



European Commission

DG Environment

**Establishment of guidelines for the inspection of
mining waste facilities, inventory and rehabilitation of
abandoned facilities and review of the BREF document**

No. 070307/2010/576108/ETU/C2

Annex 5

Comments on draft supporting document on closure

April 2012

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Management of comments on first draft of the supporting document on closure methodologies for closed and abandoned mines

The first draft of the Supporting document on closure methodologies for closed and abandoned mines was sent out to the work shop participants before the workshop on September 21 to 23, 2011.

Nils Eriksson presented the first outline of the Supporting document on closure methodologies for closed and abandoned mines. After the presentation Nils Eriksson thanked for the comments and inputs and said that quick responses would be appreciated. Written comments should be sent to the Consultant team and Michel Sponar by 12 October 2011.

After the presentation, the outline was commented and discussed:

Michel Sponar suggested that Portugal should provide input for the supporting document based on their extensive experience with rehabilitation.

The Portuguese experience has been included in the document in Section 2.2, and specific examples are given in detail in Annex III "The Legacy of abandoned mines: The context and the action in Portugal".

Michel Sponar proposed the inclusion of a section on opportunities for re-exploration in the document.

A new section 6.1 has been included in the document addressing the potential advantages of re-opening mines and re-processing old mining waste.

Hugh Potter mentioned that if we just focus on the facilities we may end up without benefits, and he agreed with Nils Eriksson statement that we need to consider the entire operation.

In the introduction to chapter 2 this has been clearly stated

Alfredo Franco said that they used the term "orphan" for an abandoned facility for which the former owner cannot be identified (but it seems that orphan and abandoned are used synonymously).

In chapter 2.2 it is explained that several expressions, including "orphan" is used to refer to closed and abandoned mine sites.

Gerry Stanley said that it is necessary to show that something is done even if the goal will not be reached for many years.

This is 100 % true and it has been the intention to reflect this in the document. E.g., in section 2.2 it is mentioned that "Common for all programs are the limited economical resources and the long-term approach. There is no "quick fix" and the work has to be systematic and ongoing for a long time in order to address all the sites that need reclamation and to obtain the desired results."

Lars-Åke Lindahl said that the rehabilitation requirements may look overwhelming, so there is a big need for setting priorities as well as a huge need for funding. There is much focus on metal mining and long term ARD problems – it is also necessary to focus on acute situations. He also proposed to refer to the work carried out by CEN/TC 292 in the document.

We agree 100 % with the comment. We believe that the methodology developed in the document reflects the need to set priorities and focussing on acute situations. We have eliminated the word "overwhelming" from the document as it was found counterproductive to use such a strong word in this context. The need for and problems related to financing are described in e.g., section 2.2 and Chapter 5.

Robert Holnsteiner did not find the chapter on costs useful and suggested to skip it and focus on technical issues. **Michel Sponar** replied that it is difficult to give guidance without referring to costs,

but maybe the presentation could be rearranged. Nils Eriksson said that funding is an important issues that is, of course, site-specific, but it is important to get a feeling of the order of magnitude.

We still believe it is useful giving some indications of which costs remediation of abandoned facilities may result in. Section 6.4 has been revised, but still gives indications of the order of the costs involved. At the same time, section 6.4. emphasises that the costs vary greatly between sites due to different conditions.

Johannes Drielsma requested lessons learned from the US Superfund (is to some extent addressed in the document).

The US Superfund methodology and experience is summarised in section 2.2 together with references to more detailed sources of information.

Hugh Potter mentioned that 8% of the rivers in the UK are not in good condition due to mining and mine waste and it takes a long time to rehabilitate even in a prioritised way.

We agree 100 % and we believe that the proposed framework will lead to a systematic approach to addressing abandoned sites in a prioritised and integrated way which is fully in agreement with the comment made by Mr Potter.

Michel Sponar found it important to push mining waste authorities in the direction of the MWD, and that there could easily be confusion between the general strategy of the authorities and in-depth remediation of sites. Portugal has made a good start and is a good example of a European country with in-depth experience. He would like to see a step-by-step approach summarised in a table or tables for people who are busy.

The Portuguese experience has been incorporated into the document as described above. A very simplified step-by-step approach has been developed and schematically illustrated.

Gyozo Jordán said that the draft outline was a good achievement – he liked the international review – and he would send references and written comments, including a check-list.

We did receive the reference list from Mr Jordán for which we are very grateful. However, the reference list refers to publications in Hungarian, for which reason we have chosen not to include these references in the document.

John O'Neill asked for a definition of closure (on a timescale) since this would be valuable for the end-user. He recommended public/private partnerships and stressed the importance of making sure that all stakeholders are on board. He also found it important to address cost in the document.

We believe these aspects are now covered by the document in an appropriate way. However, we have not tried to define closure “on a time scale”. We have instead used terminology that indicates that we are aiming for “permanent” or “long-term” remedial solutions. The reason for this “non-exact” use of terminology is that introducing a more specific time horizon of the applied closure measures may lead to further passiveness and delay of implementation of measures. Note that mine closure is an area under rapid development with regard to closure measures and related costs.

Written comments:

Gerry Stanley (Geological Survey of Ireland):

1. We think the approach outlined in the Draft is good. In particular we agree with the suggestion that abandoned mines need to be looked at in their entirety and not just the mine waste facilities. Many of our comments are of the ‘typographical’ type.

No action.

2. We can agree to some wording changes to the definitions of **closed mine waste facilities** and **abandoned mine waste facilities**, as suggestion in Nils’ presentation at the Lisbon

meeting. These need to be written down for them to be passed by the TAC. There should be clear explanations for defining closure itself and the use of terms such as Remediation, Rehabilitation, aftercare etc.?

A section "1.3 Definitions" has been included where these comments have been addressed. However, NO action has been taken in order to change the wording in the definitions agreed on by the TAC related to "Closed and Abandoned facilities". The proposal on how to change the definition is documented in the workshop presentation.

3. We agree that there should be references to as much web-based case history material as possible as no two sites are exactly the same and it is not possible to write down rules or even guidance.

We have tried to address this comment including as many references as we have found useful (without exaggerating).

4. Section 1.1, page 4 – suggest that 'bodies in charge of closed and abandoned extractive waste facilities' needs to be addressed carefully. In our experience there are no bodies in charge and indeed in many cases nobody wants to be in charge of such facilities. The writing hints that these bodies are 'government'. In straightened financial times 'government' does not want to be in charge of such sites and certainly will not thank us if we try to put the onus on 'government' to do something which may cost the public purse.

This section has been modified and makes no mention of "bodies in charge of ...".

5. Section 2.1, page 7, last line – suggest that the word '**certain**' be replaced by '**specified**'.

Yes. This has been changed.

6. Section 2.2, page 9, towards bottom of page – we think trusts should also be included. See for example http://www.ausimm.com.au/content/docs/abandoned_mine_management_in_australia.pdf and the references in it (especially the Tasmanian reference).

Thanks! This has been included in section 2.2.

7. Section 3, page 13, 4th bullet point – replace '**and**' with '**any**'.

Thanks! This has been corrected.

8. Section 5, page 15, 6th bullet point – we understand the point but this should be discussed further. Some will suggest that some elements of a remediation programme completed or contributing to an overall plan is better than nothing. Most remediation programmes will be made up of a number of discrete stand alone work packages and can be implemented on their own.

This has been modified and we believe that the new wording accommodate the comment above.

9. Section 5, page 13, final bullet point – replace '**redial**' with '**remedial**'.

Thanks! This has been corrected.

10. Section 5.3, page 17. In relation to prioritisation it might be helpful to have more information on how this prioritisation affects recommended approaches to health and safety on the one hand and environmental issues on the other. Examples of where such prioritisation has taken place (if available) would also be very useful. Related to this would be the issue of the role of "partnerships" in addressing closure and whether or not this area should get some coverage in the guidance (under the framework section for example).

We believe this is now clear and further discussed in the context of the different ranking/scoring systems references in the text in section 5.3.

11. Section 5.5, page 20, list at bottom of page – we think the **suitability** of the proposed remediation needs also to be addressed in the context of the local situation and environment.

We believe that it is clearly stated throughout the document that all actions and measures are site specific (that's why we need this framework) and the entire risk assessment is developed in order to take these factors into account.

12. Section 5.6, page 21, 1st paragraph – we think you should indicate some of the methods that could be used to facilitate Stakeholder Consultation.

A list of available means has been included in section 5.6.

13. Section 5.6, page 21 – some of the negative aspects of Stakeholder Consultation should be addressed and examples given of successful Stakeholder Consultation, e.g., managing expectations or managing conflicting views. Unfortunately, we don't have any documented case histories.

The concepts of managing expectations or managing conflicting views have now been mentioned in section 5.6. We do not, however, have any specific advice or experience to share.

14. Section 5.9, page 22 – we do think we need to provide some sort of guidance on costs. we think the best way is via case histories.

Some indications of costs are given in in section 6.4 along with some references. Case histories are available in the literature, and specifically included in Appendix III.

15. Tables 1 and 2, page 24 – we do not think these Tables are complete. We realise that they are quoting from the specified reference but they should be built upon and the referenced after Heikkinen etc.

We are fully aware of the incompleteness of these tables. Hey have been modified, but they still only provide examples – not all available or thinkable methods.

16. In ticking the *resource efficiency* box, would it be worth looking at having some reference to using (where appropriate and available) recycled materials in the rehabilitation of such sites (i.e. compost or blend of compost)?

Yes, this has been mentioned in section 6.4 making mention of re-cycled materials such as sewage sludge, ashes, slag, fibres and ashes from paper and pulp industries, agricultural waste, etc,

Gyozo Jordan (Geological Institute of Hungary):

GENERAL COMMENTS

1. This first draft document is an excellent basis for the development of final Guidelines.

Thanks!

2. **A good international review of methods** is provided. More European examples might be useful to consider.

We have tried to address this comment by adding additional examples/references and the inclusion of Appendix III – The Portuguese example.

3. It might be useful to integrate more with mine waste inventory methods and with the prepared Pre-selection Guidance.

We agree 100 %. In the applicable parts we have done so. However, the Pre-selection Guidance only cover the initial part of the proposed framework (the screening, which is addresses in section 5.1 –

where it is clearly stated that the Commission already has addressed this issue in the Pre-selection Protocol).

SPECIFIC COMMENTS

1. It would nice to learn how the QUESTIONNAIRE was developed in page 13? JRC PECO-MINES Project, for example, developed complex questionnaire tools (for mine waste inventory).

This is addressed in the main report.

2. Site inventory mentioned in page 16 is very important and various field CHECKLIST methods can be considered, such as UN ICPDR M2 methodology.

The UN ICPDR M2 methodology has been mentioned in section 5.2.

Hugh Potter (UK Environment Agency):

Comments on the guidance:

1. The guidance should mention the Water Framework Directive and acknowledge that to effectively manage pollution from abandoned mines, it is necessary to consider pollutants arising from mine water drainage as well as mine waste facilities, and must consider human health and environmental impacts. Otherwise expensive remediation of mine wastes may not deliver the required benefits. For example, there are several UK sites where significant remedial work (1970s-1990s) dealt with risks to human health but made water pollution worse; clean up for the Water Framework Directive (in England and Wales) will take a catchment approach to identify and deal with the worst inputs (whether from mine waters or wastes) so as to deliver the most benefit at the minimum cost.

The guidance should also mention that impacts from mines vary with rainfall and river flow so assessment work should take this into account. Climate change is likely to increase the impacts from un-remediated mine waste facilities as higher intensity rainfall will mobilise pollutants.

The document makes reference to the Water Framework Directive mentioned in section 2.1. In the introduction to chapter 2 it is stated that an integrated approach to the closure and rehabilitation of mine sites - and not only focusing on the waste facilities - is required. The document describes that site specific conditions need to be evaluated and assessed (this includes the above mentioned aspects).

2. Questionnaire

The first two references (see below: NoCAM reports and "Abandoned mines and the water environment") address most of the questions in the 'missing' questionnaire.

Thank you for a very useful comment. The approach has been outlined and several references to the NoCAM reports have been included. In addition, the NoCAM project summary has been included as Appendix II.

3. Section 5 'General framework'

This should also mention the benefits of remediation – environmental, socio-economic, human health etc. We have carried out several benefits assessments to support remediation of abandoned coal and metal mines and the benefits are generally significantly greater than the costs.

Stakeholder consultation: many abandoned mine sites (including waste facilities) in E&W are protected as Sites of Special Scientific Interest (e.g. rare plants, geology) and Scheduled Ancient Monuments, and the Cornish mining area is now a UNESCO World Heritage Site.

Thanks! We have taken note of this and included the experience in Chapter 5.

4. 5.2 'Establishing a site inventory and performing a first risk assessment'

Our abandoned non-coal mines project (NoCAM – see reference 1 below) is a recent example of how to carry out a large-scale strategic prioritisation exercise. By focussing on catchments (WaterFD water bodies), we were able to identify the highest priority sites (for water receptors) with historic data rather than having to collect new data. It is an effective way to focus scarce resources on the most polluting sites, particularly when there may be 1000's of potential sites and assessment may be 'overwhelming'.

The 'Future management' report sets out the steps needed to deliver environmental improvements at priority sites (or catchments) through monitoring, feasibility and remediation. Fundamental to this is the development of a conceptual model of the catchment or site – this should be included in the guidance (section 5.4 ?)

Thanks! Section 5.2 and 5.4 have been modified to incorporate the comments above.

5. 5.5 'Investigation of remedial options and risk evaluation'

The Defra-EA "Model procedures for the management of land contamination" sets out a comprehensive framework that could easily be applied to mine sites (although it focuses on the UK situation the approach is generic), and I would encourage the consultants to look at it.

<http://www.environment-agency.gov.uk/research/planning/33740.aspx>

Thanks! Section 5.5 has been modified to incorporate the comment above.

References and previous European work:

1. Prioritising of abandoned non-coal mine impacts on the water environment (NoCAM) Project funded by Defra, Welsh Government and DCLG (managed by Environment Agency) to prioritise rivers most impacted by abandoned metal mines and posing greatest risk of failing aims of Water Framework Directive. There are 13 reports and a non-technical summary. I believe the attached reports will be very pertinent to the guidance document, and also provide a timely European example of dealing with abandoned mines.

Attached are:

- Summary document
- Report 2: The national picture (England & Wales)
- Report 12: Future management of abandoned non-coal mine water discharges. This sets out a framework for how to deal with pollution from mine waters and mine wastes. It also estimates the costs of cleaning up this pollution in England & Wales.
- Report 13: Hazards and risk management at abandoned non-coal mine sites. This identifies a wider set of mine waste sites with potential problems than will feature in the inventory as we have only included those facilities where we are confident they meet the Article 20 criteria rather than just suspect a hazard.

Thanks! References to NoCAM publications have been incorporated into the document and the project summary has been attached as Appendix II as we believe there is very much to be learned from the NoCAM experience.

2. Abandoned mines and the water environment. 2008 report from Environment Agency, Scottish Environmental Protection Agency and the Coal Authority <http://publications.environment-agency.gov.uk/pdf/SCHO0508BNZS-e-e.pdf>

Thanks! Included!

3. PIRAMID: Passive in-situ remediation of acidic mine / industrial drainage EC Framework V project published in 2003: "Engineering guidelines for the passive remediation of acidic and/or metalliferous mine drainage and similar wastewaters".

Thanks! The PIRAMID project has been referenced.