

Mercury measurements in the surroundings and in the premises of the chlor-alkali plants in the Czech Republic

Executive Summary

Spolchemie Usti nad Labem



Spolana Neratovice



Arnika Association
Toxics and Waste Programme



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Purpose of measurements of mercury concentrations in the air, carried out by the Arnika Association in the premises of Spolek pro chemickou a hutní výrobu, a.s. Usti nad Labem (hereinafter Spolchemie) and in its surroundings, and in the surroundings of Spolana, a.s. Neratovice (hereinafter Spolana) in June 2006 was preliminary mapping of mercury burden in the premises of Spolchemie and in its surroundings, and in the surroundings of Spolana. The measurements concerned only monitoring of mercury concentrations in the air. An automatic mercury analyzer (Lumex RA-915+) was used for measurement of the mercury concentrations.

After **MERCURY** gets into the environment from its source, it either travels long distances, or contaminates the environment in the surroundings of its source. It damages soil, lakes, rivers and ponds, and enters the food chain, thus endangering animals and people.

People can be exposed to undesirable effects of mercury if they consume mercury containing foodstuffs (for example, fresh-water and sea fish). People are also exposed to high concentrations of toxic mercury if they live, and breathe the air, in the vicinity of natural sources of this heavy metal (for example volcanoes), but nowadays, especially if they live in the vicinity of its industrial sources (for example, in the surroundings of chemical plants, steel works, coal power plants, etc.).

High mercury concentrations or long-term exposure to lower doses of this substance cause serious health problems. In the case of adults, it causes disorders of central nervous system, which manifest themselves through loss of fine motor activity, vision defects, tremor, tingling in limbs, or amnesia. Mercury also influences fertility and blood pressure. Some scientists and doctors rank mercury among substances which may be carcinogenic for people. Mercury has also teratogenic effects, i.e., it adversely influences foetus (especially its nervous system) during its development in the mother's body.

The carried out measurements of mercury concentrations in the air revealed that chlorine chemistry plants Spolchemie and Spolana are in certain cases, depending on weather, air circulation, and level of mercury releases from the facilities and old environmental burdens, responsible for increased mercury concentrations in their surroundings.

In the time of the measurement, mercury concentrations in certain areas outside the premises of **SPOLCHEMIE**, exceeded the value of hundreds ng/m^3 . In certain parts of outside areas, mercury concentrations in the air were in the range from the detection limit ($2 \text{ ng}/\text{m}^3$) up to the highest found out value of $412 \text{ ng}/\text{m}^3$.

The Arnika Association carried out measurements also in the surroundings of electrolysis production units. Although the highest found out mercury concentration in the air ($9\,631 \text{ ng}/\text{m}^3$) did not exceed the valid limit for working environment ($50\,000 \text{ ng}/\text{m}^3$), it nevertheless proves that this technology is a mercury source for its surroundings. Measurements inside the technology of amalgam electrolysis (i.e., directly in the building, for example, in a hall of the mercury cells) was not carried out.

In the time of the measurement, mercury concentrations in certain areas outside the premises of **SPOLANA** (especially, on the opposite bank where the premises of landfill management of the company are located) reached up to the value of a thousand ng/m^3 . Mercury concentrations in the air in certain areas outside the premises of Spolana were in the range from the detection limit ($2 \text{ ng}/\text{m}^3$) up to the highest found out value of $989.18 \text{ ng}/\text{m}^3$.

The Arnika Association did not carry out measurements in the surroundings of electrolysis production units, and directly in the buildings where the amalgam electrolysis is located and employees work, because the Spolana managing director refused our request for measurement inside the Spolana premises.

The current technology of amalgam electrolysis, using mercury during chlorine and alkaline lyes manufacturing (Spolchemie and Spolana), shut down old amalgam electrolysis (Spolana), and

contaminated soils and building (Spolchemie and Spolana) are responsible for increased mercury concentrations in the air in the surroundings of Spolchemie and Spolana.

However, it is very simple to prevent air pollution with mercury - replacement of the current production process, i.e., amalgam electrolysis regarded as the worst possible production process according to the reference document in the chlor-alkali manufacturing industry, with another production process, so-called best available technology. Several such technologies may be chosen. The most used ones are membrane technology and diaphragm technology.

Spolchemie and Spolana should replace amalgam electrolysis with the best available technology within the shortest possible term - by 2009, at the latest. Replacement with the best available technology is the biggest step forward, but the Arnika Association believes that before it takes place, the state administration and self-government authorities, but also Spolchemie and Spolana, should take also several other steps focusing on protection of human health and the environment from this dangerous poison, and on monitoring of state of the environment in the premises of Spolchemie and Spolana and their surroundings:

1. Both chemical plants should clean their premises and their surroundings from mercury, but also from other hazardous substances present in their premises and their surroundings as a consequence of previous, as well as current, productions.
2. Both chemical plants, together with corresponding scientific institutions and local self-governments, should carry out consistent and long-term monitoring of mercury concentrations in the air in their premises and in their surroundings (directly in the close surroundings of the premises, and, in the case of Spolchemie, in the centre of the city of Usti nad Labem, and in the case of Spolana in the adjacent villages and in the centre of Neratovice). Results of the monitoring should be publicly available. At the end of each calendar year, a summary evaluation report should be prepared, which should be also publicly available.
3. Both chemical plants, together with corresponding scientific institutions and local self-governments, should monitor state of health of their employees. Further, there should be carried out monitoring of people, and, especially, children and pregnant women, who live and work in the surroundings of the chemical plants, especially in the areas where increased mercury concentrations will be found. All results of the monitoring (of employees, as well as of inhabitants) should be publicly available.
4. Each year, both chemical plants should inform the public and state administration and self-government bodies what amount of mercury they bought and for what reasons. Further, they should continue to provide information what amount of mercury they release through emissions to air, water, products and wastes. Spolana should provide how much mercury they dispose via waste. These reports should be publicly available.

This publication (Mercury measurements in the surroundings and in the premises of the chlor-alkali plants in the Czech Republic) is available in the Czech and English languages at <http://english.arnika.org> or the printed version is available at Arnika Association – Toxics and Waste Programme

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ENVIRONMENTAL ASSOCIATION ARNIKA

The mission of the Arnika Association is improvement of the state of the environment, its protection from pollution, protection and restoration of natural values on the territory of the Czech Republic, also in the European context. Arnika is a citizens association, active nationwide. It was established in 2001. The Arnika Association is engaged in protection of wetlands and watercourses, pollution of the environment with toxic substances and wastes, and support of the public in decision-making concerning the environment.

<http://arnika.org>

Toxics and Waste Programme

The purpose of the Toxics Free Future campaign (<http://www.bezjedu.arnika.org/>), which is the main campaign of the Arnika Association - Toxics and Waste Programme, is to reduce presence of toxic substances in the environment. Arnika wants to push through sufficiently strict new **chemical policy of the European Union (REACH)**, consistent implementation plan of the **Stockholm Convention**, and reduction of releases of so-called **persistent organic pollutants** in the Czech Republic. Its last aim is free access to information on toxic substances, for example, via the **Integrated Pollution Register**.

In addition to global aims, the campaign works also at concrete problems of environmental pollution with toxic substances - for example, from landfills and waste incinerators.

Arnika supports introduction of **recycled paper** into companies, schools and other state institutions, increase of **waste recycling**, and introduction of **substitutes of harmful PVC** in food industry and health care. We also push through **environmentally friendly technologies**, for example replacement of amalgam electrolysis in Spolana Neratovice (<http://bezjedu.arnika.org/horka-mista/spolana/>) and Spolchemie Ústí nad Labem (<http://bezjedu.arnika.org/horka-mista/ustinadlabem/>) with a process which does not use mercury.