

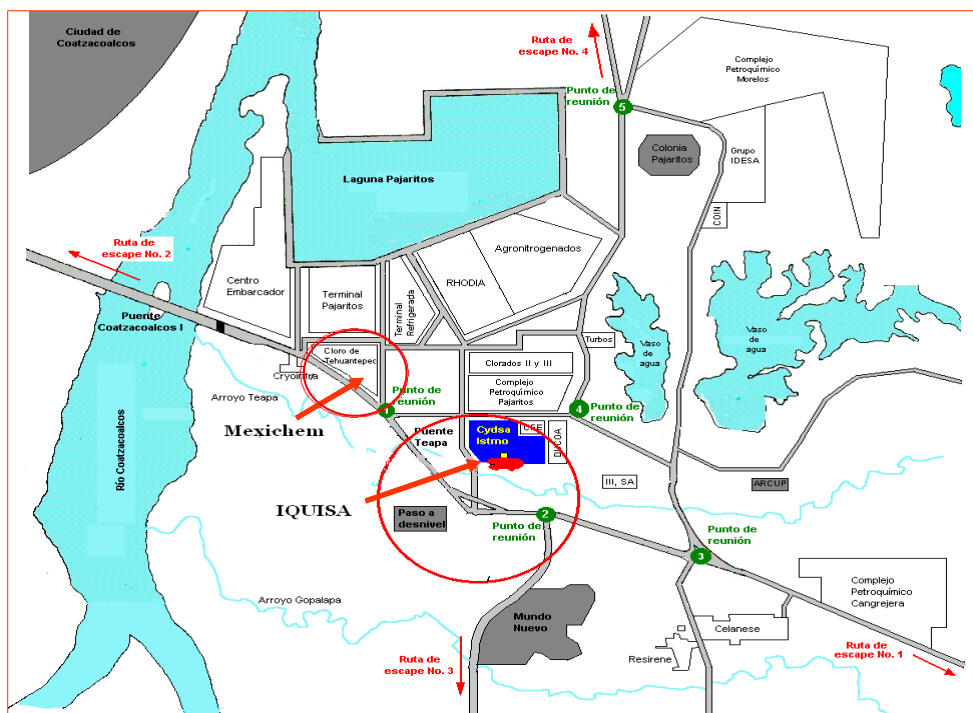
Report of the Facility Visits

Coatzacoalcos, Veracruz, Mexico

30 March 2006

Background: On 29-31 March 2006, World Chlorine Council (WCC¹), Asociación Nacional de la Industria Química (ANIQ), the U.S. Environmental Protection Agency, and the United Nations Environment Programme (UNEP) sponsored a Mercury Stewardship Workshop in Coatzacoalcos, Veracruz, Mexico. As part of this Workshop, participants visited two chlor-alkali manufacturing operations located in Coatzacoalcos, Complejo Industrial Pajaritos: Cydsa/IQUISA, a mercury cell process and Mexichem, a diaphragm cell process.

The objective of facility tours is for the industry experts and participants to view the local chlor-alkali manufacturing processes² to provide context for the discussions on and exchange of best available techniques (BAT) and best environmental practices for reducing mercury use and emissions. This report summarizes these facility visits³.



MAPA DE LOCALIZACIÓN DE INDUSTRIA QUÍMICA DEL ISTMO, S.A. DE C.V.

¹ The World Chlorine Council (WCC®) The World Chlorine Council is a global network of national and regional chlor-alkali associations in over 27 countries. The WCC membership includes associations and companies in Africa, Asia, Europe, Latin America, and North America; representing over 80 percent of global chlorine and caustic-soda production. The WCC was created in 1993 to coordinate international efforts to improve the understanding and awareness of the benefits of chlorine chemistry; further the practice and understanding of responsible stewardship; and anticipate and respond to relevant health, environmental and public policy issues. Additional information regarding the WCC can be found at www.worldchlorine.com.

² For a description of the various manufacturing processes see <http://www.eurochlor.org/makingchlorine>

³ As a practice of the industry, all participants were instructed in advance to wear appropriate attire for a facility visit. Each participant attended a safety briefing immediately prior to visiting the chlor-alkali manufacturing operations. This briefing was conducted by IQUISA and Mexichem staff to ensure that participants had a common knowledge of the safety warnings, escape routes, use of personal protective equipment and other safety requirements for each of these facilities. Prior to boarding the busses for the facility tour, each participant was issued personnel safety equipment (eye protection, emergency escape respirator, and hard hat).

Cydsa/IQUISA⁴: Grupo Cydsa, Industria Química del Istmo, SA de CV (IQUISA), has two facilities in Mexico using the mercury cell process to manufacture chlorine: one in Coatzacoalcos, Veracruz and the other in Monterrey, Nuevo León, Mexico. Representatives from both facilities participated in the Workshop and the facility visit.

The facility tour began with an overview of the Cydsa company and the IQUISA facility at Coatzacoalcos, which was constructed in 1967 (about 40 yrs old). The overview included a



description of the manufacturing operations, processes and products (chlorine, salt, hydrochloric acid) at the IQUISA Coatzacoalcos facility. At the moment, production is stable at about 120 thousand metric tons per year. Most of the chlorine gas is piped directly from this plant to the nearby Pemex⁵ plant (across the street). Chlorine is also shipped as liquid to other customers in 1-ton cylinders and rail cars. Raw salt is purified and sent to customers for both human consumption and industrial processes. An on-site laboratory checks that the quality of the salt meets governmental standards.

The facility recently completed a new raw salt storage facility (salt is shipped to the facility to make brine which serves as a raw material). A variety of other process upgrades are planned at the Coatzacoalcos facility. During the tour the participants focused its visit on the various manufacturing operations that might contain mercury. The following observations were noted:

- Mercury cell room: IQUISA has started a pilot project with a new type of cell end boxes (Telene®, a polymer) from De Nora. IQUISA is evaluating whether these new end boxes will reduce mercury emissions from the cell room.
- Liquid effluent treatment: IQUISA recently completed construction of a state of the art wastewater treatment facility that routinely meets the regulated discharge limit of 1ppb mercury⁶ in the final effluent.
- Hydrogen cooling and purification: IQUISA reported that they are planning to install a new purification system to further remove mercury from the hydrogen. No date for such an installation has yet been established. Hydrogen is used as a fuel at the facility.

After the facility tour, industry experts met with IQUISA facility engineers and management staff to share their observations and to discuss facility-specific techniques for reducing mercury emissions. In general, the discussions focused on emissions reduction and collection system from the mercury cell end boxes; mercury removal from the hydrogen stream; mercury spill collection, removal, and other housekeeping techniques; mercury emissions monitoring in the cell room air; and mercury balance reporting.



⁴ Cydsa/IQUISA website: <http://www.iqvisa.com.mx/>

⁵ Petróleos Mexicanos (Pemex)

⁶ One ppb is one part mercury in one billion parts water, parts per billion.

Mexichem⁷: The Mexichem Coatzacoalcos facility was constructed in 1979 and began operations in 1981. The facility sends chlorine gas to Pemex by pipeline and ships chlorine to other customers by 1-ton cylinder and rail car. Mexichem facility staff showed participants videos in English and Spanish that provided an overview of the Mexichem company products and the details of the Coatzacoalcos manufacturing processes. Currently, the Mexichem Coatzacoalcos facility uses asbestos diaphragm cell technology to produce approximately 250 thousand metric tons of chlorine per year. The participants visited the control room and the diaphragm cell manufacturing area where representatives from Mexichem provided an overview of the process operations.



Mexichem's Santa Clara, Estado de Mexico facility was constructed in 1957, began operations in 1958 and uses the mercury cell process. Mexichem staff presented the details of the on-going conversion from mercury cell to membrane technologies at the Santa Clara facility, which is scheduled for completion in early 2007.

Art Dungan, President of the Chlorine Institute, awarded the Mexichem Coatzacoalcos facility with the CI

Chairman's Safety Award for over one million hours without an away-from-work case. He also awarded the Mexichem's Santa Clara facility with the CI 2005 Honor Award for achieving the lowest (zero) OSHA recordable injury / illness incident rate.



Overall Impressions: During the facility visits, participants learned how these facilities were addressing the challenges of mercury emissions, evaluating and installing new techniques and practicing stewardship in keeping with the values of Responsible Care⁸.

During the plenary discussion following the facility tours, industry experts and governmental representatives agreed that, each facility was well maintained and well run. Facility staff, industry experts and governmental representatives used a series of case studies to discuss common technologies and methods to reduce mercury use, consumption, and emissions.

⁷ Mexichem website is <http://www.mexichem.com.mx/>

⁸ Responsible Care is the global chemical industry's environmental, health and safety (EHS) initiative to drive continuous improvement in performance. It achieves this objective by meeting and going beyond legislative and regulatory compliance, and by adopting cooperative and voluntary initiatives with government and other stakeholders. Responsible Care is both an ethic and a commitment that seeks to build confidence and trust in an industry that is essential to improving living standards and the quality of life. Responsible Care has been adopted in 52 countries. For a status report on some of the global activities see: <http://www.responsiblecare.org> and for the Global Responsible Care Charter see: http://www.responsiblecaretoolkit.com/pdfs/GLOBAL_CHARTER.pdf

Conclusions:

At the end of the Workshop a list of Workshop outcomes was identified discussed and endorsed by the participating representatives from Mexican companies.

- Companies agreed to voluntarily report uses, emissions, losses to their respective WCC regional association.
- Workshop attendees agree to keep in touch and develop regular communications.
- WCC agrees to upload all workshop presentations to the chlor-alkali sector's global website/extranet and to maintain website.
- Companies agree to work toward continuous improvement in mercury reductions, will consider developing specific projects for possible support from Global Mercury Partnership. WCC experts (Facility Mentor) is available for assistance.

As part of the sharing of information globally, participants from industry were invited to continue the exchange of information using the global extranet for the chlor-alkali sector. Materials for the public will be up loaded to the WCC public website where these materials can be linked to UNEP's Mercury Partnership website for sharing with other stakeholders.

In conclusion, the chlor-alkali sector opened a dialogue with Mexican chlor-alkali manufacturers and started the exchange of information and relationship building that is needed to achieve the WCC goals and the goals of the UNEP Global Mercury Partnership.



Next Steps: WCC's industrial experts will continue to work with Mexican facilities in collaboration with the U.S. EPA. A Facility Mentor, a retired industry expert, was hired to work with facilities to develop facility-specific projects. Mexican facilities are working to develop company-specific plans and/or develop specific project proposals for consideration by members of the Global Mercury Partnership.

The WCC will continue to work on the technical and logistical details to compile regional mercury data into a Global Mercury Report for submission to UNEP. The first such report is targeted for publication in late Fall of 2006. While the 2006 report will not include all mercury cell chlor-alkali facilities, WCC hopes that over time, this report will include an increased percentage of the mercury cell facilities globally.

WCC will continue to engage with chlor-alkali manufacturing organizations in other regions to facilitate the exchange of best practices toward the goal of reduced mercury use, consumption, emissions and improved worker safety.

Additional Materials: See the Workshop Report of the WCC/UNEP Mercury Stewardship Workshop in Coatzacoalcos, Veracruz, Mexico.