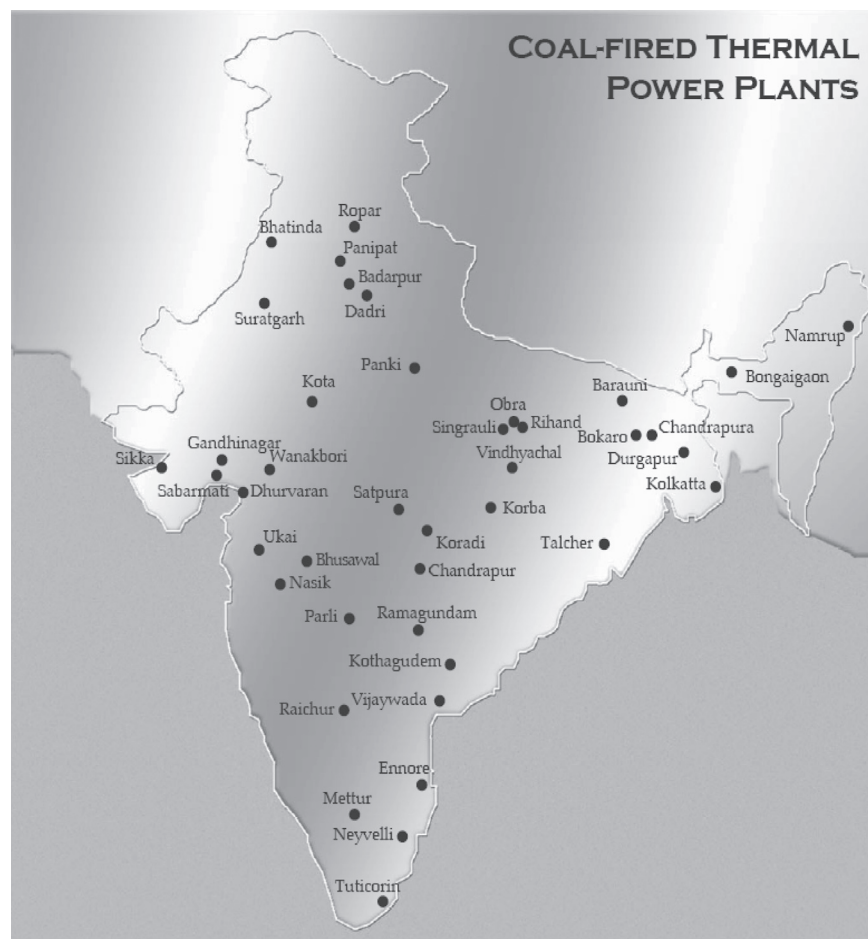


Fig. 1: Location of coal based thermal power plants in India

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by the power plants. In 1970, power generation consumed about 13 Mt (less than 20% of total coal consumption), which has increased to about 280 Mt in 2003. After 1980, the power sector emerged as the largest consumer followed by other industries like smelting, cement etc. There are more than 50-coal based TPPs in India having installed capacity 14.6 GigaWatt (GW) in the year 2008 where central, state and private sectors had power generation as high as figures 6.6 GW, 3.8 GW and 4.2 GW respectively (Electricity Authority, 2008).

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A recent study carried out by a consumer magazine has found high levels of 4 highly toxic and banned pesticides in vegetable and fruits. This is yet another piece of evidence to show that the food we eat is contaminated. In fact over the past decade, several studies have shown the presence of heavy metals and pesticides in water, milk, vegetables, fruits and grains. Despite this there has been no attention paid to this problem at the state level. The reasons for this contamination are several and occur at various parts of the food production, supply and distribution chain. However the most significant reasons are to be found at the production sites of food. Here contaminated irrigation water and soil, overuse of pesticides and the use of illegal pesticides are key. Simultaneously health impacts are caused to farmers owing to poor pesticide application practices.

The pesticides industry, instead of being part of the solution has been very aggressively pursuing a policy of silencing any criticism against it. Arguing that pesticides are essential to maintain a high level of food production they continue to protect and sell molecules, which are banned in many parts of the world. The laws of the land also support this, since pesticides once registered cannot be deregistered, and there is no review of such registration despite ongoing new information on health impacts. Also our standards, which govern contamination levels in food, are outdated, and inadequate. It must be said though that even if the laws were better, it would still require a massive effort on the ground to improve the situation.

In the case of the latest study, the Delhi High Court has taken up the matter, which is laudable. This is not the first time such matters have received Court attention. Previously the Supreme Court has deliberated on at least two such cases, which deal with food safety, but not much has changed on the ground. In these cases, the government has been very protective of the industry and has not even acknowledged that indeed there is a problem. In fact one significant study, in which Toxics Link was a partner, had shown high levels of heavy metals in vegetables like spinach over hundreds of samples taken over three years. The study created a lot of dust, but like always this settled down and it was back to business as usual. Nothing changed! At the very least the Court in this case should recommend the setting up an independent body to examine the problem and suggest practical ways forward. Else what we eat on an everyday basis is close to poison.

Ravi Agarwal

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Uptill now the only limited study on coal consumption for energy has been conducted in India to test the mercury emission from any thermal power plants in India (CPCB), though some tests had been done for knowing the mercury content in the coal in India by BHEL, 2004. Mukherjee et al., 2008 attempted to prepare emission inventory of Hg-from various sources in India for the year 2000 and 2004.

2. Coal and Thermal Power Plants in India

Exploration, development, and sale of coal and lignite resources in India are completely under the oversight of the Indian Government, through the Ministry of Coal. The Ministry of Coal effectively determines all matters relating to the production, supply, distribution and sale price of coal. The Ministry is in administrative control of major coal-producing companies including Coal India Limited (CIL), Singareni Colliery Company Limited (SCCL), and Neyveli Lignite Corporation (NLC). The Geological Survey of India (GSI), the Mineral Exploration Corporation (MEC), SCCL, and CMPDIL map India's coal resources by undertaking prospecting surveys in areas with potential coal resources. The GSI and MEC are under the jurisdiction of the Ministry of Mines.

In addition to the Ministry of Coal, the Ministry of Power plays a key role in recommending coal linkages to power projects and in recommending coal block allocations for captive mining. The Planning Commission of India sets the long-term vision and priorities for the government and provides overall policy guidance and sectoral growth targets for all government ministries through its national plans. The Power and Energy Division of the Planning Commission also provides support to an Energy Coordination Committee under the chairmanship of the Prime Minister that addresses all key energy sector issues.

Among the other government entities involved in coal, the Ministry of Environment and Forests plays a key role in regulating the environmental impacts of mining and in providing clearances for mining in forestlands. The Ministry of Mines (through the GSI and MEC) also facilitates coal resource exploration. The Directorate General of Mines Safety, in the Ministry of Labor, helps protect occupational health and safety of mine workers in India through legislation, examinations, inspections and investigations. (<http://www.pewclimate.org/docUploads/india-coal-technology.pdf>).

The quality of Indian coal is poor and has gotten worse over the past decades. Run-of-mine coals typically have high ash content (ranging from 40–50%), high moisture content (4–20%), low sulfur content (0.2–0.7%), and low calorific values (between 2500–5000 kcal/ kg) (IEA, 2002). A comparison of Indian coals to Ohio and Chinese coals indicates the key differences like ash content in Indian coal is ~3-times than US and ~6-times than China (see Table 1). Selected coals from the U.S. and China have about twice the calorific value and carbon content of Indian coals. The low calorific value implies more coal usage to deliver the same amount of electricity. Indian coal, however, has lower sulfur content in comparison to other coals, although it has relatively high amounts of toxic trace elements, especially mercury.

Table 1: Typical coal characteristics from few thermal power plants of India, China and US

Details (%)	India			Ohio (US)	Long Kou (China)
	Kahalgaon	Simhadri	Sipat		
Carbon	25.05	29.00	30.72	64.2	62.8
Hydrogen	2.95	1.88	2.30	5.0	5.6
Nitrogen	0.50	0.52	0.60	1.3	1.4
Oxygen	6.71	6.96	5.35	11.8	21.7
Moisture	18.5	15.0	15.0	2.8	11.0
Sulphur	0.17	0.25	0.40	1.8	0.9
Ash	46.0	46.0	45.0	16.0	7.7
Calorific value (kcal/kg)	2450	2800	3000	6378	6087

Indian power sector comes under the Ministry of Power India. Earlier known as Ministry of Energy, it comprised of separate departments for power, coal and non-conventional sources of energy. In 1992, the Ministry of Power started working independently with work areas covering planning and strategizing the Indian power projects and policies. The power management and implementation of the various power projects undertaken, formulation and amendments of the power laws in India, management of the power supply in India, monitoring of the power plants in India, power companies in India, power generation in India and other power shortage problems etc. Central Electricity Authority (CEA) coordinates the Ministry of Power (MoP) in all technical and economic aspects. Along with the CEA, other subsidiary organizations of the MoP are:

- National Thermal Power Corporation (NTPC)
- National Hydro Electric Corporation (NHEC)
- Power Finance Corporation of India (PFC)
- Nuclear Power Corporation of India Limited
- North Eastern Electric Power Corporation (NEEPC)
- Rural Electrification Corporation (REC)
- Damodar Valley Corporation (DVC)
- Bhakra Beas Management Board (BBMB)

- Tehri Hydro Development Corporation (THDC)
- Satluj Jal Vidyut Nigam (SJVN)
- Power Grid Corporation of India Ltd (Power Grid India)
- Power Trading Corporation (PTC)
- Bureau of Energy Efficiency (BEE)

3. Global Efforts to address Mercury

In 2002 UNEP Global Mercury Assessment identified state of science, global nature of problem, significant contributors, and reduction initiatives. UNEP initiated Mercury Program in 2003. December 2003, Long-Range Transboundary Air Pollution (LRTAP) Convention Heavy Metals Protocol entered into force (mainly European countries and US are signatories-

total 36). UNEP to conduct “Para 29 Study” of current and future trends of mercury emissions sources, analyzing and assessing the costs and the effectiveness of alternative control technologies and measures.

Under para 29-

- Focus is on most significant “unintentional” emissions sources – those sources which do not use mercury as an input but which emit mercury: Coal combustion, cement kilns, industrial metals production, and waste combustion
- Source inventories and extent of current emissions controls
- Control options and indications of costs
- Study is expected to focus on key mercury-emitting countries/regions which give a regionally-balanced picture of China, India, Russia, South Africa, Brazil, U.S., EU
- Current data limitations prevent clear determinations of many countries’ overall emissions levels

4. Global anthropogenic Mercury emission

According to UNEP report, 2008, Global anthropogenic Mercury emission in year 2005 was 1930 Mt and Asian countries contribute 66% of it. And fossil fuel contribute 46% followed by artisanal gold mining (18%), metal production (10%), cement industry (10%) etc.

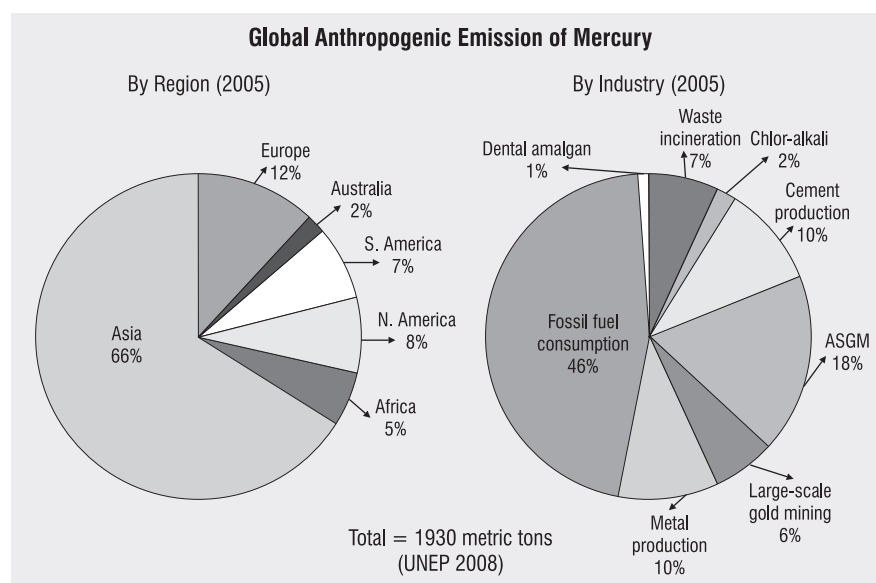


Fig. 2. Comparison of global anthropogenic emission of mercury by region and by industry, year 2005.

5. Mercury emission from Indian Thermal power plants

Coal consumption in TPPs in India has increased from 273 Mt to 321 Mt in which contribution of imported coal were 7 to 8 Mt only from year 2006 to 2008 respectively (CEA, 2008). Table 2 gives brief about the coal consumption in TPPs based upon regions.

Table 2: Region specific coal consumption (Gg) in Thermal Power Plants (TPPs) in year 2006 to 2008

Regions	Year		
	2005-06	2006-07	2007-08
Northern	76837	83072	89302
Western	88370	91346	106369
Southern	48855	55027.00	58399
Eastern	59382	65000	67147
North-East	0	0	0
All Regions	273444	294445	321217

Source: CEA annual report, 2007-08

Coal-based thermal power plants in India could be sub-divided into 4-subgroups based on the installed capacity as follows: <100, 100 to 150, 200 to 250 and 500 MW respectively.

Thermal generating units in India are under the ownership of following viz. Central, State and Private. Among all these sectors PLF achieved by Private Sector stations was the highest (91%) whereas state performed the least (72%) at the National level.

The all India PLF of thermal power plants has improved over the years 74 % to 79% respectively for the year 2005-06 to 2007-08. There are large inter-regional variations in the PLF. Thermal power station in the southern region have the highest PLF, of 85%, while those in the northern region have only 20% PLF. In fact, the PLF of thermal power station of eastern and the north-eastern region is lower than that in the other regions (TEDDY, 2009).

5.1 Mercury in Coal

Indian coal contains Hg ranging from 0.11 to 0.80 µg of Hg per gram of coal reported by various researchers and organizations across the country.

5.2 Estimation of the range of Hg-emission

Mercury estimation from the Indian TPPs was done on the basis of consumption of annual consumption of coal and average emission factor (EF) of Hg in coal used in this sector.

Emission of Hg depends upon the type and quantum of coal in use. The variation in mercury content of Indian coal is very high. So, there are chances that the emission of mercury from thermal power plants can be from 60 to 200 Ton in this country.

Physico-chemical properties of Hg depend upon their state. Like elemental is insoluble whereas mercuric is soluble in water. Because of the soluble nature of mercuric-form it has a tendency to get associate or adhered to the particles in the flue-gas as well. The residence time of Hg in the elemental state varies between 0.5 to 2-years whereas in the Hg+2 and Hg-particulate much less (few days to weeks). So, elemental Hg has contribution in the global circulation whereas other forms predominate in the regional one by atmospheric deposition.

Pirrone et al., 2001 factorize Hg-emitted from TPPs into elemental Hg-in gas, particulate and mercuric form in factor 0.5, 0.1 and 0.4 respectively.

6. Technologies to control Hg-emission from TPPs

Control-technology options for reducing Hg-releases may divide in the following three categories, (1) Pre-treatment measures; (2) Combustion modifications; and (3) Flue gas cleaning or end-of-pipe controls.

6.1 Pre-treatment measures

Coal beneficiation is a generic term, used for washing of coal and is done to lower the ash by 8 to 12% and increase the Gross Calorific Value (GCV), Kcal/ Kg.

Processes and steps involved in coal beneficiation can be as follow-1) Raw Coal Input, 2) Dense Media Processing Unit, 3) Floats (Clean Coal) and 4) Sinks

Offsite washing of coal can reduce the transportation cost as the coal is carried over a long distance along with environmental benefits (reducing green house effect and also mercury emission).

6.2 Combustion modifications

It acts to change the combustion process. These modifications may be used to reduce mercury concentrations in the process flue gas, or they may be used to change the characteristics of the flue gas stream so that mercury is more easily captured in downstream flue gas cleaning equipment. The modifications may include using technologies such as fluidized bed combustor, mass burn/waterwall combustor, low- (Oxides of Nitrogen) NOx burner, etc.

6.3 Flue gas treatment, or end-of-pipe controls

These are currently deployed for control of SO₂, NO_x, particulate matter (PM) and hence also trace metals like Hg. SO₂ control technologies include a variety of wet and dry scrubbers; NO_x may be controlled by selective catalytic or selective non-catalytic reduction; and PM might be controlled by fabric filters (FFs) or electrostatic precipitators (ESPs). There has been extensive testing of the Hg-removable capabilities of these systems on a wide range of coal-fired utility boilers in the USA. The average results ranged from 0% to 96 % dependent on a variety of factors.

6.4 Current practices in controlling Hg-emissions

Coal Beneficiations has been made mandatory w.e.f June 2001 (<http://envfor.nic.in/cpcb/newsletter/techind/therm.html>). The Ministry of Environment and Forest (MoEF) insists on making space provision for Flue Gas Desulphurization (FGD). Electrostatic Precipitators (ESP) have been provided to control the emission of particulate matter with appropriate stack height for adequate dispersion of gaseous pollutants. For wider dispersal of SO₂, stack height of different capacity units have been stipulated. For units less than 500 MW the stack height has been stipulated as 220 meters whereas 500 MW units it is 275 meters. According to CPCB report the overall efficiency of ESPs in the Indian TPPs are less than 30% in terms of controlling particulate emissions.

For further details contact:
Dr. Ragini Kumari
raginikumari@toxicslink.org

FEATURES

Safdarjung Hospital Simplifies Waste Management

Healthcare waste is a small but very significant waste stream with high potential risk for populations. Medical waste constitutes an estimated 1.5 to 2 percent of municipal waste in the urban areas of India. It is very important to classify healthcare wastes into categories and to separate the non-risk waste to treat and dispose of with the municipal solid waste stream. Medical waste, if not handled properly, can pose a serious threat to human and environmental health. Infectious waste can spread diseases such as hepatitis and HIV, toxic chemicals such as mercury can cause permanent damage to adults and children, and the burning of plastics, particularly PVC, can release pollutants into the atmosphere to contaminate the environment for decades to come. Health care facilities are meant to ensure better health and no harm. Unfortunately they also become a potential health risk due to mismanagement of the infectious and hazardous waste.

There are Bio Medical Waste (Management & Handling) Rules 1998, on how medical waste should be handled in India. The rules; now make it mandatory for all institutional health care providers to segregate their waste in specified categories, disinfect the waste, transform discarded products so they cannot be re-used, and safe disposal of all bio-medical waste by using the alternate technologies such as autoclaves, microwaves, and chemical disinfections, off-site treatment, and a ban on the combustion of polyvinyl chloride (PVC) plastics. Approximately 80 per cent of waste produced by medical centres is harmless if it is segregated and handled properly and can be recycled. The studies clearly show that even after 11 years of rules in place, we have not reached the satisfactory level in terms of developing system of health care waste management. Used syringes are packaged and resold, dirty gloves and equipments are reused and patients and attendants are unknowingly breathing in mercury fumes from broken thermometers. Therefore, the hospitals still need to do



extra for developing an efficient health care waste management system and to maintain proper hygiene.

For a successful and sustained implementation of the rules, active involvement and training and capacity building of hospital staffs are integral components. All health care staffs need to be trained and educated about the stipulation of safe disposal of health care waste, personal hygiene and the occupational hazards associated with health care and mercury waste. It is important to have routine trainings and strict follow-ups for personal protection, hygiene and waste management practices.

In Safdarjung hospital, there are total 1531 beds and the average generation of waste is approximately 3500 kilograms per day, which contains 3000 kilograms and 500 kilograms of general and bio medical waste respectively. Considering health and environmental consequences of improper waste management and mercury exposure on health care staff especially on the nurses and lower staff and the need of awareness and capacity building amongst them, Safdarjung Hospital, New Delhi with the support of ministry of health and family welfare (MoHFW), organised a series of

trainings. Purposely, Toxics Link, an environmental NGO was involved to conduct trainings at each level of hierarchy, including doctors, administrators, nurses, technicians, ward boys and safai karamcharies etc. The emphasis of training was laid on BMW rules, aspects of bio medical waste, components of medical waste management such as segregation, disinfection (chemical & mechanical) and mutilation, collection, storage and transportation of waste. The special attention was paid on the management of special waste like sharps waste, body fluid, chemicals and mercury spill. The personal protective measures, injection safety, needle stick injury (NSI), hospital and personal hygiene and occupational safety were also discussed. Since, it was difficult to reach all the staff through the limited number of training sessions, around 10 per cent of the staff were included. In total, 640 staff members (doctors – 90, nurses – 200 and technicians and lower staff – 350) were reached through the various training sessions.

The experts from Toxics Link conducted lecture-based participatory discussion on the health and environment aspects of health care waste and hazards of mercury and its

management. Screening of films on medical waste management, usage and hazards of mercury and animated film on spill management also helped to make the sessions more interactive and informative. Adding up, the plays were also performed by a professional team, for class III and class IV employees. Information and communication material like 'mercury maim poster, segregation poster and ward boys poster' was also distributed. During the sessions some important issues were also raised and discussed by the trainees such as recapping of needle, availability of the personal protective equipments, methods for preparing the disinfectant solutions, benefits of mutilation and disinfection of linen. The majority of the nurses, wards boys and technicians were not aware of health hazards of mercury and mercury spill management. The open discussion and feedback session illustrated that training have helped them to analyze the gaps, discriminate right and wrong practices and to get better understanding of safe disposal waste.

*For further details contact:
Dr. Mohammad Tariq Gaur
tariq@toxicslink.org*

World Earth Day (Global Green Economy)-Where we are?

Due to vast industrialization our globe is facing many problems on environmental issues viz., air pollution, water pollution, soil pollution, noise pollution, etc. All these pollution contribute to contaminate the environment. In general, air pollution increase the load of different gases, some of them are green house gases, which plays a major role in global warming. Many industries releases the waste in the subsidiary water bodies, like creek, river, ocean, etc. These waste contains hazardous chemicals and impacts on the biodiversity. Major important species are now in danger due to these chemical wastes, rivers are polluted lot due to these wastes. The villages, which are dependent on these water bodies (river) for their different purposes like drinking, irrigation, fishing, etc are facing problems in many parts of India. Due to change in water quality it is not suitable as well for above-mentioned purposes. Also the solid waste contributes

in the contamination of ground water (leaching of hazardous chemical in groundwater) and soil, it changes the soil properties and makes it barren, which impact the less and non-health crop/food production.

One more issue is also important for the environmental care. The recent news from Pune and Jammu & Kashmir, regarding the construction of buildings, there are cutting of trees allowed in the terms of the plantation of trees by the builder. The builder has to plant 1:3 ratio of trees. Means if the builder is cutting one tree then the builder has to plant three trees. But who will take the responsibility till its full growth, and what is the use if the trees from X place is cut and planted at Y places. Still there is a need of some reasonable policies to make these issues on ground.

22nd March 2010 was the 40th anniversary of World Earth Day and the mission was Global Green Economy, which is as same as the mission of World Environment Day (Biodiversity: Ecology Management and Green Economy). The US senator Gaylord Nelson had founded the World Earth Day. The aim was to inspire awareness and appreciation for the Earth's environment.

Go green

Not only the theme of Earth Day-2010 is Global Green Economy but also we need to think and plan to move green, there are many other options available to contribute to save an environment. Green building, green jobs, renewable energy will play a vital role in it. If we start thinking to avail green facility then it will be quite helpful for the environment, here are small tips, maximum use of sunlight for building for day time, same sunlight use to convert energy which can be useful for many other activities including electricity, electricity generated from wind also be useful for buildings and the best example is, the Bahrain World Trade Center. It is a 787ft high twin tower complex, located in Manama, the capital of Bahrain, and the first skyscraper to integrate large-scale wind turbines and these turbines supply about 11% to 15% of the electricity for the two buildings - roughly the same amount used by 300 homes. For water issue, rainwater harvesting is the best policy to save and recharge the ground water so that it will be further useful in future. And many other solutions will help for go green.

Sav/fe water

Water is precious, due to many anthropogenic activities, groundwater is not recharging, the level of ground water table reduced and hence no proper water supply from ground water sources. A minimum of 20 liters (5.2 gallons) per person per day is recommended to account for combining waste disposal and related hygiene. But do we really use this amount? Answer is NO! We waste more than this; if we shoulder some responsibility on our home we can save at least some amount of water.

Some important tips are as follows:

- Monitor overhead tank while filling.
- Do not wash vehicle with running water.
- Do not use shower for bath.
- Do not garden with pipe, etc.

Delhi government recently took an initiative to avoid wastage of water, if it is found then it will be a fine of Rs. 1000/- to 2000/- at least this step will be abundant and helps to save water.

There are some major issues also contributing to destroy the environment. Today we are facing other important issues like, plastic waste management, toxic management, hazardous waste management and climate change issues as well.

Delhi government said to ban the plastic, but after few days of this news again the society started using of plastic (plastic bag) for their routine needs, as many of us are not aware about the magic of this small thing, the material, which is used in plastic, may cause cancer. This plastic is non-biodegradable hence it remains in environment for many years, which is then lying everywhere in our environment, and hence there is need to manage it properly. The less use or no use of plastic could help to minimize the quantity of plastic pollution in a small way.

Other contributors

Only anthropogenic activities could not cause the harm to the environment/human health, but many other products of daily uses/needs, also plays the role in the destruction of the environment. Product like paints, toys, cosmetics, mercury based medical equipments, ayurvedic medicine,

batteries, pesticides, household chemicals, etc contained lot of harmful chemicals like heavy metals (lead, cadmium, chromium, arsenic, mercury), phthalates, etc, when it exposed to the environment, it will cause harm to biological system. Many study showed its impact on human health, basically on reproductive system. Now the question is, how would be the health of new generation?

There may be a variety of hazardous elements present in hazardous waste and if it not manages properly it will cause a serious harm to environment as well as human health. Recently due exposure of

Cobalt-60, a radioactive isotope of Cobalt, many people in south Delhi area were injured, so where the Cobalt came from, nobody knew the answer, likely many other elements might be present in our waste or spread in environment which will then act as a silent killer.

The question is...

Are we moving to the right direction, to save the environment and Global Green Economy, may be the answer is No. This is because of lack of awareness, lack of individual's initiative and many more reasons.

Need for....

There is an urgent need to find out the gaps. It's all about concerned to human health so at least to save our self. We, individual must have to take an initiative and should become selfish to survive healthily, so that ultimate goal in some part will solve automatically.

"If we stop thinking about the clean/green environment, then there would not be an environment to think and we will STOP."

For further details contact:

*Prashant Rajankar
prashantrajankar@toxicslink.org*

UPDATES

Phase-out of Mercury from the Health care sector, India

The issue of mercury (Hg) has gained prominence in India with the efforts of Toxics Link and its partners across the country in the last five years. During these years, various studies have been taken up on usage, disposal and its impacts on environment and human health. Toxics Link has also been engaged in a sustained campaign in reducing and finally eliminating its usage in the health care sector in Delhi.

The Government of Delhi in June 2007 took the major step towards reduction of Hg use from health care. The Health Department of the Delhi Government issued an order to stop any further purchase of Hg containing medical equipments by all hospitals in Delhi. Most tertiary care corporate hospitals in Delhi have shifted to mercury alternates while the government hospitals are gradually making that shift. The dental care facilities within government hospitals are also gradually shifting away from amalgams.

While efforts have been initiated to phase out Mercury from the healthcare setting, it has also thrown up several challenges and concerns and need serious attention. On 29th July, 2010 Toxics Link organized a round table meet on 'Plan for Phase out of Mercury in Healthcare Sector in India' with some of the key stakeholders to discuss the issues relating to

1. Standardization of non-mercury devices used in health care
2. Storage of mercury devices abandoned/redundant from the healthcare facilities.

Highlights of the discussions are placed below:

1. The representative of Bureau of Indian Standards (BIS), clarified that India presently has standards on sphygmomanometers and clinical thermometers. The Indian standard number for electro-medical equipments is IS 13450 based on the ISC standard 60601/2/30. This standard for electric-medical equipments has two parts: i) consisting of general requirements for basic safety and essential performance, and ii) general requirements for automatic cycling non-invasive blood pressure monitoring equipment. Representative from BIS pointed out in the case of clinical thermometers, the BIS require mandatory certification such that no one can manufacture or import the equipment without an ISI mark of the Bureau.
It was pointed out that certification of non-mercury devices is voluntary and is left to the choice of the manufacturer or importers hence the need to make this mandatory.
2. The representative from the Weights and Measurement Department (W&MD). W&MD commented that his department was involved in calibration and verification of devices and for the purposes of standards looked to the BIS guidelines.

State governments have been unable to authorize proper calibration and verification of mercury devices. He also indicated that the government has had a few consultations and is in the process of evolving some kind of guidelines and resources for ensuring calibration and verification of mercury thermometers and sphygmomanometers. Weights and measure department was in the process of procuring a calibration device for mercury equipment which would not serve any useful purpose as mercury devices are in the process of being phased out. He suggested that since these devices will be phased out soon it would be a good idea for some kind of representation to reach the government demanding calibration and verification of non-mercury medical devices.

3. Representatives of CPCB highlighted some of the existing legal provisions that would constrain on-site storage of mercury waste beyond a certain period of time (90 days is extendable to 6 months for storage of hazardous waste under the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 notified under the Environment (Protection) Act, 1986). He has highlighted the components of the guidelines presently being prepared and discussed among the CPCB officials. He suggested that the departments take a more proactive role in developing interim storage facility for storage of mercury waste for safe collection and storage and subse-

quently handing over to mercury based medical manufacturing units or TSDF for further treatment and disposal. He also suggested that since the common bio-medical waste treatment facilities (CBWTFs) are already authorized under BMW Rules to go to the hospitals for collection, transportation, treatment and disposal they could also be assigned to deal with mercury waste generated from the member health care facilities.

Alternately, it was suggested that CBWTFs could be used as interim storage sites for mercury waste and urged for further final disposal through authorized Hazardous Waste Treatment Storage and Disposal Facilities following the manifest as stipulated under the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008. Covering the above draft guidance document is being prepared and circulated to all the stakeholders shortly seeking comments for its finalization.

Another important issue discussed was the cost of storage of the discarded devices at the CTF. The healthcare facilities generating such waste on account of shifting to another technology felt that it will be an additional burden and would be a disincentive to shift.

Some key recommendation of the meeting is listed below:

1. Certification and Accuracy-

a. For BIS

- Certification for non-mercury medical equipments should be made mandatory by BIS
- BIS should consider labeling Mercury thermometers with symbol of "containing hazardous substance".
- Tender process must impose the requirement for BIS certified products as basic minimum requirement for non-mercury equipment.
- List of names of certified vendors should be made available on BIS website.

- b. The government needs to discuss with key standardization agencies and manufacturers about encouraging local manufacturers to make reliable and cost effective alternates.

- c. ISO, NABH should include mercury free as a component of certification process.

2. Calibration and verification

- Weights and Measurements Department, BIS and the central and state governments work together to develop the standards for non mercury medical devices in India.
- The Weights and Metrology Department, Delhi to ensure calibration of Non-mercury thermometers and B.P machines in the state.
- The Health Department, Delhi may reconsider procurement of calibration equipment for mercury equipment in view of its gradual phase out.

3. Efforts for continued awareness raising on the perils of mercury usage

- Doordarshan and print media to be used to raise awareness on mercury toxicity and spills management.

4. Storage and disposal

- a) Concerns from Healthcare settings w.r.t mercury waste disposal
- Health care setting wants to get rid of discarded mercury equipments ASAP.
- Health Care Facilities are not willing to pay for the disposal costs of discarded mercury devices.
- Agencies that will coordinate with hospitals and help collect and store mercury waste need to be clearly identified

b) MoH & FW, MoEF, CPCB, SPCB

- MoH & FW and MOEF should have dialogue with all the stakeholders for phasing out of mercury-based instruments in phased manner.
- National inventory for the mercury-containing medical devices needs to be developed to look for storage.
- Agencies like Department of Health of State Governments/UT Administration SPCBs/PCCs should ensure that the mercury waste generated from HCFs is stored properly in the designated places only for further disposal
- CPCB to finalize and issue guidelines for management of mercury waste generated from HCFs at the earliest possible subsidy from MoH & FW / Ministry of Environment and Forest (MoEF) was expected for the final disposal of mercury bearing waste generated from HCFs.

c) The State Health Departments and CGHS

- The State Health Departments could take a more proactive role in development of interim storage facility for storage and for final disposal of mercury waste.

*For further details contact:
raginikumari@toxicslink.org*

EEJP Partners Meet

Environmental Equity and Justice partnership (EEJP) a grant making initiative of The Just environment Charitable Trust hosted a three days National partners' meet from 8th-10th September at the Global Arts Village, New Delhi. The meeting was precedence to the fellowship/



grants programme for grassroots organisations for sustaining their activities. In the course of three days, two days were devoted on capacity building exercise for the recipients of the small grants (NGOs). Margdarshak, a consultant group conducted the exercise of these grass root NGOs. During this exercise, trainings were given on the development of the proposals, dissemination of reports and strengthening the organizational structure.

On the final day there was an experience-sharing meet of the grantees and fellows of first year. These recipients of small grants and fellowships made their presentations on the activities, they have undertaken in the EEJP grants.

Exhibition and workshop with society for child development

Society comprises not only those who are known to make the difference but also those who are capable of making the difference but somewhere ignored for a reason or another. The Society for Child Development that works with special children organised a two-day workshop on this Environment Day. Toxics Link, felt responsible to be part of such an activity and reach out to the children who feel responsible towards the environment. Therefore the exhibition starting June 5th had a stall displaying information material to the audience alongwith a workshop with children. Starting from basic questions like what is waste and what are the kinds of waste that can be treated, the workshop had tremendous participation from teachers and schools across the state. The event was successful in reaching out to a large number of audiences.



Karuna Raina, who has extensively been working on the issue of radioactivity in the capital and in other parts of the country, looked at India's policy framework and implementation aspect of radioactive hazards.

With participants ranging from government bodies, medical practices, media,

ngos, activists and other informed groups, the lecture was instrumental in bringing out information on a subject of such intrinsic importance for not only those at the policy level but also at the implementation level or the ones who are at the receiving end.

Radiation is caused everywhere and by everyone

In keeping with the opprobrium of Mayapuri Co60 radiation and a dire need for awareness on the subject, the hazards of Radioactivity were discussed at the Environment and Health public lecture series by Toxics Link, hosted by India International on June 25th 2010. The speakers for the event included Dr Arvind Chaturvedi, Medical Director, Rajiv Gandhi Cancer Institute, Arun Sehdeo from National Institute for Disaster Management, and Karuna Raina, nuclear campaigner from Greenpeace.

Radiation issues in medical practice: the understanding of radioactive and radiation, their sources, usage and exposures, risks from medical radiation exposure, the technology, risks and benefits associated with it were all highlighted by Dr Chaturvedi and was translated into the most simple language for common parlance.

Arun Sehdeo, on the other hand threw light on the dangers radiation can cause and how can one protect him/herself from any calamity that occurs through radioactive exposures. Some light was also thrown on government legislations and acts for radioactivity.

Swedish Society for Nature Conservation and Toxics Link look at toxicity in South Asia

The environment has no boundaries. This is particularly true of the South Asian region that not only shares a common contemporary culture and environment but also environmental problems. In the relatively new area of chemicals, waste and associated health and toxicity issues, the situation is far less uniform. The different level of urbanization and industrialization in these countries is also reflected in the different stages of development in the policy and legislation to deal with issues related to chemical safety. The availability of data and consumer awareness

are also low across the region. During 24 to 26th June, 2010 Toxics Link organized this Meet of Regional Partners in South Asia to provide a platform to learn from the diverse experiences of the participating organizations in addressing common concerns in chemical safety and also to identify some collective solutions.

Before the commencement of presentations by Toxics Link team and other regional representatives, the meet began with an enquiry into some of the expectations of the participants concerning the meet. Representatives from the South Asian region in general expressed the desire for enhanced synergy and support for campaigns related to chemical safety, technical and financial inputs from Toxics Link and engagement with new and relevant issues of concern such as the recycling of compact fluorescent lamps (CFLs). With presentations from Toxics Link and partners coming from Bhutan, Nepal, Sri Lanka, and Bangladesh, the meeting discussed issues ranging from POPs and heavy metals like lead and mercury, the issue of ewaste, and more that went onto discuss issues of toxicities in everyday life.

For further details contact:
rajeev@toxicslink.org



Public Lecture on traditional Water systems of Delhi

With the water level risen above the danger level, water clogging and mismanagement of water and its resources in the Capital, it became imperative to discuss the issue with the Delhi denizens with inputs and information on it from experts. Acknowledging the responsibility, Traditional Water systems of Delhi was chosen to be the topic of discussion as part of the Environment and Health Public Lecture Series scheduled on the 15th of September 2010 at India International Centre, New Delhi. Sh. Sohail Hashmi, an expert on traditional water bodies of Delhi and Mr A. K Bajaj, Chairman Central Water Commission were the eminent speakers for the discussion moderated by Ravi Aggarwal, Director Toxics Link.

While Sohail threw light on the historical side of the water situation in the city making people aware through the use of



maps and locations that reviving traditional water bodies of the city would help in a large way dealing with the water situation in the country, Mr Bajaj, talked more from 'ground realities' perspective stating the facts and stats about the present water situation in the city.

With rainfall above normal and commonwealth activities under construction,

the speakers faced many questions on the situation and the issue from the audience. In all, with wide participation and plethora of questions from audience, the event was successful in bringing out some information on the subject.

*For further details contact:
anjali@toxicslink.org*

Consultation on Draft E-waste (Management and Handling) Rules

Toxics Link has been actively involved on the issue of E-Waste, a problem posing serious environmental challenges world over. It is almost seven years since we brought up the concerns related to improper disposal and recycling of E-waste in the country, which results not only in loss of resources but more importantly causes health hazard to workers and contaminates air, water and soil.

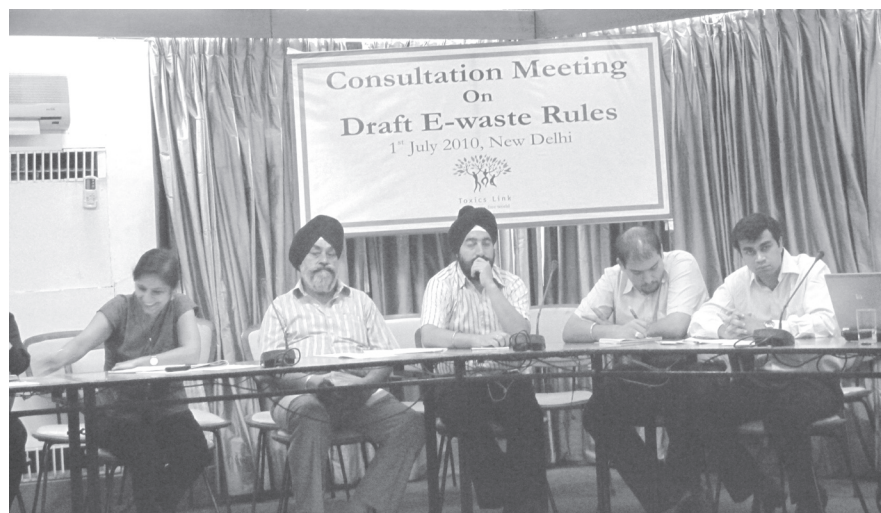
The organisation has been actively advocating for a separate legal framework in the country for E-waste for the last few years, as the current Hazardous Wastes Rules is inadequate in handling with this complex waste problem. Toxics Link, along with GTZ, MAIT and Greenpeace and other stakeholders, also prepared a draft Rule on E-waste and submitted to Ministry of Environment & Forests last year.

The Ministry issued Draft E-waste (Management and Handling) Rules in

May 2010 and opened it for public comments. The Draft is progressive as it incorporates principle of Extended Producer Responsibility and also looks at both upstream and downstream management.

We welcomed this initiative of MoEF and felt there was a need for larger consultation with all stakeholders in making valuable and constructive suggestions to the draft Rules. To foster discussion and seek comments, Toxics Link organized multi-city consultation meeting with all stakeholders on draft E-waste Rules. The meetings were organised in Delhi, Chennai and Mumbai (in association with MEWA in Mumbai) and were attended by key stakeholders from EEE industry, civil societies, recycling companies, informal sector collectors and recyclers, international organisations etc. Some critical issues related to objective, definitions, responsibilities, collection system, funding, imports, monitoring and implementation were raised and some valuable suggestion were made to improve the draft. These comments have been compiled and sent to the Ministry.

*For further details contact:
priti@toxicslink.org*



Toxic Trinkets: An Investigation of Lead in Children's Jewellery

Children's jewellery is in vogue these days. In keeping with the tendency with children to suck or chew these trinkets, what if you come to know that these embellishments contain lead, a potent neurotoxin capable of IQ deficit, brain and kidney damage, gastrointestinal symptoms such as colic, and even death due to lead poisoning?

In a concerted effort to bring out information on toxic substances and their use in everyday products in the public domain, vis-à-vis their pernicious effects on human health

and the environment, Toxics Link released the report *Toxic Trinkets: An investigation of lead in Children's Jewellery in India*.

With an intent to study the levels of lead in children's jewellery and understand the situation in India and even internationally, the report delves into identifying the gray that exists in the children's jewellery market: right from its manufacturing, retailing and even exports of these jewellery items from India to the rest of the world.

On the basis of 54 samples collected from different markets of Delhi viz: Central Delhi, Janpath, South Delhi, Lajpat Nagar, Old Delhi, and Sadar Bazaar, the report provides an insight into the persistent

problem of adversarial impacts of lead in children's jewellery much in conjunction with the fact that there exists lead in products of everyday use and children and pregnant women are most susceptible to it.

The report is also an eye opener for the fact that despite establishing international standards and prohibitions to lead in jewellery and similar items, especially children's products, there exists no specific regulation for lead in children's jewellery in India. Blame it on lack of awareness, accountability or even regulations, the fact remains that there exists lead in children's jewellery in India.

For further details contact:
anjali@toxicslink.org

INTERVIEW

Delay, decay and diluting Radioactive waste



Radioactivity is a pertinent issue which is less known and has more public attention. The not so forgotten Co 60 incident has further fanned the fire of radioactivity and its aftermath on human

life. Dr A K Chaturvedi, Medical Director, Rajiv Gandhi Cancer Institute handles with care the sensitive and now 'sensational' issue of radioactivity by throwing light on the subject and giving out information on finer details of the issue.

Q.1. What is radioactivity? How dose radiation harm the human body?

Ans. Radioactive decay is the process by which an unstable *atomic nucleus loses

energy by emitting ionizing particles or #radiation. The emission is spontaneous wherein the nucleus decays without collision with another particle. Radioactivity is the property of some naturally occurring elements or artificially produced isotopes of elements which emit Radiation like alpha/beta/gamma. Potassium-40, Calcium-45 in human body, and Uranium/Thorium and its decay products in mines/rocks/beach sands are naturally occurring radioactive elements.

Artificially produced are used in medicines like short living technium-99, gallium-67, indium-111, fluorine-18FDG, carbon-11, iodine-131 in nuclear medicine where as long living cobalt-60, caesium-137 and Iridium-192 are used in radiotherapy /research labs/industry.

The harm which manifests a human body after exposure to radiation can have somatic and genetic effects which may be described as:

Somatic effects: Somatic effects can be seen as harmful effects on a human body

exposed to radiation while the extent of harm depends upon the body area exposed to the amount, quality/energy, and rate of effective dose expressed in Sievert units, Sv. A few dose related harms are:

a) Blood Changes: The amount of Sv determines the level of radiation caused in a human body. Between 0.15 – 0.25 Sv blood count changes in a group of people, while between 0.5 to 1 Sv is recorded in the blood stream of an individual. 1 Sv exposure reduces the blood's lymphocyte cell count leaving the victim more susceptible to infection. This is often referred to as mild radiation sickness. Early symptoms of radiation sickness mimic those of flu and may go unnoticed unless a blood count is recoded. The symptoms may persist for up to 10 years alongwith chances of an increased long-term risk for leukemia and lymphoma.

Since reproductive tract cells divide rapidly, these areas in the body can be damaged by exposure levels as low as 2 Sv. In the long-term, some radiation sickness victims will become sterile. The losing of hair quickly and in clumps occurs when the radiation exposure is of the order of 2 Sv or more. Radiation damage to the intestinal tract lining will cause nausea, bloody vomiting and diarrhea. This occurs when the victim's exposure is 2 Sv or more. The radiation will begin to destroy the cells in the body that divide rapidly including blood, GI tract, reproductive and hair cells.

*The nucleus is the very dense region consisting of nucleons (protons and neutrons) at the center of an atom. Almost all of the mass in an atom is made up from the protons and neutrons in the nucleus, with a very small contribution from the orbiting electrons. It was discovered in 1911, as a result of Ernest Rutherford's interpretation of the famous 1909 Rutherford experiment performed by Hans Geiger and Ernest Marsden, under the direction of Rutherford.

#In physics, radiation describes any process in which energy travels through a medium or through space, ultimately to be absorbed by another body. Non-physicists often associate the word with ionizing radiation (e.g., as occurring in nuclear weapons, nuclear reactors, and radioactive substances), but it can also refer to electromagnetic radiation (i.e., radio waves, infrared light, visible light, ultraviolet light, and X-rays) which can also be ionizing radiation, to acoustic radiation, or to other more obscure processes. What makes it radiation is that the energy radiates (i.e., it travels outward in straight lines in all directions) from the source. This geometry naturally leads to a system of measurements and physical units that are equally applicable to all types of radiation. Some radiations can be hazardous.

Between 2-10 Sv radiation effects the local skin where dry to wet desquamation is expressed as burn within 5-12 days. When the level of radiation reaches between 10-50 Sv it effects the heart: Intense exposure to radioactive material at 1,000 to 5,000 rems would cause immediate damage to small blood vessels and probably even cause heart failure and death directly. At 50 Sv the radiation harms the brain. Since brain cells do not reproduce, they won't be damaged directly unless the exposure is 50Sv or greater. Like the heart, radiation kills nerve cells and small blood vessels, and can cause seizures and immediate death.

b) Genetic Harm: Harm suffered by the offspring of the individual exposed to radiation is called genetic harm. Mostly In-Utero teratogenic harm is mistakenly considered to be a genetic consequence of radiation exposure, because the effect, suffered by a developing embryo/fetus, is seen after birth. However, this is actually a special case of the somatic effect, since the embryo/fetus is the one exposed to the radiation.

Q.2. What are the types and effects of radioactive pollution? What do you think is the biggest source of radioactive pollution?

Ans. Radioactive pollution is any form of ionizing radiation from solid, liquid or gaseous radioactive material that results from human activities. Severity of pollution depending upon radio-toxicity from different radioactive sources is graded as under:

- (i) The most well-known radiation results from the detonation of nuclear devices,
- (ii) Meltdown of atomic reactor,
- (iii) Sources of radiation from spent-fuel reprocessing plants,
- (iv) Radioactive scrap from stolen/damaged/orphan radiation source of tele-gamma radiotherapy machine or gamma irradiators'
- (v) By-products of mining operations, and experimental research laboratories
- (vi) Waste release by nuclear-power generating plants
- (vii) Increased exposure to medical radiation emissions from nuclear medicine waste.

Q.3. Where, why and how are radioactive elements used in the field of medicine?

Ans. Radioisotopes are generally used for diagnostic and therapeutic purposes in nuclear medicine. They may be Technium-99, Mo-99, Gallium-67, Indium-111, in SPECT SCANNER, Fluorine-18 FDG and carbon-11 in PET- CT SCANNER, Iodine-131, Sr-90, or even P-32 for isotope therapy. These are the low activity radioisotopes.

The high activity radioisotopes are Cobalt-60 and Caesium-137 tele-gamma radiotherapy machines and Iridium-192, and Caesium-137 in brachytherapy machines for cancer treatments.

Q.4. What is the radioactive waste management process in the field of medicine?

Ans. All radioactive waste disposals are done according to guidelines set by Atomic Energy Regulatory Board (AERB). The three main practices of radioactive waste disposal of waste from nuclear medicine are: delay and decay; dilution and dispersion; concentration and containment and decontamination if any. Well set guidelines and procedure are followed in transport/handling & controlled administration activity in isolated room and excretions from patients and their release from the hospital. Isolated delay tank is mandatory for delay/ disposal of iodine therapy waste before release to the municipal drainage. Disposal time for radioactive waste is after 10 half lives of decay of any short living radioactive element that is 27 days for Mo-99, 32 days for Ga-67, 80 days for I-131 and 60 hours for Tc-99. Annual status report of radiation safety, functioning of radiation monitoring instruments and disposals are submitted to AERB for comments and approval.

High activity radiotherapy sources are loaded in very thick lead shielded transport flask and transferred to similarly shielded head of tele or brachytherapy machines by AERB certified under supervision/ radiation monitoring by AERB designated/qualified radiological safety officer. Telecobalt & Iridium machines are remotely operated from control console kept outside very thick RCC shielded pre approved by AERB. Decayed sources are pre-approved by AERB for

transport/ disposal/deposit back to BRIT-BARC or country of origin . Disposal time for these radiotherapy sources are 2 half lives of decay when these are not clinically useful that is 10 years for telecobalt and 6 months for Ir-192. Annual status report of radiation safety, functioning of radiation monitoring instruments, therapy calibration dose meters and disposals are submitted to AERB for comments and approval.

Q. 5. What is the permissible limit for usage of radioactive substances in the field of medicine?

Ans. Occupational radiation professional: Professionals handling and operating machines/ equipment with radioactive substances are called Occupational workers by regulatory body i.e AERB in India.

AERB LIMITS:

Occupational exposure limit:

A total of 100 mSv in 5 years (average, 20 mSv per year) with a limit of 30 mSv in any single year. It is mandatory to monitor the personal exposure of each individual such professional by special exposure device called TLD badge sent for cumulative exposure report every 2 months.

Public exposure limit: 5mSv averaged over 5 years.

ICRP LIMITS:

Occupational exposure limit: 20 mSv per year, Averaged over defined periods of 5 years (50mSv in any one year, total 100mSv in 5 years)

Public exposure ICRP: General public the standard is 1 mSv per year. (Natural background radiation is approximately 3 mSv/year and is above the mentioned permissible limits.)

Q.6. How would you compare radioactive materials' usage and disposal in India with the international level?

Ans. Developed countries have separate state or region wise radiological health and safety division/department with each hospital/lab/clinic under its umbrella having radiation safety committee and radiation safety manual and continued radiation protection training program for all the

radioactive handlers. Compared to this India has no separate dedicated and regular health physics setup in all clinics and other labs for radiation protection surveillance including functioning radiation detecting instruments and dosimeters. There is only a short capsule course for radiation safety and no dedicated and structured training program is available in the country. In majority of clinics, a medical physicist who is for full time clinical medical physics in radiotherapy facility is a part time health physicist as well. Annual status report submitted to regulatory body is rarely physically verified at hospital or lab site by AERB. There is a lack of multi-level check at the port of entry and inventory documentation.

Q.7. The recent loss of life due to direct contact with radioactive isotope Cobalt 60 has caught attention of not only the people at large but

also the decision makers. Your take on the same?

Ans. Public awareness and structured training program on detection and management of radiation dose related injuries for clinicians including radiation oncologist and medical physicists should be formulated taking into account the published evidence from similar accidents elsewhere in the world through international collaboration with IAEA & WHO.

Q.8 What precautionary measures can patients and doctors take at the time of diagnosis and treatment to avoid coming in direct contact with high levels of radioactive substances?

Ans. Patient awareness and training of doctors handling high levels of radioactive substances are needed.

Q.9 What do you suggest the people, dealers of equipment with radioactive substances, medical practitioners and the government when it comes to dealing with radioactive materials?

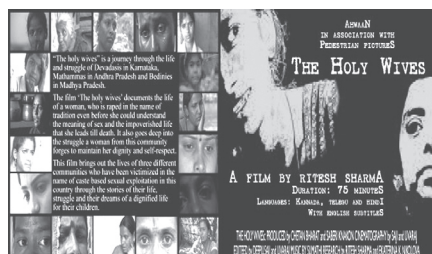
Ans. All should be made aware by structured short educational courses about radioactive materials their harmful effects and legal aspects involved.

Q.10 Is there any other thing of key importance you would like to point out when it comes to radioactivity in the field of medicine?

Ans. Patients should be educated about the harmful effects of radiation. Doctors should not indiscriminately order radiological tests where it is not essential and the utility is not much. Awareness about the radiation hazards should be increased through media and public campaign.

RESOURCES

The Holy Wives



'The Holy Wives' brings out the lives of three different communities who have been victimized in the name of caste based sexual exploitation in India, through the stories of their struggle for and their dreams of a dignified life for their children.

The film documents the life of women, who are raped in the name of tradition and the impoverished life that she leads thereafter. "The Holy Wives" is a journey through the life of Devadasis in Karnataka, Mathammas in Andhra Pradesh and Bedinis in Madhya Pradesh. Directed by Ritesh Sharma, the film is already getting rave reviews from different cross sections of society and has been nominated in various film festivals.

NEWS

International News

<http://www.chicagotribune.com/health/ct-met-mercury-skin-creams-20100518,0,7324086,full.story>

Chicago Tribune
19 May 2010

Some skin whitening creams contain toxic mercury, testing finds

High levels found as products gain popularity worldwide

By Ellen Gabler and Sam Roe,
Tribune reporters

Some creams promising to lighten skin, eliminate age spots and zap freckles contain high levels of mercury, a toxic metal that can cause severe health problems, a Tribune investigation has found.

The newspaper sent 50 skin-lightening creams to a certified lab for testing, most of them bought in Chicago stores and a few ordered online. Six were found to contain amounts of mercury banned by federal law.

Of those, five had more than 6,000 parts per million — enough to potentially cause kidney damage over time, according to a medical expert.

The Food and Drug Administration banned mercury in skin-bleaching or lightening products in 1990, but the agency rarely tests the products to see if consumers are at risk. The Tribune's tests — among only a handful ever conducted — show that tainted products are still readily available.

"I'm shocked and speechless," said Dr. Jonith Breadon, a Chicago dermatologist who said she sees patients weekly who ask about lightening their skin. "I just assumed since (mercury) was banned in the U.S., it never got in. But clearly that isn't true."

FDA spokesman Ira Allen said that with fewer than 500 inspectors reviewing imports, the agency cannot check all food, drug and cosmetic products under its jurisdiction. "It is likely that things get past us," he said.

When notified of the Tribune's test results, the retailers said they would pull the products from shelves, and two distributors said they would stop selling them.

The market for skin lighteners is booming in the U.S. and abroad. Some people of Asian, Hispanic and African heritage

use the creams because lighter skin is often considered a status symbol in their cultures. Many consumers, including Caucasians, use the creams to diminish age spots or to even out skin tone, while others want to lighten their entire face or bodies.

Sales of lightening products in the U.S. are expected to increase nearly 18 percent by 2015, reaching \$76 million annually, according to market researcher Global Industry Analysts.

Consumers can't know for sure which creams are tainted. Stores across the city sell dozens of brands, many of them made overseas. The six creams that tested high in the Tribune tests were manufactured in Lebanon, China, India, Pakistan and Taiwan.

The creams were bought at a variety of stores: a large beauty-supply store in the Uptown neighborhood, an herbal medicine shop in Chinatown, an Indian beauty salon on Devon Avenue, a grocery store also on Devon, and a small African shop on 79th Street.

Researchers say people are affected differently by mercury, depending on the amount and duration of exposure, among other variables. Daniel Hryhorczuk of the University of Illinois School of Public Health said the amounts of mercury found by the Tribune were troubling and could lead to kidney damage at the least.

"Those are very high levels," he said.

The highest level of mercury, nearly 30,000 parts per million, turned up in a circular container of thick, white cream labeled as Stillman's Skin Bleach Cream. Adbul Amin said he decided to stock it at his Devon Avenue grocery store because the product is so popular in Pakistan.

"I didn't have any idea it had mercury inside," Amin said, promising he would no longer sell the product.

Mercury is used in skin whiteners because the metal blocks production of melanin, which gives hair and skin their pigmentation. Other chemicals can do the same thing, but mercury is inexpensive and effective, said Ellen Silbergeld, a professor of environmental health science at Johns Hopkins University.

It's also toxic. Mercury is rapidly absorbed through the skin and can affect people neurologically, Silbergeld said. They might experience blurred vision or trouble

walking. Severe mercury poisoning can shut down organs and lead to death.

Silbergeld said the use of mercury in skin creams has been well-documented in other countries and should be of concern to the FDA.

"In a multicultural society such as ours, you can expect that these kinds of issues are going to arise," she said. "The duty of the agency is to protect everyone."

The FDA's Allen said the issue of mercury in skin creams hasn't been on the agency's radar since 2006, when some creams from the Dominican Republic were found to contain mercury.

The creams often follow a complicated path to the United States. Retailers say they order the creams over the Internet, buy them from suppliers and sometimes bring them in personally from abroad. Some sellers and suppliers wouldn't disclose where they bought creams that tested high for mercury.

Amin, the Devon Avenue store owner, said he bought the Stillman bleach cream from Detroit-based B.M. Trading. That firm's owner, Malik Younis, would not say where he bought the product.

The packaging says it is manufactured in an area of Pakistan "under arrangement with" the Stillman Co. Inc. USA, based in Aurora.

Back in the 1970s, Stillman authorized a Pakistani company to make and sell skin whiteners under the Stillman name — but only in Pakistan, said Stillman owner Bob Bereman.

In 2007, Bereman said, he saw the Pakistani product being sold online and thought it might contain mercury. He said he had the product tested, and when the results showed mercury, he notified the FDA. Allen, with the agency, said there is no record of a formal complaint.

Efforts to reach the Pakistani company were unsuccessful.

Four foreign manufacturers contacted by the Tribune said the tainted products sold under their name could be counterfeit.

Counterfeit drugs and cosmetics, long a problem in other countries, are increasingly common in the U.S. as more of these products are sold online and imported, FDA officials said.

Frank Lin, a sales manager for Zenna Chemical Industry Co. in Taiwan, said

the popularity of the company's Top-Gel product has spurred others to manufacture fakes. He said the products the Tribune tested were likely impostors, right down to the hologram on the box.

"We try to go after them, but they just shut down (the factories) or run away," Lin said.

The Tribune tests were conducted by Columbia Analytical Services, a lab in Kelso, Wash. Those tests found that one cream labeled Top-Gel, bought at a small African shop on the South Side, contained 7,030 parts per million of mercury. When the Tribune bought and tested another tube of Top-Gel sold online by a California-based firm, it was found to contain 1.9 parts per million — a much smaller, but still banned, amount. Labels on both boxes said the creams were manufactured by Zenna Chemical.

Lin sent the Tribune his company's own lab results that reported no mercury in his samples of the Top-Gel product.

When the Tribune notified another company, Shahnaz Husain Group, that tests showed its product contained mercury, the firm in India sent lab results indicating it is safe. The firm also said the product tested by the Tribune could be counterfeit.

Besides mercury, two other ingredients sometimes found in skin lighteners concern medical experts — steroids and hydroquinone. High amounts of hydroquinone, a bleaching agent, may darken skin, and animal studies suggest it could cause cancer.

Breadon, the Chicago dermatologist, said she often feels like she is fighting a losing battle because skin creams are so readily available in ethnic shops.

She said she often sees patients whose faces are lighter than the rest of their bodies, and she must coax out of them what products they use. Many patients feel most comfortable buying a lightening agent from a small neighborhood shop because they can avoid seeing a doctor for a prescription. Plus, friends tell them the products work.

"Culturally, it has sort of become a part of their life," she said. "I've had patients who have said, 'I'm a model; I won't get a modeling job if my skin isn't lighter.'"

Dermatologists said there are safe alternatives for people who want to lighten age spots, stretch marks or other discolorations on their skin.

Some of the more popular skin lightening creams tested by the Tribune did not contain any mercury, including one sample of Dr. Fred Summit Skin Whitener, made in south suburban Harvey and sold at area Walgreens. Tests also found no mercury in a sample of Fair & White, a well-known lightener made in France.

Dr. Roopal Kundu, assistant professor of dermatology at Northwestern University's Feinberg School of Medicine, said patients can ask for a prescription from a doctor.

Also, she said, the cream should be used only to lighten spots, not for bleaching normally dark skin. "If used appropriately and managed and not used indefinitely, then you can use it safely," Kundu said.

egabler@tribune.com
sroe@tribune.com

Nationals

Ban on use of radio elements at DU lifted

The MSc and M-tech (Nuclear physics) students of Delhi University will soon be able to breathe a sigh of relief as the two member team comprising Professor AK Bakshi, Head of Department of Chemistry, and Prof RK Sinha, Registrar, have succeeded in convincing the Atomic Energy Regulatory Board (AERB) into lifting the ban on the use of radioactive sources at the university.

The members of the team assured AERB that the radioactive sources being used by the students were of very low intensity. The AERB, earlier in May, had suspended the use of radioactive sources in DU after the Cobalt-60 incident that led to one person's death and several others being critically ill.

DU V-C Professor Deepak Pental said, "Practical classes of MSc and M-tech may take place quickly, and will hopefully henceforth continue undisturbed. We will take all precautions and send a list of radioactive sources used to the AERB."

Prof AK Bakshi said, "The fact that the students of MSc and M-tech Nuclear physics were suffering was very distressing, as they were not at fault."

At a meeting at the AERB office, in Mumbai on Friday, the professors gave an elaborate presentation delineating the various

measures taken by DU authorities to prevent any such mishaps in the future, which was well taken by the AERB. Dr Bakshi said, "We presented safety manuals and posters that will be put up in DU labs." Professor RK Sinha added, "As the radioactive sources used by these students are of low intensity, we requested AERB to grant us the permission for their use."

Professor Pental informed, "AERB asked the DU team to appoint a Radiology Safety Officer. They advised us to train our professors in safety procedures. We are taking the advice into serious consideration." Professor Bakshi added, "We have already begun accepting applications in this regard." Professor Bakshi also informed that 2-3 professors from various departments will also be sent to AERB for training so that radiology expertise is adequately available on the DU campus.

Dr Bakshi further explained that there are four categories of radioactive materials used in DU. These include the ones required for research purposes, second used for X-rays, third being used by MSc, M-tech nuclear physics students and the fourth category that are not in use completely. Dr Bakshi said, "The last group of radioactive sources will be handed over to the AERB or will be disposed off as per their guidelines. The ones used for x-rays have been placed on hold and will only be used once the RSO is appointed. Research related sources will similarly be used once the AERB is satisfied with our efforts."

Source: The Pioneer, October 16, 2010

India may have to ban toxic pesticide Endosulfan Geneva, Oct 19 (PTI)

India may have to ban the use and production of "Endosulfan", a highly toxic pesticide still used on crops like rice, tea and cotton, after a UN backed committee of scientists today recommended that it be banned.

The Stockholm Convention on Persistent Organic Pollutants recommended to list it in the Annex A of the convention. The list of chemicals under the convention are banned for production and use because of the threat they pose to living beings, particularly environment, said Kei Ohno, an official of the Convention, today.

In its meeting last week, the Persistent Organic Pollutants Review Committee (POPRC), a subsidiary body of the Stockholm Convention on Persistent Organic Pollutants, adopted a decision to include Endosulfan for consideration to list it in the Annex A, she said.

A chemical can be listed in the Stockholm Convention as a persistent organic pollutant when it shows that it persists in the environment, bio-accumulates in organisms (increases in concentration up the food chain), travels through environment over long distances from the region of its release.

India is a member of POPRC along with 30 other countries. The committee found that the continued use of Endosulfan would lead to significant adverse human health and environmental effects warranting global action on a war footing.

India, China, Israel, Brazil and South Korea are among the leading producers of Endosulfan in the world with an annual production estimated between 18,000 and 20,000 tonnes per year.

"Its use as a plant protection product is the most relevant emission source for Endosulfan," according to the risk management study of this chemical.

Already some 60 countries have banned the use of this deadly pesticide after they found viable alternatives.

In India and other countries, however, there is a large industry producing Endosulfan causing massive contamination of the soil.

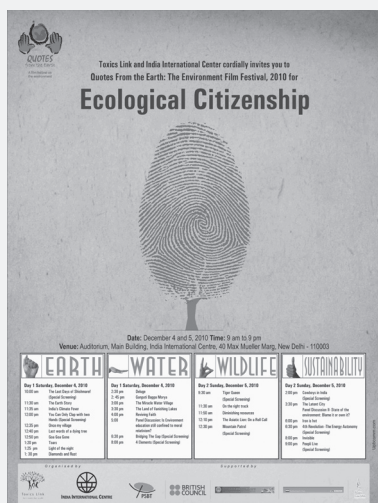
India which participated in the meeting last week agreed to review the recommendation before it comes into force sometime next year.

"For the first time, Stockholm convention parties will investigate interactions between chemicals that are of global concern," said Donald Cooper, Executive Secretary of the Convention.

In addition to Endosulfan, the POPRC reviewed and adopted the risk profile on Hexabromocyclododecane (HBCD), another harmful chemical, for inclusion in Annex A.

HBCD is used in textile coatings and in high impact polystyrene for electrical and electronic equipment.

Source: Deccan Herald, 21 October 21, 2010



QUOTES from the Earth

A film festival on
the environment

Quotes from the Earth has been the first of its kind in the Indian Capital since 2004. Using a discursive platform to highlight environmental challenges at the national and international level through films, which happen to be one of the most powerful medium of communication and discussion. The festival, is a collaborative effort by Toxics Link and India International Centre, Delhi.

Over a period of two days it aims to bring under one umbrella the persistent and persuasive, with each day culminating into a panel discussion on the theme.

Focusing on different issues, regions, and struggles to give audience a better chance to understand and engage with broader picture of the current status of environmental issues. Initiating, propagating and absorbing the idea of 'E-citizens', the films selected will throw light essentially on four categories: Earth, Water, Wildlife and Sustainability.

Registration for Visitors

Entry is free, but prior registration is must

For Sponsorship

If you wish to contribute to raising awareness on the subject, we invite you for supporting the festival by donating, sponsoring or by being part of any of our activities.

Details of the festival

Quotes from the Earth: The Environment Film Festival (2010)

Date: 4th-5th (Sat-Sun), December 2010

Time: 9 am to 9 pm

Venue:

India International Centre (IIC), 40 Max Muller Marg
Lodhi Estate, New Delhi-110003

For more information pl visit:

<http://toxicslink.org/filmfestival/2010/web/index.html>



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E-toxic listserve

Toxics Link coordinates an electronic discussion group for sharing and disseminating information. If you would like to join the group, please e-mail us at tldelhi@toxicslink.org

If you have any suggestions or require information, please contact:

Toxics Link – Delhi

H2 (Ground Floor)
Jungpura Extension
New Delhi 110 014
T: +91-(0)11-24328006, 24320711
E: tldelhi@toxicslink.org

Toxics Link – Chennai

9/5 (2nd Floor), Second Street,
Padmanabha Nagar, Adyar,
Chennai 600 020
T: 91-44- 42607642
E: tlichennai@toxicslink.org
info@toxicslink.org

I: www.toxicslink.org