OSPAR Commission

Ministerial Meeting of the OSPAR Commission

Sintra, 22-23 July 1998

Programmes and Measures

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Union and Spain.

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par l'Espagne et l'Union européenne.

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INTRODUCTION

On 25 March 1998, the 1992 OSPAR Convention entered into force. The 1998 Ministerial Meeting of the OSPAR Commission was held in conjunction with the 1998 annual meeting of the Commission in Sintra (Portugal) on 22-23 July 1998. At the end of their meeting, Ministers adopted the Sintra Statement setting out the political impetus for future action by the OSPAR Commission with a view to ensuring the protection of the marine environment of the North-East Atlantic.

The main products of this first meeting of the new OSPAR Commission were as follows:

a. a new Annex to the 1992 OSPAR Convention concerning the protection and conservation of the ecosystems and biological diversity of the maritime area covered by the Convention, and a related Appendix. Furthermore, an agreement on the meaning of certain concepts used in Annex V was made;

b. strategies aimed at guiding future work of the Commission on the longer term with regard to:
   (i) hazardous substances;
   (ii) radioactive substances;
   (iii) eutrophication;
   (iv) conservation of the ecosystems and biological diversity of the maritime area;

c. an Action Plan setting out actions for the period 1998-2003 to be taken by the Commission with a view to implementing these strategies;

d. new rules governing the participation of non-governmental organisations (NGOs) in the work of the Commission, which enable NGOs to participate at all levels of the Commission's working structure. These rules will be published on the OSPAR web-site (address: http://www.OSPAR.org).

The text of the new Annex, its related Appendix, the strategies and the Action Plan will be published in a separate report as well as on the OSPAR web-site.

The Commission also adopted the following measures:

a. OSPAR Decision 98/1 [1] concerning the Status of Decisions and Recommendations and Other Agreements Adopted under the Former Oslo Convention and Paris Convention within the Framework of the OSPAR Convention (see page 7);

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1 In accordance with Article 13 of the 1992 OSPAR Convention, OSPAR Decisions become binding on the expiry of a period of two hundred days after their adoption for those Contracting Parties that voted for it and have not within that period notified the Executive Secretary in writing that they are unable to accept the decision.

b. OSPAR Decision 98/2 on Dumping of Radioactive Waste (see page 13). With the entry into force of this OSPAR Decision, subparagraphs (b) and (c) of paragraph 3 of Article 3 of Annex II to the 1992 OSPAR Convention will cease to have effect;

c. OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations (see page 15);

d. OSPAR Decision 98/4 on Emission and Discharge Limit Values for the Manufacture of Vinyl Chloride Monomer (VCM) including the Manufacture of 1,2-dichloroethane (EDC) (see page 25);

e. OSPAR Decision 98/5 on Emission and Discharge Limit Values for the Vinyl Chloride Sector, Applying to the Manufacture of Suspension-PVC (s-PVC) from Vinyl Chloride Monomer (VCM) (see page 33);

f. OSPAR Recommendation 98/1 concerning Best Available Techniques and Best Environmental Practice for the Primary Non-Ferrous Metal Industry (Zinc, Copper, Lead and Nickel Works) (see page 39);

g. OSPAR Recommendation 98/2 on Emission and Discharge Limit Values for Existing Aluminium Electrolysis Plants (see page 51);

h. OSPAR Guidelines for the Management of Dredged Material (see page 61);

i. OSPAR Guidelines for Dumping of Fish Waste from Land-Based Industrial Fish Processing Operations (see page 95).

OSPAR DECISION 98/1 CONCERNING THE STATUS OF DECISIONS AND RECOMMENDATIONS AND OTHER AGREEMENTS ADOPTED UNDER THE FORMER OSLO CONVENTION AND PARIS CONVENTION WITHIN THE FRAMEWORK OF THE OSPAR CONVENTION[2]

RECALLING paragraph 2 of Article 31 of the OSPAR Convention which provides that Decisions, Recommendations and all other agreements adopted under the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention) or the Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris Convention) shall continue to be applicable, unaltered in their legal nature, to the extent that they are compatible with, or not explicitly terminated by, the Convention or any decision adopted thereunder,

The Contracting Parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic DECIDE that

the Decisions, Recommendations and other agreements listed in the Appendix to this Decision, which were adopted under the former Oslo Convention and under the former Paris Convention, are hereby revoked.

[2] Secretariat note:

In accordance with Article 13 of the 1992 OSPAR Convention, this Decision will enter into force and become binding on 9 February 1999. Until then, all measures listed in the Appendix will still be applicable.

APPENDIX

OSCOM AND PARCOM MEASURES WHICH ARE NOT APPLICABLE IN THE FRAMEWORK OF THE OSPAR CONVENTION

PART A

Decisions and Recommendations adopted under the former Oslo Convention and under the former Paris Convention

- PARCOM Recommendation on the Phasing out of Aldrin, Dieldrin and Endrin, 1978
- PARCOM Decision upon a Line of Action for a Dual Approach to Reducing Mercury Discharges (EQO and UES Approaches) (Valid for a period of 5 years), 1978
- PARCOM Recommendation on Synthetic, Persistent and Floating Materials, 1980
- PARCOM Recommendation on Discharges from Platforms Resulting from Exploration Activities, 1980
- OSCOM Decision to Ask Norway to Convene a Diplomatic Conference for the Purpose of Amending the Convention by Including Rules of Incineration at Sea as a new Annex IV, 1981
- PARCOM Recommendation on the Phasing Out of PCBs and PCTs, 1983
- PARCOM Decision on the Use of Oil-based Muds, 1984
- PARCOM Recommendation on Radioactive Discharges from Nuclear Reprocessing Plants (Oslo, 1984)
- OSCOM Decision 85/1 Concerning Annexes I and II to the Convention
- OSCOM Decision 85/2 on the Control of Cleaning Operations Carried out on Board Marine Incineration Facilities at Sea
- PARCOM Decision to Phase Out the Use of Aldrin, Dieldrin and Endrin, 1985
- PARCOM Decision to ask France to convene a Diplomatic Conference for the purpose of amending the Convention by extending its scope to include pollution of the maritime area through the atmosphere, 1985
- PARCOM Recommendation on Radioactive Discharges from all Nuclear Industries into the Marine Environment (Brussels, 1985)
- PARCOM Decision 86/1 on Discharges Resulting from Exploration Activities
- PARCOM Decision 86/2 on the Use of Oil-based Muds
- PARCOM Recommendation 87/3 of 3 June 1987 on the Construction of New Nuclear Reprocessing Plants
- PARCOM Recommendation 87/4 of 3 June 1987 on Radioactive Discharges
- OSCOM Decision 88/1 on the Termination of Incineration at Sea
- OSCOM Decision that the Riparian States of the North Sea will Apply the Principles on the Reduction and Cessation of Dumping of Polluting Materials as Set Out in the North Sea Conference Declaration, 1988
- PARCOM Decision 88/1 on the Use of Oil-based Muds

- PARCOM Recommendation 88/3 as a First Approach to the Use of Best Available Technology
- PARCOM Recommendation 88/5 of 17 June 1988 on Radioactive Discharges
- OSCOM Decision to ask Norway to Convene a Diplomatic Conference for the Purpose of Amending the Convention by Including Dumping in Internal Waters, 1989
- OSCOM Decision 89/1 on the Reduction and Cessation of Dumping Industrial Wastes at Sea
- PARCOM Recommendation 89/1 on the Principle of Precautionary Action
- PARCOM Recommendation 89/2 on the Use of Best Available Technology
- OSCOM Decision 90/1 on the Cessation of Dumping of Sewage Sludge at Sea
- OSCOM Decision 90/2 on the Termination of Incineration at Sea
- PARCOM Decision 90/1 on the Reduction of Discharges of Chlorinated Organic Substances from the Production of Bleached Kraft Pulp and Sulphite Pulp
- PARCOM Decision 90/4 on Phasing Out of PCBs
- PARCOM Recommendation 90/2 on Information and Consultation
- PARCOM Recommendation 90/3 of 14 June 1990 on Reporting on Progress in Applying the Best Available Technology on Radioactive Discharges from all Nuclear Industries
- OSCOM Recommendation 91/1 on the Management of Dredged Material
- PARCOM Recommendation 91/1 on the Definition of Best Environmental Practice
- PARCOM Decision 92/4 on the Phasing Out of the Use of Hexachloroethane (HCE) in the Secondary Aluminium Industry and in the Primary Aluminium Industry with Integrated Foundries
- PARCOM Decision 93/1 on the Phasing Out of the Use of Hexachloroethane in the Non-ferrous Metal Industry
- PARCOM Recommendation 93/3 on the Elaboration of National Action Plans and Best Environmental Practice for the Reduction of Inputs to the Environment of Pesticides from Agricultural Use
- PARCOM Decision 94/1 on Substances/Preparations Used and Discharged Offshore

PART B

Other agreements adopted under the former Oslo Convention and under the former Paris Convention

- Interpretation of the Convention - Definition of terms used in the Convention, 1974
- Interpretation of the Convention - Disposal of pipes, metal shavings and other material, 1976
- OSCOM Code of Practice for the Dumping of Acid Wastes from the TiO_2 Industry at Sea, 1977
- OSCOM Code of Practice on the Incineration of Wastes at Sea, 1977
- Code of Practice for the Dumping of Acid Wastes from the Titanium Dioxide Industry at Sea, 1977
- Reporting Format for the Notification of Wastes Incinerated at Sea, 1977
- OSCOM Provisional Prior Consultation Procedure for the Incineration of Wastes at Sea, 1978
- Interpretation of the Convention - Reviews of the Annexes to the Convention, 1978
- Interpretation of the Paris Convention - "persistent oil", 1978
- Methods of Monitoring Dumping Grounds for Sewage Sludge and Dredge Spoil, 1980
- Designation of a Common Incineration Site, 1980
- Methods of Monitoring Dumping Grounds for Sewage Sludge and Dredged Material, 1980
- Methods of Monitoring Sea Areas where Titanium Dioxide Wastes are dumped, 1980
- Scientific and technical aspects of the disposal of tanker wreckage,1980
- Interpretation of the Paris Convention - Scope of the Paris Convention in relation to MARPOL 1973/78 and drainage water discharged from platforms, 1980
- Monitoring of Sea Areas where Titanium Dioxide Wastes are Dumped, 1980 and 1986
- Interpretation of the Paris Convention - Discharges upstream of the freshwater limit' 1981
- OSCOM Code of Practice for the Incineration of Wastes at Sea including a Revised Prior Consultation Procedure for Incineration, 1982
- Form of Report for the Notification of Permits Issued for the Incineration of Wastes at Sea, 1982
- Interpretation of the Convention - Scuttling of ships, 1982
- Interpretation of the Paris Convention - Reviews of the annexes, 1982
- Test Procedures - General guidelines for the implementation of test procedures under the prior consultation procedure, 1982 and 1983
- Test procedures - Guideline for the testing of chemicals and waste water with a marine algal growth inhibition test, 1982 and 1983
- Test procedures - Principles for the conduct of toxicity tests, 1982 and 1983
- Test procedures - Principles for the determination of the biodegradability of the organic fraction of chemical wastes, 1982 and 1983
- Test procedures - Principles on the bioaccumulation testing of the Annex I fraction of chemical waste, 1982 and 1983

- Code of Practice for the Incineration of Wastes at Sea, 1982 and 1987
- Principles for Controlling Repairs to Incineration Vessels, 1983
- Revised Prior Consultation Procedure for the Dumping of Wastes at Sea, 1983
- Interpretation of the Convention - Marine sediments, 1984
- PARCOM Declaration of Intent on Phasing Out PCBs and PCTs in New Equipment, 1984
- Confirmation of Common Incineration Site, 1985
- Guidelines for the Classification and Allocation of Substances to the Annexes of the Oslo Convention, 1985
- Interpretation of the Convention - Organotin compounds, 1985
- Interpretation of the Convention - Polydimethylsiloxanes, 1985
- Classification and Allocation of Substances to the Annexes of the Paris Convention, 1985
- Interpretation of the Paris Convention - Definition of "Uniform Emission Standards",1985
- Interpretation of the Paris Convention - Export of pollution, 1985
- Interpretation of the Paris Convention - Organosilicon compounds,1985
- Interpretation of the Convention - Article 15 of the Convention, 1986
- Simplified procedure for the adoption of the EEC Directive on HCH, 1986
- PARCOM Agreement on "grey list" substances for priority action, 1986
- Monitoring for Purpose (a) - The Assessment of Possible Hazards to Human Health, 1986
- Performance Charts: Fifth Round Intercalibration for Trace Metals in Sea Water 1986
- Performance Charts: Seventh Intercalibration Exercise on Trace Metals in Biota (Part 1), 1986
- Monitoring of Sea Areas where Titanium Dioxide Wastes are Dumped 1986
- Interpretation of the Convention - Bulky wastes: Annex II paragraph 1 (b), 1987
- Reporting format for Atmospheric Emissions from Industrial Sources, 1987
- Agreement with ICES on Handling of JMP Data, 1987
- ICES' Access to Commissions' Summary Records, 1987
- Guidelines for Temporal Trend Analysis of Data on Contaminants in Fish Sampled for Purpose (d) of the Joint Monitoring Programme, 1987
- PARCOM Agreement to Strictly Control Discharges of Mothproofing Agents, 1988
- Overview of Biological Effects Monitoring Techniques, 1988
- Intercalibration and Methods of Analysis, 1988
- Standards for Assessment of the JMP Results, 1988
- Recommendations Concerning the Preparation of Assessment Reports under the Joint Monitoring Programme, 1988
- Quality Assurance Programmes, 1988
- Form of report for Atmospheric Emissions from Industrial Sources, 1988
- Establishment of the North Sea Task Force - Establishment of a Mechanism to Implement the Provisions of the North Sea Conference Declaration on the Enhancement of Scientific Knowledge and Understanding, 1988

- Quality Assurance Procedures, 1989
- Additional Advice on Quality Assurance, 1989
- Responsibility for the Monitoring of Nutrients, 1989
- Step-wise Procedure for Monitoring Eutrophication Phenomena in this Field, 1989
- Procedures for the Monitoring of Nutrients on a Voluntary Basis, 1989
- National Comments, 1989
- Overview of Intercalibration/Intercomparison Exercises Coordinated by ICES, 1989
- Monitoring of Benthic Communities, 1989
- Monitoring for Purpose (c), 1989
- Monitoring for Purpose (d) - The Assessment of the Effectiveness of Measures Taken for the Reduction of Marine Pollution in the Framework of the Conventions, 1989
- Interpretation of the Convention - Dumping of platforms from vessels, 1989
- Reporting Formats for Nutrient Discharges, 1989
- Introduction to JMP Guidelines, 1989
- Questionnaire for Reporting Discharges of Priority Substances via Chemicals Used Offshore to the Paris Commission, 1990
- Reporting Format for the Evaluation of Data with Respect to Airborne Deposition to the Area of the Paris Convention, 1990
- Guidelines for the Sampling and Analysis of Trace Metals in Seawater under the Joint Monitoring Programme, 1990
- Subject Specific Compilation of Documents of the Joint Monitoring Group, 1990
- Sampling Procedures and Methods of Analysis, 1990
- North Sea Monitoring Master Plan, 1990
- Reporting formats for Atmospheric Inputs of Pollutants to Convention Waters, 1990
- Guidelines for the Management of Dredged Material, 1991, 1992 and 1993
- A Compilation of Standards and Guidance Values for Contaminants in Fish, Crustaceans and Molluscs for the Assessment of Possible Hazards to Human Health (Purpose (a)), 1992
- Provisional Guidelines on Areas of Special Concern, 1993
- Annual Reports on Direct and Riverine Inputs to Convention Waters, 1993
- Principles of the Comprehensive Study on Riverine Inputs, 1993
- Reporting Formats, 1994
- Guidelines for the Use of Sediments in Marine Monitoring in the Context of Oslo and Paris Commissions Programmes, 1994
- Officers of the Oslo and Paris Commissions’ Subsidiary Bodies Charged with Assessing and Monitoring the Marine Environment, 1994
- Guidelines for the Sampling and Analysis of Organisms and the Reporting of Results under the Joint Monitoring Programme, 1994
- Provisional Additional Guidelines for Reporting of Contaminants Monitoring Data Collected under the Joint Monitoring Programme, 1994

OSPAR DECISION 98/2 ON DUMPING OF RADIOACTIVE WASTE[3]

WELCOMING the statement by the Government of the French Republic at the 1997 meeting of the Oslo and Paris Commissions that it had agreed to renounce for good the possibility of resuming dumping at sea of radioactive substances, including waste,

WELCOMING equally the statement by the Government of the United Kingdom of Great Britain and Northern Ireland at the same meeting that it no longer wished to preserve the possibility of an exemption for the United Kingdom from the permanent and complete prohibition on the dumping at sea of radioactive substances, including waste, contained in the Convention for the Protection of the Marine Environment of the North-East Atlantic,

RECALLING the provisions of subparagraph 3(c) of Article 3 of Annex II to that Convention,

The Contracting Parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic decide that:

The exception, provided in subparagraph (b) of paragraph 3 of Article 3 of Annex II to the OSPAR Convention, to the prohibition, in subparagraph (a) of that paragraph, on the dumping of low and intermediate level radioactive substances, including wastes, shall not be continued.

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3 Secretariat note:

In accordance with Article 13 of the 1992 OSPAR Convention, this Decision will enter into force and become binding on 9 February 1999.

OSPAR DECISION 98/3 ON THE DISPOSAL OF DISUSED OFFSHORE INSTALLATIONS

RECALLING the Convention for the Protection of the Marine Environment of the North East Atlantic, in particular Articles 2 and 5 of that Convention,

RECALLING the relevant provisions of the United Nations Convention on the Law of the Sea,

RECOGNISING that an increasing number of offshore installations in the maritime area are approaching the end of their operational life-time,

AFFIRMING that the disposal of such installations should be governed by the precautionary principle, which takes account of potential effects on the environment,

RECOGNISING that reuse, recycling or final disposal on land will generally be the preferred option for the decommissioning of offshore installations in the maritime area,

ACKNOWLEDGING that the national legal and administrative systems of the relevant Contracting Parties need to make adequate provision for establishing and satisfying legal liabilities in respect of disused offshore installations,

The Contracting Parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic decide that:

DEFINITIONS

1. For the purposes of this Decision,

"concrete installation" means a disused offshore installation constructed wholly or mainly of concrete;

"disused offshore installation" means an offshore installation, which is neither

a. serving the purpose of offshore activities for which it was originally placed within the maritime area, nor

b. serving another legitimate purpose in the maritime area authorised or regulated by the competent authority of the relevant Contracting Party;

but does not include:

c. any part of an offshore installation which is located below the surface of the sea-bed, or

d. any concrete anchor-base associated with a floating installation which does not, and is not likely to, result in interference with other legitimate uses of the sea;

"relevant Contracting Party" means the Contracting Party, which has jurisdiction over the offshore installation in question;

"steel installation" means a disused offshore installation, which is constructed wholly or mainly of steel;

"topsides" means those parts of an entire offshore installation which are not part of the substructure and includes modular support frames and decks where their removal would not endanger the structural stability of the substructure;

"footings" means those parts of a steel installation which:

(i) are below the highest point of the piles which connect the installation to the sea bed;

(ii) in the case of an installation built without piling, form the foundation of the installation and contain amounts of cement grouting similar to those found in footings as defined in sub-paragraph 3(a); or

(iii) are so closely connected to the parts mentioned in subparagraphs (i) and (ii) of this definition as to present major engineering problems in severing them from those parts.

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2. The dumping, and the leaving wholly or partly in place, of disused offshore installations within the maritime area is prohibited.

3. By way of derogation from paragraph 2, if the competent authority of the relevant Contracting Party is satisfied that an assessment in accordance with Annex 2 shows that there are significant reasons why an alternative disposal mentioned below is preferable to reuse or recycling or final disposal on land, it may issue a permit for

a. all or part of the footings of a steel installation in a category listed in Annex 1, placed in the maritime area before 9 February 1999, to be left in place;

b. a concrete installation in a category listed in Annex 1 or constituting a concrete anchor base, to be dumped or left wholly or partly in place;

c. any other disused offshore installation to be dumped or left wholly or partly in place, when exceptional and unforeseen circumstances resulting from structural damage or deterioration, or from some other cause presenting equivalent difficulties, can be demonstrated.

4. Before a decision is taken to issue a permit under paragraph 3, the relevant Contracting Party shall first consult the other Contracting Parties in accordance with Annex 3.

5. Any permit for a disused offshore installation to be dumped or permanently left wholly or partly in place shall accord with the requirements of Annex 4.

6. Contracting Parties shall report to the Commission by 31 December 1999 and every 2 years thereafter, relevant information on the offshore installations within their jurisdiction including, when appropriate, information on their disposal for inclusion in the inventory to be maintained by the Commission.

7. In the light of experience in decommissioning offshore installations, in particular those in categories listed in Annex 1, and in the light of relevant research and exchange of information, the Commission shall endeavour to achieve unanimous support for amendments to that Annex in order to reduce the scope of possible derogations under paragraph 3. The preparation of such amendments shall be considered by the Commission at its meeting in 2003 and at regular intervals thereafter.

Entry into force

8. This Decision enters into force on 9 February 1999, and shall then replace Decision 95/1 of the Oslo Commission concerning the Disposal of Offshore Installations.

Implementation Reports

9. If any Contracting Party decides to issue a permit for a disused offshore installation to be dumped or left wholly or partly in place within the maritime area, it shall submit to the Commission at the time of the issue of the permit a report in accordance with paragraph 3 of Annex 4.

10. If any disused offshore installation is dumped or left wholly or partly in place within the maritime area, the relevant Contracting Party shall submit to the Commission, within six months of the disposal, a report in accordance with paragraph 4 of Annex 4.

ANNEX 1

CATEGORIES OF DISUSED OFFSHORE INSTALLATIONS WHERE DEROGATIONS MAY BE CONSIDERED

The following categories of disused offshore installations, excluding their topsides, are identified for the purpose of paragraph 3:

a. steel installations weighing more than ten thousand tonnes in air;

b. gravity based concrete installations;

c. floating concrete installations;

d. any concrete anchor-base which results, or is likely to result, in interference with other legitimate uses of the sea.

ANNEX 2

FRAMEWORK FOR THE ASSESSEMENT OF PROPOSALS FOR THE DISPOSAL AT SEA OF DISUSED OFFSHORE INSTALLATIONS

General Provisions

1. This framework shall apply to the assessment by the competent authority of the relevant Contracting Party of proposals for the issue of a permit under paragraph 3 of this Decision.

2. The assessment shall consider the potential impacts of the proposed disposal of the installation on the environment and on other legitimate uses of the sea. The assessment shall also consider the practical availability of reuse, recycling and disposal options for the decommissioning of the installation.

Information required

3. The assessment of a proposal for disposal at sea of a disused offshore installation shall be based on descriptions of:

   a. the characteristics of the installation, including the substances contained within it; if the proposed disposal method includes the removal of hazardous substances from the installation, the removal process to be employed, and the results to be achieved, should also be described; the description should indicate the form in which the substances will be present and the extent to which they may escape from the installation during, or after, the disposal;

   b. the proposed disposal site: for example, the physical and chemical nature of the sea bed and water column and the biological composition of their associated ecosystems; this information should be included even if the proposal is to leave the installation wholly or partly in place;

   c. the proposed method and timing of the disposal.

4. The descriptions of the installation, the proposed disposal site and the proposed disposal method should be sufficient to assess the impacts of the proposed disposal, and how they would compare to the impacts of other options.

Assessment of disposal

5. The assessment of the proposal for disposal at sea of a disused offshore installation shall follow the broad approach set out below.

6. The assessment shall cover not only the proposed disposal, but also the practical availability and potential impacts of other options. The options to be considered shall include:

   a. re-use of all or part of the installation;

   b. recycling of all or part of the installation;

   c. final disposal on land of all or part of the installation;

   d. other options for disposal at sea.

Matters to be taken into account in assessing disposal options

7. The information collated in the assessment shall be sufficiently comprehensive to enable a reasoned judgement on the practicability of each of the disposal options, and to allow for an authoritative comparative evaluation. In particular, the assessment shall demonstrate how the requirements of paragraph 3 of this Decision are met.

8. The assessment of the disposal options shall take into account, but need not be restricted to:

a. technical and engineering aspects of the option, including re-use and recycling and the impacts associated with cleaning, or removing chemicals from, the installation while it is offshore;

b. the timing of the decommissioning;

c. safety considerations associated with removal and disposal, taking into account methods for assessing health and safety at work;

d. impacts on the marine environment, including exposure of biota to contaminants associated with the installation, other biological impacts arising from physical effects, conflicts with the conservation of species, with the protection of their habitats, or with mariculture, and interference with other legitimate uses of the sea;

e. impacts on other environmental compartments, including emissions to the atmosphere, leaching to groundwater, discharges to surface fresh water and effects on the soil;

f. consumption of natural resources and energy associated with re-use or recycling;

g. other consequences to the physical environment which may be expected to result from the options;

h. impacts on amenities, the activities of communities and on future uses of the environment; and

i. economic aspects.

9. In assessing the energy and raw material consumption, as well as any discharges or emissions to the environmental compartments (air, land or water), from the decommissioning process through to the re-use, recycling or final disposal of the installation, the techniques developed for environmental life cycle assessment may be useful and, if so, should be applied. In doing so, internationally agreed principles for environmental life cycle assessments should be followed.

10. The assessment shall take into account the inherent uncertainties associated with each option, and shall be based upon conservative assumptions about potential impacts. Cumulative effects from the disposal of installations in the maritime area and existing stresses on the marine environment arising from other human activities shall also be taken into account.

11. The assessment shall also consider what management measures might be required to prevent or mitigate adverse consequences of the disposal at sea, and shall indicate the scope and scale of any monitoring that would be required after the disposal at sea.

Overall assessment

12. The assessment shall be sufficient to enable the competent authority of the relevant Contracting Party to draw reasoned conclusions on whether or not to issue a permit under paragraph 3 of this Decision and, if such a permit is thought justified, on what conditions to attach to it. These conclusions shall be recorded in a summary of the assessment which shall also contain a concise summary of the facts which underpin the conclusions, including a description of any significant expected or potential impacts from the disposal at sea of the installation on the marine environment or its uses. The conclusions shall be based on scientific principles and the summary shall enable the conclusions to be linked back to the supporting evidence and arguments. Documentation shall identify the origins of the data used, together with any relevant information on the quality assurance of that data.

ANNEX 3

CONSULTATION PROCEDURE

1. A relevant Contracting Party which is considering whether to issue a permit under paragraph 3 of this Decision shall start this consultation procedure at least 32 weeks before any planned date of a decision on that question by sending to the Executive Secretary a notification containing:

   a. an assessment prepared in accordance with Annex 2 to this Decision, including the summary in accordance with paragraph 12 of that Annex;

   b. an explanation why the relevant Contracting Party considers that the requirements of paragraph 3 of this Decision may be satisfied;

   c. any further information necessary to enable other Contracting Parties to consider the impacts and practical availability of options for re-use, recycling and disposal.

2. The Executive Secretary shall immediately send copies of the notification to all Contracting Parties.

3. If a Contracting Party wishes to object to, or comment on, the issue of the permit, it shall inform the Contracting Party which is considering the issue of the permit not later than the end of 16 weeks from the date on which the Executive Secretary circulated the notification to the Contracting Parties, and shall send a copy of the objection or comment to the Executive Secretary. Any objection shall explain why the Contracting Party which is objecting considers that the case put forward fails to satisfy the requirements of paragraph 3 of this Decision. That explanation shall be supported by scientific and technical arguments. The Executive Secretary shall circulate any objection or comment to the other Contracting Parties.

4. Contracting Parties shall seek to resolve by mutual consultations any objections made under the previous paragraph. As soon as possible after such consultations, and in any event not later than the end of 22 weeks from the date on which the Executive Secretary circulated the notification to the Contracting Parties, the Contracting Party proposing to issue the permit shall inform the Executive Secretary of the outcome of the consultations. The Executive Secretary shall forward the information immediately to all other Contracting Parties.

5. If such consultations do not resolve the objection, the Contracting Party which objected may, with the support of at least two other Contracting Parties, request the Executive Secretary to arrange a special consultative meeting to discuss the objections raised. Such a request shall be made not later than the end of 24 weeks from the date on which the Executive Secretary circulated the notification to the Contracting Parties.

6. The Executive Secretary shall arrange for such a special consultative meeting to be held within 6 weeks of the request for it, unless the Contracting Party considering the issue of a permit agrees to an extension. The meeting shall be open to all Contracting Parties, the operator of the installation in question and all observers to the Commission. The meeting shall focus on the information provided in accordance with paragraphs 1 and 3 and during the consultations under paragraph 4. The chairman of the meeting shall be the Chairman of the Commission or a person appointed by the Chairman of the Commission. Any

question about the arrangements for the meeting shall be resolved by the chairman of the meeting.

7. The chairman of the meeting shall prepare a report of the views expressed at the meeting and any conclusions reached. That report shall be sent to all Contracting Parties within two weeks of the meeting.

8. The competent authority of the relevant Contracting Party may take a decision to issue a permit at any time after:

a. the end of 16 weeks from the date of despatch of the copies under paragraph 2, if there are no objections at the end of that period;

b. the end of 22 weeks from the date of despatch of the copies under paragraph 2, if any objections have been settled by mutual consultation under paragraph 4;

c. the end of 24 weeks from the date of despatch of the copies under paragraph 2, if there is no request for a special consultative meeting under paragraph 5;

d. receiving the report of the special consultative meeting from the chairman of that meeting.

9. Before making a decision with regard to any permit under paragraph 3 of this Decision, the competent authority of the relevant Contracting Party shall consider both the views and any conclusions recorded in the report of the special consultative meeting, and any views expressed by Contracting Parties in the course of this procedure.

10. Copies of all the documents which are to be sent to all Contracting Parties in accordance with this procedure shall also be sent to those observers to the Commission who have made a standing request for this to the Executive Secretary.

ANNEX 4

PERMIT CONDITIONS AND REPORTS

1. Every permit issued in accordance with paragraph 3 of this Decision shall specify the terms and conditions under which the disposal at sea may take place, and shall provide a framework for assessing and ensuring compliance.

2. In particular, every permit shall:
   a. specify the procedures to be adopted for the disposal of the installation;
   b. require independent verification that the condition of the installation before the disposal operation starts is consistent both with the terms of the permit and with the information upon which the assessment of the proposed disposal was based;
   c. specify any management measures that are required to prevent or mitigate adverse consequences of the disposal at sea;
   d. require arrangements to be made, in accordance with any relevant international guidance, for indicating the presence of the installation on nautical charts, for advising mariners and appropriate hydrographic services of the change in the status of the installation, for marking the installation with any necessary aids to navigation and fisheries and for the maintenance of any such aids;
   e. require arrangements to be made for any necessary monitoring of the condition of the installation, of the outcome of any management measures and of the impact of its disposal on the marine environment and for the publication of the results of such monitoring;
   f. specify the responsibility for carrying out any management measures and monitoring activities required and for publishing reports on the results of any such monitoring;
   g. specify the owner of the parts of the installation remaining in the maritime area and the person liable for meeting claims for future damage caused by those parts (if different from the owner) and the arrangements under which such claims can be pursued against the person liable.

3. Every report under paragraph 9 of this Decision shall set out:
   a. the reasons for the decision to issue a permit under paragraph 3;
   b. the extent to which the views recorded in the report of the special consultative meeting under paragraph 7 of Annex 3 to this Decision, or expressed by other Contracting Parties during the procedure under that Annex, were accepted by the competent authority of the relevant Contracting Party;
   c. the permit issued.

4. Every report under paragraph 10 of this Decision shall set out:
   a. the steps by which the disposal at sea was carried out;
   b. any immediate consequences of the disposal at sea which have been observed;
   c. any further information available on how any management measures, monitoring or publication required by the permit will be carried out.

OSPAR DECISION 98/4 ON EMISSION AND DISCHARGE LIMIT VALUES FOR THE MANUFACTURE OF VINYL CHLORIDE MONOMER (VCM) INCLUDING THE MANUFACTURE OF 1,2-DICHLOROETHANE (EDC)

RECALLING Article 2(1) of the Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention");

RECALLING that the 1997/1998 Action Plan of the Oslo and Paris Commissions calls for the adoption of further measures, including the application of best available techniques (BAT) and best environmental practice (BEP), for the reduction or elimination of inputs to the maritime area from specific industrial sectors, and in considering these sectors, attention should be given in particular to activities which result in inputs of hazardous substances (especially organohalogen substances) and to the reduction of such inputs, with the aim of their elimination;

RECALLING that the Oslo and Paris Commissions published in 1996 a Description of BAT for the Vinyl Chloride Industry;

RECALLING PARCOM Recommendation 96/2 Concerning Best Available Techniques for the Manufacture Vinyl Chloride Monomer (VCM);

NOTING Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC Directive) and corresponding legislation of other Contracting Parties;

RECOGNISING that the vinyl chloride industry has the potential to release significant amounts of organohalogens to the environment;

RECOGNISING that the releases of chlorinated hydrocarbons arising in the manufacture of VCM can be minimised by applying BAT;

The Contracting Parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic DECIDE:

1. DEFINITIONS

For the purposes of this Decision:

"Chlorinated hydrocarbons"	means the sum of at least 1,2-dichloroethane (EDC), vinyl chloride monomer (VCM), chloroform, carbon tetrachloride, trichloroethane, methyl chloride and hexachlorobenzene.
"Existing plant"	means plant the operation of which was authorised before 9 February 1999.
"New plant"	means plant the operation of which was authorised on or after 9 February 1999.
"VCM-plant"	means plant manufacturing VCM and/or EDC from ethylene and chlorine and/or hydrochloric acid (HCl) as feedstock.
"Dioxins"	means polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofuranes, reported as Toxic Equivalents (TEQ)
"Fugitive emissions"	means releases into air due to leakages.

2. SCOPE

2.1 The purpose of this Decision is to prevent and eliminate pollution and to take the necessary measures to protect the maritime area against the adverse effects of human activities due to the manufacture of VCM including the manufacture of EDC.

2.2 This Decision lays down limit values for releases of certain hazardous substances into water and air from the manufacturing process of VCM including EDC from ethylene and chlorine and/or HCl as feedstock.

2.3 The discharge limit values in table 3.2 apply only to VCM-plants from which discharges may reach the maritime area of the OSPAR Convention by waterborne routes.

2.4 The emission limit values in table 3.1 apply to all VCM-plants of Contracting Parties.

3. PROGRAMMES AND MEASURES

3.1 General provisions

3.1.1 The annual averages of emissions from VCM-plants to the air shall not exceed the emission limit values in table 3.1.

3.1.2 The annual averages of discharges from VCM-plants to the water environment shall not exceed the discharge limit values in table 3.2.

3.1.3 The dilution of treated or untreated waste air or waste water streams for the purpose of compliance with limit values as set out in §§ 3.2 and 3.3 shall not be permitted.

3.2 Emissions to air:

3.2.1 Potential point sources of gas emissions from the installation/equipment shall be collected as far as possible for treatment in an incinerator or in equipment with comparable performance.

Table 3.1: Emission Limit Values

Substance	**Limit value** [1)]
VCM	5 mg/Nm^3
EDC	5 mg/Nm^3
Dioxins	0,1 ng/Nm^3 (TEQ)
HCl	30 mg/Nm^3

1) Standardised at the following conditions: temperature 273 °K, pressure 101,3 kPa and 11% O_2 dry gas.

Fugitive emissions to air shall be minimised as far as possible.

3.3 **Discharges to water** (total of aqueous waste streams)

Table 3.2: Discharge Limit Values

Substance	Sampling Point	Limit values	
		concentration	releases in unit of weight per tonne
Chlorinated hydrocarbons	after stripper, before secondary treatment		0,7 g/tonne EDC purification capacity
Copper (total)	after final treatment		for plants with fixed bed reactors: g/tonne of oxychlorination capacity for plants with fluidised bed reactors: 1,0 g/tonne of oxychlorination capacity
Dioxins	after final treatment		1 µg TEQ per tonne oxychlorination capacity
Chemical Oxygen Demand (COD)	after final treatment	250 mg/litre	

3.3.1 Adsorbable organic halogen compounds (AOX) or extractable organic halogen compounds (EOX) can be used as optional alternative parameters for chlorinated hydrocarbons, provided that a correlation, on a plant by plant basis, between AOX or EOX and chlorinated hydrocarbons has been established and will be reported in the reporting on implementation. On sites where no VCM is manufactured and EDC is not purified, the discharge limits for chlorinated hydrocarbons shall be defined in terms of EDC production capacity and not in terms of EDC purification capacity.

3.3.2 As copper discharges are related only to oxychlorination technology, their limits shall only be applied to discharges of the oxychlorination processes for VCM/EDC production.

3.3.3 On sites where no VCM is manufactured and oxychlorination processes are not used for VCM/EDC production, the discharge limits for dioxins shall be defined in terms of EDC production capacity. In this case, the limit value shall be 0,1 µg TEQ per tonne of EDC production capacity.

3.3.4 As an alternative to the discharge limit value of 250 mg/litre for COD, a 90% reduction of the load of COD may be applied.

3.3.5 As an alternative to COD as parameter, total organic carbon (TOC) may be used as a control parameter, provided a correlation factor between COD and TOC has been established.

3.4 Sampling

3.4.1 Samples shall be taken for analysis on the following bases:

a. for emissions to the atmosphere, a sample, or a number of samples, representative of such emissions over a period of one hour;

b. for discharges to water, a sample, or a number of samples, representative of such discharges over a period of one day. Analysis of chlorinated hydrocarbons (or AOX or EOX) shall be performed on the basis of spot samples over a period of one day.

3.4.2 The frequency of analysis shall be determined by the competent authorities taking into account the results obtained.

3.4.3 For dioxins, one analysis per year can be sufficient, provided that the sampling procedure ensures representative samples.

3.4.4 Water samples shall be homogenised, unfiltered and undecanted, where this is compatible with the analytical methodology specified in table 3.3.

3.5 Analyses

3.5.1 The analytical methods set out in table 3.3, or methods yielding equivalent results, shall be used:

Table 3.3: Analytical Methods

COD	to be analysed by using potassium dichromate oxidation (See ISO 6060, second edition)
TOC	to be analysed in accordance with EN 1484
AOX, EOX	to be analysed according to ISO 9562 and EN 1485
Cu (total)	to be analysed by using flame atomic absorption spectrometry (See ISO 8288: Water Quality – determination of cobalt, nickel, copper, zinc, cadmium and lead. - Flame atomic absorption spectrometric methods)
EDC	to be analysed by gas chromatography
VCM	to be analysed by gas chromatography
Dioxins	to be analysed according to EN 1948 parts 1-3
Chlorinated hydrocarbons	to be analysed by gas chromatography
Fugitive emissions	to be quantified by using appropriate methods (e.g. by using a trace gas technique)

4. ENTRY INTO FORCE

4.1 This Decision enters into force on 9 February 1999 for new plants and on 1 January 2006 for existing plants. The programmes and measures of this Decision shall be applied to:

a. new plants from 9 February 1999;

b. existing plants from 1 January 2006.

4.2 In the case of technical modifications to an existing VCM-plant, the competent authorities shall decide whether the provisions for existing plants in this Decision still apply to the modified plant.

5. IMPLEMENTATION REPORTS

5.1 Reports on the implementation of this Decision shall be submitted to the appropriate OSPAR working group in accordance with OSPAR's Standard Implementation Reporting and Assessment Procedure. In respect of existing plants this reporting shall commence in the intersessional period 2007/2008.

5.2 When reporting on implementation, the format as set out in the Appendix should be used to the extent possible.

APPENDIX

Format for Implementation Reports of OSPAR Decision 98/4 on Emission and Discharge Limit Values for the Manufacture of Vinyl Chloride Monomer (VCM) (including Manufacture of 1,2-dichloroethane (EDC))

I. IMPLEMENTATION REPORT ON COMPLIANCE

Country:	
Reservation applies	yes/no[1]
Is measure applicable in your country?	yes/no[1]

If not applicable, then state why not (e.g. no relevant plant)

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Means of Implementation:	**by legislation**	**by administrative action**	**by negotiated agreement**
	yes/no[1]	yes/no[1]	yes/no[1]

Please provide information on:

a. specific measures taken to give effect to this measure;

b. any special difficulties encountered, such as practical or legal problems, in the implementation of this measure;

c. the reasons for not having fully implemented this measure should be spelt out clearly and plans for full implementation should be reported.

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II. IMPLEMENTATION REPORT ON EFFECTIVENESS

Contracting Parties should endeavour to report also the following items in accordance with the reporting format.

Emissions into the atmosphere

(annual averages, accompanied by appropriate statistical information)

Plant/site	Production [a] (tonnes)	EDC (mg/m^3)	VCM (mg/m^3)	HCl (mg/m^3)	Dioxins (ng/Nm^3 (TEQ))

Discharges into water

(annual averages, accompanied by appropriate statistical information)

Plant/site	Chlorinated hydrocarbons (g/tonne EDC purification capacity)[b]	Cu (total) (g/tonne of oxychlorination capacity)[c]		Dioxins (µg TEQ per tonne oxychlorination capacity) [c]	COD (mg/l) [c]
		fixed bed	fluidised bed		

[a] Production in tonnes for the year of reporting can be given either as:
- Actual production of VCM or EDC (indicate as “A-VCM” or “A-EDC”);
- Production capacity of VCM (indicate as “PC-VCM”);
- Production capacity of EDC (indicate as “PC-EDC”);
- EDC purification capacity (indicate as “PU-EDC”); or
- Oxychlorination capacity (indicate as “O-C”).

[b] Chlorinated hydrocarbons (to be sampled after stripper, before secondary treatment) may alternatively be calculated from AOX or EOX if a correlation, on a plant-by-plant basis, has been established. The application of those alternatives should be described in the implementation report.

[c] To be sampled after final treatment.

OSPAR DECISION 98/5 ON EMISSION AND DISCHARGE LIMIT VALUES FOR THE VINYL CHLORIDE SECTOR, APPLYING TO THE MANUFACTURE OF SUSPENSION-PVC (S-PVC) FROM VINYL CHLORIDE MONOMER (VCM)

RECALLING Article 2(1) of the Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention");

RECALLING that the 1997/1998 Action Plan of Oslo and Paris Commissions calls for the adoption of further measures, including the application of best available techniques (BAT) and best environmental practice (BEP), for the reduction or elimination of inputs to the maritime area from specific industrial sectors, and in considering these sectors, attention should be given in particular to activities which result in inputs of hazardous substances (especially organohalogen substances) and to the reduction of such inputs, with the aim of their elimination;

RECALLING that the Oslo and Paris Commissions published in 1996 a Description of BAT for the Vinyl Chloride Industry;

RECALLING PARCOM Recommendation 96/3 concerning Best Available Techniques for the Manufacture of s-PVC from VCM;

NOTING Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC Directive) and corresponding legislation of other Contracting Parties;

RECOGNISING that the vinyl chloride industry has the potential to release significant amounts of organohalogens to the environment;

RECOGNISING that the release of chlorinated hydrocarbons arising in the manufacture of s-PVC can be minimised by applying BAT and BEP;

The Contracting Parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic DECIDE:

1. DEFINITIONS

For the purposes of this Decision:

"Existing plant"	means plant the operation of which was authorised before 9 February 1999.
"New plant"	means plant the operation of which was authorised on or after 9 February 1999.
"Single plant"	means plant manufacturing suspension-polyvinyl chloride (s-PVC).
"Combined plant"	means plant manufacturing s-PVC and being part of an industrial site, where other chemical processes are being carried out.
"Fugitive emissions"	means releases into air due to leakages.

2. Scope

2.1 The purpose of this Decision is to prevent and eliminate pollution and to take the necessary measures to protect the maritime area against the adverse effects of human activities due to the manufacture of s-PVC from vinyl chloride monomer (VCM).

2.2 This Decision lays down limit values for releases of certain hazardous substances into water and air from the manufacturing process of s-PVC from VCM, i.e. polyvinyl chloride produced from VCM by the suspension process.

2.3 The discharge limit values in tables 3.2 and 3.3 apply only to single or combined plants from which discharges may reach the maritime area of the OSPAR Convention by waterborne routes.

2.4 The emission limit values in table 3.1 apply to all single or combined plants of Contracting Parties.

3. Programmes and Measures

3.1 General provisions

3.1.1 The annual averages of emissions from plants producing s-PVC to the air shall not exceed the emission limit values in table 3.1.

3.1.2 The annual averages of discharges from plants producing s-PVC to the water environment shall not exceed the discharge limit values in tables 3.2 and 3.3.

3.1.3 The dilution of treated or untreated waste air or waste water streams for the purpose of compliance with limit values as set out in §§ 3.2. and 3.3 shall not be permitted.

3.2 Emissions to air from point sources

Table 3.1 Emission Limit Values

Substance	**Limit value**
VCM	80 g VCM per tonne s-PVC produced

3.2.1 Fugitive emissions shall be minimised as far as possible. They should be measured from the s-PVC production applying modern techniques.

3.3 Discharges to water

a. after effluent stripper, before secondary treatment

Table 3.2 Discharge Limit Values

Substance	**Limit value**
VCM	1 mg VCM per litre
	5 g VCM per tonne s-PVC produced

3.3.1 Adsorbable organic halogen compounds (AOX) or extractable organic halogen compounds (EOX) can be used as optional alternative parameters for VCM, provided that a correlation, on a plant by plant basis, between AOX or EOX and VCM has been established and will be reported in the reporting on implementation.

b. at outlet of effluent water treatment plant

Table 3.3 Discharge Limit Values

Substance	**Limit value**
Chemical Oxygen Demand (COD)	For single plants: 125 mg COD per litre For combined plants: 250 mg COD per litre
Suspended solids	30 mg suspended solids per litre

3.3.2 The main parts of the suspended solids referred to in table 3.3 are PVC particles. These suspended solids may be calculated from AOX if a correlation, on a plant by plant basis, between AOX and suspended solids has been established and will be reported in the reporting on implementation.

3.3.3 As an alternative to the discharge limit value of 250 mg/litre for chemical oxygen demand (COD), a 90 % reduction of the load of COD may be applied.

3.3.4 As an alternative to COD as parameter, total organic compounds (TOC) may be used as a control parameter, provided that a correlation factor between COD and TOC has been established.

3.4 Sampling

3.4.1 Samples shall be taken for analysis on the following bases:

a. for emissions to the atmosphere, a sample, or a number of samples, representative of such emissions over a period of one hour;

b. for discharges to water, a sample, or a number of samples, representative of such discharges over a period of one day. Analysis of chlorinated hydrocarbons (or AOX or EOX) shall be performed on the basis of spot samples over a period of one day.

3.4.2 The frequency of analysis shall be determined by competent authorities taking into account the results obtained.

3.4.3 Water samples shall be homogenised, unfiltered and undecanted, where this is compatible with the analytical methodology specified in table 3.4.

3.5 Analyses

3.5.1 The analytical methods set out in table 3.4, or methods yielding equivalent results, shall be used:

Table 3.4: Analytical Methods

VCM	to be analysed by gas chromatography
TOC	to be analysed in accordance with EN 1484
AOX, EOX	to be analysed according to ISO 9562 and EN 1485
COD	to be analysed by using potassium dichromate oxidation (See ISO 6060, second edition)
Suspended solids	to be determined in water effluent by filtration through glass fibre filters (see EN 872)
Fugitive emissions of VCM	to be quantified by using appropriate methods (e.g. by using a trace gas technique)

4. ENTRY INTO FORCE

4.1 This Decision enters into force on 9 February 1999 for new plants and on 1 January 2003 for existing plants. The programmes and measures of this Decision shall be applied to:

a. new plants from 9 February 1999;

b. existing plants from 1 January 2003.

4.2 In the case of technical modifications to an existing PVC-plant competent authorities shall decide whether the provisions for existing plants in this Decision still apply for the modified plant.

5. IMPLEMENTATION REPORTS

5.1 Reports on the implementation of this Decision shall be submitted to the appropriate OSPAR working group in accordance with OSPAR's Standard Implementation Reporting and Assessment Procedure. In respect of existing plants this reporting shall commence in the intersessional period 2004/2005.

5.2 When reporting on implementation, the format as set out in the Appendix should be used to the extent possible.

APPENDIX

Format for Implementation Reports of OSPAR Decision 98/5 on Emission and Discharge Limit Values for the Vinyl Chloride Sector, Applying to the Manufacture of s-PVC from VCM

I. IMPLEMENTATION REPORT ON COMPLIANCE

Country:	
Reservation applies	yes/no[1]
Is measure applicable in your country?	yes/no[1]

If not applicable, then state why not (e.g. no relevant plant)

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Means of Implementation:	**by legislation**	**by administrative action**	**by negotiated agreement**
	yes/no[1]	yes/no[1]	yes/no[1]

Please provide information on:

a. specific measures taken to give effect to this measure;

b. any special difficulties encountered, such as practical or legal problems, in the implementation of this measure;

c. the reasons for not having fully implemented this measure should be spelt out clearly and plans for full implementation should be reported.

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[1] Delete as appropriate

II. IMPLEMENTATION REPORT ON EFFECTIVENESS

Contracting Parties should endeavour to report also the following items in accordance with the reporting format.

Emissions into the atmosphere

(annual averages, accompanied by appropriate statistical information, including sampling frequencies)

Plant/site	Production [a] (tonnes)	VCM (g/tonne s-PVC; point sources)	VCM (g/tonne s-PVC; fugitives)	Description of techniques to estimate fugitive emissions

a) - Actual production of PVC (indicate as A-PVC)
- Production capacity of PVC (indicate as P-PVC)

Discharges into water

(annual averages, accompanied by appropriate statistical information, including sampling frequencies)

Plant/site	VCM [a), c)] (mg/l)	VCM [a), c)] (g/tonne s-PVC)	COD [d)] (mg/l)		Suspended solids [b), d)] (mg/l)
			single plants	combined plants	

a) Please state correlation when VCM data are based on AOX or EOX measurements.

b) Please state correlation when suspended solids data are based on AOX measurements.

c) after effluent stripper, before secondary treatment.

d) at outlet of effluent water treatment plant.

OSPAR RECOMMENDATION 98/1 CONCERNING BEST AVAILABLE TECHNIQUES AND BEST ENVIRONMENTAL PRACTICE FOR THE PRIMARY NON-FERROUS METAL INDUSTRY (ZINC, COPPER, LEAD AND NICKEL WORKS)

RECALLING Article 2(1) of the Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention");

RECALLING also that the 1997/1998 Action Plan of the Oslo and Paris Commissions requires the adoption of further measures, including the application of best available techniques and best environmental practice, for the reduction or elimination of inputs to the maritime area from specific industrial sectors including the non-ferrous metal industry;

RECALLING the Description of Best Available Techniques for the Primary Production of Non-Ferrous Metals (Zinc, Copper, Lead and Nickel Works) which was published by the Oslo and Paris Commissions in 1996;

NOTING Council Directive 96/61/EC concerning integrated pollution prevention and control which addresses this sector;

RECOGNISING that the primary zinc, copper, lead and nickel industries represent a considerable potential source of inputs of contaminants to the maritime area;

The Contracting Parties to the Convention for Protection of the Marine Environment of the North-East Atlantic RECOMMEND:

1. DEFINITIONS

For the purposes of this Recommendation:

"Primary metallurgical industry" means industry producing one or more refined metals directly and predominantly from ores and concentrates.

2. SCOPE

This Recommendation applies to the primary metallurgical industry producing one or more of the following metals or process related compounds:

- zinc;
- copper;
- lead;
- nickel.

The techniques described in this document are applicable to new metallurgical plants, as well as to existing plants that are going to be transformed significantly. In addition, national authorities should establish reasonable periods of time intended for the environmental update of all existing plants to the level of the techniques.

3. GENERAL PROVISIONS AND REQUIREMENTS

1. The following general provisions and requirements put forward technical measures and operations described in the Description of Best Available Techniques for the Primary Production of Non-Ferrous Metals (Zinc, Copper, Lead and Nickel Works) which was published by the Oslo and Paris Commissions in 1996. There may be additional techniques which can achieve equal or better environmental protection, or which are more appropriate in certain geographical situations which are also acceptable. Contracting Parties should report on such additional techniques in their implementation reports.

3.1 Storage and handling of raw materials

2. Site selection of the stockpile area should consider protection from winds and minimisation of vehicle movements. The area of its location should be hard surfaced and the height of the stockpile of fines should not extend above the retaining walls of the open bays. The contact with vehicles, especially wheel contact, should be avoided. Where this is not practicable tyres should be washed prior to leaving the site of the stockpile if climatic conditions allow. For this purpose, the site should have a well-designed separation from the remainder of the plant, with preferably only one exit/entrance with the tyre washer.

3. Stockpiles and stockpiling or blending operations should preferably be fully enclosed with roof and side coverings. When this is not practicable the following, at least, should be considered:

- establishing overgrown earth embankments, windbreak plantings or windbreak hedges;
- discontinuation, as far as possible, of stockpiling operations during weather conditions which particularly favour the generation of emissions (long-lasting droughts, high wind velocities).

4. Raw materials should be received wetted and/or in sealed containers and/or in enclosed vehicles. These should be inspected before tipping. Appropriate dust control precautions should be taken when sampling. Properly designed dust arresting measures should be installed, e.g. spray systems may be required to maintain stockpile surface wetting.

5. In case of longer lasting storage a crust-forming agent can be applied.

6. Tipping to stockpiles can be made through chutes equipped with wet suppression systems. Exposed free fall of dusty material to stock should be avoided.

7. For the storage and handling of hazardous substances, the strictest measures, roofing and complete side coverage should be applied.

3.2 Transfer operations

8. Reclamation of raw materials from stockpiles can be by:

   a. toploading conveyor, (the best method);
   b. grab crane; or
   c. front end loader;
   d. covered lorries.

9. Totally closed facilities, like conveyor belts, exhausters, chain conveyors or transport containers should be used for the transportation of dusty materials. Machinery, equipment, or other facilities used for the treatment or production of

dusty goods should be also completely encapsulated. Where encapsulation is not or only partly possible, dust-containing waste gas should be collected and fed to a dust collector.

3.3 Traffic and roadways

10. Roads should be cleaned, well defined and well maintained.

11. Drains should be fitted with interceptor points in order to prevent blocking.

12. As far as practicable, site vehicles should be restricted to designated functions and areas and their use should be prohibited outside the site. Access of private vehicles to affected areas should be minimised. Careful on-site traffic management is required.

13. Where climatic conditions permit, wheels of vehicles should be washed before exiting the site. A well-designed wheel wash system would include:

- a spray system capable of cleaning tyre surfaces and wheel arches;
- water trough to at least half the depth of the tyre. Rumbler bars submerged in the trough along its full length;
- an irrigated exit ramp and draining off area using clean water draining to the trough should be provided; automatic jet operation by pressure pads; solids recovery system;
- restrictions to prevent bypassing the wheel wash system.

14. Because effluents from facilities that wash vehicles may be polluted with heavy metals, discharges should be treated before release.

3.4 Recycling

15. When technical and economically possible, recycling of collected materials should be the first objective of an environmental management program this principle is also applicable to water discharges and waste management.

4. ATMOSPHERIC POLLUTION

4.1 Fugitive Dust and Fume Emissions

4.1.1 Storage and handling of raw materials

16. The handling of dusty materials may require the installation of exhausters and dedusters at:

- stationary reception, transfer, and discharge points, shovel loaders, and transport units;
- downspouts of loading facilities;
- dispersion systems as parts of pneumatic or mechanical unloading facilities;
- pouring gutters of facilities used, or unloading road and rail vehicles;
- siphons.

17. In as much as dust-containing waste gases cannot be collected:

- the discharge height at discharge points should be, automatically, if possible, adjusted to the changing height of the pile; or
- the discharge velocity of the bulk goods at the downspout should be kept as low as possible, e.g. by using shuttle flaps.

4.1.2 Recycling operations

18. Wetting, as soon as practicable after removal from the process, using a properly designed spray system can greatly reduce dust emissions when this operation does not imply any risk.

19. Transfer of drosses and slags for crushing should be in enclosed containers. Crushers should be fitted with arrestment plant.

20. Fine collected dust can be:

- continuously recycled in a closed system direct from the filter plant;
- fed directly into a continuous smelting furnace or wet pelletised before charging;
- collected in combustible containers for charging direct to the furnace;
- slurried pumped and separated for recycling in thickeners or clarifiers.

4.1.3 Process containment

21. Extraction of fumes followed by arrestment should be applied to sources such as furnaces, launders, melting pots, converters etc. Design extraction volumes should be sufficient to cope with overloads and abnormal operating conditions.

22. Methods of containment, where practical, should employ primary, secondary and tertiary stages and could include:

- lock chambers on charging systems;
- covered launders and ladles;
- close hooding at tapping points;
- enclosure of hot dressing areas and rotary furnaces.

23. The above emissions should be extracted to filters.

24. High capacity vacuum cleaning systems should be used for housekeeping within the process area.

25. Fabric filter units on hot gases should be located inside a building to reduce emissions during maintenance, condensation and corrosion due to weather effects. Emissions high in moisture may best be treated using wet scrubbers or electrostatic precipitators. Where practicable, filtration systems should be fitted with filter failure systems.

4.2 Direct Emissions of Vaporous or Gaseous Substances

26. Vaporous or gaseous inorganic substances, that cannot be abated by means of the use of precipitators, scrubbers or filters should be treated by means of chemical or physico-chemical methods, (for example, absorption and adsorption), in order to minimise their emission to the atmosphere.

4.2.1 Sulphur dioxide

General

27. All sulphur dioxide-containing gas streams from non-ferrous metallurgical plants should be processed in order to meet emission limit values of sulphur dioxide to the atmosphere.

28. The installation for sulphur dioxide removal should be monitored, operated and maintained adequately, so that a maximum total operating time can be accomplished. Procedures during start-up and shutdown of equipment should aim at a minimisation of sulphur dioxide emissions.

29. Continuous stable operation of the purification process, be it a sulphuric acid plant (as is most common at smelters), or some other kind of abatement process, should be maintained in order to have a successful purification of sulphur dioxide-containing gases to the required standards.

30. The following approaches to sulphur dioxide pollution abatement can be used, alone or in combination:

- recovery as sulphuric acid, by means of one of the following processes:
  - double contact;
  - wet catalysis;
  - processes based on NO_x;
  - single contact, in conjunction with other techniques or in cases of low sulphur dioxide concentrations;
- recovery as liquid sulphur dioxide, by means of one of the following processes:
  - condensation processes;
  - absorption processes;
- recovery as elemental sulphur or gypsum.

31. When the sulphur dioxide concentration or the conditions of the waste gas prevents the methods listed above from being used, or after using them, the tail gases do not meet the air quality standards of the affected area, additional abatement measures should be taken such as additional treatment of the tail gas by means of chemical, physical or physico-chemical methods, including e.g. discharge to water as neutral sulphates, (e.g., mainly Na_2SO_4).

Copper works

32. The fluctuations in volume and composition, of some gas streams can be mitigated by conducting the conversion procedure in several converters in a phased sequential operation and combining their off-gases. In some cases it is also common practice to mix them with the steadier, more concentrated gas streams from the roasting and smelting stages so as to produce a combined gas stream within the concentration range needed to maintain autothermal operation of a sulphuric acid plant.

33. When possible, the individual stages of copper extraction should be carried out in continuous processes and avoid any discontinuous stages. Processes, where possible, should be autogenous and designed for optimum energy and resource conservation.

Zinc works

34. When possible, the recommendations given for copper works should be applied to sulphur dioxide streams from zinc sulphide ores roasting facilities.

35. To permit economic and efficient processing of the sulphur dioxide roaster gases, the sulphur dioxide concentration should be kept as high and steady as possible, (e.g.: with the aid of fluid-bed technology for the roasting step).

Lead works

36. When possible, the recommendations given for copper works should be applied to sulphur dioxide streams from lead sulphide ores roasting facilities.

37. Under optimum operation conditions, when sintering machines with gas recycling are used, the sulphur dioxide concentrations of lead concentrates roaster gases should be maintained in the range of 4-6 % vol. or above in order to facilitate efficient recovery of sulphur. In order to produce waste gases with a higher concentration of sulphur dioxide, the roasting and reduction steps could be carried out in a single unit.

Nickel works

38. When possible, the recommendations given for copper works should be applied to sulphur dioxide streams from nickel sulphide ores roasting facilities.

39. Sulphur dioxide concentrations can be controlled by minimising air filtration.

4.2.2 Mercury

40. Mercury vapour, leaving the scrubbing section, should be removed from gas streams by wet and/or dry methods.

41. Alternatively, where the gas is being used as sulphuric acid plant feed, the mercury may be left in the gas and removed instead from the product acid.

42. Impure metallic mercury, condensed as liquid metal and mercury-containing sludges, precipitated in the scrubbing liquor, should be removed and treated as a dangerous and toxic waste. Internal recycling to the roaster should be allowed only for streams where appropriate facilities are installed which enable safe mercury removal.

43. Waste water originating from wet gas treatment for mercury removal in metallurgical plants should be treated in an appropriate treatment plant.

4.3 Direct Emissions of Particulate Matter (Fumes and Dust)

44. Direct emissions of particulate matter shall be minimised using appropriate waste gas cleaning techniques. The applicability and the final choice of techniques depend, *inter alia*, on waste gas parameters such as dew point considerations, raw gas temperature and raw gas composition.

45. **Electrostatic precipitators** imply capital and running costs that are relatively high. Because of this, it is usual to remove the coarser particles in a preliminary separator, such as a cyclone separator, and to use the electrostatic precipitator as an eliminator for the very fine material. Although they operate more satisfactorily at low temperatures, they can be used up to about 550°C. Pressure drops over the separator are low. The minimum collection efficiency of electrostatic precipitators occurs with particle sizes of about 0,5 to 2 µm. With electrostatic precipitators in many cases the same clean emission levels can be attained as is often achieved with fabric filters.

46. **Scrubbers** will cool the exhaust gas to temperatures where heavy metal vapours are virtually non-existent, thus allowing the collection of essentially all heavy metals present in the gas. In addition, scrubbers are able to control an appreciable proportion of fine particles and gaseous emissions (e.g. sulphur dioxide, hydrochloric acid, hydrogen fluoride), simultaneously. Scrubbing provides an effective method of cleaning which gives a gas of high purity.

47. When using scrubbers, recirculation of scrubbing water in combination with water treatment (sedimentation/filtration) should be applied. When soluble metals are involved also a precipitation step could be applied in the water treatment.

48. **Fabric filters** are the most effective dust collectors for dry gases. The particulate collection efficiency obtainable depends mainly on the aerosol characteristics, the filter medium, filter-rate and cleaning mode. It is possible to attain almost any collection efficiency that is needed to resolve specific emission problems. Since elevated heavy metal emissions generally occur in processes where the exhaust gas temperature exceeds 100°C - 150°C, the filter media have to be selected very carefully. There are filter media which are suited to withstand elevated temperatures. In some cases it may be necessary to have more than one type of dust recovery system to deal with a range of particle sizes.

49. To avoid transfer of pollution from air to water preference should be given to use fabric filters and dry electrostatic precipitators to remove particles from flue gas.

4.4 Prevention of Water Pollution

50. The volume of effluent sent for treatment should be minimised. Therefore, uncontaminated water, (e.g. from cooling systems), should not be discharged to the central treatment plant. Cooling systems should be designed and maintained so as to prevent contamination of the cooling water. Process water, polluted run off from the industrial area and drainwater from bulk and waste storage should be treated in a waste water treatment plant.

51. The wastewater treatment plant should at least consist of the following treatment steps:

- pre-separation,
- neutralisation/precipitation; and
- solid separation.

Sulphide precipitation to increase the removal efficiency and/or effluent polishing by sand filtration can be considered as additional options for waste water treatment.

52. When technically possible, all contaminated surface runoff should be collected and treated as waste process water.

53. When possible, purified water, after its treatment, should be re-used.

54. Table 1 lists some examples of possible causes of accidental discharges in metallurgical plants as well as measures which can be adopted in order to prevent, minimise or avoid them.

- Most spills can be prevented by careful design, use of the right equipment, and safe operating procedures.
- Operators and supervisory personnel should be trained in the proper methods of spill prevention and cleanup.
- Areas of a plant that are vulnerable to spills should be designed with containment systems to hold the discharge in the immediate area.
- The drain system should be designed so that rainwater is either bled or periodically pumped to a waste treatment facility when contaminants are detected.
- Good engineering practice dictates that storage tanks should be diked.
- Dikes may be simple earth structures for non-toxic materials, but concrete is preferred for containment of toxic materials.

- Because the potential for spillage is high in loading and unloading areas in a plant, special care should be taken to minimise pollution in these areas are properly diked and drained.
- Peripheral trenching covered with grating is also useful for collecting and disposing of spills that occur with tank truck and tank car operations.

55. The plant monitoring system should be designed to alert plant operating personnel when a spill occurs to enable them to take immediate corrective action.

5. WASTE MANAGEMENT AND THE PREVENTION OF SOIL POLLUTION

56. Any wastes from primary non-ferrous industrial plants should be treated following the alternatives which are described below in order of preference.

I Recycling at the same site where waste has been produced.

II Recycling in other site.

III Minimisation of its environmental impact, (e.g. volume reduction, inertisation, toxicity reduction), with final disposal preferably at the production site or at the nearest available site.

IV When wastes are not recyclable, and further treatment for minimising their effect is not possible, direct final disposal at the production site may be the best alternative.

V In cases III and IV, if a disposal area (e.g. for landfilling) is not available at the production site or near it, the wastes should be sent to other installations for final disposal. This is the least desirable solution to the problem, and it should be avoided if any one of the solutions described under headings I to IV is possible.

57. Waste reduction should be accomplished through:

- the development of a company waste-plan by the operator, including a waste management plan;
- improvement of the efficiency of the use and treatment of raw material.

58. The company waste-plan should, *inter alia*, comprise an inventory of the entire production process indicating possible waste and raw material saving measures.

6. ENERGY CONSERVATION

59. Energy saving should be accomplished through:

- the development of a company energy plan by the operator, including the introduction of an energy management plan;
- improvement of energy efficiency.

The company energy plan should, *inter alia*, comprise an inventory of the entire production process indicating possible energy saving measures.

7. IMPLEMENTATION REPORTS

60. The first progress report on the implementation of this Recommendation should be made to the appropriate OSPAR Working Group in 2000. Subsequent progress reports on implementation should be made on a four yearly basis until this Recommendation is fully implemented. These implementation reports should be submitted in accordance with the format at the Appendix.

APPENDIX

Implementation Report on compliance with OSPAR Recommendation 98/1 concerning Best Available Techniques and Best Environmental Practice for the Primary Non-Ferrous Metal Industry (Zinc, Copper, Lead and Nickel Works)

Country: [ ]

Reservation applies yes/no[1]

Is measure applicable in your country? yes/no[1]

If not applicable, then state why not (e.g. no relevant plant)

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Means of Implementation:

by legislation	by administrative action	by negotiated agreement
yes/no[1]	yes/no[1]	yes/no[1]

Please provide information on:

a. specific measures taken to give effect to this measure;

b. any special difficulties encountered, such as practical or legal problems, in the implementation of this measure;

c. the reasons for not having fully implemented this measure should be spelt out clearly and plans for full implementation should be reported.

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Contracting Parties should report on additional techniques which can achieve equal or better environmental protection, or which are more appropriate in certain geographical situations which are also acceptable, than those described in the Description of BAT for the Primary Production of Non-Ferrous Metals.

Please provide information concerning:

a. the development of company energy plans and the introduction of energy management plans;

b. applied and planned specific measures (if possible including typical performances);

c. the development of waste management plans.

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[1] Delete as appropriate

TABLE 1.

Potential Waste Discharges Caused by Accidents in Metallurgical Plants. Correction and Prevention

SOURCE	METHOD OF DETECTION	CORRECTION/PREVENTION
Process tank overflow: - Unattended water additions. - Leak of cooling water into solution from heat exchanger of cooling coil.	High-level alarms in floor collection systems to signal unusual discharges. Integrated floor spill treatment.	Provide proper floor construction for floor spill segregation and containment (curbs, trenches, pits). Provide treatment facilities for collected floor spill. Integrated floor spill treatment system. Use of spring-loaded valves for water additions. Provide automatic level controls for water additions.
Process solution leakage: - Tank rupture or leakage. - Pump, hose, pipe rupture or leakage, filtration, heat exchanger, etc. - Accidental opening of wrong valve	High-level alarms in floor collection systems to signal unusual discharges. Integrated floor spill treatment.	Provide proper floor construction for floor spill segregation and containment (curbs, trenches, pits). Provide treatment facilities for collected floor spill. Integrated floor spill treatment System.
Normal drippage from workpieces during transfer between process tasks.	Inspection.	Provide drainage pans between process tanks so that drippage returns to the tanks. Collect floor spillage. Integrated floor spill treatment.
Process solution entering cooling water heat exchanger leak.	Conductivity cell and bridge to actuate an alarm.	Use of the cooling water as rinse water in a process line where the contamination will be immediately evident.
Process solution entering steam condensate (heat exchanger or heating coil leak)	Conductivity cell and bridge to actuate an alarm.	Use conductivity controller to switch contaminated condensate to a waste collection and treatment system.
Spillage of chemicals when making additions to process tanks or spillage in the chemical storage area.	Make the solution maintenance man responsible for chemical additions.	Careful handling and segregation of chemical stores. Segregation and collection of all floor spillage. Integrated floor spill treatment.

OSPAR RECOMMENDATION 98/2 ON EMISSION AND DISCHARGE LIMIT VALUES FOR EXISTING ALUMINIUM ELECTROLYSIS PLANTS[4]

RECALLING Article 2(1) of the Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention");

RECALLING that the 1997/1998 Action Plan of Oslo and Paris Commissions calls for:

a. the adoption of further measures, including the application of best available techniques (BAT) and best environmental practice (BEP), for the reduction or elimination of inputs to the maritime area from the aluminium sector, and in considering this sector, attention should be given in particular to activities which result in inputs of hazardous substances (especially organohalogen substances) and to the reduction of such inputs, with the aim of their elimination;

b. consideration and development of measures to make significant reductions of anthropogenic inputs of the order of 50% or more between 1985 and 2000 from all sources of PAHs, which are of concern to the marine environment;

RECALLING PARCOM Recommendation 92/1 on Best Available Technology for Plants producing Anodes and for New Electrolysis Installations in the Primary Aluminium Industry;

RECALLING PARCOM Recommendation 94/1 on BAT for New Aluminium Electrolysis plants;

RECALLING PARCOM Recommendation 96/1 on Best Available Techniques and Best Environmental Practice for Existing Aluminium Electrolysis Plants;

RECALLING the description of Existing Techniques and Best Available Techniques in the Aluminium Electrolysis Industry which was published by the Oslo and Paris Commissions in 1997;

NOTING Council Directive 96/61/EC concerning integrated pollution prevention and control which addresses this sector;

RECOGNISING that PAHs are toxic, persistent and liable to bioaccumulate;

The Contracting Parties to the Convention for the Protection of the Marine Environment of the North-East Atlantic RECOMMEND:

1. DEFINITIONS

For the purpose of this Recommendation:

"Existing plant"	means plant for which the operation has been authorised before 24 July 1998.
"Emission limit value"	means value that specifies an emission level that should not be exceeded.
"Discharge limit value"	means value that specifies a discharge level that should not be exceeded.

4 Reservation from France.

"Target emission limit value"	means emission level which, on the basis of existing knowledge, should be achievable by existing plants in the future and should be considered as a goal, bearing in mind the definition of best available techniques (BAT) in Appendix 1 of the OSPAR Convention.

2. SCOPE

This Recommendation covers emissions and discharges from existing aluminium electrolysis plants, but does not apply to anode baking operations.

3. PROGRAMMES AND MEASURES

3.1 Emissions to air

3.1.1 Contracting Parties should achieve the annual average emission limit values in table 3.1 by 1 January 2007 for emissions to air (including stack gas and fugitive emissions) and, if possible, should aim to achieve them by 1 January 2005.

Table 3.1 Emission Limit Values

Plant/ Technology	Emission Limit Values (annual average in kg per tonne of aluminium produced)			
	F_{total} (as F)	HF (as F)	Dust	PAH (as BaP_{total})
Soederberg	1,0	0,5 [(1)]	2	0,015
Prebake	1,0	0,5 [(1)]	2 [(2)]	

3.1.2 The emission limit value for fluoride may be specified as total fluoride or as gaseous fluoride.

3.1.3 Contracting Parties should aim to achieve by 1 January 2010 for emissions to air (including stack gas and fugitive emissions) the target emission values in table 3.2.

Table 3.2 Target emission values

Plant/ Technology	Target emission limit values (annual average in kg per tonne of aluminium produced)			
	F_{total} (as F)	HF (as F)	Dust	PAH (as BaP_{total})
Prebake	0,6	0,4	1 [(2)]	
Soederberg without ventilation air scrubbers	0,6	0,4	1 [(2)]	0,01
Soederberg with ventilation air scrubbers	0,5	0,2	1	0,008

Notes to tables 3.1 and 3.2

Note (1)

Where it can be demonstrated that partition between total fluoride and gaseous fluoride differs from the values given at note (1) in table 3.1, then a value of 0,6 kg/tonne produced aluminium should not be exceeded for gaseous fluoride.

Note (2)

If the values given at note (2) in tables 3.1 and 3.2 are expressed as daily averages, a limit value of 5,0 kg per tonne aluminium produced should not be exceeded.

3.1.4 The target emission limit values for fluoride in table 3.2 may be specified as total fluoride or as gaseous fluoride.

3.2 Discharges to water

3.2.1 With respect to discharges of PAH (as Borneff 6[5]) to the water environment from Soederberg plants, Contracting Parties concerned should collaborate in preparing:

- a measuring programme for and intercalibration exercise between different Soederberg plants and;
- descriptions of technologies (including treatment facilities, relevant design criteria, flows) used in Soederberg plants for wet cleaning of pot gas and ventilation air.

3.2.2 Based upon the results of these activities, which should be available by 1 January 2000, the Commission will evaluate the need for and timing of an additional OSPAR measure concerning limit values with respect to discharges of PAH (as Borneff 6) to the water environment from Soederberg plants.

4. SAMPLING, ANALYSIS, AND MONITORING

4.1 General provisions

4.1.1 Emissions and discharges from each aluminium smelter should be monitored in terms of the limit values given in this Recommendation. Monitoring equipment should be calibrated and maintained. Records of this process should be retained. The reliability of instrumental monitoring should be documented.

4.1.2 The monitoring should be based on recognised international standards where such standards are available. In cases where no such standards are available, national standards or standards from other countries may be used.

4.1.3 Data on air and water flows should be based on measurements. The validity of the flow data used to calculate the emissions and discharges should be documented in cases where flow measurements are not carried out regularly as part of the monitoring programme.

5 Borneff 6: fluoranthene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indenol(1,2,3-cd)pyrene and benzo(g,h,i)perylene

4.1.4 Unless indicated differently, emissions should be reported as an annual average. The calculation methods used should be reported, as well as an assessment of the accuracy of the results.

4.2 Air

4.2.1 Stacks emitting cleaned pot gas should be monitored. Monitoring of only a proportion of stacks can be accepted if it is shown that the emissions are similar.

4.2.2 Ventilation air emissions should be monitored at pot rooms. Monitoring of ventilation air emissions should be documented to show that the results are reliable and representative of the total emissions from all pot rooms under all operating conditions. If monitored by sampling from roof openings or fans, a sufficient number of sampling points to obtain representative results should be used.

Fluoride

4.2.3 Emissions of fluoride in air may be measured by sampling and chemical analysis or by instrumental monitoring. It is optional whether fluoride emissions should be specified as total or gaseous fluoride. Continuous monitoring for HF should be used where appropriate.

PAH

4.2.4 The monitoring programme for emissions of PAH to air should include the following components:

1. phenanthrene
2. anthracene
3. fluoranthene
4. benzo(b)anthracene
5. chrysene
6. benzo(b)fluoranthene
7. benzo(k)fluoranthene
8. benzo(a)pyrene
9. indenol(1,2,3-cd)pyrene
10. benzo(g,h,i)perylene
11. dibenzo(a,h)anthracene

4.2.5 PAH emission levels should be expressed as benzo(a)pyrene (BaP) as an indicator component. BaP emission levels should be related to the emission levels of the 11 components by the use of correlation factors that will need to be established for each process, and to be reported to the competent national authority, in order to assess the total PAH load. Any change in processes will require recalculation of the correlation factors.

4.2.6 Emissions of PAHs in air should be measured by isokinetic sampling and chemical analysis of PAHs. PAH may be sampled in the particulate state only for low-temperature gases where the error introduced by not including vapour phase PAH is negligible.

Dust

4.2.7 Emissions of dust should be measured by isokinetic sampling or by instrumental monitoring. Continuous monitoring for dust should be used where appropriate.

4.3 Water

PAH

4.3.1 Discharges from Soederberg plants and prebake plants where wet scrubbing is used, should be monitored for the Borneff 6 PAH components.

The concentration of these PAH components should be monitored by sampling at each outlet to the receiving waters.

5. REVIEW

5.1. A review of the target emission values should be undertaken in the year 2001 based on the results of the measurement programme referred to in paragraph 3.2.1 and information about emission levels of PAHs to air.

5.2 A further review of this Recommendation should be undertaken in the year 2006 with particular reference to the values in table 3.2.

6. IMPLEMENTATION REPORTS

6.1 Reports on the implementation of this Recommendation should be submitted to the appropriate OSPAR working group in the year 2006 for existing plants. When reporting on implementation, the format as set out in Appendices I and II should be used to the extent possible.

APPENDIX I

Implementation Report on compliance with OSPAR Recommendation 98/2 on Emission and Discharge Limit Values for Existing Aluminium Electrolysis Plants

Country:	
Reservation applies:	yes/no[1]
Is measure applicable in your country?	yes/no[1]

If not applicable, then state why not (e.g. no relevant plant)

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Means of Implementation:

by legislation	by administrative action	by negotiated agreement
yes/no[1]	yes/no[1]	yes/no[1]

Please provide information on:

a. specific measures taken to give effect to this measure;

b. any special difficulties encountered, such as practical or legal problems, in the implementation of this measure;

c. the reasons for not having fully implemented this measure should be spelt out clearly and plans for full implementation should be reported.

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[1] Delete as appropriate

APPENDIX II

Implementation Report on OSPAR Recommendation 98/2 on Emission and Discharge Limit Values for Existing Aluminium Electrolysis Plants

REPORTING ON EFFECTIVENESS

Please report any information on effectiveness that you see relevant, and if possible give the information on individual plants as indicated below, if this data is public information in your country

1. EMISSIONS TO AIR FROM SOEDERBERG PLANTS

	F_t (as F) kg/tonne aluminium	**Methods used for sampling and analysis and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

	HF(as F) kg/tonne aluminium	**Methods used for sampling and analysis and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

	Dust kg/tonne aluminium	**Methods used for sampling and analysis and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

	PAH (as BaP) kg/tonne aluminium	**Methods used for sampling and analysis, including correlation factors, and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

Please indicate in the following table the load emitted to air for individual PAH-components for each plant

PAH component	**Plant 1**	**Plant 2**	**Plant 3**	**Plant 4**	**Plant 5**	**Plant 6**	**Plant 7**
1. Phenanthrene							
2. Anthracene							
3. Fluoranthene							
4. Benzo(b) anthracene							
5. Chrysene							
6. Benzo(b) fluroanthene							
7. Benzo(k) fluroanthene							
8. Benzo(a) pyrene							
9. Indenol (1,2,3-cd) pyrene							
10.Benzo(g,h,i) perylene							
11. Dibenzo(a,h) anthracene							

2. EMISSION TO AIR FROM PREBAKE PLANTS

	F_t (as F) kg/tonne aluminium	**Methods used for sampling and analysis and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

	HF (as F) kg/tonne aluminium	**Methods used for sampling and analysis and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

	Dust kg/tonne aluminium	**Methods used for sampling and analysis and the sampling frequency**
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

3. DISCHARGES TO WATER

	PAH (as Borneff 6) kg/tonne aluminium	Methods used for sampling and analysis and the sampling frequency
Plant 1		
Plant 2		
Plant 3		
Plant 4		
Plant 5		
Plant 6		
Plant 7		

REMARKS

Information should also be provided about any special difficulties encountered in the implementation of OSPAR Recommendation 98/2.

OSPAR GUIDELINES FOR THE MANAGEMENT OF DREDGED MATERIAL

(Reference Number: 1998-20)

OSPAR GUIDELINES FOR THE MANAGEMENT OF DREDGED MATERIAL

PREFACE

These guidelines were adopted at the 1998 Ministerial Meeting of the OSPAR Commission. Contracting Parties are obliged to take these guidelines into consideration in their authorisation or regulation procedures for dredged material. It will, however, be implicit that the detailed procedures described in the guidelines will not be applicable in all national or local circumstances.

1. INTRODUCTION

1.1 Dredging is essential to maintain navigation in ports and harbours as well as for the development of port facilities. Much of the material removed during these necessary activities requires disposal at sea. Most of the material dredged from within the OSPAR maritime area is, by its nature, either uncontaminated or only slightly contaminated by human activity (i.e. at, or close to, natural background levels). However, a smaller proportion of dredged material is contaminated to an extent that major environmental constraints need to be applied when depositing these sediments.

1.2 Within the framework of the Convention for the Protection of the Marine Environment of the North-East Atlantic (hereinafter called the 1992 OSPAR Convention), dredged materials have been listed in Article 3.2 of Annex II as being permitted to be dumped at sea.

2. SCOPE

2.1 The guidelines are designed to assist Contracting Parties in the management of dredged material in ways that will prevent and eliminate pollution and thus protect the maritime area. In accordance with the mandate of the OSPAR Commission, the guidelines specifically address the disposal of dredged material by dumping in the maritime area.

2.2 It is recognised that both removal and disposal of dredged sediments may cause harm to the marine environment, but removal by dredging is not covered by the 1992 OSPAR Convention. Nevertheless, Contracting Parties are encouraged to exercise control over both dredging operations, including sidecast and agitation dredging practices and disposal operations using a Best Environmental Practice (BEP) approach designed to minimise both the quantity of material that has to be dredged and the impact of the dredging and disposal activities in the maritime area - see Technical Annex III. Advice on environmentally acceptable dredging techniques is available from a number of international organisations e.g. the Permanent International Association of Navigation Congresses (PIANC).

2.3 In the context of these guidelines, dredged materials are deemed to be sediments or rocks with associated water, organic matter etc. removed from areas that are normally or regularly covered by water, using dredging or other excavation equipment.

2.4 The terms "dumping" and "disposal" are used in accordance with Article I (f) and (g) of the 1992 OSPAR Convention.

3. REQUIREMENTS OF THE 1992 OSPAR CONVENTION[6]

3.1 Article 2.1a requires Contracting Parties to take all possible steps to prevent and eliminate pollution and to take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected.

3.2 Article 4 requires Contracting Parties to take all possible steps to prevent and eliminate pollution by dumping or incineration of wastes or other matter in accordance with the provisions of the 1992 OSPAR Convention, in particular as provided for in Annex II.

3.3 With regard to the dumping of wastes or other matter at sea that are permitted under Article 3(2) of Annex II of the 1992 OSPAR Convention, Article 4 (1)(a) of Annex II requires Contracting Parties to ensure that no such materials are dumped without authorisation or regulation by their competent authorities. In addition, Article 4 (1)(b) of Annex II requires Contracting Parties to ensure that such authorisation or regulation is in accordance with the relevant applicable criteria, guidelines and procedures adopted by the Commission.

3.4 Furthermore, Article 4 (3) of Annex II requires Contracting Parties to keep records and report to the Commission on the nature and quantities of wastes or other matter dumped at sea in accordance with Article 4(1) of Annex II and the locations and methods of dumping used. To this end, OSPAR has agreed on reporting formats for the submission of data on wastes dumped at sea.

4. EVALUATION OF NEED FOR DREDGING AND DISPOSAL

4.1 There are a number of dredging activities which may give rise to the need to dispose of sediments. These include:

a. Capital dredging - for navigation, to enlarge or deepen existing channel and port areas or to create new ones; and for engineering purposes; e.g. trenches for pipes, cables and immersed tube tunnels, removal of material unsuitable for foundations, removal of overburden for aggregate extraction;

b. Maintenance dredging - to ensure that channels, berths or construction works are maintained at their designed dimensions (i.e. counteracting sedimentation and changes in morphology); and

c. Clean-up dredging - deliberate removal of contaminated material from the marine environment for human health and environmental protection purposes.

[6] All Article or Annex references mentioned in this chapter refer to the 1992 OSPAR Convention.

4.2 Before beginning a full assessment of the material and the disposal options the question should be asked "Is dredging necessary?" In the event of a subsequent full assessment indicating no acceptable options for disposal it will be necessary to re-address this question in a broader context.

4.3 In addition, attention needs to be given to ensuring that the quantities of material needing to be dredged and disposed of at sea are minimised as far as is practicable. This is dealt with further in Technical Annex III under 'Optimise the disposed quantities'.

5. DREDGED MATERIAL CHARACTERISATION

5.1 Guidance on the selection of determinants and methods of contaminant analysis, together with procedures to be used for normalisation and quality assurance purposes, will be found in the Technical Annexes. It is envisaged that developments in biological testing techniques might eventually provide sufficient information to assess the potential impact of the contaminants in the material, so that less reliance would need to be placed on chemical testing.

Exemptions from detailed characterisation

5.2 Dredged material may be exempted from the testing referred to in paragraphs 5.4 to 5.9 of these Guidelines (but note that the information listed in paragraph 5.3 below will still be required) if any of the criteria below are met:

a. it is composed of previously undisturbed geological material; or

b. it is composed almost exclusively of sand, gravel or rock; or

c. in the absence of appreciable pollution sources, which should be supported by existing local information so as to provide reasonable assurance that the dredged material has not been contaminated, the quantity of dredged material from single dredging operations does not exceed 10 000 tonnes per year.

Dredged material that does not meet one of these requirements will need further stepwise characterisation to assess its potential impact (i.e. see paragraphs 5.3-5.9).

Physical characterisation

5.3 The following information is required:

a. the amount of material;

b. anticipated or actual loading rate of material at the disposal site;

c. sediment characteristics (i.e. clay/silt/sand/gravel/boulder) on the basis of visual determination.

Evaluation of the physical characteristics of sediments for disposal is necessary to determine potential impacts and the need for subsequent chemical and/or biological testing (cf. Technical Annex I for further guidance).

Chemical characterisation

5.4 Sufficient information for chemical characterisation may be available from existing sources. In such cases new measurements may not be required of the potential impact of similar material in the vicinity, provided that this information is still reliable and has been obtained within the last 5 years. Details of the substances recommended to be determined are listed in Technical Annex I.

5.5 Considerations for additional chemical characterisation of dredged material are as follows:

a. major geochemical characteristics of the sediment including redox status;
b. potential routes by which contaminants could reasonably have been introduced to the sediments;
c. industrial and municipal waste discharges (past and present);
d. probability of contamination from agricultural and urban surface runoff;
e. spills of contaminants in the area to be dredged;
f. source and prior use of dredged materials (e.g., beach nourishment); and
g. natural deposits of minerals and other natural substances.

5.6 Further information may also be useful in interpreting the results of chemical testing (cf. Technical Annex I).

Biological characterisation

5.7 If the potential impacts of the dredged material to be dumped cannot be adequately assessed on the basis of the chemical and physical characterisation and available biological information, biological testing should be conducted. Further detailed guidance on biological testing is provided in Technical Annex I.

5.8 It is important to ascertain whether adequate scientific information exists on the characteristics and composition of the material to be dumped and on the potential impacts on marine life and human health. In this context, it is important to consider information about species known to occur in the area of the disposal site and the effects of the material to be dumped and of its constituents on organisms.

5.9 Biological tests should incorporate species that are considered appropriately sensitive and representative and should determine, where appropriate.

a. acute toxicity;
b. chronic toxicity;
c. the potential for bioaccumulation; and
d. the potential for tainting.

Action List

5.10 The Action List is used as a screening mechanism for assessing properties and constituents of dredged material with a set of criteria for specific substances. It should be used for dredged material management decisions, including the identification and development of source control measures as described in paragraphs 6.1 to 6.3 below. The criteria should reflect experience gained relating to the potential effects on human health or the marine environment.

5.11 Action List levels should be developed on a national or regional basis and might be set on the basis of concentration limits, biological responses, environmental quality standards, flux considerations or other reference values. They should be derived from studies of sediments that have similar geochemical properties to those from the ones to be dredged and/or to those of the receiving system. Thus, depending upon natural variation in sediment geochemistry, it may be necessary to develop individual sets of criteria for each area in which dredging or disposal is conducted. With a view to evaluating the possibilities for harmonising or consolidating the criteria referred to above, Contracting Parties are requested to inform the OSPAR Commission through SEBA of the criteria adopted, as well as the scientific basis for the development and refinement of these criteria.

5.12 An Action List may include an upper and lower level giving these possible actions:

a. material which contains specified contaminants or which causes e.g. biological responses, in excess of the relevant upper levels should generally be considered unsuitable for disposal at sea;

b. material which contains specified contaminants or which causes e.g. biological responses, below the relevant lower levels should generally be considered of little environmental concern for disposal at sea; and

c. material of intermediate quality should require more detailed assessment before suitability for disposal at sea can be determined.

5.13 If dredged material is disposed of at sea when one or more criteria exceed the upper level, a Contracting Party should:

a. where appropriate, identify and develop source control measures with a view to meeting the criteria - see paragraphs 6.1 - 6.2 below; and

b. utilise disposal management techniques, including the use of containment or treatment methods, to mitigate the impact of the dumping operation on the marine environment see paragraphs 8.3 - 8.4 below; and

c. report the fact to the Secretariat, including the reason for permitting the disposal, in accordance with the requirements of section 1b (i) of the format for the Annual Reporting of Dumping Permits Issued.

6. CONTAMINANT SOURCE EVALUATION AND CONTROL

6.1 Contamination of estuarine and coastal marine sediments both as a consequence of historical and present day inputs presents a continuing problem for the management of dredged material. High priority should be given to the identification of sources, reduction and prevention of further contamination of sediments and should address both point and diffuse sources. Successful implementation of prevention strategies will require collaboration among national agencies with responsibility for the control of point and diffuse sources of contamination.

6.2 In developing and implementing the source control strategy, appropriate agencies should take into account:

a. the continuing need for dredging;

b. the hazards posed by contaminants and the relative contributions of the individual sources to these hazards;

c. existing source control programmes and other regulations or legal requirements;

d. the criteria for best available techniques (BAT) and best environmental practice (BEP) as defined in Appendix 1 of the 1992 OSPAR Convention, *inter alia*, as regards the technical and economic feasibility;

e. the evaluation of the effectiveness of measures taken; and

f. consequences of not implementing contaminant reduction.

6.3 In cases where there has been historical contamination or where control measures are not fully effective in reducing contamination to acceptable levels, disposal management techniques, including the use of containment or treatment methods may be required - see paragraphs 8.3 - 8.4 below.

7. DREDGED MATERIAL SAMPLING

Sampling for the purpose of issuing a dumping permit

7.1 Dredged material that is not exempted under paragraph 5.2 will require analysis and testing (cf. Technical Annex I) to obtain sufficient information for permitting purposes. Judgement and knowledge of local conditions will be essential when deciding what information is relevant to any particular operation.

7.2 A survey of the area to be dredged should be carried out. The distribution and depth of sampling should reflect the size and depth of the area to be dredged, the amount to be dredged and the expected variability in the horizontal and vertical distribution of contaminants. Core samples should be taken where the depth of dredging and expected vertical distribution of contaminants suggest that this is warranted. In other circumstances, grab sampling will usually be sufficient. Sampling from dumping vessels or barges is not advisable for permitting purposes.

7.3 The following table gives an indication of the number of separate sampling stations required to obtain representative results, assuming a reasonably uniform sediment in the area to be dredged:

Amount dredged (m3)	Number of stations
Up to 25 000	3
25 000 - 100 000	4 - 6
100 000 - 500 000	7 - 15
500 000 - 2 000 000	16 - 30
>2 000 000	extra 10 per million m3

The number of sample stations can also be determined on the basis of the area to be dredged. The number of sample stations should take account of the exchange characteristics of the area; more samples may be required in enclosed and semi-enclosed areas and less in open areas.

7.4 Normally, the samples from each sampling station should be analysed separately. However, if the sediment is clearly homogenous with respect to sediment texture, it may be possible to analyse composite samples from two or more adjacent sampling stations at a time, providing care is taken to ensure that the results allow derivation of valid mean contaminant values. The original individual samples should, however, be retained until the permitting procedure has been completed, in case further analyses are necessary.

Frequency of sampling

7.5 If the results of the analyses indicate that the material is essentially 'clean', sampling in the same area need not be repeated more frequently than once every 3 years, provided that there is no indication that the quality of the material has deteriorated.

7.6 It may be possible, following assessment of the results of an initial survey, to reduce either the number of sampling stations or the number of determinants and still provide sufficient information for permitting purposes. If a reduced sampling programme does not confirm the earlier analyses, the full survey should be repeated. If the list of determinants is reduced, further analysis of the complete list of determinants is advisable every 5 years.

7.7 In areas where there is a tendency for sediments to exhibit high levels of contamination, analysis of all the relevant determinants should be frequent and linked to the permit renewal procedure.

8. EVALUATION OF DISPOSAL OPTIONS

8.1 The results of the physical/chemical/biological characterisation will indicate whether the dredged material, in principle, is suitable for disposal at sea. Where sea disposal is identified as an acceptable option, it is nonetheless important, recognising the potential value of dredged material as a resource, to consider the availability of beneficial uses.

Beneficial Uses

8.2 There is a wide variety of beneficial uses depending on the physical and chemical characteristics of the material. Generally, a characterisation carried out in accordance with these guidelines will be sufficient to match a material to possible uses such as:

a. <u>Engineered</u> uses - land creation and improvement, beach nourishment, offshore berms, capping material and fill;

b. <u>Agricultural and product</u> uses - aquaculture, construction material, liners; and

c. <u>Environmental enhancement</u> - restoration and establishment of wetlands, terrestrial habitats, nesting islands, and fisheries.

The technical aspects of beneficial uses are well-established and described in the literature - see the references section.

Options for material for which criteria exceed the upper level

8.3 Where the characteristics of' the dredged material are such that normal sea disposal would not meet the requirements of the 1992 OSPAR Convention, treatment or other management options should be considered. These options can be used to reduce or control impacts to a level that will not constitute an unacceptable risk to human health, or harm living resources, damage amenities or interfere with legitimate uses of the sea.

8.4 Treatment, such as separation of contaminated fractions, may make the material suitable for a beneficial use and should be considered before opting for sea disposal. Disposal management techniques may include placement on or burial in the sea floor followed by clean sediment capping, utilisation of geochemical interactions and transformations of substances in dredged material when combined with sea water or bottom sediment, selection of special sites such as abiotic zones, or methods of containing dredged material in a stable manner. Advice on dealing with contaminated dredged material is available from PIANC - see references.

9. SEA DISPOSAL SITE SELECTION

9.1 The selection of a site for sea disposal involves considerations of an environmental nature and also economic and operational feasibility. Site selection should try to ensure that the disposal of dredged material does not interfere with, or devalue, legitimate commercial and economic uses of the marine environment nor produce undesirable effects on vulnerable marine ecosystems.

9.2 For the evaluation of a sea disposal site information should be obtained on the following, as appropriate:

a. the physical, chemical and biological characteristics of the seabed (e.g., topography, redox status, benthic biota);

b. the physical, chemical and biological characteristics of the water column (e.g., hydrodynamics, dissolved oxygen, pelagic species); and

c. proximity to:

   (i) areas of natural beauty or significant cultural or historical importance;

   (ii) areas of specific scientific or biological importance;

   (iii) recreational areas;

   (iv) subsistence, commercial and sport fishing areas;

   (v) spawning, recruitment and nursery areas;

   (vi) migration routes of marine organisms;

   (vii) shipping lanes;

   (viii) military exercise zones;

   (ix) engineering uses of the sea such as undersea cables, pipelines, etc.

Such information can be obtained from existing sources, complemented by field work where necessary.

9.3 The information on the characteristics of the sea disposal site referred to above is required to determine the probable fate and effects of the dumped material. The physical conditions in the vicinity of the sea disposal site will determine the transport and fate of the dredged material. The physico-chemical conditions can be used to assess the mobility and bioavailability of the chemical constituents of the material. The nature and distribution of the biological community and the proximity of the site of sea disposal to marine resources and amenities will, in turn, define the nature of the effects that are to be expected. Careful evaluation will allow determination of environmental processes that may dominate the transport of material away from the sea disposal site. The influence of these processes may be reduced through the imposition of permit conditions.

9.5 Information from baseline and monitoring studies at already established dumping sites will be important in the evaluation of any new dumping activity at the same site or nearby.

9.6 The use of open-sea sites at distant offshore locations is seldom an environmentally desirable solution to the prevention of marine pollution by contaminated dredged material.

10. ASSESSMENT OF POTENTIAL EFFECTS

General

10.1 Assessment of potential effects should lead to a concise statement of the expected consequences of the disposal option (i.e., the Impact Hypothesis). Its purpose is to provide a basis for deciding whether to approve or reject the proposed disposal option and for defining environmental monitoring requirements.

10.2 This assessment should integrate information on the characteristics of the dredged material and the proposed disposal site conditions. It should comprise a summary of the potential effects on human health, living resources, amenities and other legitimate uses of the sea and should define the nature, temporal and spatial scales and duration of expected impacts based on reasonably pessimistic assumptions.

10.3 In order to develop the hypothesis, it may be necessary to conduct a baseline survey which describes not only the environmental characteristics, but also the variability of the environment. It may be helpful to develop sediment transport, hydrodynamic and other models, to determine possible effects of disposal.

10.4 For a retentive site, where the material deposited will remain within the vicinity of the site, the assessment should delineate the area that will be substantially altered by the presence of the deposited material and what the severity of these alterations might be. At the extreme, this may include an assumption that the immediate receiving area is entirely smothered. In such a case, the likely timescale of recovery or re-colonisation should be projected after disposal operations have been completed as well as the likelihood that re-colonisation will be similar to, or different from, the existing benthic community structure. The assessment should specify the likelihood and scale of residual impacts outside the primary zone.

10.5 In the case of a dispersive site, the assessment should include a definition of the area likely to be altered in the shorter term by the proposed disposal operation (i.e., the near-field) and the severity of associated changes in that immediate receiving environment. It should also specify the likely extent of long-term transport of material from this area and what this flux represents in relation to existing transport fluxes in the area, thereby permitting a statement regarding the likely scale and severity of effects in the long-term and far-field.

Nature of the impact

10.6 All dredged materials have a significant physical impact at the point of disposal. This impact includes covering of the seabed and local increases in suspended solids levels. Physical impact may also result from the subsequent transport, particularly of the finer fractions, by wave and tidal action and residual current movements.

10.7 Biological consequences of these physical impacts include smothering of benthic organisms in the dumping area. In comparatively rare circumstances, the physical impacts can also interfere with the migration of fish (e.g. the impact of high levels of turbidity on salmonids in estuarine areas) or crustacea (e.g. if deposition occurs in the coastal migration path of crabs).

10.8 The toxicological and bioaccumulation effects of' dredged material constituents should be assessed. Disposal of sediments with low levels of contamination is not devoid of environmental risk and requires consideration of the fate and effects of dredged material and its constituents. Substances in dredged material may undergo physical, chemical and biochemical changes when entering the marine environment and these changes should be considered in the light of the eventual fate and potential effects of the material. It should also be taken into account that disposal at sea of certain substances may disrupt the sensory capabilities of the fish and may mask natural characteristics of sea water or tributary streams, thus confusing migratory species which e.g. fail to find spawning grounds or food.

10.9 In relatively enclosed waters, such as some estuarine and fjordic situations, sediments with a high chemical or biological oxygen demand (e.g. organic carbon-rich) could adversely affect the oxygen regime of the receiving environment while sediments with high levels of nutrients could significantly affect the nutrient flux.

10.10 An important consequence of the physical presence of dredged material disposal activities is interference with fishery activities and in some instances with navigation and recreation. These problems can be aggravated if the sediment characteristics of the dredged material are very dissimilar to that of the ambient sediment or if the dredged material is contaminated with bulky harbour debris such as wooden beams, scrap metal, pieces of cable etc.

10.11 Particular attention should be given to dredged material containing significant amounts of oil or other substances that have a tendency to float following re-suspension in the water column. Such materials should not be dumped in a manner or at a location which may lead to interference with fishing, shipping, amenities or other beneficial uses of the marine environment.

11. PERMIT ISSUE

11.1 If sea disposal is the selected option, then a permit authorising sea disposal must be issued in advance. In granting a permit, the immediate impact of dredged material occurring within the boundaries of the disposal site such as alterations to the local, physical, chemical and biological environment is accepted by the permitting authority. Notwithstanding these consequences, the conditions under which a permit for sea disposal is issued should be such that environmental change beyond the boundaries of the disposal site are as far below the limits of allowable environmental change as practicable. The disposal operation should be permitted subject to conditions which further ensure that environmental disturbance and detriment are minimised and benefits maximised.

11.2 The permit is an important tool for managing sea disposal of dredged material and will contain the terms and conditions under which sea disposal may take place as well as provide a framework for assessing and ensuring compliance.

11.3 Permit conditions should be drafted in plain and unambiguous language and will be designed to ensure that:

a. only those materials which have been characterised and found acceptable for sea disposal, based on the impact assessment, are dumped;

b. the material is disposed of at the selected disposal site;

c. any necessary disposal management techniques identified during the impact analysis are carried out; and

d. any monitoring requirements are fulfilled and the results reported to the permitting authority.

Management of the Disposal Operation

11.4 Where appropriate, disposal vessels should be equipped with accurate positioning systems. Disposal vessels and operations should be inspected regularly to ensure that the conditions of the disposal permit are being complied with and that the crew is aware of their responsibilities under the permit. Ships' records and automatic monitoring and display devices (e.g. black-boxes), where these have been fitted, should be inspected to ensure that disposal is taking place at the specified disposal site.

11.5 This section deals with management techniques to minimise the <u>physical</u> effects of dredged material disposal. The key to management lies in careful site selection and an assessment of the potential for conflict with other interests and activities. In addition, appropriate methods of dredging and of disposal should be chosen in order to minimise the environmental effects. Guidance is given in Technical Annex III.

11.6 In most cases, blanketing of a comparatively small area of seabed is considered to be an acceptable environmental consequence of disposal. To avoid excessive degradation of the seabed as a whole, the number of sites should be limited as far as possible and each site should be used to the maximum extent that will not interfere with navigation.

11.7 Effects can be minimised by ensuring that, as far as possible, the dredged material and the sediments in the receiving area are similar. Locally, impacts may also be reduced if the deposition area is subject to natural physical disturbance. In areas where natural dispersion is low or unlikely to be significant and where reasonably clean, finer-grained dredged material is concerned, it may be appropriate to use a deliberately dispersive disposal strategy to prevent or reduce blanketing, particularly of a smaller site.

11.8 The rate of deposition of dredged material can be an important consideration since it will often have a strong influence on the impacts at the disposal site. It may therefore need to be controlled to ensure that the environmental management objectives for the site are not exceeded.

11.9 The infilling of depressions, deliberate capping or other contained methods of disposal of dredged material deposits may be appropriate in certain circumstances to avoid interference with fishing or other legitimate activities.

11.10 Temporal restrictions on dumping activities may be appropriate e.g. tidal and/or seasonal restrictions to prevent interference with migration, spawning or seasonal fishing activity. Silt screens have been used to reduce the impact of suspended solids levels outside working areas in estuaries in order to mitigate the impact of disposal on migratory fish. However, these have proved hard to manage effectively.

12. MONITORING

12.1 Monitoring in relation to disposal of dredged material is defined as measurements of compliance with permit requirements and of the condition and changes in condition of the receiving area to assess the Impact Hypothesis upon which the issue of a disposal permit was approved.

12.2 The effects of dredged material disposal are likely to be similar in many areas, and it would be very difficult to justify (on scientific or economic grounds) monitoring all sites, particularly those receiving small quantities of dredged material. It is therefore more appropriate, and cost effective, to concentrate on detailed investigations at a few carefully chosen sites (e.g. those subject to large inputs of dredged material) to obtain a better understanding of processes and effects.

12.3 It may usually be assumed that suitable specifications of existing (pre-disposal) conditions in the receiving area are already contained in the application for disposal

12.4 The impact Hypothesis forms the basis for defining the monitoring programme. The measurement programme should be designed to ascertain that changes in the receiving environment are within those predicted. In designing a monitoring programme the following questions must be answered:

a. what testable hypotheses can be derived from the Impact Hypothesis?

b. what measurements (e.g. type, location, frequency, performance requirements) are required to test these hypotheses?

c. what should be the temporal and spatial scale of measurements?

d. how should the data be managed and interpreted?

12.5 The permitting authority is encouraged to take account of relevant research information in the design and modification of monitoring programmes. Measurements should be designed to determine two things:

a. whether the zone of impact differs from that projected; and

b. whether the extent of change protected outside the zone of impact is within the scale predicted.

The first of these questions can be answered by designing a sequence of measurements in space and time that circumscribe the projected zone of impact to ensure that the projected spatial scale of change is not exceeded. The second question can be answered by the acquisition of measurements that provide information on the extent of change that occurs outside the zone of impact after the disposal operation. Frequently, this latter suite of measurements will only be able to be based on a null hypothesis - that no significant change can be detected.

Feedback

12.6 Information gained from field monitoring, (or other related research studies) can be used to:

a. modify or terminate the field monitoring programme;

b. modify or revoke the permit; and

c. refine the basis on which applications to dump dredged material at sea are assessed.

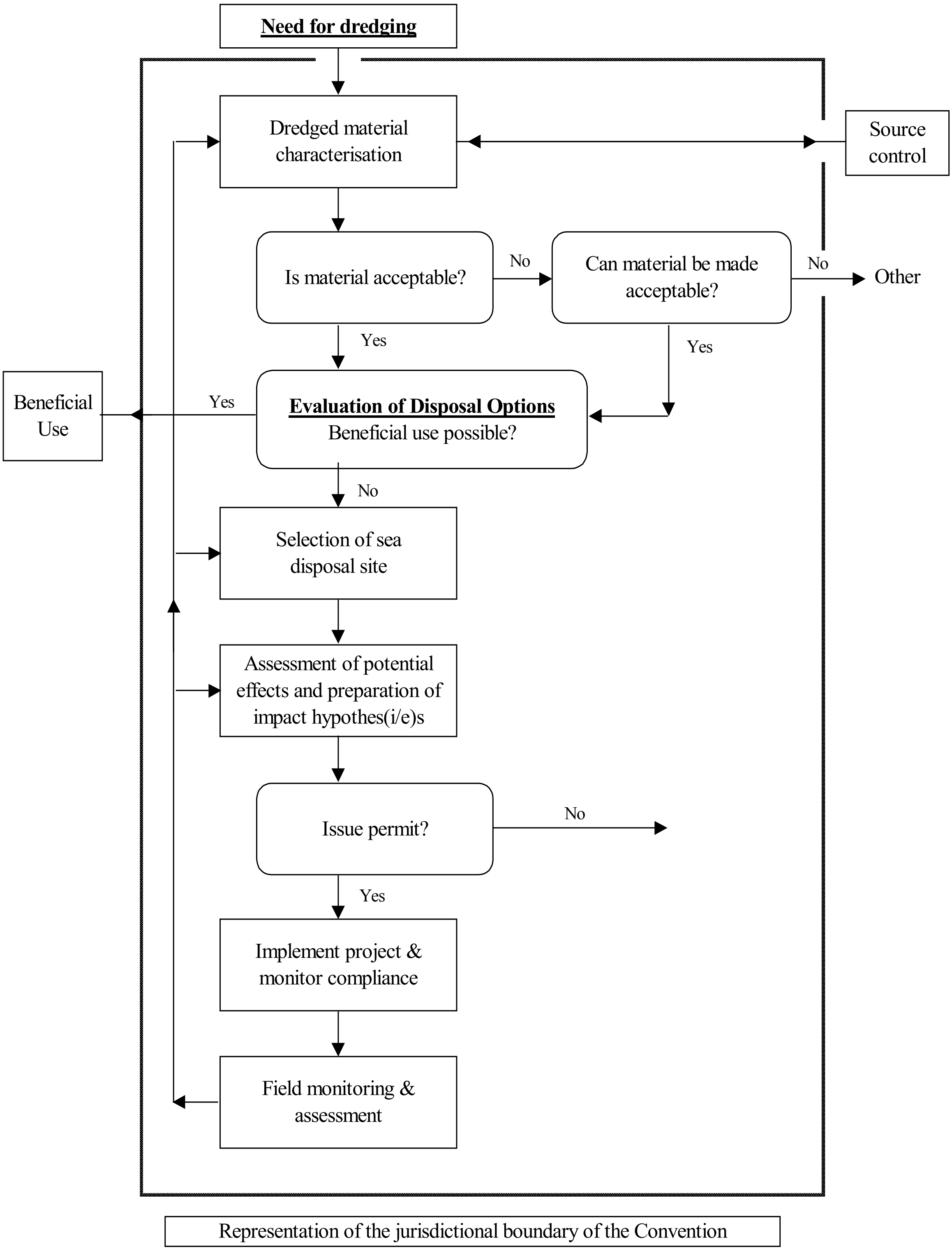
12.7 Concise statements of monitoring activities should be prepared. Reports should detail the measurements made, results obtained and how these data relate to the monitoring objectives. The frequency of reporting will depend upon the scale of disposal activity and the intensity of monitoring.

13. REPORTING

13.1 Reporting of permits issued and amounts of dredged material, dumped together with the associated contaminants, is required according to the 1992 OSPAR Convention - see paragraph 3.5 above. The characterisation process is designed to provide information for permitting purposes. However, it will also provide some information on the contribution of dredged material to total inputs and, at the present time, it is considered the only approach available for this purpose. It is assumed that materials exempted from analysis represent insignificant inputs of contaminants and therefore it is not necessary to calculate or report contaminant loads. See paragraph 3.5 for the basis of this reporting requirement.

13.2 Contracting Parties should also inform the Secretariat of their monitoring activities and submit reports when they are available.

FLOW DIAGRAM



BACKGROUND INFORMATION AND SUPPLEMENTARY LITERATURE TO THE OSPAR GUIDELINES FOR THE MANAGEMENT OF DREDGED MATERIAL

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TECHNICAL ANNEX I

ANALYTICAL REQUIREMENTS FOR DREDGED MATERIAL ASSESSMENT

1. This Technical Annex covers the analytical requirements necessary to implement paragraphs 5.4 - 5.9 of the OSPAR Guidelines for the Management of Dredged Material.

2. A tiered approach to testing is recommended. At each tier it will be necessary to determine whether sufficient information exists to allow a management decision to be taken or whether further testing is required.

3. As a preliminary to the tiered testing scheme, information required under section 5.3 of the Guidelines will be available. In the absence of appreciable pollution sources and if the visual determination of sediment characteristics leads to the conclusion that the dredged material meets one of the exemption criteria under paragraph 5.2 of the Guidelines, then the material will not require further testing. However, if all or part of the dredged material is being considered for beneficial uses, then it will usually be necessary, in order to evaluate these uses, to determine at least some of the physical properties of the material indicated in Tier I.

4. The sequence of tiers is as follows:

   - assessment of physical properties
   - assessment of chemical properties
   - assessment of biological properties and effects

A pool of supplementary information, determined by local circumstances may be used to augment each tier (cf. section 5.5 of the Guidelines).

5. At each stage of the assessment procedure account must be taken of the method of analysis. Analysis should be carried out on the whole sediment (< 2mm) or in a fine-grained fraction. If analysis is carried out in a fine-grained fraction, the results should be appropriately converted to whole sediment (< 2 mm) concentrations for establishing total loads of the dredged material. Additional information (e.g. as regards storage and pre-treatment of samples, analytical procedures, analytical quality assurance) can be obtained in the JAMP Guidelines for Monitoring Contaminants in Sediments.

6. The physical composition of samples, and therefore the chemical and biological properties, can be strongly influenced by the choice of sampling sites, the method of sampling and sampling handling. These possible influences should be taken into account when evaluating data.

TIER I: PHYSICAL PROPERTIES

Physical analyses are important because they help to indicate how the sediment may behave during dredging and disposal operations and indicate the need for subsequent chemical and/or biological testing. In addition to the visual determination of sediment characteristics required in section 5.3 of the Guidelines, it is strongly recommended that the following determinations be carried out:

Determinant	Indicating
• grain size (% sand, silt, clay) • percent solids (dry matter)	• Cohesiveness, settling velocity/resuspension potential, contaminant accumulation potential
• density/specific gravity	• Consolidation of placed material, volume *in situ* vs. after deposit
• organic matter (as total organic carbon)	• Potential accumulation of organic associated contaminants

When dredged material is being considered for beneficial uses, it will also usually be necessary to have available details of the engineering properties of the material e.g. permeability, settling characteristics, plasticity and mineralogy.

TIER II: CHEMICAL PROPERTIES

The following trace metals should be determined in all cases:

Cadmium (Cd)	Copper (Cu)	Mercury (Hg)	Zinc (Zn)
Chromium (Cr)	Lead (Pb)	Nickel (Ni)	

The following organic/organo-metallic compounds should be determined:

- Polychlorinated biphenyl (PCB) congeners - IUPAC nos. 28, 52, 101, 118, 138, 153 and 180.
- Polycyclic aromatic hydrocarbons (PAHs)
- Tri-Butyl Tin compounds and their degradation products

However, the determination of PCBs, PAHs and Tri-Butyl Tin compounds and its degradation products will not be necessary when:

a) sufficient information from previous investigations indicating the absence of contamination is available (cf. §§ 7.5 - 7.7 in the OSPAR Guidelines for the Management of dredged Material); or

b) - there are no known significant sources (point or diffuse) of contamination or historic inputs; and
   - the sediments are predominantly coarse; and
   - the content of total organic carbon is low.

When PCB analyses are undertaken, information on each of the congeners on the ICES primary list should be reported to the Commission.

Based upon local information of sources of contamination (point sources or diffuse sources) or historic inputs, other determinants may require analysis, for instance:

arsenic	other chlorobiphenyls[7]	organophosphorus pesticides	petroleum hydrocarbons
	organochlorine pesticides	other organotin compounds	Polychlorinated dibenzodioxins (PCDDs)/polychlorinated dibenzofurans (PCDFs)
	other anti-fouling agents		

In deciding which individual organic contaminants to determine, reference should be made to existing priority substance lists, such as those prepared by OSPAR and the EU [8].

Normalisation

It is recommended that normalised values of contaminants should be used to enable a more reliable comparison of contaminant concentrations in dredged material with those in sediments at disposal or reference sites, as well as with action levels. The normalisation procedure (see Technical Annex II) used within a regulatory authority should be consistent to ensure effective comparisons.

Analytical Techniques

Reference should be made to the Technical Annexes of the JAMP monitoring guidelines (cf. reference OSPAR, 1997) for recommended analytical techniques.

TIER III: BIOLOGICAL PROPERTIES AND EFFECTS

In a significant number of cases the physical and chemical properties described above do not provide a direct measure of the biological impact. Moreover, they do not adequately identify all physical disturbances and all sediment-associated constituents present in the dredged material. If the potential impacts of the dredged material to be dumped cannot be adequately assessed on the basis of the chemical and physical characterisation, biological measurements should be carried out.

The selection of an appropriate suite of biological test methods will depend on the particular questions addressed, the level of contamination at the dredging site and the degree to which the available methods have been standardised and validated.

To enable the assessment of the test results, an assessment strategy should be developed with regard to granting a permit authorising disposal at sea. The extrapolation of test results on individual species to a higher level of biological organisation (population, community) is still very difficult and requires good knowledge of assemblages that typically occur at the sites of interest.

7 cf. Joint Assessment and Monitoring Programme (JAMP) Guidelines for Monitoring Contaminants in Sediments.

8 Communication of 22 June 1982 from the Commission to the Council on hazardous substances within the meaning of List I of Council Directive 76/464/EEC. Official Journal of the European Communities C 176, 14.7.1982, p.3

1. Toxicity bioassays:

   The primary purpose of toxicity bioassays is to provide direct measures of the effects of all sediment constituents acting together, taking into account their bioavailability. For ranking and classifying the acute toxicity of harbour sediment prior to maintenance dredging, short-term bioassays may often suffice as screening tools.

   - To evaluate the effects of the dredged material, acute bioassays can be performed with pore water, an elutriate or the whole sediment In general, a set of 2-4 bioassays is recommended with organisms from different taxonomic groups (e.g. crustaceans, molluscs, polychaetes, bacteria, echinoderms);
   - In most bioassays, survival of the test species is used as an endpoint. Chronic bioassays with sub-lethal endpoint (growth, reproduction etc) covering a significant portion of the test species life cycle may provide a more accurate prediction of potential impact of dredging operations. However, standard test procedures are still under development;

   The outcome of sediment bioassays can be unduly influenced by factors other than sediment-associated chemicals. Confounding factors like ammonia, hydrogen sulphide, grain size, oxygen concentration and pH should therefore be determined during the bioassay.

   Guidance on the selection of appropriate test organisms, use and interpretation of sediment bioassays is given by e.g. EPA/CE (1991/1994) and IADC/CEDA (1997) while guidance on sampling of sediments for toxicological testing is given by e.g. ASTM (1994).

2. Biomarkers:

   Biomarkers may provide early warning of more subtle (biochemical) effects at low and sustained levels of contamination. Most biomarkers are still under development but some are already applicable for routine application on dredged material (e.g. one which measures the presence of dioxin-like compounds - Murk *et al*., 1997) or organisms collected in the field (e.g. DNA strand/breaks in flat fish).

3. Microcosm experiments:

   There are short-term microcosm tests available to measure the toxicant tolerance of the community e.g. Pollution Induced Community Tolerance (PICT) (Gustavson and Wangberg, 1995)

4. Mesocosm experiment:

   In order to investigate long-term effects, experiments with dredged material in mesocosms can be performed, for instance to study the effects of PAHs in flatfish pathology. Because of the costs and time involved these experiments are not applicable in the process of authorising permits but are useful in cases where the extrapolation of laboratory testing to field condition is complicated r environmental conditions are very variable and hinder the identification of toxic effects as such. The results of these experiments would be then available for future permitting decisions.

5. Field observation of benthic communities:

   Monitoring in the surrounding of the disposal site of benthic communities e.g. *in situ* (fish, benthic invertebrates) can give important clues to the condition of marine sediments and are relevant as a feed-back or refinement process for authorising permits. Field observations give insight into the combined impact of physical disturbance and chemical contamination. Guidelines on the monitoring of benthic communities are provided by e.g. OSPAR, ICES, HELCOM.

6. Other biological properties:

   Where appropriate, other biological measurements can be applied in order to determine e.g. the potential for bioaccumulation and for tainting.

SUPPLEMENTARY INFORMATION

The need for further information will be determined by local circumstance and may form an essential part of the management decision. Appropriate data might include: redox potential, sediment oxygen demand, total nitrogen, total phosphorus, iron, manganese, mineralogical information or parameters for normalising contaminant data (e.g. aluminium, lithium, scandium – cf. Technical Annex II). Consideration should also be given to chemical or biochemical changes that contaminants may undergo when disposed of at sea.

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TECHNICAL ANNEX II [9]

NORMALISATION TECHNIQUES FOR STUDIES ON THE SPATIAL DISTRIBUTION OF CONTAMINANTS*

1. INTRODUCTION

Normalisation in this discussion is defined as a procedure to compensate for the influence of natural processes on the measured variability of the concentration of contaminants in sediments. Most contaminants (metals, pesticides, hydrocarbons) show high affinity to particulate matter and are, consequently, enriched in bottom sediments of estuaries and coastal areas. In practice, natural and anthropogenic substances entering the marine system are subjected to a variety of biogeochemical processes. As a result, they become associated with fine-grained suspended solids and colloidal organic and inorganic particles. The ultimate fate of these substances is determined, to a large extent, by particulate dynamics. They therefore tend to accumulate in areas of low hydrodynamic energy, where fine material is preferentially deposited. In areas of higher energy, these substances are "diluted" by coarser sediments of natural origin and low contaminant content.

It is obvious that the grain size is one of the most important factors controlling the distribution of natural and anthropogenic components in the sediments. It is, therefore, essential to normalise for the effects of grain size in order to provide a basis for meaningful comparisons of the occurrence of substances in sediments of various granulometry and texture within individual areas or among areas. Excess levels, above normalised background values, could then be used to establish sediment quality.

For any study of sediments, a basic amount of information on their physical and chemical characteristics is required before an assessment can be made on the presence or absence of anomalous contaminant concentrations. The concentration at which contamination can be detected depends on the sampling strategy and the number of physical and chemical variables that are determined in individual samples.

The various granulometric and geochemical approaches used for the normalisation of trace elements data as well as the identification of contaminated sediments in estuarine and coastal sediments has been extensively reviewed by Loring (1988). Two normalisation approaches widely used in oceanography and in atmospheric sciences have been selected here. The first is purely physical and consists of characterising the sediment by measuring its content of fine material. The second approach is chemical in nature and is based on the fact that the small size fraction is usually rich in clay minerals, iron and manganese oxi-hydroxides and organic matter. Furthermore, these components often exhibit a high affinity for organic and inorganic contaminants and are responsible for their enrichment in the fine fraction. Chemical parameters (e.g., Al, Sc, Li) representative of these components may thus be used to characterise the small size fraction under natural conditions.

It is strongly suggested that several parameters be used in the evaluation of the quality of sediments. The types of information that can be gained by the utilisation

9 This Technical Annex is currently under review in the framework of OSPAR's Working Group on Concentrations, Trends and Effects of Substances in the Marine Environment (SIME).

* Extract from the 1989 ACMP Report (Section 14). ICES Coop. Res. Rep. 167, pp 68-76

of these various parameters are often complementary and extremely useful considering the complexity and diversity of situations encountered in the sedimentary environment. Furthermore, measurements of the normalising parameters selected here are rather simple and inexpensive.

This report presents general guidelines for sample preparation, analytical procedures, and interpretation of physical and chemical parameters used for the normalisation of geochemical data. Its purpose is to demonstrate how to collect sufficient data to normalise for the grain-size effect and to allow detection, at various levels, of anomalous concentrations of contaminants within estuarine and coastal sediments.

2. SAMPLING STRATEGY

Ideally, a sampling strategy should be based on a knowledge of the source of contaminants, the transport pathways of suspended matter and the rates of accumulation of sediments in the region of interest. However, existing data are often too limited to define the ideal sampling scheme. Since contaminants concentrate mainly in the fine fraction, sampling priority should be given to areas containing fine material that usually correspond to zones of deposition.

The high variability in the physical, chemical and biological properties of sediments implies that an evaluation of sediment quality in a given area must be based on a sufficient number of samples. This number can be evaluated by an appropriate statistical analysis of the variance within and between samples. To test the representativity of a single sediment specimen at a given locality, several samples at one or two stations should be taken.

The methodology of sampling and analysis should follow the recommendations outlined in the "Guidelines for the Use of Sediments as a Monitoring Tool for Contaminants in the Marine Environment" (ICES 1987). In most cases, the uppermost layer of sediments collected with a tightly closing grab sampler (Level I in the Guidelines) is sufficient to provide the information concerning the contamination of the sediments of a given area compared to sediments of uncontaminated locations or other reference material.

Another significant advantage of using sediments as monitoring devices is that they have recorded the historical evolution of the composition of the suspended matter deposited in the area of interest. Under favourable conditions, the degree of contamination may be estimated by comparison of surface sediments with deeper samples, taken below the biological mixing zone. The concentrations of trace elements in the deeper sediment may represent the natural background level in the area in question and can be defined as baseline values. This approach requires sampling with a box-corer or a gravity corer (Levels II and III in the Guidelines).

3. ANALYTICAL PROCEDURES

Typical analytical procedures to be followed are outlined in Table 1. The number of steps that are selected will depend on the nature and extent of the investigation.

3.1 Grain size fractionation

It is recommended that at least the amount of material <63 μm, corresponding to the sand/silt classification limit, be determined. The sieving of the sample at 63 μm is, however, often not sufficient, especially when sediments are predominantly fine grained. In such cases, it is better to normalise with lower size thresholds since the contaminants are mainly concentrated in the fraction <20 µm, and even more specifically in the clay fraction (<2 µm). It is thus proposed that a determination be made, on a sub-sample, of the weight fraction <20 µm and that <2 µm with the aid of a sedimentation pipette or by elutriation. Several laboratories are already reporting their results relative to the content of fine fractions of various sizes and these results may be useful for comparison among areas.

3.2 Analysis of contaminants

It is essential to analyse the total content of contaminants in sediments if quality assessment is the goal of the study, and it is thus recommended that the unfractionated sample (<2 mm) be analysed in its entirety. The total content of elements can be determined either by non-destructive methods, such as X-ray fluorescence or neutron activation, or by a complete digestion of the sediments (involving the use of hydrofluoric acid (HF)) followed by methods such as atomic absorption spectrophotometry or emission spectroscopy. In the same way, organic contaminants should be extracted with the appropriate organic solvent from the total sediment.

An individual size fraction of the total sediment may be used for subsequent analysis, if required, to determine the absolute concentrations of contaminants in that fraction, providing that its contribution to the total is kept in perspective when interpreting the data. Such size fraction information might be useful in tracing the regional dispersal of metals associated with specific grain-size fractions, when the provenance of the material remains the same. However, sample fractionation is a tedious procedure that introduces considerable risk of contamination and potential losses of contaminants due to leaching. The applicability of this approach is thus limited.

4. NORMALISATION PROCEDURES

4.1 Granulometric normalisation

Since contaminants tend to concentrate in the fine fraction of sediments, correlations between total concentrations of contaminants and the weight percent of the fine fraction, determined separately on a sub-sample of the sediment by sieving or gravity settling, constitute a simple but powerful method of normalisation. Linear relationships between the concentration and the weight percentage of the fine fraction are often found and it is then possible to extrapolate the relationships to 100% of the fraction studied, or to characterise the size dependence by the slope of the regression line.

4.2 Geochemical normalisation

Granulometric normalisation alone is inadequate to explain all the natural trace variability in the sediments. In order to interpret better the compositional variability of sediments, it is also necessary to attempt to distinguish the sedimentary components with which the contaminants are associated throughout the grain-size spectrum. Since effective separation and analysis of individual components of sediments is extremely difficult, such associations must rest on indirect evidence of these relationships.

Since contaminants are mainly associated with the clay minerals, iron and manganese oxi-hydroxides and organic matter abundant in the fine fraction of the sediments, more information can be obtained by measuring the concentrations of elements representative of these components in the samples.

An inert element such as aluminium, a major constituent of clay minerals, may be selected as an indicator of that fraction. Normalised concentrations of trace elements with respect to aluminium are commonly used to characterise various sedimentary particulate materials (see below). It may be considered as a conservative major element, that is not affected significantly by, for instance, early diagenetic processes and strong redox effects observed in sediments.

In the case of sediments derived from the glacial erosion of igneous rocks, it has been found that contaminant/Al ratios are not suitable for normalising for granular variability (Loring, 1988). Lithium, however, appears to be an ideal element to normalise for the grain size effect in this case and has the additional advantage of being equally applicable to non-glacial sediments.

In addition to the clay minerals, Mn and Fe compounds are often present in the fine fraction, where they exhibit adsorption properties strongly favouring the incorporation of various contaminants. Mn and Fe are easily analysed by flame atomic absorption spectrometry and their measurement may provide insight into the behaviour of contaminants.

Organic matter also plays an important role as scavenger of contaminants and controls, to a major degree, the redox characteristics of the sedimentary environment.

Finally, the carbonate content of sediments is easy to determine and provides additional information on the origin and the geochemical characteristics of the sediments. Carbonates usually contain insignificant amounts of trace metals and act mainly as a diluent. Under certain circumstances, however, carbonates can fix contaminants such as cadmium and copper. A summary of the normalisation factors is given in Table 2.

4.3 Interpretation of the data

The simplest approach in the geochemical normalisation of substances in sediments is to express the ratio of the concentration of a given substance to that of the normalising factor.

Normalisation of the concentration of trace elements with respect to aluminium (or scandium) has been used widely and reference values on a global scale have been established for trace elements in various compartments: crustal rocks, soils, atmospheric particles, river-borne material, marine clays and marine suspended matter (cf., e.g., Martin and Whitfield, 1983; Buat-Menard and Chesselet, 1979).

This normalisation also allows the definition of an enrichment factor for a given element with respect to a given compartment. The most commonly used reference level of composition is the mean global normalised abundance of the element in crustal rock (Clarke value).

The enrichment factor EF is given by:

$$EF_{crust} = (X/Al)_{sed} / (X/Al)_{crust}$$

where X/Al refers to the ratio of the concentration of element X to that of Al in the given compartment.

However, estimates of the degree of contamination and time trends of contamination at each sampling location can be improved upon by making a comparison with metal levels in sediments equivalent in origin and texture.

These values can be compared to the normalised values obtained for the sediments of a given area. Large departures from these mean values indicate either contamination of the sediment or local mineralisation anomalies.

When other variables (Fe, Mn, organic matter and carbonates) are used to characterise the sediment, regression analysis of the contaminant concentrations with these parameters often yields useful information on the source of contamination and on the mineralogical phase associated with the contaminant.

A linear relationship between the concentration of trace constituents and that of the normalisation factor has often been observed (Windom et al., 1989). In this case and if the natural geochemical population of a given element in relation to the normalising factor can be defined, samples with anomalous normalised concentrations are easily detected and may indicate anthropogenic inputs.

According to this method, the slope of the linear regression equation can be used to distinguish the degree of contamination of the sediments in a given area. This method can also be used to show the change of contaminant load in an area if the method is used on samples taken over intervals of some years (Cato, 1986).

A multi-element/component study in which the major and trace metals, along with grain size and organic carbon contents, have been measured allows the interrelationships between the variables to be established in the form of a correlation matrix. From such a matrix, the most significant ratio between trace metal and relevant parameter(s) can be determined and used for identification of metal carriers, normalisation and detection of anomalous trace metal values. Factor analyses can sort all the variables into groups (factors) that are associations of highly correlated variables, so that specific and/or non-specific textural, mineralogical, and chemical factors controlling the trace metal variability may be inferred from the data set.

Natural background levels can also be evaluated on a local scale by examining the vertical distribution of the components of interest in the sedimentary column. This approach requires, however, that several favourable conditions are met: steady composition of the natural uncontaminated sediments; knowledge of the physical and biological mixing processes within the sediments; absence of diagenetic processes affecting the vertical distribution of the component of interest. In such cases, grain-size and geochemical normalisation permits compensation for the local and temporal variability of the sedimentation processes.

5. CONCLUSIONS

The use of the granulometric measurements and of component/reference element ratios are useful approaches towards complete normalisation of granular and mineralogical variations, and identification of anomalous concentrations of contaminants in sediments. Their use requires that a large amount of good analytical data be collected and specific geochemical conditions be met before all the natural variability is accounted for, and the anomalous contaminant levels can be detected. Anomalous metal levels, however, may not always be attributed to contamination, but rather could easily be a reflection of differences in sediment provenance.

Geochemical studies that involve the determination of the major and trace metals, organic contaminants, grain size parameters, organic matter, carbonate, and mineralogical composition in the sediments are more suitable for determining the factors that control the contaminant distribution than the measurement of absolute concentrations in specific size fractions or the use of potential contaminant/reference metal ratios alone. They are thus more suitable for distinguishing between uncontaminated and contaminated sediments. This is because such studies can identify the factors that control the variability of the concentration of contaminants in the sediments.

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TABLE 1

A typical approach for determinations of physical and chemical parameters in marine sediments

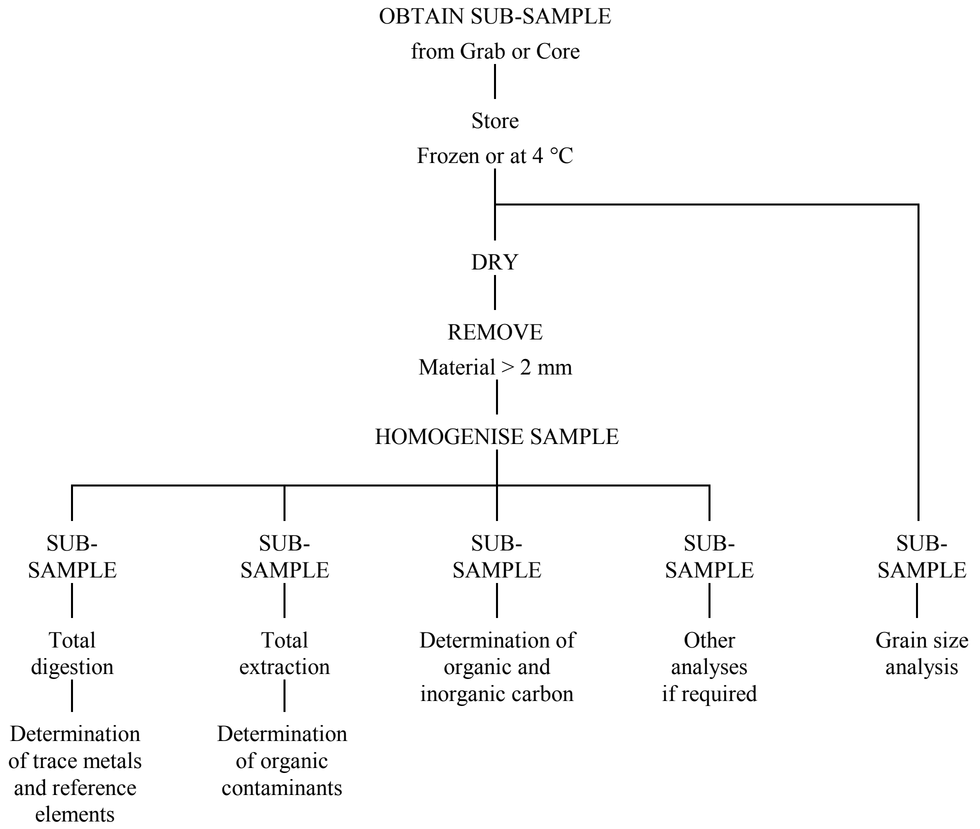


TABLE 2

Summary of normalisation factors

NORMALISATIONFACTOR	SIZE (µm)	INDICATOR	ROLE
Textural			Determines physical sorting and depositional pattern of metals
Sand	2000 – 63	Coarse-grained metal-poor minerals/compounds	Usually diluent of trace metal concentrations
Mud	< 63	Silt and clay size metal-bearing minerals / compounds	Usually overall concentrator of trace metals
Clay	< 2	Metal-rich clay minerals	Usually fine-grained accumulator of trace metals
Chemical			
Si		Amount and distribution of metal-poor quartz	Coarse-grained diluter of contaminants
Al		Al silicates, but used to account for granular variations of metal-rich fine silt and clay size Al-silicates	Chemical tracer of Al-silicates, particularly the clay minerals
Li, Sc		Structurally combined in clay minerals and micas	Tracer of clay minerals, particularly in sediments containing Al-silicates in all size fractions
Organic carbon		Fine-grained organic matter	Tracer of organic contaminants. Sometimes accumulator of trace metals like Hg and Cd
Fe, Mn		Metal-rich silt and clay size Fe-bearing clay minerals, Fe-rich heavy minerals and hydrous Fe and Mn oxides	Chemical tracer for Fe-rich clay fraction. High absorption capacity of organic and inorganic contaminants
Carbonates		Biogenic marine sediments	Diluter of contaminants. Sometimes accumulate trace metals like Cd and Cu

TECHNICAL ANNEX III

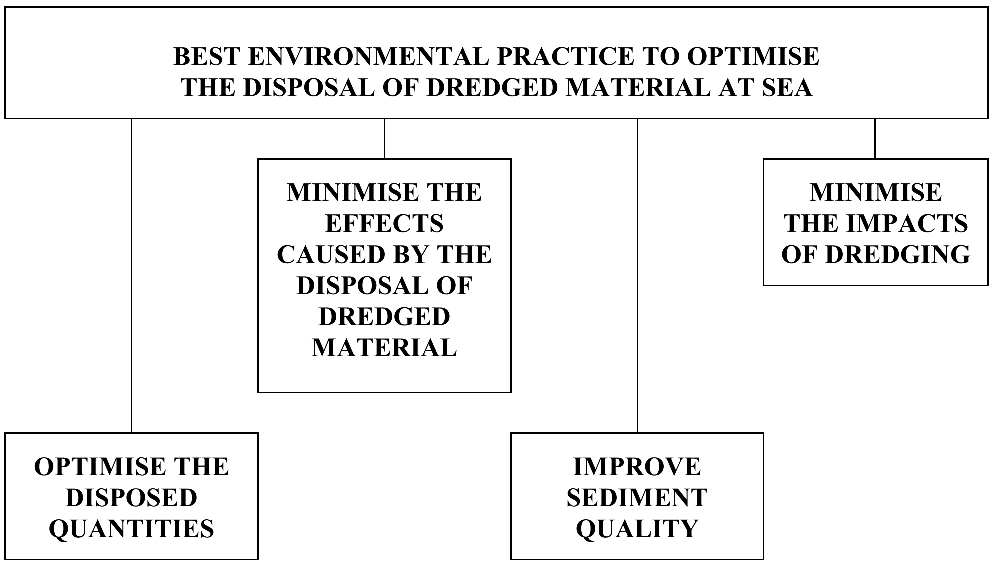
BEST ENVIRONMENTAL PRACTICE (BEP)

INTRODUCTION

This Technical Annex was prepared bearing in mind that, although the guidelines strictly only apply to the disposal of dredged material, Contracting Parties are encouraged also to exercise control over dredging operations.

This Technical Annex has as its aim to provide guidance to national regulatory authorities, operators of dredging vessels and port authorities on how to minimise the effects on the environment of dredging and disposal operations. Careful assessment and planning of dredging operations are necessary to minimise the impacts on marine species and habitats.

The items given as BEP under the different headings of this Technical Annex are given as examples. Their applicability will generally vary according to the particular circumstances of each operation and it is clear that different approaches may then be appropriate. More detailed information on dredging techniques and processes can be found in Guide 4 of the IADC/CEDA series on Environmental Aspects of Dredging.



Point A - Minimisation of the effects caused by the disposal of dredged material - is comprehensively described in the main body of these guidelines.

Point B ‘Optimisation of the disposed quantities’, Point C ‘Improvement of sediment quality’ and Point D ’Minimise the Impacts of Dredging’ do not fall within the strict remit of the Oslo Commission, but are very relevant to the prevention of pollution of the marine environment resulting from the disposal of dredged materials. Descriptions of BEP in relation to these activities are given at Appendices I and II.

APPENDIX I

OPTIMISE THE DISPOSED QUANTITIES

KEEP VOLUME OF DREDGED MATERIAL MINIMAL

MINIMISE NEED FOR DREDGING

In fluid mud areas: introduce the concept of Navigable depth based on:

- physico-chemical evaluation of the sediment (including rheometry and densimetry)
- full scale trials

BEP: Dredging only the amount of material required for maintaining a particular density level to allow navigation. This may require e.g. continuous underway measurement of sediment density by using a nuclear transmission gauge or measurement of shear forces.

In areas with sandy waves etc.

BEP: - selective dredging of sand waves and other mobile sand structures

Hydraulic Engineering

BEP: - use of hydraulic structures to reduce sedimentation

Accurate monitoring of dredged depths at an appropriate frequency

BEP: - accurate positioning systems e.g.:
  - microwave systems
  - radiowave technology
  - DGPS
- apply rapid survey equipment
  - continuous measurement systems
  - echosounders
  - swath/multibeam systems

OPTIMISE DREDGING OPERATIONS MANAGEMENT

Accurate survey systems

(see column 1: Accurate monitoring)

Availability of survey data on board

BEP: - on-line visualisation of updated bathymetric charts, including topographic data, coastlines, disposal areas, dredge position, dredge head position
- tidal information

Process evaluation

BEP: - visualisation/evaluation of dredged tracks/profiles/zones
- dredging intensity chart
- in case of muddy material, sand and gravel: establish optimum overflow time by analysis of load diagrams

IMPROVE DREDGING PROCESS

Effective dredging process control

BEP: - Continuous on-line measurements and presentation e.g.
- of area, heading, speed of the dredgers and position of the suction head/buckets/cutter/backhoe/grab/ wheel/...
- measurement of mixture velocity and concentration
- measurement of macro production (load diagram)
- hopper-measurement system monitoring the filling process

Output improving techniques

BEP: - best suited suction head/cutters wheel/ backhoe/buckets
- submerged dredge-pumps
- degassing installations
- etc.

Selective dredging techniques

BEP: - selective dredging to e.g. separate contaminated material

See IADC/CEDA report referenced in the Introduction for further information on this topic

APPENDIX II

IMPROVE SEDIMENT QUALITY

IN SITU BEFORE DREDGING AND AFTER DISPOSAL

<u>Improve physical aspects (cohesion, consistency, density) of dredged material</u>

BEP:
- increase sediment density by physical means e.g. vibration

IN THE HOPPER

<u>Mechanical separation</u>

BEP:
- hydrocyclones for separation of granulometric fractions
- flotation
- dewatering (under development)

(consider potential problems with process water and associated contaminants e.g. re-circulation will reduce problems

MINIMISE THE IMPACTS OF DREDGING

<u>Minimise increases in turbidity</u>

BEP:
- use excavation tools /dredger heads appropriate to minimise turbidity
- use silt screens/shields
- minimise overflow by e.g. recirculation of overflow water
- use specially designed dredgers to dredge contaminated sediments
- avoid the use of dredgers which introduce large amounts of suspended sediments into the water column where this may lead to problems with oxygen depletion or contamination e.g. agitation dredgers

<u>Minimise oxygen depletion</u>

BEP: Avoid periods when dredging induced turbidity will lead to unacceptable reductions in oxygen levels due to high temperatures

OSPAR GUIDELINES FOR THE DUMPING OF FISH WASTE FROM LAND-BASED INDUSTRIAL FISH PROCESSING OPERATIONS

(Reference Number: 1998-21)

1. SCOPE AND AIM OF THE GUIDELINES

1.1 Article 3 of Annex II of the Convention for the Protection of the Marine Environment of the North-East Atlantic ("1992 OSPAR Convention") exempts the dumping of fish waste from industrial fish processing operations from the general prohibition of the dumping of all wastes or other matter.

1.2 Article 6 of Annex II of the 1992 OSPAR Convention requires the Commission to draw up and adopt criteria, guidelines and procedures with a view to preventing and eliminating pollution related to, *inter alia*, the dumping of fish waste from industrial fish processing operations.

1.3 The aim of the present guidelines is to prevent and eliminate pollution related to the dumping of fish waste from industrial fish processing operations and to set out the basic practical considerations required for determining the conditions under which such dumping might be carried out.

1.4 These guidelines relate to the dumping of fish waste from land-based industrial fish processing operations. In accordance with Article 1 (o) of the 1992 OSPAR Convention, these guidelines do not cover the discarding of unprocessed fish and fish offal from fishing vessels. Environmental considerations are, however, more or less the same for the dumping of all types of fish waste, so that the content may have some value also in other applications.

1.5 For the purpose of these guidelines the term “fish” means “fish and shellfish”.

2. INTRODUCTION

2.1 Fish waste from industrial fish processing requires careful consideration prior to dumping. Improper dumping in the marine environment may lead to problems for intertidal and shallow subtidal benthic communities because of microbiological activity, H_2S formation and oxygen deficiencies.

2.2 In those cases where practical beneficial uses are not found, dumpsite selection is a key element to avoid local environmental problems after dumping of fish waste. One should also bear in mind the possibility that dumping may result in the introduction of diseases and alien species.

3. EVALUATION OF OPTIONS

3.1 Fish waste from industrial fish processing operations represents an inherent value. The dumping of fish waste should be compared with alternative disposal options. Dumping should only be selected if it can be demonstrated that it is the most environmentally acceptable and practicable option. The first option should therefore always be to have use of fish waste as a raw material. Particular attention should be given to potentially beneficial uses, such as:

a. recycling to food for mariculture;

b. recycling to food for domestic animals (pigs, sheep etc.);

c. recycling to fishmeal;

d. production of silage;

e. production of fertilisers and soil conditioners for land farming;

f. manufacturing of biochemical industry products (health products etc.).

3.2 It is necessary to consider waste reduction options. The nature of the waste, and the nature of the processing or waste treatment, may rule out dumping at sea. In this context, for example, the presence of pathogens or alien species, or the chemical treatment of the waste should be taken into consideration.

4. CHARACTERISATION OF FISH WASTE

4.1 It may be necessary to undertake Chemical or Biological Oxygen Demand (COD/BOD) measurements as the waste is predominantly organic material. Fish waste will not normally require chemical characterisation. Analyses will, however, be necessary if chemical contamination is suspected. If the primary concern is the transfer of pathogens or unwanted species, biological analysis will also be necessary.

4.2 The possibility that the waste is contaminated with pathogens or unwanted species shall always be taken into consideration. The most likely risk is the transmission of diseases to species in the vicinity of proposed dumpsites. (In rare cases, human pathology may also be associated with processing waste). Heat or irradiation can be used to reduce the risks associated with pathogens and unwanted species. Silage production techniques or disinfection may be appropriate in certain cases, but these methods will usually be less efficient in the case of viral pathogens, and could result in additional environmental concerns. For example, ensiled waste may be unsuitable for dumping because of aesthetic considerations such as associated ”oil slicks”, and disinfected waste could be totally unsuitable for dumping because of the associated chemical contamination of the fish waste.

4.3 The main parameters which should be considered are:

a. origin of waste (wild/farmed, indigenous/non-indigenous);

b. nature of waste (liquid/solid, density/buoyancy, whole/macerated/crushed);

c. nature of processing and/or waste treatment (raw/cooked, untreated/irradiated/ disinfected etc.);

d. relative proportions of inorganic or organic materials and, if appropriate, levels of Chemical or Biological Oxygen Demand (COD/BOD);

e. possibility of chemical or biological contamination;

f. quantity of waste (tonnes);

g. frequency and strategy of dumping.

4.4 Pending a decision on disposal of the waste, the nature of the waste may undergo major or minor changes. The expected degradation and the need for preservation of the material e.g. by deep freezing shall be considered.

5. DUMPSITE SELECTION

5.1 The selection of a dumpsite involves considerations of environmental nature (including aesthetic considerations) as well as economic and operational feasibility. Attention has to be given to possible interference with or devaluation of other legitimate uses of the sea, for example mariculture or commercial fisheries; or to possible adverse effects on the spawning, recruitment, nursery or feeding areas for commercially exploited species. Sensitive habitats and the habitats of rare, vulnerable, or endangered species are not appropriate dumping sites.

5.2 For the evaluation of dumpsites, information should be obtained on the following, as appropriate:

a. physical, geochemical and biological characteristics of the sea-bed (e.g. topography, redox status, benthic biota);

b. physical, chemical and biological characteristics of the water column (e.g. currents, dissolved oxygen, pelagic species); and

c. proximity to:

(i) areas of specific scientific or biological importance such as protected areas and critical habitats;

(ii) mariculture operations;

(iii) spawning, recruitment, nursery or feeding areas for different species;

(iv) migration routes of marine organisms;

(v) areas of natural beauty or significant cultural and historic importance;

(vi) recreational areas;

(vii) commercial or recreational fishing areas;

(viii) shipping lanes;

(ix) military exclusion zones;

(x) engineering uses of the sea e.g. seabed mining, placement of undersea cables and pipelines, water intake, energy conversion sites.

5.3 Such information can be obtained from existing sources, complemented by fieldwork where necessary.

5.4 The information on the characteristics of the dumpsite referred to above is required to determine the probable fate of and the effects caused by the dumped material. Careful evaluation will then permit prediction of the consequences of dumping. It will also permit determination of environmental processes that may dominate any transport of material away from the dumpsite. The influence of these processes may be reduced by imposing permit conditions.

5.5 It is likely, given the nature of fish waste, that the most suitable dumpsite is one where the waste is readily consumed by birds, scavenger fish, invertebrates etc. In the case of fish waste which can be consumed by scavengers, it will usually be appropriate to select a dumpsite in an area of dispersion, or to adopt a dispersive dumping strategy (see paragraph 7.1) or both. It will usually be inappropriate to select an area of no or low dispersion, as large accumulations of waste could have an effect on oxygen levels in the sediments or water column. In the case of waste which is predominantly made up of inorganic materials, such as mollusc shells, dispersion may be less important.

5.6 The stress on biological communities as a result of existing activities normally needs evaluation before any new or additional dumping operations are undertaken. The possible future uses of the sea area need also be considered.

5.7 Information from baseline and monitoring studies at existing dump sites will be important in the evaluation of any new dumping activity.

6. ASSESSMENT OF POTENTIAL EFFECTS

6.1 Environmental impacts include eutrophication and oxygen reduction in the marine area. Fish waste that sinks may in addition have physical impact such as covering of the seabed and interference with fishing gear. Effects may be avoided by careful dumpsite selection. For non-dispersive sites evaluation criteria should be established based on characterisation of O_2 saturation and alteration in sediment E_h.

6.2 Assessment of potential effects should lead to a statement (impact hypothesis) of the expected consequences of the dumping option. Its primary purpose is to provide a basis for deciding whether to approve or reject the proposed dumping. In cases of approval the impact assessment is important:

a. for deciding permit conditions to minimise effects;

b. to decide if monitoring requirements should be set (the latter is probably only relevant in certain cases e.g. when large amounts of fish waste are involved).

6.3 This assessment should take account of the potential effects on living resources, amenities and other legitimate uses of the sea. It may define the nature, temporal and spatial scales and duration of expected impacts based on reasonable conservative assumptions. The primary areas of potential impact (e.g. which are considered to have the most serious consequences for the environment) should be identified.

6.4 In most cases it would be expected that the null hypothesis i.e. that dumping will not result in any negative long-term changes to the water column, sediment or biota, will be the usual result of the assessment.

7. METHOD OF DUMPING

7.1 It may be necessary to consider the proposed method of release of the fish waste and treatment prior to dumping (e.g. grinding) in order to minimise impacts.

8. PERMIT ISSUE

8.1 If dumping is the selected option, then a permit authorising dumping must be issued in advance. The conditions under which such a permit is issued should normally try to minimise effects as far as practicable. Thus the permit is an important tool for managing the dumping of fish waste from industrial fish processing operations.

8.2 Permit conditions should be set to ensure that:

a. only those wastes are dumped, which, on the basis of an impact assessment, have been characterised and found acceptable for dumping;

b. waste is dumped at the selected dump site;

c. any operation is carried out within a time frame that ensures that the impact hypothesis is still valid. (The delay between production and disposal of the waste can be very important, as organic wastes will degrade rapidly if they are not stored under controlled conditions. This may also lead to aesthetic problems, such as odour and flies.)

d. any necessary management techniques for the dumping, identified during the impact analysis, are carried out; and

e. the permitting authority receives reports of the operation, including activities done to ensure the fulfilment of permit conditions and monitoring requirements (if any).

8.3 Where appropriate, dumping vessels should be equipped with accurate positioning systems. Dumping vessels and operations should be inspected regularly to ensure that the conditions of the dumping permit are being complied with and that the crew is aware of their responsibilities under the permit. Ships´ records and automatic monitoring and display devices (e.g. black boxes), where these have been fitted, should be inspected to ensure that dumping is taking place at the specified dump site.

9. MONITORING

9.1 In making the decision to permit dumping of fish waste from industrial fish processing operations, the impact hypothesis should indicate whether monitoring is necessary, and should direct the monitoring programme. Past experiences of such waste dumping operations suggest that monitoring is unlikely to be desirable in most cases, but this will have to be confirmed on a case-by-case basis.

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