

The International Lead Management Center

Inception Meeting

The Global Pollution Remediation Fund

Risk Reduction Initiatives in the Lead Industry

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ILMC

Risk Reduction Initiatives in the Lead Industry

Ban Lead

Increasingly during the late nineteen eighties and the early nineteen nineties the lead industry was targeted by environmental and public health groups and NGOs demanding a phase out of leaded gasoline and prohibitions on many lead products.

The Collision Course

By the middle of the nineteen nineties most of the Lead Industry had developed a siege mentality.

Whilst the resolution of this dilemma was seemingly very simple, that is, to open up a constructive dialogue between the regulators and the industry, in practice many of the governments of the major industrial nations of the world were now lining up to impose ever stricter controls and even product bans.

However, in 1995 enlightened environmental enforcement agencies in some of the OECD countries came to the conclusion that simply applying the “stick without the carrot” did not guarantee compliance or improvements in environmental performance. Enforcement agencies also realized that if they successfully prosecuted persistent offenders, they would likely force a company out of business leaving the “public purse” to pick up a huge bill for site remediation.

The Formation of the ILMC

So, following groundbreaking discussions between the OECD and the Lead Industry, the Environment Ministers of the OECD issued a Declaration on Lead Risk Reduction in 1996 seeking to voluntarily develop and strengthen national and cooperative efforts considered necessary to reduce risks from exposure to lead.

In the build up to the OECD Declaration the International Lead Industry, through the Offices of the Lead Development Association International (LDAI) and the International Lead Zinc Research Organization (ILZRO), had argued strongly for a voluntary approach to Lead Risk Management on the basis that restricting lead product production throughout the OECD, as originally proposed under a draft Council Act, would not necessarily restrict the availability of those products amongst member countries under prevailing World Trade Organization (WTO) rules.

Indeed, the likely consequence was that it might even export any environmental threats and occupational exposure problems to the developing world if production moved to countries outside the OECD.

The acceptance of these arguments by the OECD Ministers lead to an innovative approach to the management of lead risk and the creation of the International Lead Management Center, the ILMC, in the summer of 1996.

Supporters of the ILMC

Initially, only eleven of the World's largest Primary and Secondary Lead Producers were prepared to endorse a new partnership with the Governments of the OECD and sponsor the ILMC.

So, with only limited funds available a decision was taken early in the life of the ILMC that our focus would be the provision of "Expert Advice" and "Technology Exchange".

However, before I continue, let me assure you that the situation is very different ten years on, and the ILMC is supported directly by 35 companies and many more through Lead Industry Organizations.

Lead Contaminated Mine Sites

In the early days of the ILMC when we were contemplating how to implement the Risk Reduction Program we began by collating an inventory of known lead contaminated sites. Regrettably, there are many and these are a few of the most polluted sites.

Argentina	- San Antonio Oeste - Geotécnica
Dominican Republic	- Bajos de Haina, San Cristóbal
India	- Picnic Garden, Kolkata, Kolkata, West Bengal
Kosovo	- Trepca Recycling Plant - Mitrovica Refugee Camp
Mexico	- Tijuana, Baja California
Peru	- La Oroya, Junín
Romania	- Copsa Mica.
Russia	- Rudnaya Pristan – Dalnegorsk - Dzerzhinsk - Nizhny Novgorod Province
UK	- Greenside Lead Mine – Lake District
USA	- Bunker Hill, Kellogg, Idaho Tar Creek, Oklahoma
Zambia	- Kabwe, Katondo township - Lusaka

It was clear that the sites fell into two distinct categories, "abandoned" and "those in production".

Lead Contaminated Mine Sites

Typical of the many abandoned sites is the Metales y Derivados disused lead smelter, in Tijuana, Mexico, just 130 meters from the town of Chilpancingo, home to more than 10,000 people.

The site contains almost 24,000 tons of hazardous waste, including 7,000 metric tons of lead slag. The operation was shut down by the Mexican government agency PROFEPA in 1994 after repeatedly flouting Mexican environmental regulations.

The owner of the company, fled from Mexico after a warrant was issued for his arrest in 1995. He currently lives just across the border in San Diego and his company, is still in business with an annual turnover of US\$ 1M.

The latest estimate to clean up the contamination is \$10M and last month it was reported that the intergovernmental agency American-Mexican 2012 have made funds available to remediate the site and the surrounding area the by the year 2009.

What is puzzling, is why is money is coming from the public purse and not from the company!

In the early nineteen nineties Greenpeace reported many instances of poor environmental conditions at used lead acid battery recycling plants, including Philippine Recyclers or PRI, located just outside Manila. All too often I have found the Greenpeace sensationalize their claims but in this case their report was accurate.

The PRI operation was environmentally unsound and a major source of lead pollution.

But in 1997 the Company asked the United Nations Conference on Trade and Development and the ILMC to help them to improve their environmental performance and attain ISO 14001 for Environmentally Sound Management. The new management team were committed to make the necessary changes to the plant operation and the ILMC could support this on-going business to raise environmental performance.

Pilot Programs

So in 1997 the ILMC embarked on a series of Pilot Programs dealing with a variety of Lead risk management issues:

Philippines: In the Philippines the ILMC worked with PRI to explore and implement environmental and occupational health improvement strategies to facilitate ISO 14001 Certification for Environmentally Sound Management.

Russian Federation: There were three projects in the Russian Federation. In St. Petersburg the focus was on setting up an atmospheric monitoring system and establishing a correlation with occupational exposure. In the Rudnya Valley, the main issues here were soil contamination and population exposure around the town's lead smelter. At the Kursk secondary lead smelter and battery manufacturing plant a medical surveillance program was introduced for its employees.

Mexico: In Mexico a Reference Manual was collated and published to assist small and medium sized businesses to conform to the prevailing national environmental and occupational health legislation.

Peru: Specialist advice on materials handling and storage were required to resolve a childhood lead exposure issue at a primary school in the Port of Callao in Peru.

Zambia: ILMC examined the remediation options to deal with the legacy of population exposure following the closure of the Anglo-American lead mines at Kabwe.

In addition to the Country based Pilot Programs, the ILMC was also engaged in two Information Projects for worldwide distribution.

Ceramic Foodware:

An Information Handbook detailing best practice for the safe production, use and disposal of Lead Glazed Ceramicware.

The introduction of unleaded gasoline:

Clearing house reference materials and case studies in the phase out of leaded gasoline were compiled, collated and uploaded into the public domain via the ILMC web site.

Environmentally Sound Management:

ILMC have been active in the demonstration of “Best Practice” with site visits, work place secondments and “on the job” training for Pilot Program Partners.

Pilot Programs – Project Partners

From the outset of the formation of the ILMC it was clear that the level of support from the Lead Industry would not be sufficient to resource or fund a comprehensive series of Lead Risk Reduction Pilot Programs.

We also found that as an Industry Association, organizations such as the World Bank and the Asian Development Bank were most reluctant to make funds available to us.

Funding and Resource partnerships have therefore been a key element in the delivery of Pilot Programs.

In the Philippines, the ILMC worked with the United Nations Conference on Trade and Development and the Philippines’ Environmental Management Bureau.

In the Russian Federation, Electrozarjad was a key partner together with the Regional Offices of the Department of the Environment and Natural Resources.

The ILMC could not raise the funds to remediate the Rudnya Valley and Kabwe, and we were most fortunate that after contacting the Blacksmith Institute, they were able to not only mobilise local community groups, but also to leverage remediation funds from International Agencies.

In Mexico the ILMC worked through the Mexican Chamber of Mines, CAMIMEX (Cámara Minera de México) and the Government’s Health Ministry, the INE (Instituto Nacional de Ecología).

Funding in Peru came through the US AID Program and implementation of the project was undertaken by the Ministry for Health and the Environment, DIGESA (Dirección General de Salud Ambiental).

The Ceramic Handbook was produced in partnership with, and co-funded by the ISO Secretariat and prepared in Cooperation with Rutgers University.

The Clearing House Unleaded Gasoline Database was undertaken in partnership with UNEP's Paris Bureau.

Mission Continues

Global Outreach activities begun in 2000 when the ILMC provided expertise to the Basel Secretariat in the preparation of Technical Guidelines for the Environmentally Sound Recovery of Used Lead Acid Batteries.

The ILMC worked with the Brazilian Department of the Environment and Natural Resources to produce a comprehensive set of Guidelines that were approved by the Basel Technical Working Group in May 2002 and adopted unanimously by the Conference of the Parties in 2002 and published in the six UN languages in 2003.

To this day remain the best guidance document for the sound recycling of used lead acid batteries.

Mission Continues – SBC ULAB Project

Once the Basel Technical Guidelines were adopted by the Parties to the Convention, the Basel Secretariat invited the ILMC to provide technical support for a Regional Project for the Environmentally Sound Management of Used Lead Acid Batteries in nine countries in Central America, Colombia, Venezuela and the Caribbean Island States.

The ILMC worked with the respective Departments of the Environment and Natural Resources and two of the Basel Convention Resource Centers in Trinidad and El Salvador, together with the United Nations Conference on Trade and Development.

SBC ULAB Project - Recycling Plant Visits

However, a regional recycling strategy requires compliance with the Basel Convention Regulations for the Transboundary Movement of Hazardous Waste, that is, in this case, used lead acid batteries shipped from those countries without recycling capacity to those countries with recycling plants.

To confirm environmental credibility, assessments were made of plants and operations in Trinidad and Tobago, El Salvador, the Dominican Republic, Mexico and Venezuela to assess compliance with the Basel Technical Guidelines.

SBC ULAB Project – Outcomes

The outcomes from this project were:

- A Model seven step process to achieve Environmentally Sound Management (ESM) of Used Lead Acid Batteries (ULAB).
- A strategy to restrict the illicit activities of the “*informal sector*”, whilst providing them opportunities to work in the “*formal sector*” collecting ULAB for shipment to a licensed smelter.
- A comprehensive Training Manual that covers all the requirements of the Technical Guidelines and the Model seven step approach to achieving environmentally sound management of used lead acid batteries.
- A Regional Strategy agreed by all nine Countries in the Pilot Project.

SBC ULAB Training Manual – Cambodian Project

The Training Manual was then used by the ILMC to train staff at the Cambodian Ministry of the Environment to enable them to prepare a national inventory of used lead acid batteries for Cambodia and formulate a national strategy for the sound recovery of ULAB.

Four population centers, typical of the different economies found in Cambodia were used for the surveys. The Capital Phnom Penh with its financial center, the fishing port of Sihanoukville, the farming community around Battambang and the border trading town of Svay Rieng.

At each of the locations consideration was given to battery sales, use and life whether that was automotive, telecommunications or the growing field of solar power, and finally the methods of recovery.

Lead Life Cycle – Sigma Loop

Over the last decade ILMC projects have moved from risk specific, to embrace the management of risk throughout a product’s life cycle, and we are not alone in this field. Indeed, a great deal of research and analysis has been undertaken by the Lead Development Association International and the International Lead Zinc Research Organization.

And of course, Product Life Cycle Management for a lead acid battery is Product Stewardship, and this is often illustrated by the Mobius Loop.

However, Mining Operations, a vital component of the Lead Life Cycle, does not fit into the Mobius Loop, but it does provide a natural input into the Sigma Life Cycle Loop.

Lead ore enters the Life Cycle Loop when it leaves the mine for the smelter and in the case of lead acid batteries passes onto the battery manufacturer, then the consumer and after use, to the recycler, where the used batteries are sent in bulk to the smelter and the cycle is repeated.

Ideas connecting Product Stewardship through interactions throughout the Product Chain in a Sigma Loop were initially suggested by the Green Lead Initiative.

Green Lead Project

The Green Lead approach to Product Stewardship is to establish a chain of Environmental Providence throughout the Life Cycle and when the ILMC was invited to provide technical input into the Green Lead Project, it seemed to be another opportunity to further the risk reduction programs.

Certainly, a Scheme to develop a Tool for the Assessment of Environmental Performance would integrate very well with the used lead acid battery project in Central America and the Caribbean, where the ILMC were already working on a similar scheme. Furthermore, the Green Lead Initiative was consistent with:

- Life Cycle Analysis
- Sustainable Development

And

- the outreach policy of the ILMC; that is, offering more opportunities to work with other organizations interested in Lead Risk Reduction.

Green Lead Project

But the main attraction of the Green Lead Initiative to the ILMC and its partners in the Developing World was that the introduction of a Green Lead Chain of Custody offered a real opportunity to severely restrict, and even eliminate the illicit and polluting activities of the “informal” sector.

In every ILMC study of used lead acid battery recovery, the vast majority of lead exposure problems were caused by the poor recycling methods used by the “informal” sector. If, for example, a chain of custody could be established for lead acid batteries, then used batteries would ONLY be sent to certified collection centers and licensed recycling plants. At a stroke, the Informal Sector could be eliminated and then with unbroken environmental integrity, Product Stewardship gives way to a sustainable mechanism for the lead life cycle.

Green Lead Project

But, for this meeting, the most important aspect of the Green Lead Project is Site Sustainability. The Green Lead Protocols detail the criteria necessary to achieve Product Stewardship throughout the Life Cycle and the Product Chain whilst maintaining environmentally sound management at any operating site.

The Green Lead philosophy is that a site used for mining, battery manufacturing, recycling or retailing should be regarded as asset that requires care and attention in order to ensure that it does not become a liability. However, unlike the legislative requirements of the Mining Remediation Plans for financial bonds or liability insurance for closure, Green Lead focuses on maintaining the sustainability of the site in respect of the not only the environment, but of its socio-economic value and institutional aspects. The emphasis for Green Lead is on establishing procedures that are applied on a daily basis to reduce or eliminate adverse environmental effects; potential impacts on human health; and probable impacts on aquatic and wildlife.

In this way, industry co-exists with the local “way of life” during the period that a business is active at a site, as the local economy will be sustained throughout operations. And that means when there is closure, communities return very quickly to a way of life that is self sufficient, based on local resources, skills and experience, and most importantly, pollution free.

Lead Product Sustainability

Now running in parallel with the ILMC Risk Reduction Program and Green Lead is the LDAI Product Sustainability Project. Having explained how difficult it is for the Industry to look back, at least we are now committing ourselves to the safe production and use of lead in the present and in the future, enabling society to continue to benefit from lead’s particular properties, whilst safeguarding human health and the impact of our products on the natural environment.

The following principles are the foundation of our responsibilities to society:

- Sustainable development is integral to our business decision making
- Operations should be managed responsibly, safely and without adverse impacts on the natural environment
- Protecting human health is of paramount importance and we abide by all relevant regulations, and adopt best practice
- We support the application of sound science for the continual improvement in health, safety and environmental performance and in the implementation of risk management strategies
- We encourage responsible product design, use, re-use, recovery and recycling of lead containing products
- We promote openness in our relationships with all stakeholders, treating them with respect and recognizing that cultures, priorities and working practices differ around the world

And Now La Oroya.....

I know that there are certain Lead Smelter sites that are always on your mind if not on the Blacksmith Institute web site, such as La Oroya in Peru.

After 75 years of State ownership, the Doe Run Company bought the mining and smelting concession in 1998. You know the conditions

Since then the Company has introduced its “Walking Together” program and a three point improvement plan that: covers Emissions and Discharges with the:

- Consolidation of the outfalls
- Construction of a new process water treatment plant
- Construction of a new extraction and ventilations system

And a Hygiene Program that has:

- Built new changing rooms
- Issued employees with new personal protective equipment

Finally there is the Remediation Program and that includes:

- Assistance with the construction of a new municipal water treatment plant.
- A community outreach program for schools and agriculture

Evidence for the results of the current investments can be seen in the occupational lead in blood data for the last 10 years, showing a fall of nearly 38%.

We know that the issues at La Oroya and many other sites are of great concern and there are reports in the press almost daily, and we know there is much to do, but we are not about to walk away.

Over the next few years the levels of personal lead exposure will fall, including those of the children in the area, but we should all be aware that the Doe Run operations are not the only contributors to the levels of pollution and consideration by all interested parties will be needed to substantially reduce the environmental and health risks.

Tailings Dams

As I have mentioned, even if Doe Run comply with all their commitments, they will not eliminate all the pollution and contamination in La Oroya and the main reasons are linked to old mine sites and tailings dams.

Just in case you are not familiar with tailings dams – wherever there is mining activity there are tailings dams.

Most mining processes are wet and the fine wastes or “tailings” leave the processing plant as a slurry. This is conveniently pumped from the plant to a place for sedimentation and storage. The use of tailings dams to create an impoundment for storage is the most common way of dealing with tailings. When the tailings have settled within the containment area, the water will either be recovered for use in the treatment plant, released after proper treatment into a tributary river or stream or, in arid climates, evaporate. As the tailings fill the impoundment, the surrounding dams are continuously raised. (ICOLD, 1996c)

In theory when a mine site is closed, the tailings should be treated and the dam area remediated – In practice in the past the dams were often abandoned.

And what do these dams contain. Well, mine wastes will vary from mine to mine and depend on the mineral bearing rocks, but generally you will find:

- arsenic
- heavy metals
- acid generating elements (causing AMD)
- cyanide from the process
- radioactivity (i.e. from uranium tailings)

Marulan Mine – NSW, Australia

And here is an example of a tailings dam raised layer by layer as the wall is built ever higher.

Tailings Dams

Apart from the fact that they are getting larger they are also growing in height with the maximum at present at about 280 metres and if you can compare that to the Eiffel Tower; that means the dam reaches the top observation platform.

A failure at a major tailings dam is usually catastrophic. Some here today may recall the disaster at the Boliden Lead, Zinc and Silver mine in Los Frailes, near Aznalcóllar in Southern Spain.

On April 25, 1998 the tailings dam wall slipped and suddenly there was a 20 metre breach in the dam wall, releasing 5 - 7 million cubic metres of toxic slurry and contaminated liquid effluent into the Río Agrio, increasing the river level by 3 metres and flooding a huge swath of the Donana National Park, a UN Heritage Site.

The clean up cost is estimated to have been in the region of US\$ 100 – 200 million dollars and the campaign cost the lives of six people killed in road accidents as the sludge was transported back to the mine site.

I could give you more examples, and there are many, but I think that you understand the situation. Now what has been the response from the Industry?

Well, the problems associated with tailings dam failures have been known and understood for many years and prior to the events at Los Frailes the mining industry, through the International Council for Metals in the Environment (ICME), in conjunction with UNEP was in the process of compiling a Best Practice manual for the maintenance and inspection of Tailings Dams. This manual of Case Studies into Best Practice was published in 2001 and has been used as the basis for changes in dam management and legislation in many countries around the world.

Good Practice for Mining and the Metals Sector

Furthermore, the successor to the ICME, the International Council for Mining and Metals (ICMM) went on to develop and launch the “Mining and Metals Sector Good Practice” website, in conjunction with the UK Department for International Development (DfID), the United Nations Conference of Trade and Development (UNCTAD) and the Division of Technology, Industry and Economic of the United Nations Environment Program (UNEP). <http://www.goodpracticemining.com/index.php>

This web site provides free access to a library of good practice guidelines, standards, case studies, legislation and other relevant material that are leading examples of their kind, including the APELL Handbook written as a direct consequence of tailing dam failures. APELL stands for, “Awareness and Preparedness for Emergencies at the Local Level”. http://www.icmm.com/uploads/187ICMM-UNEP_APELL_BROCHURE%20-DEC%2003.pdf

Among the documents already available are guidance notes on.....

Mining Certification Evaluation Project (MCEP)

This three year project managed by the WWF-Australia demonstrated the feasibility of independent, third-party certification of environmental and social performance applied to mine sites. http://www.minerals.csiro.au/sd/Certification/MCEP_Final_Report_Jan2006.pdf

Sustainability Reporting Guidelines

The Guidelines for Sustainability Reporting were released in October 2006 following several year’s of research, development, and consensus-seeking by multi-stakeholder technical working groups. <http://www.globalreporting.org/Home>

Strategic Approach to International Chemicals Management (SAICM)

The Strategic Approach to International Chemicals Management is a policy framework for international action on chemical hazards.

It was developed through a multi-stakeholder process in support of a goal agreed at the 2002 Johannesburg World Summit on Sustainable Development to ensure that by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health.

New Mine Tailings Technology

So what is the sustainable answer to the Mine Tailings problem? What should you be looking for at mine sites?

A likely solution was initially developed about 10 years ago in Canada at the Kidd Creek Copper and Zinc Mine in Ontario. The tailings slurry was de-watered and a thickener added to and mixed with the remaining sludge to produce a non-segregating high-density paste with such a high viscosity that in the event of a tailings dam failure, the slurry would hardly move.

More recently, mining engineers have developed mine backfilling using the tailings paste mixed with a special cement and then poured through boreholes into the underground mine to backfill mined-out stopes. A good example can be found at the BHP Billiton Silver-Lead Mine at Cannington, Australia. Currently 50% of the tailings are pumped back into the mine.

The advantages of this technology are that it:

- makes good use of a waste product by returning it to where it came from,
- stabilizes the rock formations underground and reduces subsidence
- prevents local ground-water from flowing into the empty mined out stopes thereby reducing the risk of environmental damage from mine tailings

By the time the Cannington Mine closes all the mine tailings will be consolidated and the whole site remediated.

Thank you.

Brian Wilson
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