OECD WORKSHOP:

THE ENVIRONMENTALLY SOUND MANAGEMENT OF RECOVERABLE WASTES (ESM)

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SESSION 1

Standards for Environmentally Sound Management of Recoverable Wastes

Scoping Paper

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1. Introduction

The Organisation for Economic Co-operation and Development (OECD) Working Group on Waste Management Policy (WGWMP) has, as part of its mandate until December 2000, development of standards for environmentally sound management of recoverable wastes (ESM). As part of its work program the WGWMP will hold a workshop in Cancun, Mexico on October 28 to 29, 1999. The workshop will consider relevant experience in assessing ESM in OECD and non-OECD countries, elaborate the elements of ESM, and consider voluntary and regulatory approaches to assess ESM. Results of the October workshop will provide guidance to the WGWMP for future work in the ESM area.

This scoping paper is designed to support discussions at the October workshop. The paper will discuss the elements of ESM and will suggest procedures for the development of standards for ESM. The paper begins with the following question:

- How, in principle, might one go about deciding if an arrangement for the recovery of a waste constitutes ESM?

Consideration of this question moves discussion away from the details of the management of specific types of recoverable wastes, and toward the consideration of the general structure of standards for ESM.

Discussion in this paper is based, in part, on a simple Waste Flow Model. Models of this type have proved useful in OECD-wide discussion of other complex issues. For example, the Producer Responsibility Organization model provided a framework for the consideration of a variety of Extended Product Responsibility arrangements.[(1)] The paper begins with a description of the model. Building on that description technical requirements for ESM are formulated. Drawing on a recent OECD discussion of environmental standards[(2)] as well as on the technical requirements, a general structure for standards for ESM is developed. This structure is then utilized as a basis for discussion of the "elements of ESM" specified in the Terms of Reference (TOR) for this paper. (The elements of ESM from the TOR are included as an appendix to this report.) The paper ends with a brief consideration of directions for future work.

The structure for standards and discussion of the elements of ESM presented in this paper are offered as points of departure for discussion, not as final or settled positions. It is hoped that this paper together with the earlier OECD scoping paper on ESM [(3)] will facilitate the development of standards for ESM across the wide range of recoverable wastes.

2. Requirements for ESM

Assume for the moment that a specific waste has been specified and that an arrangement for the recovery of that waste has been suggested. How might one go about

deciding if that arrangement constitutes ESM? To begin one needs to know what is meant by ESM. The following definition of ESM is essentially that offered in the Guidance Document for Basil Convention.[4]

- Environmentally sound management requires taking all practicable steps to ensure that wastes are managed in a manner which will protect human health and the environment against adverse effects which may result from such wastes.

Applying this definition to a specific waste recovery arrangement requires an understanding of the areas in which waste recovery could affect human health and the environment. The following list of areas drawn from the earlier OECD scoping paper provides this information:

> "Firstly, there is a need to have knowledge of the origin and form of the waste and the circumstances under which it has been produced. Secondly, there is a need to have knowledge of the constituents present in the waste and the hazards they could present. Thirdly, the means of containment used for the waste, how it is stored and its means of transportation for recovery. Fourthly, there is a need to understand any processes which have to be undertaken to condition the waste for recovery, any by-products produced and their fate and their means of disposal. Fifthly, there is a need to understand the recovery process being used, the qualities of the products and any wastes arising from the process and their fate. Finally there is a need to compare the quality of performance of the whole reclamation process and compare it with the permits issued by the regulatory controlling authority. In particular, there is a need to evaluate performance in relation to accepted international criteria for environmentally sound recovery operations." (See page 9 of reference 3. The above will be referred to as the list in what follows.)

The list identifies areas that need to be examined. However, it leaves a number of questions open:

1. Are these all the areas that need to be examined?

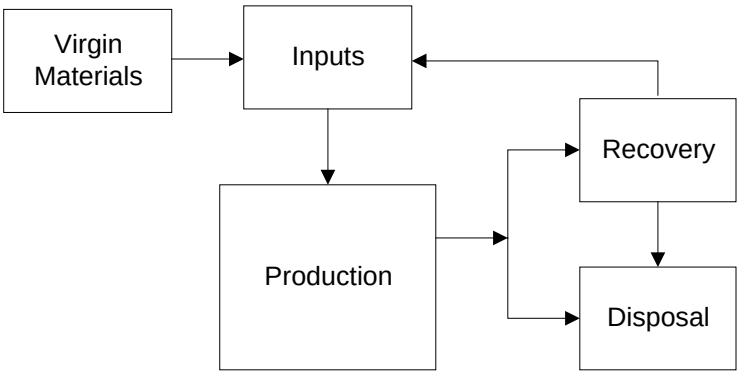
2. Do these areas need to be considered individually, as a group, or in both ways?

3. In consideration of these (or other) areas, what are the criteria that need to be met to qualify as ESM?

One could approach these questions by simply listing wastes and, for each, describing one or more specific recovery arrangements which constitute ESM. However, it is also useful to develop a general framework within which questions such as those raised above can be addressed. As part of such a framework use of a simple Waste Flow Model (WFM) is suggested. In this model waste is created by a production process. One option is to

dispose of the waste. The other option is to recover it. Both options are included in the model as shown below.

Figure 1: The Waste Flow Model



In the WFM, selection of recovery rather than disposal has four effects: need for direct disposal of the waste is avoided, need for disposal of recovery by-products is created, need for virgin inputs is reduced, and the mix of inputs to production changed, and transport requirements for wastes and for the inputs to production are changed. Depending on the waste, any or all of these effects could have significant impacts on human health and the environment. Consideration of these effects suggests two technical requirements which ESM should meet:

- **Component Impacts**. Each component of the **recovery path—** transport of waste to recovery, processing for recovery, transport and disposal of recovery by-products, transport of recovered material to its end-user and use in production—must meet all health and environmental regulations or requirements, including permits, applicable to that component.

- **Net Benefit**. Taken as a whole, the health and environmental impacts of recovery, including impacts due to reduced virgin materials production, should be no greater than the impacts of disposal or other reasonable recovery options.

Both the Component Impacts and Net Benefit requirements appear to be essential for ESM. To qualify as ESM, each step in a waste recovery arrangement must meet all applicable health and environmental regulations. However one could imagine a recovery arrangement in which each component of the recovery path meets all applicable

regulations, but in the aggregate is much worse for human health and the environment than an alternative recovery or disposal option. Such an arrangement should not constitute ESM.

How, in practice, one might apply the Net Benefit requirement is a difficult issue. Application requires consideration of impacts occurring over a substantial portion of the material life cycle. One reasonable approach would be to specify **benchmarks**, that is standard, environmentally attractive arrangements for the disposal and recovery of specific wastes. One could then take the Net Benefit requirement to mean that the human health and environmental impacts of a proposed recovery arrangement are no greater than those of the benchmark(s). The remaining open question is how, in practice, one might make the required comparison with the benchmark(s). There are a wide range of options for addressing this issue. One could select a specific methodology for making the comparison from among the wide range discussed in literature.[5] Alternatively, one could simply require that recovery approaches claiming to represent ESM document their net benefit relative to the relevant benchmark(s).

The two requirements address the concerns raised in the definition of ESM and in the earlier scoping paper. The WFM includes the five areas identified in the list. The Component Impacts requirement addresses the range of requirements suggested by the list. The Net Benefit requirement operationalizes the requirement for the protection of human health and the environment contained in the definition of ESM.

The two requirements also suggest answers to the three questions posed earlier.

1. The “list” does not identify all of the areas which need to be considered. Virgin material production also needs to be considered.

2. Areas need to be considered individually, as indicated in the Component Impacts requirement, and jointly, as indicated in the Net Benefit requirement.

3. The criteria to be met are those indicated in the Component Impacts and Net Benefit requirements.

Finally, it is important to note that the two requirements discussed in this section are not meant in any way to conflict with the established framework and criteria associated with the Basel Convention (i.e., Sections VI and VII of reference 4). Rather, the requirements proposed here should be seen as a mechanism which systematizes and facilitates the application of the existing criteria and framework.

3. Standards

This section begins with a brief discussion of standards taken primarily from the recent OECD discussion drawn from the report cited in reference 2. Building on this discussion and the technical requirements for ESM developed in the preceding section, a general structure for ESM standards is suggested.

In the sense used here a standard is something designed and established as a basis for the measurement of quality, weight, extent, value or quantity. Meeting a standard can be a legally binding requirement or a voluntary commitment. At a minimum, standards provide useful guidelines for producers and information for consumers. The choice among these options is left for discussion at the meeting.

Standards are an important aspect of the world-wide economic system. They convey to producers and purchasers the characteristics they may expect of a product, system, material methodology or production process. Standards currently cover food products, telecommunication systems and accounting practices. In these diverse areas standards ensure that a product or service is within a verifiable and measurable set of technical and professional norms. International standards must take into account the wide variation at the national level in matters such as perception of risk and frameworks for regulation. A key challenge for those devising international standards is to respond meaningfully to concerns about product or process variability while remaining sufficiently "open" and flexible enough to be applied in a variety of national contexts.

Standard-setting involves a number of choices. To begin, there are a variety of different types of standards:

- **Design Standards** which provide technical prescriptions of the specific methods or processes to be employed.

- **Performance Standards** which require measurable objectives to meet, but leave the means for meeting them open to some extent.

- **Generic Standards** which specify a process to be followed to enhance performance in an area, but do not specify the level of performance to be achieved.

For any type of standard, there must be a procedure for providing assurance that a product, process or service does indeed conform to the requirements of the standard. There are two basic options for providing such **conformity assessments**:

- **Self Declaration**, in which the organization claiming to meet a standard itself verifies and declares that the standard has been met.

- **Independent Verification**, in which a party other than the organization claiming to meet a standard verifies, and in some cases certifies, that the standard has been met.

Related to conformity assessment is the question of **extent of disclosure**. Self declaration or independent verification could simply require a statement to the effect that a standard has been met. Alternatively, there could be additional requirements involving, for example, statements that specific aspects of a standard have each been met, or describing the actions undertaken to meet a standard.

Development of standards for ESM needs to address four areas: (1) technical requirements; (2) type of standard (i.e., design, performance or generic); (3) requirements for conformity assessment; and (4) extent of disclosure. Component Impacts and Net Benefit requirements defined with respect to waste specific benchmark(s**)** are suggested as the technical requirements for standards for ESM. Assuming these requirements are adopted, at least as a starting point, (2) to (4) remain to be addressed. In doing so the following points need to be taken into consideration:

- The proposed technical requirements for ESM specify results to be achieved, not processes to be undertaken. In particular, the Component Impacts requirement calls for meeting, not trying to meet, all health and environmental requirements applicable to each component of the waste recovery path.

- There is no dichotomy between design and performance standards. Indeed, the use of benchmarks as discussed in Section 2 above is a blend of the two types of standards.

- Conformity assurance is essential if standards are to do their job. However, it creates a technical burden and imposes costs. Small and medium-sized enterprises and firms in developing countries could be disadvantaged by such requirements. One possibility is to set conformity assurance requirements which vary by type of waste and tonnage to be recovered.

- It may be useful to link the choice between self declaration and independent verification to the extent of disclosure required. Rigorous independent verification by a knowledgeable third party may limit the need for disclosure of the specific steps taken to meet a standard. On the other hand, substantial requirements for disclosure may make self declaration an acceptable option.

In light of the preceding discussion, the following general **structure for standards for ESM** is suggested:

- Standards for ESM should be of the design/performance type. Meeting Component Impacts and Net Benefit requirements based on suitable benchmarks should be the basic technical requirement for ESM. Conformity assurance and disclosure requirements should be specified

jointly. Where possible, alternatives based on self declaration and independent verification should be included.

4. Elements of ESM

The terms of reference (TOR) for this scoping paper identify eight specific elements whose role in ESM is to be considered. (The eight elements are listed in the Appendix.) Among these, the focus of this paper has been on **Element 8** which addresses standard-setting. Briefly, in response to Element 8 the paper proposes that standards for ESM be set individually for specific waste streams, following the general approach developed in Sections 2 and 3 and summarized in the structure presented at the end of Section 3. The discussion in Sections 2 and 3 above also addresses **Elements 2 and 3**, which deal with transport regulations and facility permitting. The specific requirements stated in Elements 2 and 3 are examples of the applicable health and environmental regulations and requirements included as part of the Component Impacts requirement. The remaining Elements—1, 4, 5, 6, and 7—are not addressed directly by the preceding discussion. They are taken up in the remainder of this section.

Element 1 focuses on criteria for an adequate overall infrastructure to facilitate ESM. As described in this paper, ESM requires (1) assurance of conformity with all applicable regulations along the entire recovery path and (2) evidence of net health and environmental impacts of a level less than certain benchmarks. The following two aspects of an infrastructure would help a waste generator seeking ESM status to meet these two requirements:

- Regulations applicable along the entire recovery path which are clearly identified and their requirements well stated;

- Information required for assessing net health and environmental impacts which is easily available.

It is by no means clear that the existing infrastructure is adequate to the task of fostering ESM. Addressing this issue would require the development of one or more **test standards** in light of which the adequacy of the existing infrastructure could be considered. (Test standards are discussed further in Section 5 below).

Element 4 raises the question of facility monitoring as a requirement for ESM. The structure for ESM standards proposed in this paper does not include facility monitoring as a **separate** requirement. However, facility monitoring may arise as part of the requirements for meeting ESM standards as described in this paper:

- The Component Impacts requirement will entail monitoring to the extent that compliance with health and environmental regulations applicable to any component of the recovery path requires the use of monitoring.

- Monitoring beyond that required to meet the Component Impacts requirement may be necessary to produce data sufficient for an assessment of net benefits.

Assuming that an arrangement for recovery of a waste includes monitoring sufficient to meet the Component Impacts and Net Benefit requirements, including any continuing requirements for conformity assessment, there is no need to address monitoring as a separate requirement.

The issues concerning the use of Best Available or Practicable Technology raised in **Element 5** are addressed through the Net Benefit requirement, particularly the use of benchmarks. One could go beyond the use of benchmarks, requiring the use of Best Available or Practical Technology to qualify for the designation of ESM. However, this is not recommended. Instead, standards for ESM for specific wastes should be reviewed periodically and their benchmarks adjusted in the direction of Best Available or Practicable Technology. This approach provides for changes in standards for ESM responsive to technological improvement while avoiding the definitional problems identified in Element 8.

Changing benchmarks could result in some existing recovery arrangements, which previously qualified as ESM, failing to meet current requirements. There is no simple rule for dealing with such situations. Rather, the impact of withdrawing the ESM designation needs to be addressed on a case-by-case basis.

Elements 6 and 7 deal with ISO and EMAS in relation to ESM. (For ISO the ISO 14000 series is taken as the point of reference.) Neither ISO nor EMAS has the same scope and requirements as ESM:

- ISO and EMAS refer to the activities of a specific corporate entity. ESM refers to the full recovery path, which may include activities under the control of a range of corporate entities.

- ISO and EMAS require compliance with applicable regulations, as does the Component Impact requirement. However, neither ISO nor EMAS requires a net benefit relative to specified benchmark(s).

Development of environmental management systems—the central feature of ISO and EMAS—is likely to be helpful in meeting ESM standards. The continuous improvement sought under ISO and the real and measurable improvement sought under EMAS both fit with the objectives sought through the use of benchmark(s) which rise over time in ESM standards. The audit and disclosure requirements for EMAS are in line with the conformity assessment and disclosure requirements for ESM standards discussed in Section 3. However, because of the differences in scope and type of requirements, neither ISO nor EMAS is a substitute for meeting ESM standards.

5. Directions for Future Work

The discussion of ESM standards presented in this paper is designed to complement the discussion and information presented in the OECD's earlier scoping paper (Reference 3). Based jointly on that paper and the discussion presented here, it should be possible to develop **Test Standards** for one or more waste streams. The word "test" is used to make it clear that, at least initially, the standards developed would be used for discussion and analysis, not implementation.

Development of a test standard would entail the following steps:

1. Identification of a waste stream.

2. Development of a detailed Waste Flow Model for that stream.

3. Identification of health and environmental requirements associated with each component of the Waste Flow Model.

4. Specification of benchmarks for disposal and recovery of the waste.

5. Description of procedures by which the Net Benefit associated with departures from the benchmarks would be assessed.

6. Development of conformity assurance and disclosure requirements.

Once test standards are developed, they should be applied, if possible to a range of recovery arrangements, to see if the standard-setting mechanism is reasonable and workable. Depending on the outcome of these efforts, three courses of action are possible:

- If the test standards work well, one might move to the development of ESM standards designed for actual application.

- If the standard-setting process works well apart from specific "problem areas," these areas can be subjected to further study and discussion.

- If development or application of test standards proves generally unworkable, effort can be directed elsewhere.

NOTES AND REFERENCES

1. Organisation for Economic Co-operation and Development (OECD), 1998. *Extended and Shared Producer Responsibility: Phase 2. Executive Summary*. Group on Pollution Prevention and Control, May. See in particular pages 6 and 7.

2. Organisation for Economic Co-operation and Development (OECD), 1998. *What Do Standards for Environmental Management Systems Offer?* Proceedings from the WPPPC Special Session, 4 May 1998.

3. Organisation for Economic Co-operation and Development (OECD), 1996. *Environmentally Sound Practices for Recovery Operations, A Scoping Paper*.

4. *Guidance Document on Transboundary Movements of Hazardous Wastes Destined for Recovery Operations*, 1995. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. September.

5. Centre for Energy Conservation and Environmental Technology, January 1998. Apples, Oranges and Environment. Hein Sas, Jan Paul Van Soest, Gerrit De Wit.

APPENDIX:

Elements to be Considered in the Scoping Paper

1. Should include criteria for an adequate overall infrastructure to facilitate environmentally sound recovery of wastes. Development of these criteria should take into consideration, for example:

   - Base1 documents SBC No: 95/002, page 12 and SBC No: 94/005, pages 1-3;
   - Cairo Guidelines on ESM;
   - OECD Annex 2 of the council Decision C(92)39/FINAL; and
   - Any criteria in place in OECD Member countries.

1. Should include a requirement to comply with international transport regulations.

2. Should include a requirement that the recovery facility is appropriately permitted by the competent authorities, and that compliance with this permit is verified at appropriate intervals.

3. Should include a requirement for facility monitoring (emissions, spills, training, procedures, etc.).

4. Should include a requirement to apply Best Available or best Practicable Technology, along with clear definitions of these terms.

5. Should outline, with reference to existing ISO and EMAS standards, if it covers standards for environmentally sound management and if a special international standard dealing with environmentally sound management is required.

6. Should identify the role of environmental audits within the ESM and their relation to ISO and EMAS standards.

7. Should include an evaluation of:

   i) Whether the standards should address:

   - all types of recycling facilities as a group, or individual recovery/recycling operations (e.g., solvent reclamation, recycling/reclamation of metals, etc.);
   - waste streams;
   - industrial sectors;
   - processes, including storage and handling of materials;
   - technologies; or
   - other.

i) Which waste streams/sectors/processes/technologies would require qualitative and/or quantitative environmental and/or health standards (providing examples to help discussion).

ii) How detailed standards should be developed; whether detailed technical standards or rather more general framework guidelines are appropriate, including a few options for discussion.