

1. EXECUTIVE SUMMARY

Context, Scope and Priorities

- 1.1 This is the Final Report of a study into the costs of improving the management of mining waste. It was not carried out in isolation, but in parallel with a consultation process being run by the Directorate General for the Environment of the European Commission (DG ENV) and a technical review process coordinated by the European Integrated Pollution Prevention and Control Bureau (EIPPCB) in Sevilla. DG ENV's consultation was prompted by their stated intention to introduce a 'Mining Waste Directive', covering current and historic installations. EIPPCB's technical review, although not initiated in direct response to this potential Mining Waste Directive, has been running in parallel with DG ENV's consultation, and closely coordinated with it.
- 1.2 Throughout this report the term 'potential Mining Waste Directive' is used even though the scope of this initiative is still under discussion, and could include mineral waste from a range of mining and quarrying activities.
- 1.3 Chapter 2 of this report sets out the background in more detail, and stresses that this study is limited in its scope to considerations of costs, and particularly:
- (i) the current costs of managing mining waste; and
 - (ii) the economic implications for the mining sector of implementing certain additional waste management measures.
- 1.4 Waste is defined in the same way as in the EU's Waste Framework Directive, which includes some materials not thought of as waste by 'the man in the street'. In the context of mining and non-aggregate quarrying this includes waste rock and overburden, whether inert or not, as well as tailings.
- 1.5 Establishing which minerals needed to be covered, and with what priority, was not simple. The differences between the three categories of metal mining, coal and lignite mining and industrial minerals mining are very considerable, as are the variations within each category. Chapter 4 seeks to set the different mining activities in context using the most recent available statistics and the results of extensive internet searches. Readers who are familiar with the European mining industry will be able to ignore Chapter 4, but for those with a partial knowledge based on a few minerals or a few countries, it is intended to provide a helpful *tour d'horizon*.
- 1.6 Given the limitations on time and budget available, this study gave the highest priority to investigating costs at zinc, copper, gold, coal and potash mines. It should be stressed that these priorities refer to this study, and are not intended to influence the coverage of the potential Mining Waste Directive in any way.

Main Findings on Current Costs

- 1.7 This study found that the costs of managing mining waste vary considerably from mineral to mineral, and for a single mineral they vary significantly from mine to mine. For both zinc and copper mines, waste management typically accounts for about 1.5-2.0% of total cash costs. This includes an allowance for capital expenditure (on items such as raising the height of tailings dams) as well as current costs.
- 1.8 The cost of managing waste from underground coal mines is estimated at around €1.25 per tonne of coal sold. Because mining costs per tonne of coal produced vary so much (from around € 125 per tonne in France, to € 100 in Germany and Spain and € 36 in the UK), the

proportion of mining costs accounted for by the same waste management practices ranges from 1.0% in France to 3.5% in the UK.

- 1.9 For industrial minerals, the cost of waste management seldom if ever exceeds 2% of the sales value of the mineral being sold.
- 1.10 These cost estimates have drawn on limited information already in the public domain, plus significant detailed information provided by mining companies. This help and cooperation is readily acknowledged. All individual mine cost details were provided by the mining companies on the basis that they were to be treated as commercially sensitive.

The Implications of Raising the Cost of Waste Management

- 1.11 In Chapter 6 the implications of raising the costs reported above are considered. The general conclusion is that many European metal mines could until recently almost certainly have absorbed the relatively modest costs of higher waste management standards without becoming uncompetitive on the world market. However, the recent steep fall in metal prices has made many European mines much less profitable than the long-term norm.
- 1.12 The European coal industry has for some time been under more severe financial pressure than metal mining, but many of its waste management practices are already substantially in line with the thinking behind the potential Mining Waste Directive.
- 1.13 Some industrial mineral producers generate little or no waste of any sort, and several others produce inert waste only. The economic implications for such companies arising from the potential Mining Waste Directive are therefore very limited. There are, however, some industrial minerals producers for whom this is not true.
- 1.14 Because the techniques for managing mining waste are closely linked to those for mining and processing the ore, and because the investment cycle in mining is relatively long, any cost impacts associated with implementing the potential Mining Waste Directive would be reduced if they were phased in over a long time period.

How Higher Waste Management Costs Might Come About

- 1.15 The potential additional measures being considered when this study was commissioned were specified in general terms only. It is expected that in due course the Commission will define and describe such measures more fully in its proposal for a Mining Waste Directive. This is likely to have in common with the Landfill Directive an emphasis on those measures which will guarantee the protection of surface and groundwater from pollution, and the long-term protection of the environment. The preferred mechanisms are likely to be identified through the EIPPCB technical review. Since this is not expected to be complete until mid-2003, it offers an opportunity for interested parties to contribute information and views to the definition of good industry practice.
- 1.16 Since this study has been carried out in advance of the results of the EIPPCB review being available, it has sought to identify those waste management activities which involve significant costs, and to see which of these might change, or be more widely required. Most of the larger cost items are directly related to the management of tailings, which in many cases are stored in a wet form, at least in the operational phase of the facility. Some tailings are then stored permanently under water. Others are managed wet, with the tailings pond being drained once it is full, before being capped and planted.
- 1.17 This distinction between the short-to-medium-term storage of tailings (i.e. while a mine and/or its tailings pond is operational), and the long-term/permanent storage/disposal of tailings after the mine is closed has tended to get lost in some of the discussions concerning what represents best practice, and what the potential Mining Waste Directive may require. This is something which should be addressed in the next phase of consultation.