



**a toxics-free future**

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## **International SAICM Implementation Project (ISIP)**

In 2010, in an effort to demonstrate SAICM implementation via IPEN Participating Organizations, IPEN launched an International SAICM Implementation Project, also known as ISIP. ISIP aims to mobilize resources for initial enabling activities pertaining to national priorities, in keeping with the work areas set out in the strategic objectives of section IV of the SAICM Overarching Policy Strategy.

In particular, the ISIP supports the Governance objective of SAICM's Overarching Policy Strategy paragraph 26, which calls for enhanced "cooperation on the sound management of chemicals between Governments, the private sector and civil society at the national, regional and global levels."

In addition, ISIP builds on the 2008-2009 Global SAICM Outreach Campaign to raise awareness about SAICM and strengthen collaboration among the public interest, health and labor sectors.

### **ISIP Objectives**

ISIP's four objectives include:

- Promoting the need for sound chemicals management
- Advancing National SAICM Implementation
- Promoting global SAICM implementation by global civil society
- Building capacity among NGOs developing countries and countries with economies in transition

**Title of activity:** Emisiones de mercurio como subproducto de la mega minería de oro a cielo abierto en América Latina (By-product Mercury Emissions from Large-scale, Open-pit Mining in Latin America)

**NGO:** Observatorio Latinoamericano de Conflictos Ambientales (OLCA)

**Country:** Chile

**Date:** December, 2012

### **Elements of SAICM Covered:**

Identify, explain problem, make initial recommendations on how to address the problem, may be linked to public awareness-raising about the issue; Facilitate the identification and disposal of obsolete stocks of pesticides and other chemicals (47, 68)

### **Provide a physical description of the site**

Andacollo:



The Andacollo mine is located in the urban area of the city of Andacollo, which is located in the Elqui province of Chile's Coquimbo region. Andacollo is located in the Andes mountains of El Norte Chico, 56 kilometers southeast of La Serena, and is 1017 meters above sea level. The region is characterized by an arid Mediterranean climate and is composed of six communes: La Serena, Coquimbo, Andacollo, La Higuera, Vicuña and Paihuano. The Elqui province is named after the Elqui River, which is the main watershed in the area (<<http://www.gobernacionelqui.gov.cl/geografia.html>>). In the surrounding urban area of Andacollo proper, there are over 20 hectares of tailings from mining activities.

#### La Coipa:



The La Coipa mine lies within the Domeyko Cordillera of the Andes, at an elevation of between 3,800 and 4,400 meters above sea level (Global InfoMine Fact Sheet). The mine is located in the Atacama region of northern Chile, approximately 140 km northeast of the city of Copiapó (Global InfoMine Fact Sheet). The greater province of Copiapó covers 34,543 square kilometers and is comprised of the Caldera, Tierra Amarilla, and Copiapó communes (Gobernación Provincia de Copiapó website).

The region has a coastal, desert climate and depends on the snow-melt in the Andes Mountains for water (Gobernación Provincia de Copiapó website). Vegetation is sparse in the region, however, wildlife includes fox, vicunas, guanacos, and pink flamingos (except during their migration in winter) (Belanger 2003, p. 5-1).

Historically, the Copiapó River, and the larger basin, have been the primary source of water for the entire region.

### **Give a history of the site**

Andacollo:

The presence of copper and gold in the Andacollo area dates back to pre-European colonization when the Inca exploited the region's deposits. Throughout the 18<sup>th</sup>, 19<sup>th</sup> and 20<sup>th</sup> centuries, Andacollo was one of the principle gold producers in Chile. The current mine is operated and owned by the Dayton Gold Corporation.

La Coipa:

The history of the La Coipa Mine dates back almost a century, when a small copper and silver mine first began operations just two kilometers southeast of the present day mining site. Since then, the region has been mined sporadically. However, the modern La Coipa area was not officially explored until the late 1970s (Kinross website, 2012).

The current mine is operated by Mantos de Oro (MDO), a subsidiary of the Kinross Gold Corporation, owner of La Coipa (Belanger 2003, p. 1 - 1).

Both mines are large-scale, open-pit gold mines that use the cyanide leaching process to separate gold from the ore.

### **Description of the chemical characterization**

Our research found that in Chilean gold mines there is a significant source of by-product mercury pollution to the air and soil in the country. Furthermore, we found that both the Andacollo and La Coipa mines had mercury present in the soil and atmosphere. Both mines also use cyanide, which was also present in the surrounding environment. Information on the specific amount of mercury pollution from each mine was not available however, due to a lack of regulation, monitoring and transparency from both Dayton and Kinross corporations as well as Chile's National Service of Geology and Mining (SERNAGEOMIN).

### **Description of the environmental and health consequences**

Mercury pollution from both the Andacollo and La Coipa mines has shown to have serious environmental and health consequences. In an interview with OLCA, Luis Guerrero, president of the group Environmental Control and Community Development of Andacollo (CMA), stated that, "In 2011, studies were conducted by scientists from Canada, Ecuador, United Kingdom and Germany, in which measurements were made with a device called the Lumex vapor analyzer, which showed high concentrations of mercury near areas where they perform the extraction and processing of gold, because the high temperatures required in the process evaporate the mercury, which then travels through the air and effects residents of the city and the whole atmosphere."

A report prepared for Kinross by AMEC E&C Services Limited states that, "The most significant environmental issue at the [La Coipa] mine is mercury contamination of the Campamento Aquifer" (Belanger 2003, p. 64). Mercury also occurs naturally in the ore body at a rate of around 30 grams per ton. This mercury is released in the soil during the mining process and emitted to the atmosphere as it "passes through the metallurgical process generating mercury fumes" (MiningWatch Canada 2007, p. 14).

With regards to health, higher mercury concentrations have been found in the blood, urine and hair samples of communities living closer to mining sites than communities living farther away

(Ed. Saunders, 2008, p. 5, Basu & Hu, 2010, p. 4.). At the La Coipa mine, poor maintenance of equipment and noncompliance with regulatory standards have led to mercury releases. As such, “mercury-related illnesses have been reported and there have been numerous union complaints due to mercury poisoning” at the La Coipa mine (MiningWatch Canada 2007, p. 14).

A study found that miners in the Andacollo region demonstrated more symptoms of mercury related neurological health problems than control groups in the region. Participants in the study showed signs of neurological damage, tremors, Parkinson’s disease associated with cognitive deterioration, and deterioration of the frontal lobe, among other health effects, such as impaired ability to speak, attention span, and panning and sequencing behavior in general. Furthermore, all groups in the study had elevated mercury concentration in their blood and hair samples, demonstrating the mobility of mercury pollution.

### **Description of who is responsible for the site**

Currently, the two corporations operating at each site, Dayton and Kinross, are responsible for mercury emissions at each site. But the Chilean government is responsible for keeping those corporations accountable so that they adhere to Chilean laws and regulations.

### **Description of the plans for cleanup**

Both mines are currently active and continue emitting mercury, among other contaminants related to open-pit gold mining. Mining corporations are required to have a detailed plan detailing the procedures for mine closures including cleanup of the surrounding area. These guidelines are often not adhered to fully, and the contamination left behind can persist for thousands of years.

In the case of the La Coipa mine, Kinross has recognized the high level of mercury in the surrounding aquifer and has publically committed to clean and reduce the mercury levels in the water. However, further reports have stated that the duration and effectiveness of the cleanup operation remain unclear.

### **Project Outcomes:**

#### **Description of the activity conducted**

The activities associated with this project included:

Literary Review: We conducted a literary review of articles, studies and other documents and essays on mercury as a byproduct of large-scale mining around the world, but with a focus on Latin America.

Case Studies: We conducted two case studies, the first on Mantos de Oro (the La Coipa project), located in Chile’s Atacama Region, in the commune of Copiapó, 140 kilometers northeast of the city of Copiapo, 4000 meters above sea level, owned by Kinross. The second case study examined Andacollo Oro, located in Chile’s Coquimbo Region, in the commune of Andacollo, just outside of the town of the same name, operated by Dayton.

The criteria for selecting these cases were:

- a) Be mines that produce non-ferrous metals on a large-scale,
- b) Be located in agriculture regions of Chile where environmental and social conflicts are more visible.
- c) Be projects that have been exploiting for more than 10 years, so that there is enough data history to draw from.

The analysis of these cases included a detailed report on the processes of extracting gold and silver that release mercury as a byproduct, the destination of this byproduct, and the environmental costs associated with it.

We especially wanted to determine the lack of regulation and control systems in the management of mercury as a byproduct of nonferrous metal mining, and the lack of awareness of the risks of mercury by the authorities, a fact which is exploited by companies to solve the mercury problem with their own criteria.

We interviewed community members and contacted the corporations and Chilean Government, as well as various other individuals who contributed to our research.

We were unable to accurately calculate the total mercury emissions at each case study site due to incompletion and the refusal to divulge information by both Corporations and Chile's National Service of Geology and Mining (SERNAGEOMIN). However, using reports and previous studies using UNEP's toolkit, we concluded that byproduct mercury from large-scale gold mining is a significant contributor to national and global mercury pollution.

Report: We have a draft report of 46 pages detailing our findings: We have created a document containing the results and the methodology employed in this study, and shared our work with the organizations and governments participating in UNEP's discussions regarding the Mercury Convention as well as the organizations of OCMAL (Observatory of Mining Conflicts in Latin America) and other civil society organizations that work in our country. The report is now under review by IPEN hub focal point in Latin America.

#### **Impact on target groups:**

Consistent with our mission, OLCA has consistently engaged community members, organizations, and groups in our research. For this project we encouraged the participation of communities affected by large-scale mining throughout Chile and especially near the two case study sites. In general, the research for this report was highly influenced by the self reported experiences and interviews of Chilean communities impacted by large-scale mining.

#### **Impact on target policies:**

The target policies are the International Treaty on mercury being negotiated by the UNEP Committee and Chile's national mining laws. As the final product is just finished, it is hard to tell what impact it may have on local and international policy. There was significant resistance to incorporating large-scale mining in the INC4 discussions. Hopefully, the final report may persuade governments to reconsider at INC5.

#### **Outreach to stakeholders:**

As a part of this project, OLCA engaged a variety of stakeholders. We contacted the Dayton and Kinross Corporations, neither of which responded. OLCA engaged Chile's National Service of Geology and Mining (SERNAGEOMIN), although they did not divulge sufficient answers to our questions.

OLCA also contacted and remains in contact with community members in Copiapó and Andacollo and the surrounding areas, as well as community organizations and groups (including the president of the Environmental Control and Community Development of Andacollo Group--CMA). As a part of this report, OLCA also collaborated with organizations and institutions throughout Latin America and the world, including OCMAL and other IPEN members. OLCA remains in close contact with these organizations and will disseminate the finished report throughout the region, engaging even more NGOs, institutions and other groups.

#### **Deliverables, outputs and/or products:**

As a part of this project, we produced an in-depth report on the impacts of large-scale gold-mining, specifically focusing on byproduct mercury emissions and releases. The results were incorporated into the IPEN position at the INC4 in Uruguay this past June/July and the full report will be available for reference and dissemination in the ongoing UNEP negotiations.

### **Communication Efforts:**

The project was presented and received visibility at the INC4. OLCA also presented the issue at IPEN's General Assembly in Brazil in June. The finished report will also be published on the OLCA website and diffused throughout the country and region with the help of OCMAL and other participating NGOs including members of IPEN's Heavy Metals Working Group.

### **SAICM National Focal Point:**

Francisco Espinoza at political level in Foreign Relations Ministry

Lorenzo Caballero as technical expert from the Environment Ministry

### **NGO Recommendations for next steps:**

- 1) From our research, we found that Chilean government and governments in general lack the sufficient resources or are faced with political pressure that makes it difficult to establish and comply with environmental laws that regulate mercury emissions separately. Therefore, it is essential to create an international instrument related to mercury emissions. UNEP is currently negotiating such a treaty, that must recognize large-scale mining as a significant contributor to global mercury emissions and include regulations on the mining industry that eliminate the emission and release of by-product mercury and include specific procedures to force corporations to use reduction measures that lead to the elimination of mercury releases to the soil, air, and water.
- 2) One of the findings of our study was that there is a lack of regulation, measurements and overall data regarding by-product mercury emissions and releases in Chile. Therefore, it is necessary to design mechanisms to collect and share information and create sanctions that encourage governments and businesses to measure and file periodic reports detailing mercury emissions of each gold and silver mining project in the country. Furthermore, communities deserve access to clear and transparent information regarding mercury emissions. Therefore, it should be mandatory for corporations and governments to provide accessible, timely, and reliable information on issues of mercury releases to the atmosphere, soil, and water.
- 3) We believe it is essential to open a broad and serious debate involving all stakeholders on this issue and that the outcome on a local, provincial, national and regional level produces binding policies that safeguard the collective rights of present and future generations, before it is too late. In this sense, we understand that this report is only a beginning of a line of research that should continue to broaden our knowledge of the issue at hand with the participation of government agencies, academic institutions and of course the communities themselves who are most aware of the profound alterations that are affecting their territories and their way of life.
- 4) We believe that governments that ignore the precautionary principle agreed upon by nations, and which continue to approve gold and silver mining projects, should be sanctioned on an international level. We support a moratorium on mining, until national legislation, control devices and environmental and health institutions of the countries involved define clear rules on permissible limits, set penalties for non-compliance and define measures aimed at effective regulation in these areas.
- 5) Due to the destructive nature of cyanide-based mining, and its contribution to mercury emissions, we believe that the use of cyanide in mining should be banned. Cyanide-leach technology has already been banned in many countries around the world, like the Czech Republic, Greece, Turkey, Germany, Hungary, Costa Rica, Argentina, Ecuador, and even a few states in the USA like Montana (Justice and Environment, 2011 p. 2). Alternative technologies such as the Haber Gold Process (HGP) and the YES-process have been shown to be more environmentally sustainable and emit less by-product mercury (Justice and Environment, 2011 p. 6). In fact, recent studies of the HGP have found that "HGP results in more gold recovery over a shorter period of time than the cyanide-leaching processes, with a cost comparable to, or less than, cyanide-leaching" (Justice and Environment, 2011 p. 6).

