

# ***Business Plan of the Mercury cell Chlor-alkali production partnership area***

***February 2016***

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This Business Plan describes the activities of the mercury reduction of mercury emissions and use from the Chlor Alkali sector partnership area of the United Nations Environmental Programme (UNEP) Global Mercury Partnership. It serves as a planning and communication vehicle both for Partners and others.

The purpose of the business plan is to provide a framework for developing and implementing projects. The business plan is to serve as a resource for providing a common, cohesive structure for implementing the UNEP Global Mercury Partnership.

The partnership is open for government and stakeholder participation. In the UNEP Governing Council Decision 24/3 part IV paragraph 27, UNEP is tasked with working in consultation with Governments and stakeholders to strengthen the UNEP Global Mercury Partnerships, to include new activities and partners.

## **I. SUMMARY**

The mercury cell process is one of three manufacturing processes used by the Chlor-alkali sector to produce chlorine and alkalis. Mercury cell Chlor-alkali production remains a significant user of mercury and is a significant source of mercury releases to the environment. Mercury cell facilities which close or convert to non-mercury cell technologies require careful site management as well as management of any excess mercury.

The Chlor-alkali partnership area had previously promoted a target for reduction in mercury demand to 250 tonnes by 2015 (a reduction of 29% from previously projected 2015 demand of 350 tonnes). This target represented a 50% reduction in mercury demand by 2015 based on a 2005 baseline of 500 tonnes. Based on available data, the Partnership believes we have achieved this target. However, significant work remains to be achieved for the sector, globally, to align with the Minamata Convention. As of late 2014, approximately 70 mercury-cell Chlor-alkali facilities remained in operation in about 40 countries.

A significant milestone is the anticipated phase out of mercury cell process in the European Union countries. In the EU, the Best Available Technique (BAT) Reference document (BREF) 2013/732/EU issued on December 2013 indicates that the Chlor-alkali mercury cell process is not BAT, triggering phase-out over the next four years, by 2017. This action will result in the cessation of mercury usage in the EU with a substantial number of facilities ( $\geq 20$ ).

Beginning in 2016, the partnership area will focus on a new set of goals. The primary goal remains the effective phasing out of the use of mercury by 2025 as identified in the Convention. The partnership will set new targets that track the progress of actions that will contribute to meeting that goal, including relevant national and regional legislative actions, reductions in stocks and waste production, and the development and implementation of viable storage solutions.

The partnership area will work in coordination with UNEP, the World Chlorine Council and other partners to expand efforts to identify and reach out to additional facilities and operators in the Chlor-Alkali sector that may benefit from assistance with phasing efforts.

## **II. OBJECTIVE OF THE PARTNERSHIP AREA**

Consistent with the overall goal of the UNEP Global Mercury Partnership, the objective of this partnership area is to significantly minimize and where feasible eliminate global mercury releases to air, water, and land that may occur from chlor-alkali production facilities. The sub-objectives of this partnership area are to:

- Prevent the construction of new mercury-cell Chlor-alkali production facilities and/or expansion of the existing mercury cell room facilities
- Support efforts of governments and stakeholders to achieve conversion to non-mercury processes, or closure, of remaining mercury-cell Chlor-alkali facilities
- Reduce mercury emissions and use from existing mercury-cell facilities prior to their closure or conversion pursuant to the Minamata Convention.
- Reduce or eliminate mercury releases from waste generated by Chlor-alkali production facilities including waste from conversion or closure.
- Promote and support environmentally-sound options for management of excess mercury resulting from closure or conversion.

The partnership area will meet its objectives by providing economic, technical, and educational information to Chlor-alkali production facility partners; and by promoting commercially competitive and environmentally responsible solutions for minimizing and eliminating mercury emissions and use in Chlor-alkali production.

## **III. PRIORITY ACTIONS**

- Develop and maintain global inventory of mercury cell Chlor-alkali facilities by country.
- Improve awareness and information exchange on non-mercury technologies in Chlor-alkali production.
- Share information on, and encourage, appropriate procedures and methods to convert to non-mercury processes using environmentally sound methods, and best practices, including proper waste management, to minimize releases of mercury during the conversion process.
- Seek and share available information on financing options to assist private sector in addressing capital costs associated with conversion and reducing the length of the pay-back period.
- Work with partner governments to establish effective approaches to prevent new mercury cell facility construction or expansion and to meet Minamata Convention requirements for closure or conversion of existing mercury-cell Chlor-alkali facilities by 2025, or sooner as practicable, including consideration of national phase-out plans for those countries with multiple facilities.
- Share information and best practices for managing excess mercury generated by conversion, phase-out, and closure of mercury-cell Chlor-alkali production facilities.
- Develop and share information on best practices for management of mercury-containing waste generated by Chlor-alkali production facilities or generated by conversion, phase-out, and closure of mercury cell Chlor-alkali production facilities.

- Expand inventory to include information regarding excess mercury and mercury waste for those facilities captured in the inventory which have, or plan to, close or convert.
- Encourage the implementation of environmentally sound management practices for reduction of mercury use and emissions at mercury-cell facilities that obtain time-bound exemption(s) from Minamata phase-out requirements.

## IV. PARTNERSHIP EFFORTS AND TIMELINES

### *Mercury Cell Chlor Alkali Facility - Emissions and Use Reporting*

(i) The World Chlorine Council reports annually to UNEP on mercury emissions and consumption in the Chlor-alkali industry on a country/regional basis for the following countries/regions: Europe (EU + Norway + Switzerland), India, Russia, South America, USA and Canada. This data covers to the best of World Chlorine Council knowledge more than 90% of the world chlorine production capacity based on mercury. The data is posted at:

<http://www.unep.org/hazardoussubstances/Mercury/PrioritiesforAction/ChloralkaliSector/Reports/tabid/4495/language/en-US/Default.aspx>

Partners: World Chlorine Council (WCC) and member industries and organizations

Contact: Dolf van Wijk, WCC, [dvw@cefic.be](mailto:dvw@cefic.be)

(ii) The partnership initiated the development of a global inventory of mercury cell Chlor-alkali facilities in 2010 with assistance from the World Chlorine Council. This inventory provides information on chlorine capacity, locations, and any plans for conversion or closure for mercury-cell facilities around the world. It was requested by the Intergovernmental Negotiating Committee for a Legally-Binding Instrument on Mercury. The inventory has been updated with data from the 2012 UNEP survey, 2012 WCC reporting, and communications with Partners. The update also provides new information on closures and conversions.

Contact: US EPA as Partnership Area Lead ([ankrah.rodges@epa.gov](mailto:ankrah.rodges@epa.gov)) and UNEP-DTIE:

### *Joint activities with Mercury Supply/Storage and Waste Management Partnership Areas*

The Chlor-alkali partnership area will explore joint initiatives to leverage expertise in the various partnership areas towards our objectives. This will include exploring additional inventory information that would assist in identifying needs for the sound management of excess mercury and mercury waste from mercury-cell Chlor-alkali facilities that have closed or converted or plan to close or convert; and information exchange on technologies and management practices for mercury containing waste and excess management.

**Storage Projects:** UNEP has initiated mercury storage projects with partners in South America and Asia to assist in preparing the region for retirement of large quantities of mercury (including from chlor alkali facilities). A detailed work-plan and timetable for the project is available on the UNEP mercury web-site.

Contact: Desiree Narvaez, UNEP Chemicals, +41 22 917 88 65

## V. OPPORTUNITIES

In addition to current and already-planned activities, the following ideas represent opportunities for developing a more robust set of Partnership approaches:

- **Russia Industry Proposal:** Russia's Association for Chlorine Industry (Ruschlor) is seeking support for further mercury management following the successful reduction project summarized in the appendix below. The project would focus on the development of industry-wide standards for managing the mercury content wastes (MCW) of the Chlor-alkali industry of the Russian Federation. In addition to the acquisition and operation of the setups for mercury decontamination and remediation of the buildings and sites, the project may also involve the construction, commissioning, and operation of new brine conditioning plant at the Chlor-alkali facility in Kirovo-Chepetsk. While the plant's operator has been able to significantly reduce the consumption of mercury, the new brine plant has the potential to reduce mercury consumption and waste production by between 20 – 25 metric tons per year. The project would be carried out by RusChlor for the waste standards component and RusChlor and industry partners industry partners for the secondary components.
- Mexico is encouraging a private company (IQUISA-CYDSA) to seek financing to switch to membrane cells at their two plants in Mexico, They have also provided UNEP and the United States of America with a summary of their needs. Partners will seek to meet with relevant financing organizations to explore possibilities for and obstacles to financing of conversions.
- The Chlor-Alkali Partnership will actively work with the Mercury Supply and Storage and Mercury Waste Management partnership areas to coordinate efforts on managing excess mercury resulting from the conversion or closure of mercury-cell Chlor-alkali facilities.
- Build on collaboration with industry to ensure that excess mercury is managed in accordance with both the spirit and intent of their government regulations as well as the Minamata Convention. This may include the development and implementation of "best practices" manuals to ensure that excess Mercury is managed properly and in accordance with government regulations, as well as promoting the effective monitoring the management of Mercury waste.
- Consider ways to track and evaluate closures and conversions, including their site assessments. Special attention will need to be given to facilities not currently covered by regional or national phase-out plans or programs, as well as those industries not participating in regional and global industry forums. EuroChlor has provided information that will assist with this effort at: <http://www.eurochlor.org/chlorine-industry-issues/phasing-out-mercury-based-production-technology-where-do-we-stand.aspx>
- Consider additional strategies to address technical, economic, or regulatory impediments to achieving mercury reductions goals.

## **VI. EVALUATION**

The Partnership will report biennially to UNEP in accordance with the UNEP reporting format. Reporting will include tracking partnership activities and partner contributions as well as assessing effectiveness, and measuring the impact of partnership activities on the achievement of the overall goal.

*The partnership's progress will be evaluated on the following, using 2002 as a baseline:*

- *Per cent reduction in mercury use per metric ton of chlorine production.*

- *Per cent reduction in mercury emissions and use per metric ton of chlorine production.*
- *Per cent reduction in mercury use by the Chlor-alkali industry.*
- *Per cent reduction in mercury emissions and use from the Chlor-alkali industry.*
- *Number of Chlor-alkali units with mercury cell technology decommissioned.*

## **VII. RESOURCE MOBILIZATION**

The UNEP Global Mercury Partnership and the associated Partnership Area business plans are a way of mobilizing resources in a systematic, focused and harmonized way. The partnership objectives and business plans should provide clarity for potential donors and finance institutions.

The partners are encouraged to contribute financially and also to offer in-kind assistance.

Partners can develop specific initiatives, work with non-partners, or pursue projects consistent with Partnership objectives. It is hoped that the UNEP Global Mercury Partnership will serve as a mechanism to consolidate and leverage funding for large, strategic projects.

Partners are encouraged to apply for funding to relevant funders and regional organizations.

Partners can outline possible fiscal or other incentives systems for conversion from mercury cell to membrane or other non-mercury technology, as one possible means to increase or accelerate the extent and rates of conversion, to include: dedicated funding sources, soft loans, accelerated depreciation accounting, or possible carbon credits from improved energy efficiency. Analysis of these options can benefit from the Partnership's "Economics of Conversion" report (Annex 1).

## **VIII. BUSINESS PLANNING PROCESS**

The business plan will be reviewed regularly and adjusted accordingly by the partners. Consideration will be given to the direction of the partnership area, the projects being undertaken, and measures for evaluating the productivity of the efforts. Annual partnership area meetings, in person or by teleconference, will be arranged and hosted by the partnership area lead in cooperation with partners and stakeholders in order to evaluate productivity and conduct joint planning.

<b>Table 2: Administration and Management Support</b> (will vary across the Partnerships)		<b>Source of Support</b>
Partnership Lead <sup>1</sup>	<ul style="list-style-type: none"> <li>▪ Facilitation and support of the partnership.</li> <li>▪ Preparing Business Plan.</li> <li>▪ Preparing for meetings.</li> <li>▪ Logging meeting notes, tracking action items.</li> <li>▪ Collaborating with partners to strategically link to overall partnership goals and objectives.</li> </ul>	U.S. Environmental Protection Agency
UNEP Secretariat Support	<ul style="list-style-type: none"> <li>• Managing the clearinghouse/website.</li> <li>• Taking in funding from multiple sources to fund projects.</li> <li>• Developing activity proposals in collaboration with partners.</li> <li>• Assisting the lead in following up activities by partners.</li> <li>• Other tasks as requested.</li> </ul>	In-kind support from UNEP
Teleconferences and Meetings	At least one per year and as needed.	U.S. Environmental Protection Agency

## IX. LINKAGES

Given the cross-cutting work undertaken by the UNEP Global Mercury Partnership, this section is intended to highlight the key related activities. These activities should include cross-cutting activities that are both internal and external to the UNEP Global Mercury Partnership efforts:

- Mercury supply and mercury storage
- Mercury waste partnership area and Secretariat of Basel Convention mercury waste guidelines development
- UN Cleaner Production Centers
- Vinyl Chloride Monomer production
- Energy Efficiency

## X. PARTNERS

Please see section vii of this document for the current list of partners that have submitted letters of support to the UNEP Global Mercury Partnership. There are a number of participating partners that have not officially submitted support letters. For the list of participating partners, please see the following web address:

[http://www.chem.unep.ch/mercury/Sector-Specific-Information/Current\\_partners.htm](http://www.chem.unep.ch/mercury/Sector-Specific-Information/Current_partners.htm)

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## **ANNEX 1: Completed Projects**

### ***Paper on the Economics of Conversion:***

The partnership has prepared a paper on the economics of converting mercury-cell Chlor-alkali facilities to non-mercury production technology. The paper presents the costs and savings of performing conversions and outline the various factors which can influence the economic viability of a conversion. This paper can help stakeholders better understand the financial drivers influencing the decision to convert a mercury-cell facility.

### ***Russia Mercury Release Reduction and Waste Management***

The Russia Chlor-alkali project ended in November 2010 with a wrap-up conference in Russia to discuss the overall results of the project:

(i) *Reduction of Mercury Release and Consumption in Russia:* Completed mercury audits at all three chlor-alkali facilities in Russia. Based on these audits, conducted a technical workshop in Volgograd, Russia, with the participation of international experts and experts from all three Russian Chlor-alkali facilities to share experiences and best practices. Completed Cleaner Production Training and conducted two technical exchange visits of Russian experts to Chlor-alkali facilities in Europe. As a result of these technical visits, each facility developed an “Action Plan” to reduce mercury consumption and releases. Currently all three Russian Chlor-alkali facilities continue developing and implementing mercury reduction projects, as identified in their “Action Plans”.

Partners: Canada, Norway, the United States, RusChlor, EuroChlor, Volgograd “Caustic” Facility, the Volgograd Regional Environmental Authority (Rostekhnadzor), UNEP Chemicals, Arctic Council and World Chlorine Council (WCC).

Contact: Marianne Bailey, [bailey.marianne@epa.gov](mailto:bailey.marianne@epa.gov) +1 (202)-564-6473

### ***Mexico Mercury Stewardship Workshop and Follow-up:***

Partners conducted an international mercury stewardship workshop in Veracruz, Mexico to share methods and guidelines for calculating mercury releases and consumption, share best practices for reducing releases, and encourage adoption of best management practices to facilitate reductions in consumption. Following the workshop, WCC provided the Mexican facilities with a technology mentor for six months to help identify process improvements. The facilities are now considering how to implement best practices at their facilities. Additionally, several Mexican industry representatives traveled to Brazil to tour a state-of-the-art mercury cell facility and to discuss possible future improvements in Mexican facilities.

Partners: Mexico, United States, UNEP, ANIQ, Chlorine Institute, Clorosur, Euro Chlor, Mexichem, and WCC

### ***India Voluntary Program:***

A comprehensive plan for control of mercury emissions from chlor-alkali sector was developed through a Government-Industry partnership - Corporate Responsibility on Environmental Protection (CREP). Following the CREP initiative by the Government of India, the number of mercury based Chlor-alkali plants have drastically reduced with only 46k MTPA capacity remaining on mercury based plant. Initially, there were 36 numbers of plants with a total production capacity of 3.2 million MTPA of caustic soda, out of which only 2 small plants i.e.

Atul Ltd. and Hindustan Paper are still running on mercury cell, but both at 30% capacity utilization and running for captive use intermittently. These plants are already in the process of conversion and are likely to convert to membrane cell technology and that would complete the process of shift from mercury to alternate.

Contact: G.K. Pandey, Ministry of Environment and Forests, India, [pandey@menf.delhi.nic.in](mailto:pandey@menf.delhi.nic.in)