

National Energy  
Board



Office national  
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**CNSOPB**



CANADA-NOVA SCOTIA  
OFFSHORE PETROLEUM BOARD

CANADA-NEWFOUNDLAND  
and LABRADOR  
**OFFSHORE  
PETROLEUM  
BOARD**

**OFFSHORE CHEMICAL  
SELECTION GUIDELINES  
FOR  
DRILLING & PRODUCTION ACTIVITIES  
ON FRONTIER LANDS**

**April 2009**

**Canada**

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## TABLE OF CONTENTS

|                                                              |    |
|--------------------------------------------------------------|----|
| ACRONYMS AND DEFINITIONS .....                               | ii |
| 1.0 INTRODUCTION.....                                        | 1  |
| 2.0 SCOPE OF GUIDELINES .....                                | 1  |
| 3.0 REGULATORY PROCEDURE.....                                | 2  |
| 4.0 TECHNICAL CONSIDERATIONS.....                            | 2  |
| 5.0 SELECTION CRITERIA .....                                 | 3  |
| 6.0 RECORDS TO BE MAINTAINED AND REPORTING REQUIREMENTS..... | 7  |

## LIST OF FIGURES

|                                                |   |
|------------------------------------------------|---|
| FIGURE 6-1: CHEMICAL SELECTION FLOWCHART ..... | 8 |
|------------------------------------------------|---|

## APPENDICES

|                                                    |    |
|----------------------------------------------------|----|
| 1 SELECTED REFERENCES AND CONTACT INFORMATION..... | 9  |
| 2 HAZARD ASSESSMENT .....                          | 10 |
| 3 MEMBERSHIP OF WORKING GROUP .....                | 13 |

## ACRONYMS AND DEFINITIONS

### Acronyms

|             |                                                                |
|-------------|----------------------------------------------------------------|
| CAPP        | Canadian Association of Petroleum Producers                    |
| Cefas       | Centre for Environment, Fisheries and Aquaculture Science      |
| CEPA        | <i>Canadian Environmental Protection Act</i>                   |
| CHARM       | Chemical Hazards and Risk Management                           |
| C-NLOPB     | Canada-Newfoundland and Labrador Offshore Petroleum Board      |
| CNSOPB      | Canada-Nova Scotia Offshore Petroleum Board                    |
| DSL         | Domestic Substances List                                       |
| EEM         | Environmental Effects Monitoring                               |
| EC50        | Median Effective Concentration required to induce a 50% effect |
| HOCNF       | Harmonized Offshore Chemical Notification Format               |
| MSDS        | Material Safety Data Sheet                                     |
| NEB         | National Energy Board                                          |
| NDSL        | Non-Domestic Substances List                                   |
| NSNR        | New Substances Notification Regulations                        |
| OCNS        | Offshore Chemical Notification Scheme                          |
| OCSG        | Offshore Chemical Selection Guidelines                         |
| OSPAR       | Oslo and Paris Commissions                                     |
| PARCOM      | Paris Commission (one of the two forerunners of OSPAR)         |
| PCPA        | <i>Pest Control Products Act</i>                               |
| PLONOR List | OSPAR Pose Little or No Risk to the Environment List           |
| SNAc        | Significant New Activity                                       |
| UK          | United Kingdom                                                 |

## Definitions

- “Accord Acts” means the *Canada-Newfoundland Atlantic Accord Implementation Act*, the *Canada-Newfoundland and Labrador Atlantic Accord Implementation (Newfoundland and Labrador) Act*, the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*.
- “Board” means the Canada-Newfoundland and Labrador Offshore Petroleum Board, the Canada-Nova Scotia Offshore Petroleum Board or the National Energy Board.
- “Chemical” in these Guidelines, chemical means a single, pure chemical or a product or formulation containing a number of different chemicals.
- “Discharge” in these Guidelines, discharge means a planned release of waste into the marine environment, which is approved by the Board, and is related to routine operational activity.
- “Installation” has the same meaning as in subsection 2(1) of the *Canada Oil and Gas Installations Regulations*, subsection 2(1) of the *Nova Scotia Offshore Petroleum Installations Regulations*, and subsection 2(1) of the *Newfoundland Offshore Petroleum Installations Regulations*.
- “Operator” means a person that holds
- (a) an operating licence pursuant to the *Accord Acts*, or the *Canada Oil and Gas Operations Act*, R.S.C. 1987, c O-7.; and
  - (b) an authorization issued pursuant to the *Accord Acts*, or the *Canada Oil and Gas Operations Act*, R.S.C. 1987, c O-7.
- “Pest control Product” has the same meaning as in the *Pest Control Products Act* (2002, c. 28).

## **1.0 INTRODUCTION**

The Offshore Chemical Selection Guidelines (OCSG) provide a framework for chemical selection which minimizes the potential for environmental impacts from the discharge of chemicals used in offshore drilling and production operations. These Guidelines are applicable to the offshore areas under the jurisdictions of the National Energy Board (NEB), the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) and the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB). These Guidelines were prepared jointly by the three regulatory Boards with the assistance of a government/industry/public working group established for this purpose. A listing of the membership of the working group is provided in Appendix 3.

The regulatory frameworks applicable to oil and gas activities in each of Canada's offshore areas are substantially the same. In the Newfoundland and Labrador offshore area, such activities are regulated by the C-NLOPB under the *Canada-Newfoundland Atlantic Accord Implementation Act*, S.C. 1987, c. 3 and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation (Newfoundland and Labrador) Act*, R.S.N. 1990, c. C-2. In the Nova Scotia offshore area, oil and gas activities are regulated by the CNSOPB under the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, S.C. 1988, c. 28 and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c. 3. The NEB is responsible for regulating oil and gas operations in the rest of Canada's offshore areas under the *Canada Oil and Gas Operations Act*, R.S.C. 1987, c. O-7.

Regulations governing drilling and production operations have been promulgated under each Act which contain requirements related to environmental protection. These Guidelines outline the minimum requirements associated with the selection of chemicals for use in offshore drilling and production operations.

These Guidelines will be formally reviewed every five years to ensure that they continue to reflect significant gains in scientific and technical knowledge. More frequent reviews may be initiated should the results of environmental effects monitoring programs or research studies indicate a higher than anticipated risk to the environment from chemicals which were selected in accordance with these Guidelines. Other reviews may be considered as the result of specific written requests to the Boards from government departments, industry, or the public.

The use of these Guidelines does not exonerate operators from their duty to meet legislation or regulatory requirements, including requirements of relevant authorizations and approvals.

## **2.0 SCOPE OF GUIDELINES**

These Guidelines provide a framework for the selection of drilling and production chemicals intended for use and possible discharge into the offshore areas under the jurisdiction of the Board. The objectives of these Guidelines promote the selection of lower toxicity chemicals to minimize the potential environmental impact of a discharge where technically feasible.

These Guidelines do not address the following:

- the approval for discharge or disposal of wastes or emissions as described in the *Offshore Waste Treatment Guidelines*;
- occupational health and safety requirements associated with chemical usage and handling;
- requirements relating to chemical storage, transportation or onshore disposal;
- the selection of domestic chemicals and other chemicals that are used on an installation that are not directly associated with drilling and production activities, such as those used for accommodations, catering, equipment and facility maintenance (e.g., lubricants, paints, etc.), safety systems and laboratory operations; and
- the selection of chemicals that are used on vessels under contract (e.g., support, standby, construction, etc.) to support operational activities.

In areas where increased risk to the environment has been identified, variations to the selection process described in these Guidelines may be required.

### **3.0 REGULATORY PROCEDURE**

Legislation requires that an operator who proposes to carry on any work or activity related to oil or gas exploration or production must first obtain an authorization from the appropriate Board. In an application for an authorization an Operator should demonstrate that they have a chemical selection process incorporated into their management system that meets the minimum expectations outlined in these Guidelines. The Board may conduct periodic audits to ensure compliance with these Guidelines, and operator specific chemical selection systems.

### **4.0 TECHNICAL CONSIDERATIONS**

#### **Chemical Transformation**

The selection criteria in these Guidelines are intended to apply to the original chemical and transformation products where they are known.

#### **Material Balance**

Once a chemical has been chosen, the quantity used and its ultimate fate should be tracked. Its “ultimate fate” could include such aspects as storage, discharge overboard, waste brought to shore, injected downhole or being left in the well, or it could be consumed in a chemical reaction. This “material balance” will be calculated, where reasonably practical, using conservative assumptions if precise information is not readily available (i.e. assume any material otherwise not accounted for is discharged).

## **5.0 SELECTION CRITERIA**

### **Step 1: Propose a Chemical for Use**

#### ***Explanation***

When a chemical is proposed for use in drilling or production operations, the OCSG should be used to determine the overall acceptability of the candidate chemical from an environmental perspective.

Collect information on the quantity, intended use and ultimate fate.

#### ***Decision Criteria***

- If information is available, continue to Step 2.
- If information is not available, seek alternatives.

### **Step 2: Is the Chemical to be Used as a Pest Control Product (Biocide)?**

#### ***Explanation***

The *Pest Control Products Act* (PCPA) governs the importation, sale and use of pest control products, including products used as biocides in the offshore. All products to be used as a pest control product must be registered in accordance with that Act and used in accordance with label instructions.

For clarification, some products may contain chemicals that are known to have pesticide like properties or may be the same chemicals as in registered pest control products; however they do not necessarily require registration under the PCPA. Only those chemicals which are intended to be used as pesticides (biocides) require PCPA registration. In cases of uncertainty, the local Pest Management Regulatory Agency offices should be contacted. For contact information, see Appendix 1.

#### ***Decision Criteria***

- If the chemical is not to be used as a pest control product, proceed to Step 3.
- If the chemical is a pest control product, is intended to be used as a pest control product, is registered under the PCPA for its intended use, and is used in accordance with instructions governing the registered use of the chemical, continue to Step 4.
- If the chemical is intended to be used as a pest control product but is not registered under the PCPA find a substitute or register the chemical.



### Step 3: Canadian Domestic Substances List (DSL)

#### *Explanation*

The *Canadian Environmental Protection Act* (CEPA) provides for the notification and control of certain manufactured and imported substances. The Domestic Substances List (DSL) is a list of substances approved for use in Canada.

Any substance that is not on the DSL is required to go through the New Substances Notification process. A new substance is assessed, and may have restrictions, controls or prohibitions imposed.

#### *Decision Criteria*

- If the chemical is on the DSL, and has not been subjected to a Significant New Activity (SNAc) notice, continue to Step 4. A chemical on the DSL is identified as a SNAc by an S or S'.
- If the chemical is identified as a SNAc, contact Environment Canada to verify how the chemical can be used. If the chemical can be used within the Environment Canada use limitations, proceed to Step 4, if not seek an alternative chemical.
- If not on the DSL and small quantity exemptions below apply, continue to Step 4.
  - Less than 1000 kg/year for Non-Domestic Substance Lists (NDSL) listed chemicals.
  - Less than 100 kg/year for all other chemicals.
- If not on the DSL and small quantity exemptions will be exceeded, confirm registration or register the chemical under the *New Substances Notification Regulations* (NSNR), or seek an alternative chemical (see Appendix 1 for NSNR contact information).

### Step 4: CEPA Toxic Substances

#### *Explanation*

Schedule 1 of *CEPA* is a list of substances that are considered toxic. Substances determined to be “**toxic**” may have risk management strategies or may be proposed for “**virtual elimination**” under *CEPA*.

For chemicals already in use, verification of whether they have been added to the List of Toxic Substances should be conducted regularly.

#### *Decision Criteria*

- If the chemical or its constituents are not on the *CEPA* List of Toxic Substances, continue to Step 5.
- If the chemical and/or any constituents of the proposed substance are listed on *CEPA* List of Toxic Substances, ensure use of the chemical is in accordance with *CEPA* risk management strategies for the substance and continue to Step 5.

- If the chemical or its constituents are on the Virtual Elimination List, consider alternatives.

### **Step 5: Discharge to the Marine Environment**

#### ***Explanation***

Determine whether a discharge of the chemical is intended. If there is a discharge, the subsequent steps apply to chemicals which are discharged to the marine environment.

#### ***Decision Criteria***

- If no discharge is intended, accept the chemical for use.
- If a discharge is intended, continue to Step 6.

It should be noted that all discharges are subject to Board approval. These guidelines do not provide for authorization of any discharges.

### **Step 6: OSPAR Pose Little or No Risk to the Environment (PLONOR) List**

#### ***Explanation***

The PLONOR List, generally agreed upon by OSPAR countries, contains a list of substances that will pose little or no risk to the environment.

#### ***Decision Criteria***

- If all the constituents of a chemical are on the PLONOR List, accept product/chemical for use.
- If one or more of the constituents of a chemical are not on the PLONOR List, continue to Step 7.

### **Step 7: PARCOM OCNS Hazard Rating**

#### ***Explanation***

The Centre for Environment, Fisheries and Aquaculture Science (Cefas), on behalf of the UK government, assigns product ratings for the petroleum industry based on the Offshore Chemical Notification Scheme (OCNS). These ratings are based on the physical, chemical and ecotoxicological properties of products. Cefas publishes a list of ranked products and their hazard classifications (see Appendix 2). The assigned hazard groups vary from category A (most hazardous) through E (least hazardous), and hazard quotient colour bands from purple (most hazardous), through orange, blue, white, and silver, to gold (least hazardous).

Operators should select chemicals with the least environmental risk where appropriate.

#### ***Decision Criteria***

- If there is no OCNS rating, continue to:
  - Step 8 if quantities of less than 10 tonnes per year per installation will be discharged.
  - Step 9 if more than 10 tonnes per year per installation will be discharged.
- If rated C through E, or colour band silver or gold, accept chemical.
- If rated A or B, or colour band purple, orange, blue or white, proceed to Step 9 for further hazard assessment or Step 10.

**Step 8: Is the Microtox EC50(15) > 75%**

***Explanation***

Although there are several toxicity tests available, the Microtox test has been selected as an initial screening test for these Guidelines. The Microtox test is one of the most widely accepted toxicity tests, and provides a rapid and cost effective method to evaluate the potential toxicity of production and/or drilling chemicals. Hydrocarbons are relatively toxic to the Microtox bioassay but could have little effect on other bioassays such as rainbow trout. Biological Test Method: Toxicity Test Using Luminescent Bacteria. Report EPS 1/RM/24 has been selected as the preferred screening protocol for these Guidelines. In the test mixture, the concentration of the chemical must be the same as the intended discharge concentration.

The following Microtox values should be used to determine the toxicity of a chemical formulation:

|                         |                                |
|-------------------------|--------------------------------|
| <b><u>EC-50(15)</u></b> | <b><u>Toxicity</u></b>         |
| <b>≤ 75%</b>            | <b>Toxic (fails test)</b>      |
| <b>&gt; 75%</b>         | <b>Non-toxic (passes test)</b> |

Although the chemical passes the Microtox test, a discharge and time limit as defined below should be imposed to reduce any potential adverse environmental effects which would not be predicted because the test is not universally applied. A chemical which passes this test should not be discharged in quantities greater than 10 tonnes per year per installation and for periods greater than two years without a Hazard Assessment (Step 9).

***Decision Criteria***

- If the chemical passes the test, then accept chemical and apply discharge limit of less than 10 tonnes per year per installation for a maximum of two years.
- If the candidate chemical fails the test or quantity discharged exceeds 10 tonnes per year per installation, or the use period exceeds two years, then proceed to Step 9.

## **Step 9: Hazard Assessment**

### ***Explanation***

If the preceding steps do not enable the operator to determine the acceptability of a given chemical, the operator may conduct a chemical specific hazard assessment of the candidate chemical to determine its suitability for use.

The hazard assessment process should be documented and conducted in accordance with the UK OCNS models outlined in Appendix 2. If the OCNS models are not used, an equivalent methodology and criteria should be used to demonstrate to the appropriate Board that the objectives of these Guidelines have been met.

The OCNS (or equivalent) rating may be re-assessed with the application of site specific information before applying the decision criteria.

### ***Decision Criteria***

- If rated equivalent to C through E, or colour band, silver or gold, accept chemical.
- If rated equivalent to A or B, or colour band purple, orange, blue or white, proceed to Step 10.

## **Step 10: Risk Justification**

### ***Explanation***

If there is no alternative to discharging an A or B chemical, or a colour band purple, orange, blue or white chemical, develop and provide justification that demonstrates to the Board how the discharge of the chemical will meet the objective of the Guidelines

### ***Decision Criteria***

- If justification is acceptable to the appropriate Board, accept the chemical for use.
- If justification is not acceptable to the Board, reject the chemical.

## **6.0 RECORDS TO BE MAINTAINED AND REPORTING REQUIREMENTS**

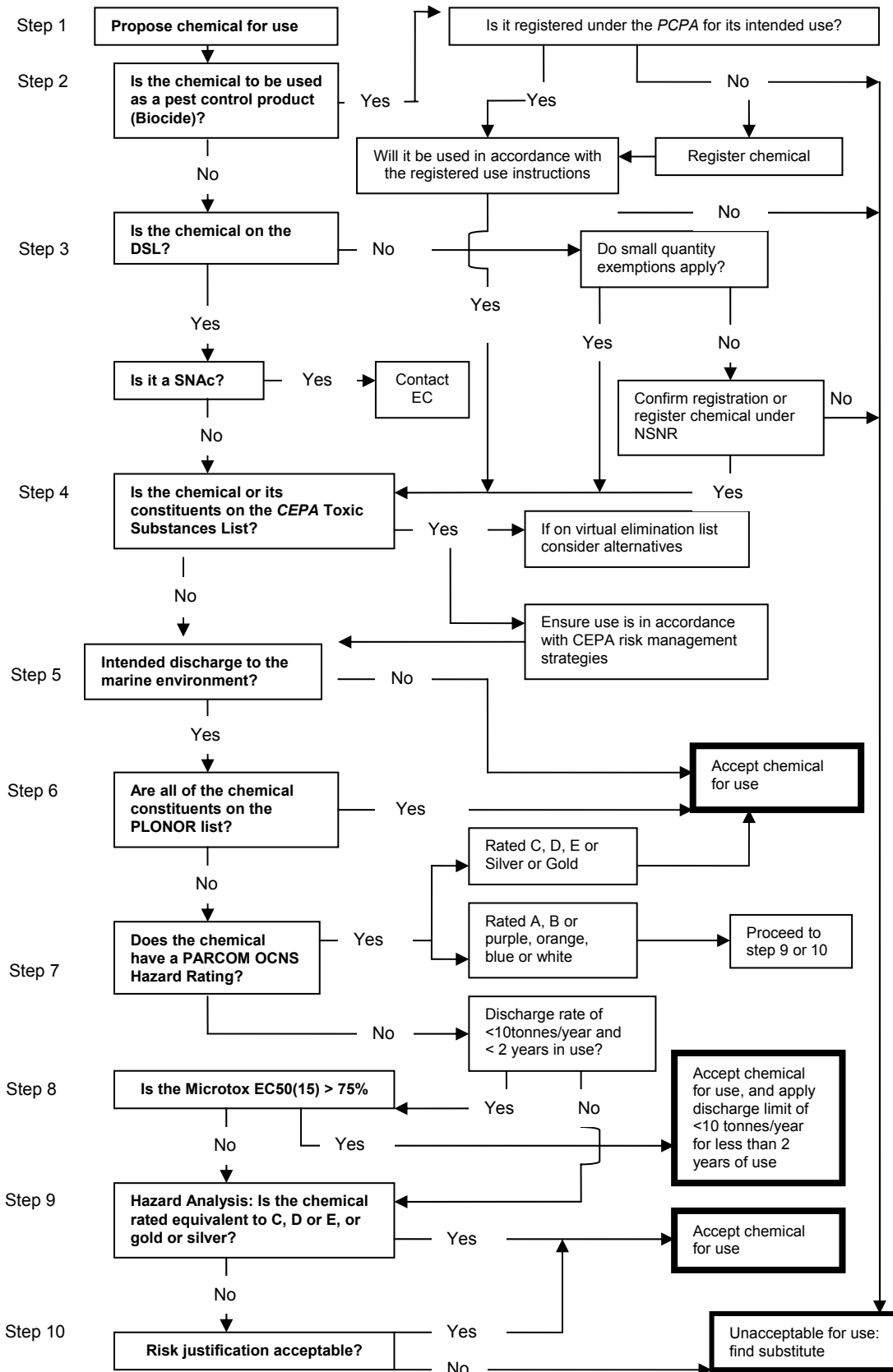
### **Records**

Operators shall keep records of the steps used to evaluate prospective chemicals. These records may be audited by the Board.

### **Reporting**

Operators shall prepare and submit annually, a report that outlines each chemical used in the past year, including the hazard rating, quantity used, and its ultimate fate.

**FIGURE 6-1: CHEMICAL SELECTION FLOWCHART**



## APPENDIX 1

### SELECTED REFERENCES AND CONTACT INFORMATION

**Disclaimer: The information provided in this appendix was current as of the publication date of these Guidelines.**

1. *CEPA*, New Substances Notification and DSL/SNAc  
  
Telephone: (800) 567-1999 (Within Canada)  
(819) 953-7156 (Outside of Canada)  
  
E-mail: nsn-infoline@ec.gc.ca  
  
SNAc website: [http://www.ec.gc.ca/Substances/nsb/eng/bio\\_snac\\_e.shtml](http://www.ec.gc.ca/Substances/nsb/eng/bio_snac_e.shtml)  
  
*CEPA* website: <http://www.ec.gc.ca/CEPARegistry/>
2. Pest Management Regulatory Agency  
  
Telephone: (800)-267-6315 (Within Canada)  
(613)-736-3799 (Outside of Canada)  
  
E-mail: pmra\_infoserv@hc-sc.gc.ca  
  
Website: <http://www.pmra-arla.gc.ca>
3. Oslo and Paris Commissions (OSPAR) Website  
  
OSPAR Website: <http://www.ospar.org/eng/html/welcome.html>
4. Chemical Hazard Assessment and Risk Management (CHARM) Users Manual (Version 1.4, 2004)  
  
CHARM Website: <http://www.ogp.org.uk/pubs/charmmanualfeb05.pdf>
5. OCNS website: [http://www.cefas.co.uk/offshore-chemical-notification-scheme-\(ocns\).aspx](http://www.cefas.co.uk/offshore-chemical-notification-scheme-(ocns).aspx)
6. Environment Canada. Biological Test Method. Toxicity Test Using Luminescent Bacteria (Report EPS 1/RM/24), 1992.

## APPENDIX 2

### HAZARD ASSESSMENT

This appendix will provide initial guidance for the completion of a hazard assessment if the screening of the chemical is directed towards Step 9 of these Guidelines. The results and methodology of this assessment must be made available to the appropriate Board for audit purposes upon request.

The following is a brief description of the Harmonized Offshore Chemical Notification Format (HOCNF) required to complete a Cefas OCNS rating.

The hazard assessment should include information on the composition, fate and toxicity of the chemical in question. Under composition, the following information should be provided:

- Trade name
- Supplier and/or manufacturer
- Composition - name, concentration, toxic substances present in the chemical (i.e. metals, organohalogens, pesticides, petroleum compounds)
- CEPA or OSPAR lists
- Material Safety Data Sheet (MSDS) information
- Physical properties - liquid, solid, mixture, whether components of the chemical float, dissolve or sink in seawater.

The following information should be considered in determining the fate of a chemical:

- Use - function and process applied
- Normal dose rate - concentration and quantity per day
- Partitioning behavior for organic substances and organo-metals
- Bioaccumulation/bioconcentration
- Biodegradability (aerobic and anaerobic)
- Chemical degradation
- Discharge - % of total use, quantity discharged
- Adsorbability for chemicals which sink or adsorb to sediments
- Likely fate if known (mass balance).

To determine a chemical's toxicity, the relevant toxicity for the following organisms should be evaluated:

- algae
- invertebrates
- fish, and
- sediment reworker (as required).

As a minimum the data generated above should include details on the analytical protocols followed and should include laboratory quality assurance/quality control information.

The interpretation of the above test data will follow the OSPAR Convention models used for OCNS ratings to develop:

- an equivalent non-CHARM hazard category A through E; or
- an equivalent CHARM Hazard Quotient (HQ).

The CHARM or CHARM equivalent HQ can be re-assessed to generate a Risk Quotient (RQ) if installation-specific information is available, such as flow and discharge rates, and characteristics of the discharge dispersion plume.

The following tables describe the toxicity and HQ values associated with the OCNS ratings:

**Table 1: The OCNS HQ and colour bands<sup>1</sup>**

| Minimum HQ value | Maximum HQ value | Colour banding |                                                                                                                                  |
|------------------|------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|
| >0               | <1               | Gold           | <p>Lowest Hazard</p>  <p>Highest Hazard</p> |
| ≥1               | <30              | Silver         |                                                                                                                                  |
| ≥30              | <100             | White          |                                                                                                                                  |
| ≥100             | <300             | Blue           |                                                                                                                                  |
| ≥300             | <1000            | Orange         |                                                                                                                                  |
| ≥1000            |                  | Purple         |                                                                                                                                  |

<sup>1</sup> Centre for Environment, Fisheries & Aquaculture Science (Cefas)( [http://www.cefas.co.uk/offshore-chemical-notification-scheme-\(ocns\)/hazard-assessment.aspx](http://www.cefas.co.uk/offshore-chemical-notification-scheme-(ocns)/hazard-assessment.aspx))



**Table 2: The OCNS letter grouping<sup>2</sup>**

| <b>Initial OCNS grouping</b> | <b>Result for aquatic toxicity (mg/l)</b> | <b>Result for sediment toxicity (mg/l)</b> |
|------------------------------|-------------------------------------------|--------------------------------------------|
| A                            | <1                                        | <10                                        |
| B                            | >1 - 10                                   | >10 - 100                                  |
| C                            | >10 - 100                                 | >100 - 1,000                               |
| D                            | >100 - 1,000                              | >1,000 - 10,000                            |
| E                            | >1,000                                    | >10,000                                    |

These letter groupings are adjusted based on biodegradation and bioaccumulation of the chemical. Adjustment of grouping is made according to Table 3.

**Table 3: The OCNS letter grouping Adjustment<sup>3</sup>**

| <b>Increase by 2 Groups e.g. From C to E</b>                  | <b>Increase by 1 Groups e.g. From C to D</b>                     | <b>Do not adjust initial grouping</b>                                                                                           | <b>Decrease by 1 group e.g. From C to B</b>              | <b>Decrease by 2 groups e.g. From C to A</b>     |
|---------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------|
| Substance is readily biodegradable and is non-bioaccumulative | Substance is inherently biodegradable and is non-bioaccumulative | Substance is not biodegradable and is non-bioaccumulative<br><b>Or</b><br>Substance is readily biodegradable and bioaccumulates | Substance is inherently biodegradable and bioaccumulates | Substance does not biodegrade and bioaccumulates |

Chemicals screened using the risk assessment process are rejected or accepted depending on whether the assigned OCNS or equivalent rating is acceptable for use, as defined in Step 9 of these Guidelines.

2 Centre for Environment, Fisheries & Aquaculture Science (Cefas)( [http://www.cefas.co.uk/offshore-chemical-notification-scheme-\(ocns\)/hazard-assessment.aspx](http://www.cefas.co.uk/offshore-chemical-notification-scheme-(ocns)/hazard-assessment.aspx))

3 *Guidelines To UK Offshore Chemical Notification Scheme Including The Classification Of Chemicals That Cannot Be Ranked By The Charm Model*. July 2006. Prepared by: Cefas, Burnham-on-Crouch, Essex

## **APPENDIX 3**

### **MEMBERSHIP OF WORKING GROUP**

#### **Regulatory Members**

Canada-Newfoundland and Labrador Offshore Petroleum Board

Canada-Nova Scotia Offshore Petroleum Board

Environment Canada

Fisheries and Oceans Canada

Indian and Northern Affairs Canada

National Energy Board

Natural Resources Canada

#### **CAPP Industry Representatives**

ExxonMobil

Husky Energy

Petro-Canada

#### **Non-Government Organizations**

Inuvialuit Game Council

Natural History Society of Newfoundland and Labrador