



EEB comments on the REVISED Draft final BiPRO report on 'Requirements for facilities and acceptance criteria for the disposal of metallic mercury'

2 February 2010

The European Environmental Bureau (EEB) welcomes the opportunity to comment once more to the Revised Draft final consultant's report on '*Requirements for facilities and acceptance criteria for the disposal of metallic mercury*', as presented by BiPRO (17 January 2010). The time allotted for such an extended report is rather short, so our comments are made in light of this. Therefore, we would welcome the opportunity for further discussion on issues of key importance, namely questions regarding protecting public health and safety, the environment and future generations.

First, we welcome the fact that most of our earlier comments have now been addressed. The structure of the report flows better and more details, explanations and justifications have been provided.

However, we would like to stress once more that potential time constraints in deciding what is the best way to store or sequester mercury, permanently, should not compromise the safety and the potential for exposure of future generations to mercury. We generally believe that, if determined viable, solidifying the liquid mercury before its final storage/sequestration could be the safest solution, as an emerging technology appears promising at this time. Yet at this time we must continue to view these emerging technologies as unproven and therefore subject to the need for additional scrutiny before we can support them. Therefore, it's clear that more studies are needed to ensure the long term safety aspects for their acceptance and respective facility requirements, and adequate time should be allocated respectively. In the meantime, safe temporary solutions should be given priority in the near term.

Contextual comments

EEB welcomes that the gaps of information, mainly regarding the long term behaviour of metallic mercury in salt mines have now been identified; therefore until such a study is carried out, no permanent disposal of metallic mercury in salt mines can be accepted. We can't emphasize this enough.

In view of this, we have concerns on the fact that storage of metallic mercury in salt mines may appear presented as safe as the storage of solidified mercury in salt mines and as the most cost effective option. As mentioned in our earlier comments, economic costs from risks to society potentially involved are not discussed in the study.

At the same time, it appears that the solidification technology is or will be available very soon; the results from the different analysis of the solidified material at the currently available small scale appear rather positive in terms of stability, leaching etc. Nevertheless we would like to underline once more that no discussion has been made about the need to study further the long term behaviour of the solidified product in salt mines. Although someone could say that it could be considered as any other solid hazardous waste disposed in salt mines— on which experience is already available – the fact is that this is a liquid which has been chemically modified into a solid material. Therefore, we believe strongly that this needs further consideration and discussion. In the report, page 256- the proposed approach is only partly justified; more concrete evidence would need to be produced and presented that demonstrates clearly its safety and long term viability. To that end an additional criteria/requirement is therefore needed for the stabilized mercury and additional facility related requirements (see below points 2 and 11).

We have other specific concerns as well, including the following:

1. The minimum environmental and economic requirements need to be identified, justified and discussed in detail, separately and before the screening analysis. The assessment-screening (chapter 8) will then flow more logically. Otherwise further details and justification is needed when criteria are chosen within the options presented.
2. p. 203, and p.256 (also relevant to 5.2.3). It is said that *'Each underground storage facility needs a site specific risk assessment which provides the long term safety of the stored waste in the facility.'* Further discussion is needed on the fact that the site specific risk assessment requirements will need to be revised to ensure that conditions in the site will not facilitate re-transformation, leaks and eventual contact of mercury with the biosphere, taking into consideration that:
 - a. mercury may be stored in liquid form, and/or that
 - b. mercury may be stored in solidified form, but this is a form coming from a chemical transformation of liquid.
3. p. 204 - What should be the material of the lining and slopes where mercury will be collected in case of spillage, needs to be specified.
4. p.205 – As mentioned in our earlier comments, what is 'adequate' and/or 'regular' [linings and slopes, monitoring, measures for spillage etc] needs to be better defined and justified. These appear across the chapter but without specifying what those conditions are.
5. p.206. On the sentence 'The inspection interval should not be less than every 12 month and within 1 month after the detection of a leak.'
 - a. We assume that you mean 'more' instead of 'less' ; similar correction is also needed on page 212 in table – it should not be 'min. interval 12 months' but rather that the latest they need to inspect is every 12 months but if they want to do so sooner, even better.
 - b. Inspecting one month after a leak has been detected appears too late. This interval should be one week (after leak detection) at the latest to avoid potential exposure risk as soon as possible.
6. Leaching of solidified product (ch.8.9.3 environmental minimum requirements).
 - a. Explanations provided are still not considered sufficient. Many countries¹ have chosen limits lower than the one proposed by the EU Landfill Directive for mercury (2mg Hg/kg dry substance limit), as minimum requirement for their hazardous landfill sites. Considering the toxicity of mercury it would be

¹ p. 88 of the report

Member States mercury leaching limit values for landfills (stricter or additional to Decision 2003/33/EC)			
Landfill type	L/S =2 l/kg mg/kg dry substance	L/S =10 l/kg mg/kg dry substance	C ₀ (percolating test) mg/l dry
EU criteria for waste acceptable for landfills for hazardous waste	0.5	2	0.3
Austria [DeponieVO 2008]		0.5	
Denmark (hazardous landfills in a non-coastal location)[Miljøministeriet 2009]	0.012	0.051	0.0064
Italy [Decreto 2003]		0.5*	
Luxembourg [Legislation36 2006]			0.1
UK / Northern Ireland [Schedule10 2007]		0.4	

preferable that more in-depth analysis/justification is provided on why the limit of the EU Landfill directive is chosen. A lower limit should be proposed, e.g. 0.5mg Hg/kg dry matter or much lower. We would like to remind that the EU landfill directive was adopted in 1999, therefore revision or re-consideration of the then proposed leaching standards appears logical.

- b. Following our earlier comments, we think that more discussion is needed in reference to the leaching test/protocol itself. It is not clear for how many hours the leaching test is performed under the prescribed standards in the EU – what is the exposure period and would this be long enough for our needs? For example in the US an exposure of 14 days, rather than the 18 hours of the TCLP was chosen to allow all samples time to reach near-equilibrium before measurements of the release potential of mercury from the treatment residuals². Wouldn't such a test be relevant in our case for the long term behaviour of the solidified product?
 - c. It is clear on the other hand, that leaching of mercury from the stabilised elemental mercury is pH dependent. Are the tests/standards proposed to be used for the leaching relevant to check the usual pH range in landfills of 2-12? Should the samples of solidified mercury be also checked under constant pH conditions? (see also study cited under footnote 2) Please discuss further.
7. p.237- The proposal for a separate EWC code for stabilized metallic mercury waste is very interesting and we would agree that this route should be pursued in any case to be able to track down solidified mercury.
8. p. 245 (table 9.1). In the proposed *acceptance criteria for metallic mercury and additional facility related requirements, under waste acceptance criteria* – further discussion/justification is needed on what is preferable – opening a sample of flasks to confirm their contents versus relying on a certificate. Further discussion may be needed on whether there are ways to ensure what the flask content is, without re-opening it in case it is sealed.
9. p. 246 (table 9.1). In the *proposed acceptance criteria for metallic mercury and additional facility related requirements under facility related requirements - salt mine-(permanent storage)* – further discussion is needed on how the containment should be and how mercury containers themselves should be packed (e.g. If the flasks are the typical 34 kg ones, should there be many in a drum?, etc.)
10. p. 246 (table 9.1). In the *proposed acceptance criteria for metallic mercury and additional facility related requirements, under facility related requirements- above ground storage (temporary storage)* – discussion/criteria are needed on how the collection sump should be constructed.
11. p. 248 (Table 9.2) In the *proposed acceptance criteria for solidified mercury and additional facility related requirements, under facility related requirements – for salt mines*: It is not clear whether a long term study requirement also needs to be included in the site-specific risk assessment considering that the solidified product comes from a chemical transformation of a liquid phase. On the basis of our comments above, such a consideration should be clearly incorporated in the criteria/table.
12. The risks related with storage in salt mines vis a vis the water intrusion, as well as risk of collapsing etc have been discussed very briefly now (p. 255). This issue should be discussed further and examples be provided.

² ENVIRONMENTAL PROTECTION AGENCY [FRL-7445-4; RCRA-2002-0029] Land Disposal Restrictions: Treatment Standards for Mercury-Bearing Hazardous Waste; Notice of Data Availability - Federal Register / Vol. 68, No. 19 / Wednesday, January 29, 2003 / Notices

13. Economic requirements (also relevant to 10.1) – could also include cost estimates of the risks involved (exposure, incidents, etc) by using one or the other method – this needs to be discussed further and considered in the analysis. We therefore request that this be done.
14. Chapter 10.3 – further explanation is needed regarding the graph presented, since it incorporates weighting factors related to the environment and economic assessment.

Structural/Editorial comments

15. p. 18. Study talks about ranking but there is no ranking really any more after the comparative assessment approach has been revised.
16. Dates referring to EU export ban should be 15th March and not 11th March as it is in many places including the summaries.
17. On p.75 – phrase ‘Waste disposal installations for the incineration, chemical treatment as defined in Annex IIA to Directive 75/442/EEC³ under heading D9, or landfill of hazardous waste (i.e. waste to which Directive 91/689/EEC³....’ appears not finished
18. p. 219, on title of ch.8.8 last word should be ‘facilities’ and not ‘facilitates’
19. Under ‘Option 5I-1I (Temp. storage above ground + perm. storage in salt rock) (p. 258)’, the word ‘mercury’ is missing after ‘metallic’.
20. Table 9.2 (p. 248) – in the last column the title is not complete ‘Above ground storage site (with valid)...’

In sum, we would greatly appreciate it if the comments and concerns above are fully addressed before the report is completed and we are available for further consultation as appropriate. Thank you (in advance) for your consideration of our comments.

For more information please contact:

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³ References to repealed Directives shall be construed as references to new Directives in accordance with the correlations table, thus meaning Directive 2006/12/EC Annex IIA and Directive 2008/98/EC Annex I.