

# Disposal Operations

## Inception Workshop

Norway ODA Mercury Storage and Disposal Project in the Caribbean

Jamaica, Suriname, Trinidad and Tobago

12-13 August 2015 Port of Spain

## Basel Technical Guidelines Disposal operations

- D5 – Specially-engineered landfill
- D9 – Physico-chemical treatment
- D12 – Permanent storage
- D13 – Blending or mixing prior to submission to D5, D9, D12, D14 or D15
- D14 – Repackaging prior to submission to D5, D9, D12, D13 or D15
- D15 – Storage pending any of the operations D5, D9, D12, D13 or D14

## R 15 Permanent Storage: Specially Engineered landfills

### **Important ESM landfill considerations include the following:**

- Examine the long-term stability of treated mercury wastes in specially engineered landfills and establish methods to evaluate such long-term stability;
- Design a facility with attention to protect ground water
- Establish a permit system, stipulating leachate and gas control systems, closure and post-closure measures *etc.*;
- Identify existing landfills that could be retrofitted for the disposal of stabilized mercury;
- Make thorough environmental impact assessments and analyse the long-term behaviour of stabilized mercury wastes in the specific settings of the facility; and
- Continuously manage and monitor specially engineered landfills in which treated mercury wastes have been disposed

## Physico-chemical Treatment (Stabilization/Solidification)

- Objective is to immobilize the mercury in a solid and low permeable matrix so that the waste complies with the acceptance criteria for disposal in specially engineered landfills or permanent storage in underground facilities
- **Sulphur Stabilization of Mercury:** Sulphur and mercury are mixed under heat in a vacuum mixer forming mercury sulphide
- **Sulphur Polymer Stabilization and Solidification (SPSS):** mercury wastes are stabilized with sulphur as mercury sulphide and then incorporated and microencapsulated in a polymeric sulphur matrix
- **S/S with Sulphur Microcements:** mixture of mercury waste with the sulphur microcement and water; the mixture is then discharged into the desired mould

## Evaluation of Methods for Physio-Chemical Treatment

It is suggested to evaluate physico-chemical treatment methods in **pilot-scale tests** before commercial use. This includes:

- a **verification of the quality of the stabilization process** by determining the conversion rate and the mercury vapour release from the stabilized waste;
- an **evaluation of the leaching potential** over a range of plausible disposal conditions (especially over a range of pH values); and
- an **evaluation of plausible changes to the treated waste in the long-term** due to exposure to the environment and biological activity at disposal sites.

## Permanent Storage: Underground

- Mercury wastes can be permanently stored in deep geological cavities (*e.g.* in an underground mine)
- Mercury wastes, after having been solidified or stabilized, where appropriate, which meet the acceptance criteria for permanent storage (disposal operation D12)
- May use salt rock, clay formations, or hardrock formations
- The sealing and permanent isolation from the environment may be achieved through a multi-barrier system
- A long-term, thorough and holistic site-specific risk and safety assessment is necessary