

**GUIDELINES RESPECTING
THE SELECTION OF CHEMICALS
INTENDED TO BE USED IN
CONJUNCTION WITH OFFSHORE
DRILLING & PRODUCTION ACTIVITIES
ON FRONTIER LANDS**

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National Energy Board

Canada - Newfoundland Offshore Petroleum Board

Canada - Nova Scotia Offshore Petroleum Board

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Offshore Chemical Selection Guidelines Introduction

The Offshore Chemical Selection Guidelines (OCSG) are intended to provide a consistent framework for chemical selection as part of the environmentally responsible management of chemicals used in offshore drilling and production activities under the jurisdiction of the National Energy Board (NEB), the Canada-Newfoundland Offshore Petroleum Board (C-NOPB) 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 working group established for this purpose. A listing of the membership of the working group is provided in Appendix 2.

The Boards were established and operate pursuant to federal and provincial legislation. In addition to this Board enabling legislation, there is legislation of general application that provides limitations on the discharge of substances into the marine environment. The applicable legislation is outlined in the "Legislative Framework" section of this guideline.

Within this legislative framework there exists several regulatory requirements providing for certain restrictions on the importation, transportation, handling, use and discharge of chemicals. However, these provide limited direction on the usage and discharge of chemicals into the marine environment from petroleum operations. Consequently, these Guidelines have been created.

These Guidelines will normally be applied by industry in making decisions related to the selection of chemicals to be used in offshore drilling and production activities, and to the treatment and disposal of the chemicals selected. The Boards will conduct periodic audits to ensure compliance with these Guidelines, and to ensure that these Guidelines are achieving their objective of minimizing impacts from the discharge of chemicals to the marine environment.

This joint regulatory/industry guideline has been produced with the following objectives:

to minimize the environmental impact from the discharge of chemicals used in offshore operations;

· to promote the use of "environmentally friendly" alternatives where practical;

to develop a system that achieves the maximum benefit with the least amount of effort and cost to both the industry and the regulator;

to provide an industry-driven system that can be audited by the regulatory community;

to provide regulatory clarity to the extent possible by guidelines; and,

to provide the basis for a regulation that can be put into effect to provide a higher level of regulatory clarity.

It is intended that the Boards and other regulatory departments or agencies will cooperate to establish a system that regulates the use of offshore chemicals in accordance with these Guidelines. In addition, the Boards will undertake to establish regulations, or to modify existing regulations, to embody the principles of the Guidelines.

A formal review of these Guidelines will be undertaken after an 18 month trial period to address problems which may arise through their initial implementation and use. The Guidelines will also be formally reviewed at least once every five years thereafter 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.

Scope of Guidelines

These Guidelines apply to the selection and use of all offshore drilling and production chemicals which may be discharged into the marine environment. These discharge streams (i.e. cuttings, cooling water, produced water) would normally be authorized or regulated by one of the Boards.

These Guidelines are not applicable for the selection and use of domestic chemicals or chemicals that are used on-board offshore drilling or production facilities that are not associated with production or drilling (i.e. cleaning products, paints, biocides on platform or rig structures, anodes, etc.). These Guidelines do not apply to the selection of chemicals which may be discharged from vessels that are under contract to perform specific tasks, such as construction vessels. In these instances, international requirements for the safe use of chemicals will be applied.

Legislative Framework

Offshore Petroleum Legislation

The regulatory frameworks applicable to oil and gas activities in each of Canada's offshore areas are broadly the same. In the Newfoundland offshore area, such activities are administered by the C-NOPB under the *Canada-Newfoundland Atlantic Accord Implementation Act*, S.C. 1987, c. 3 and the *Canada-Newfoundland Atlantic Accord Implementation (Newfoundland) Act*, R.S.N. 1990, c. C-2. In the Nova Scotia offshore area, oil and gas activities are administered by the CNSOPB under the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, S.C. 1988, c-2 and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c. 3. The NEB is responsible for the regulation of 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. This legislation collectively shall be referred to as the energy legislation.

Regulations governing drilling and production operations have been promulgated under each Act which contain requirements related to the protection of the environment. The three Boards have also issued the Offshore Waste Treatment Guidelines, 1996.

The selection of chemicals for Canadian offshore petroleum activities currently does not have specific regulatory requirements under the energy legislation or regulations. The Production and Conservation Regulations require that an operator include in its Environmental Protection Plan, a summary of chemical substances intended for use in the operation and maintenance of a production installation. There are no similar requirements for other petroleum related activities.

There are other regulatory requirements of general application in Canada that provide some restrictions on the transportation, handling and use of chemicals, however, these provide limited direction on the discharge of chemicals into the marine environment. Some of the relevant requirements are as follows:

Fisheries Act

Section 36 (3) of the *Fisheries Act* states that "... no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish....". Deleterious is broadly defined in Section 34 of the Act to mean "any substance" or "any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would", if added to any water, "degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water". Case history provides some additional clarification.

Section 36 (3) of the Act is not contravened if the waste or pollutant is "in a quantity and under conditions authorized by regulations applicable to that water or place made by the Governor in Council..."

Canadian Environmental Protection Act (CEPA)

CEPA, amongst other things, provides for the notification and control of certain substances. Regulations have been made under sections 26 to 32 of CEPA for the notification of the manufacture or importation of new substances. Any substance that is not on the Domestic Substances List is required to go through this process. A new substance is assessed for toxicity and may have restrictions, controls or prohibitions imposed.

Under CEPA there is also a "Prohibited Substances List". This is a list of chemicals that are prohibited to be imported, exported or dumped into the ocean under an Ocean Dumping Permit.

Part VI of CEPA provides for the control of ocean disposal. This requires specific authorization prior to dumping or discharging material into the ocean. The definition of dumping, and subsequently the Act, does not include "any disposal that is incidental to or derived from the normal operations of a ship, aircraft or platform" or "any discharge that is incidental to or derived from the exploration for, exploitation of and associated off-shore processing of sea bed mineral resources".

Pest Control Products Act

This requires registration or authorization for the specific use of pesticides. This would include oil field biocides but otherwise would not capture substances used in offshore drilling and production operations.

Transportation of Dangerous Goods Act (TDG)

The TDG Act places certain restrictions on the transportation of dangerous goods, but does not provide for the regulation of substance use or discharge.

Hazardous Products Act

This Act is the basis for WHMIS (Workplace Hazardous Materials Information System). WHMIS provides a system whereby certain substances are labeled appropriately to advise individuals who may come into contact with them of their potential hazards. It does not control discharges, nor does it specifically consider the ecological acceptability of substances.

International Commitments

Canada has signed or ratified a number of international marine conventions, agreements and guidelines, collectively representing its goal of protecting and conserving the environment and living resources in the coastal and offshore marine regions under its jurisdiction. These include the United Nations Law of the Sea Convention (1994), MARPOL 73/78 (the international Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978), Agenda 21 (United Nations Conference on Environment and Development 1992), the Convention on Biological Diversity (1992), and the Organization for Economic Cooperation and Development (OECD)'s Environment Directorate Guidelines on Harmonization of Classification and Labeling (in final preparation 1998). The principles of sustainable development, precaution (i.e. the precautionary principle), and integrated management pervade these instruments. The present Offshore Chemical Selection Guidelines have been prepared within the context and with the recognition of the obligations set forth by this international framework. They also are harmonized to the maximum extent with the methodologies of international bodies as those mentioned above.

Regulatory Procedure

The energy legislation require that a person 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. (Each Board may delegate its power to issue work authorizations, and this function is normally handled for the Boards by the Chief Conservation Officers. Other persons may, however, be delegated this function). Such authorizations may be made subject to such requirements as the Board (or its delegate) determines, and it is the intention that such authorizations will normally be subject to conditions pertaining to the selection of chemicals that will be done in accordance with these Guidelines.

The Boards will require that, for every operation that involves the offshore use of chemicals, and discharge of chemicals to the marine environment, operators are able to demonstrate that they have a chemical selection process incorporated in their management system that will achieve results equivalent to those achieved by the application of these Guidelines. Selection processes may be audited by the appropriate Board, therefore complete access to audit the process shall be provided by the operator and its contractors.

Consultation between the Boards and federal departments will be undertaken as required to determine if the discharge of chemicals to the marine environment may result in a violation of the *Fisheries Act*.

Technical Considerations

Chemical Data Base

The establishment of a data base for the chemicals that have been used in the offshore areas pursuant to these Guidelines is beyond the scope of these Guidelines. Following implementation of these Guidelines, the industry and regulators will review the merits of establishing a single data base or of sharing data.

Chemical Transformation

The selection criteria in these Guidelines are intended to be primarily used for the selection of chemicals based on the characteristics of the chemicals prior to usage. Technical judgment is to be exercised to determine if this is appropriate for a particular chemical being proposed. If it is established that the chemical will undergo transformation in the process prior to any potential discharge, and if the characteristics of the transformed chemical are known, it may be more appropriate to apply the selection criteria on the transformed chemical.

Material Balance

Once a chemical has been chosen, the quantity used, where it goes, and its ultimate discharge should be tracked. "Where it goes" could include such aspects as storage, discharge overboard, waste brought to shore, re-injection 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 that most of the chemical will be discharged).

Environmental Effects Monitoring

Although the goal of these Guidelines is to reduce the environmental impacts of discharges from offshore installations through a rigorous chemical selection process, the potential for adverse environmental effects still exists. Environmental conditions unique to each location may result in different site-specific ecological effects from the discharge of similar chemicals. In addition, laboratory toxicity tests do not always accurately predict actual effects in the field.

Operators should therefore consider developing environmental effects monitoring (EEM) programs to detect and document any adverse environmental effects which may result from the discharge of chemicals to the marine environment. These EEM programs can also be a component of a broader EEM program developed for the operation as a whole (i.e. EEM for a development project). If this is the case, information on chemicals subject to discharge should be provided to the individuals responsible for designing the project's EEM program. The results of these programs will be used by regulatory agencies, in consultation with industry and other interested parties, to help in determining whether or not these Guidelines are achieving their stated objective of environmental protection.

SELECTION CRITERIA

Step 1: Propose Chemical for Application

Explanation

The chemical supplier will nominate a candidate chemical for a particular offshore treatment application based on its proven performance, cost and perceived efficacy. The OCSG screening flowchart should be used to determine the overall acceptability of the candidate chemical from an environmental/safety perspective. The flowchart shall apply to all production and drilling chemicals with the exception of common janitorial (a separate policy will apply for selection of appropriate chemicals), laboratory and other chemicals (disposal controlled under separate procedures) not intended for production and drilling applications.

Decision Criteria

Suitability of the chemical is based on its performance, cost and efficacy.

Step 2: Chemical to be used as a Biocide?

Explanation

Any biocide imported into, sold or used in Canada must first be registered under the Pest Control Products (PCP) Act. Before registration can be granted all pest control products must undergo a rigorous scientific evaluation to determine their safety, merit and value for the proposed use.

Decision Criteria

If a chemical is to be used as a biocide determine if it is registered for its intended use under the PCP Act. If yes, continue to Step 4. If no, look for a substitute chemical.

If chemical is not going to be used as a biocide continue to Step 3.

Step 3: Canadian Domestic Substances List (DSL)

Explanation

Before a chemical or its constituents can be imported into or used in Canada it must be on the DSL. Oil and gas chemicals and their constituents must therefore be assessed under CEPA for acceptability for use in Canada prior to importation and procurement. Although new chemicals cannot be added to the DSL, they can be assessed and approved for usage under the New Substances Regulations.

Decision Criteria

If chemical is not on DSL, determine whether to submit New Substances Notification. If yes, continue Step 3, if no, then look for substitute chemical.

Continue to Step 4 if on DSL.

Step 4: Hazardous to Humans?

Explanation

MSD sheets contain a comprehensive listing of information required to assess the potential occupational and environmental hazards associated with various chemicals. OH&S legislation requires that up-to-date MSD sheets accompany or be available to any worker exposed to a given chemical. Section 6 of the MSD sheets provide toxicological information on carcinogenicity and mutagenicity and is the basis of the IARC, USOSHA (see Appendix 1 - Abbreviations and Definitions), and Health & Welfare Canada Listing.

Decision Criteria

If chemical or constituents are known carcinogens or mutagens as indicated under Section 6 of the MSDS, then determine if worker safeguards are adequate. If yes, proceed to Step 5, if no, then choose an alternate chemical for application .

If chemical or constituent are not known carcinogens or mutagens proceed to Step 5.

Step 5: Discharge to Environment?

Explanation

Determining whether or not an operational discharge of the chemical will occur determines what chemicals can be used in offshore operations. Legislation identified on the screening flowchart below Step 5 apply to chemicals which are discharged to the marine environment. Thus, if there is no operational discharge, then there is no need to go any further in the screening process.

Decision Criteria

If no operational discharge of a chemical occurs accept chemical. The following factors should be evaluated to determine if discharge occurs:

Determine if the system to which chemical is added is designed to be closed or open. If closed and no discharge occurs then accept product/chemical.

Determine if the stream to be treated has components that are discharged and components that are not (e.g., mixed phase production).

Determine the partitioning behavior of product/chemical in treated stream and calculate discharged amount.

If an operational discharge occurs then continue to Step 6.

Step 6: CEPA Prohibited, Toxic, and Restricted List

Explanation

This contains a list of substances restricted or approved for the purposes of ocean disposal.

Decision Criteria

If chemical or its constituents are on any of these lists then continue to Step 12 - Hazard Analysis?

If chemical or its constituent are not on these lists continue to Step 7.

Step 7: OSPAR HOCNF Taint List

Explanation

This contains a list of substances liable to cause tainting in fish tissues. These substances are therefore to be avoided if their fate is such that they will impact the environment (through water column or sediment contamination) in an area where a fishery could be affected. However, it is sometimes necessary to use these substances with a taint warning because of a lack of feasible alternatives.

Decision Criteria

If chemical or constituents are on Part 4 of the PARCOM HOCNF Taint List then continue to Step 12.

If chemical or constituents are not on list continue to Step 8.

Step 8: OSPAR List A or B

Explanation

This contains a list of substances generally agreed upon by PARCOM countries that will not cause problems at sea (environmentally benign) or substances known to be potentially of environmental concern but for which there is sufficient information to enable safe use.

Decision Criteria

If chemical or constituents are on the "List of Substances/Preparations Used and Discharged Offshore. Oslo and Paris Conventions for the Prevention of Marine Pollution Programs and Measures Committee (PRAM), Oviedo: 20-24 February, 1995" (Formerly known as OSPAR List A), accept product/chemical.

If chemical or constituents are on the "Decisions and Recommendations of the Oslo and Paris Commissions 1992 - 1995, PARCOM Decision 94/1 on Substances/Preparations Used and Discharged Offshore, Appendix 1" (Formerly known as OSPAR List B), accept product/chemical for use subject to applicable Canadian regulations. If chemical appears in Appendix 2 then reject chemical and seek alternative.

If not on lists continue to Step 9.

Step 9: PARCOM OCNS Hazard Rating

Explanation

OCNS rating is done by the UK government. The UK Department of Trade and Industry publishes a list with ratings which has resulted in the hazard classification of a substantial number of drilling and production chemicals based on their physical, chemical and ecotoxicological properties. The assigned hazard rating varies from A (most hazardous) to E (least hazardous). The requirement for notification for offshore use is governed in accordance with the appropriate hazard classification (i.e., for production chemicals; Group A: 40 tonnes/year/installation versus Group E: 1000 tonnes/year/installation).

Decision Criteria

If hazard rating is Group A or B then continue to Step 12.

If rating C through E then accept chemical.

If there has been no hazard rating completed on the chemical then continue to Step 10.

Step 10: Is the Microtox EC50(15) > 75%

Explanation

CAPP Product Listing for Potential Toxicity

The Canadian Association of Petroleum Producers (CAPP) and the Petroleum Services Association of Canada (PSAC) are compiling a database of toxicity test results (using Microtox) for mud additives used in the drilling industry. This replaces the CAPP list of "Drilling Fluids Not Requiring Microtox Testing in Alberta". The database can be accessed on the internet at www.pfac.ca.

Decision Criteria

If a drilling fluid chemical is on the CAPP/PSAC list, Microtox testing shows the chemical to have an IC50(15) greater than 75%, and the chemical is proposed to be used at a concentration equal to or below the testing concentration on the list, the product/chemical is acceptable for offshore use.

· If the chemical is on the CAPP/PSAC list, and testing shows the product to have a Microtox IC50(15) less than or equal to 75%, or if the chemical is proposed to be used at a concentration above the testing concentration on the list, then proceed to Step 12.

If the product/chemical is not on the list, conduct Microtox test.

Microtox Test

The Canadian Government's *Offshore Waste Treatment Guidelines*, 1996, state that drilling muds which use oil based carrier fluids should be tested for toxicity (guidelines currently advocate rainbow trout bioassay tests) prior to use offshore. 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 5 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. Considering the above, Microtox has been selected as the preferred OCSG screening protocol.

Operators will be responsible for providing Microtox test data on chemicals to be proposed for use offshore to CanAmera United Supply Ltd., of Calgary, Alberta. Contact Brian Costom at telephone (403) 265-4401 or facsimile (403) 269-5540. This will ensure that the database is constantly updated and covers a complete range of production and drilling chemicals.

Decision Criteria

The Western Canada Microtox Users Committee has developed a standard procedure for Microtox analysis (Alberta Environmental Centre 1994). The product chemical will be tested at its intended use concentration. The following Microtox values are to be used to determine the toxicity of a chemical formulation:

IC-50(15) Toxicity

_ 75% Toxic (fails test)

> 75% Non-toxic (passes test)

If the candidate chemical fails the test then proceed to Step 12.

If the chemical passes the test then proceed to Step 11.

Step 11: Evaluate Discharge Quantity

Explanation

Although the product/chemical passes the Microtox test, a discharge limit will be imposed to help prevent any potential adverse environmental effects which would not be predicted due to the non-general nature of the test. To ensure a conservative value, the mass equivalent to the PARCOM B rating is to be used.

Decision Criteria

If the product/chemical use is predicted to be > 10 t/y, then proceed to Step 12.

If the predicted use is up to 10 t/y then accept the product/chemical.

Step 12: Hazard Analysis?

Explanation

The preceding steps of the chemical hazard screening flowchart have been designed to allow operators to make an informed decision on the environmental acceptability of the majority of chemicals proposed for use offshore. If, however, the flowchart is unable to determine the acceptability of a given chemical, the operator should decide whether to conduct a chemical specific hazard analysis of the candidate chemical to determine its suitability for use.

Decision Criteria

The decision to proceed should be based on the time constraints, availability of data, and cost of performing a hazard analysis. If any of these elements are deemed excessive, then an alternative chemical must be sought.

If the decision, based on the factors above, is to undertake a hazard analysis, or no other product/chemical is suitable, then proceed to Step 13.

Step 13: Hazard Analysis Process

Explanation

The chemical hazard screening flowchart has been designed to allow operators to make an informed decision on the environmental acceptability of the majority of proposed chemicals for use offshore. If, however, the flowchart is unable to determine the acceptability of a given chemical the operator should conduct a hazard analysis of the candidate chemical to determine its suitability for use. The hazard analysis should consider the criteria detailed in Appendix 3.

Decision Criteria

The hazard analysis process should be documented and conducted according to standardized hazard assessment techniques. Sound professional judgment should be used to determine the ultimate acceptability of chemical use. The process used should be documented and submitted to the appropriate Board to facilitate operator and/or regulator audits. Guidelines for conducting the analysis of data are included in Appendix 3.

If a chemical passes the hazard analysis then accept the chemical for use. If it fails, look for a substitute.

RECORDS TO BE MAINTAINED

Operators shall keep records of the steps used to evaluate prospective chemicals, which may be audited by the regulatory community.

APPENDIX 1

ABBREVIATIONS AND DEFINITIONS

CAPP Canadian Association of Petroleum Producers

CEPA Canadian Environmental Protection Act

C-NOPB Canada-Newfoundland Offshore Petroleum Board

CNSOPB Canada-Nova Scotia Offshore Petroleum Board

DSL Domestic Substances List

EEM Environmental Effects Monitoring

HOCNF Harmonized Offshore Chemical Notification Format

IARC International Agency for Research on Cancer

IC50 Inhibiting Concentration

MSD(S) Material Data Safety (Sheets)

NEB National Energy Board

OCNS Offshore Chemical Notification Scheme

OCSG Offshore Chemical Selection Guidelines

OH&S Occupational Health and Safety

OSPAR Oslo and Paris Commissions

PARCOM Paris Commission (one of the two forerunners of OSPAR)

PCP Pest Control Products

PSAC Petroleum Services Association of Canada

TDG Transport of Dangerous Goods

UK United Kingdom

USOSHA United States Occupational Safety and Health Administration

WHMIS Workplace Hazardous Materials Inventory System

APPENDIX 2

MEMBERSHIP OF WORKING GROUP

Regulatory Members

Canada - Nova Scotia Offshore Petroleum Board

Canada - Newfoundland Offshore Petroleum Board

National Energy Board

Environment Canada

Department of Fisheries and Oceans

Industry Members

Hibernia Management and Development Corporation

PanCanadian Nova Scotia Limited

Mobil Oil Canada

PetroCanada

Sable Offshore Energy Incorporated

Canadian Association of Petroleum Producers

APPENDIX 3

HAZARD ANALYSIS

This appendix will provide initial guidance for the completion of a hazard analysis if the assessment of the chemical is directed towards Steps 13 and 14 of the OCSG flowchart. Based on this analysis, the chemical will either be approved for use or rejected. The results and methodology of this analysis must be made available to the appropriate Board for audit purposes.

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

- Trade name
- Supplier/Distributor/Producer/Importer
- Composition - name, concentration, toxic substances present in the chemical (i.e. metals, organohalogens, pesticides, petroleum compounds), CEPA or OSPAR lists
- MSDS information
- Physical properties - liquid, solid, mixture, whether the product floats, dissolves or sinks in seawater.

The following should be determined for fate:

- 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)

The following tests should be conducted to determine toxicity:

- Microtox test or a plant test, and invertebrate test, fish test, sediment reworker test
- These toxicity tests must include both acute lethality and sub-lethal chronic tests

The data generated above must include details on the laboratory used, analytical protocols, and QA/QC information.

The interpretation of the data will follow the OSPARCOM Model, which classifies the results of toxicity, biodegradation and bioaccumulation tests into different groups. Each group is assigned a different discharge rate. The chemical will be rejected/accepted depending on whether the proposed discharge exceeds or falls within the discharge rate for the appropriate group.