

The Arctic Council Offshore Oil and Gas Guidelines Recommendations for HSE Management Systems

Principle(s)

Continuous improvement (AOOGG p 6)

All parties should continually strive to improve health, environment and safety by identifying the processes, activities and products that need improvement, and implement necessary improvement measures. The process of identifying what can be improved may be based on mappings and results of analyses, investigation of situations of hazard and accident, or near hazards and accidents, handling of non-conformities, experience from internal follow-up or auditing, or experience gained by others.

Safety and Environmental Management (AOOGG p 25)

Two basic regulatory approaches are available for dealing with the safety and environmental aspects of offshore Arctic oil and gas operations. They are: (A) a performance-based system and (B) a prescriptive approach.

- (A) In the performance based approach, the regulator sets specific quantifiable goals but does not specify how the operator must meet these goals. This system allows the operator the flexibility to specify how they intend to comply with a regulatory body's mandate that operations be conducted safely and in an environmentally sound manner. There are a variety of approaches available to the operator to meet the intent of this alternative, including the use of technical standards, company guidelines, "safety case" initiatives, or combinations of the above.
- (B) The prescriptive approach to regulation is based on a series of specific regulatory requirements, which typically represent minimal expectations on behalf of the regulatory body. This approach can be complemented by a performance-based program. Under the prescriptive system, a regulatory body normally develops requirements addressing all phases of offshore operations. The requirements are typically developed from a series of existing standards, practices, guidelines, and procedures. Compliance with these requirements are normally evaluated by a regulatory body through review and evaluation of a series of plans, permits, and related documents and through a system of field based inspections and evaluations.

Either regulatory approach, performance or prescriptive, can be modified to form a 'hybrid' system of regulation, composed of appropriate elements from both regimes. Such a system of regulation may represent a viable alternative for a regulatory body to consider adopting due to the systems' ease of operation and flexibility.

Today, there has been significant interest by both the offshore oil and gas industry and the various regulatory bodies to adopt, when applicable, appropriate international standards as a component of a regulatory system (performance, prescriptive, or hybrid). Use of these international standards addresses the fact that more often than not, regulators are regulating a global industry and there is value in using global standards wherever practical.

In either approach, before oil and gas activities are approved, regulatory bodies should require the operator to demonstrate financial capacity to carry out all aspects of the operation, including responding to environmental emergencies and decommissioning of facilities. This should also include the proven ability to adequately clean up oil spills.

There are many similarities between the two systems of regulation. An important management tool to assist the operator in meeting the regulatory objectives of either system, eliminating unsafe behavior, and achieving continual improvement in safety and pollution prevention practices is defining and communicating a culture focus on safety and environmental performance to the workforce and ensuring that they are fully motivated to implement it through a management system. This philosophy can also be applied to a hybrid regulatory program. See Annex F.

Management Systems (AOOGG p26)

Proper planning to address the environmental sensitivities of a project and to ensure safety of the work force is essential. Whether required by the regulator or conducted voluntarily within industry, environmental and safety planning should be contained in a formal management system. Often referred to as EMS (Environmental Management System), HSEMS (Health and Safety and Health Environmental Management System) or SEMP (Safety and Environmental Management Program) these systems focus attention on the influences that human behaviour and organization have on accidents. Various types of management system documents have been developed around the world with applicability to the offshore oil and gas industry. These include; American Petroleum Institute (Recommended Practice 75), the International Organization for Standardization (ISO 14000 and 9001 series) and Oil and Gas Producers (OGP) and UNEP/OGP publications.

These systems all have as a common and central feature a cyclic process involving sequential consideration of:

- policy and strategic objectives;
- organization, resources and documentation;
- risk evaluation and risk management;
- planning;
- implementation and monitoring; and
- auditing and review

Each step of the cyclic process requires leadership and commitment by the implementing body and the principal aim of the system is to deliver continual environmental, safety and health

performance. This is assessed by periodic audit or review of a management system's performance to ensure that necessary components are in place and that they are effective.

The key elements of a management system can be described as follows:

Policy and Strategic Objectives (AOOGG p26)

The operator's management should define and document its safety and environmental policies and strategic objectives and ensure that these:

- have equal importance with the operator's other policies and objectives;
- are implemented and maintained at all organizational levels;
- are publicly available;
- commit the operator to meet or exceed all relevant regulatory and legislative requirements;
- commit the operator to reduce the risks and hazards to health, safety and the environment (HSE) of its activities, products and services; and
- provide for the setting of safety and environmental objectives that commit the operator to continuous efforts to improve performance

The operator should also take steps to ensure that all contractors engaged in operations are also able to meet the requirements of the operator management system and applicable laws and regulations.

A more detailed and specific list of possible objectives is set out in Annex F.

Organization, Resources and Documentation (AOOGG p27)

Successful management of safety and environmental matters is a line responsibility, requiring the active participation of all levels of management and supervision. This should be reflected in the organizational structure and allocation of resources. The operator should define, document and communicate - with the aid of organizational diagrams where appropriate - the roles, responsibilities, authorities, accountabilities and interrelations necessary to implement the HSEMS and meet regulatory responsibilities. The operator should also stress and encourage individual and collective responsibility for safety and environmental performance to all employees. It should ensure that personnel are properly trained, competent, and have necessary authority and resources to perform their duties effectively.

Evaluation and risk management (AOOGG p27)

The operator should maintain and implement procedures to identify systematically the hazards and potential effects, which may affect or arise from project inception through to decommissioning and disposal. Procedures should be maintained to evaluate (assess) risk and potential effects from identified hazards against screening criteria, taking into account probabilities of occurrence and severity of consequences for:

- People;
- Environment; and
- Assets.

The operator should maintain procedures to select, evaluate and implement measures to reduce risks and effects throughout the project. Risk reduction measures should include both those to prevent incidents (*i.e.* reducing the probability of occurrence) and to mitigate chronic and acute effects (*i.e.* reducing the consequences). In all cases, risks should be reduced to a level deemed as low as reasonably practicable, reflecting amongst other factors, local conditions and circumstances, the balance of costs and benefits and the current state of scientific and technical knowledge.

Risk Assessment and Environmental Risk Analysis (AOOGG p.16)

The reason for a risk assessment or analysis is to determine if an action has an acceptable level of risk. Both regulators and industry use the information gathered through an EIA and risk analysis to make decisions on whether a proposed activity or development should go forward as planned, to institute preventative and mitigating measures to reduce risk, or to chose another alternative action.

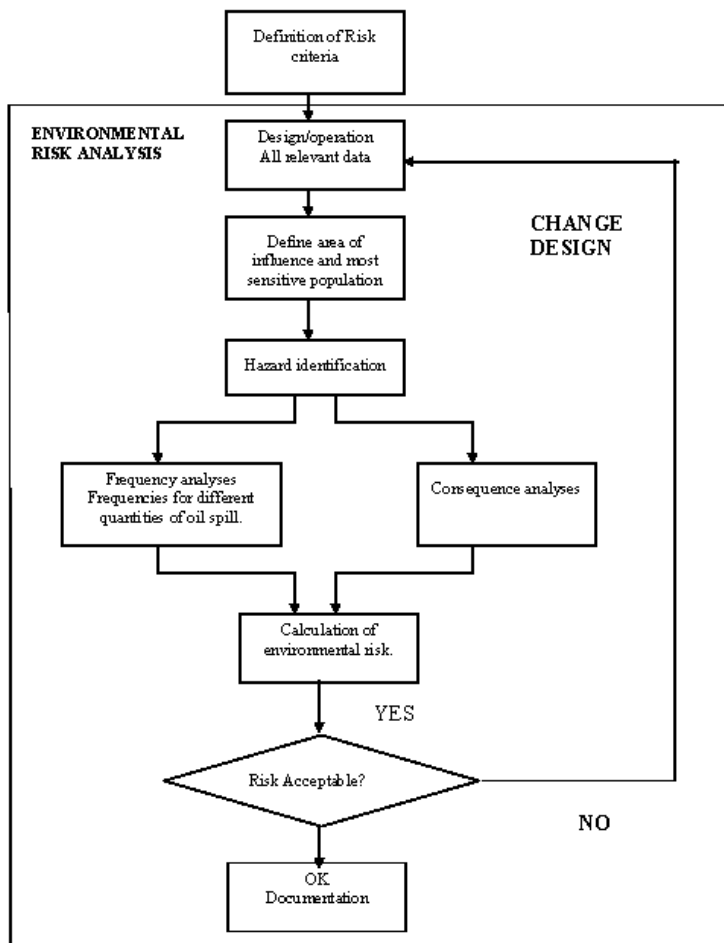
Prior to carrying out an environmental risk analysis, risk criteria should be defined. The risk criteria should be documented and the regulator and/or operator should update the criteria during the course of operations as appropriate and necessary for enhancing the safety level and as an effort to achieve the objectives defined for the activities. Risk or acceptance criteria must at a minimum incorporate national and international laws and standards. Consultation should also include input from local communities and interested parties for risk criteria analysis. If data is insufficient to define risk criteria, then the risk assessment should also incorporate the precautionary principle as reflected in Principle 15 of the Rio Declaration.

The environmental risk analysis should be initiated as soon as practical to allow time if needed for public consultation. The analysis should be valid for the period of the year the operations will be carried out. If there is uncertainty of the timing of operations, the analysis should be valid for a longer period.

Risk associated with offshore oil and gas activities has two main elements--the risk that an event might happen, such as an oil spill, and the risk that something will be impacted, such as ecologically sensitive areas. A risk assessment should be carried out in order to estimate the risk of an acute oil spill or other event. An environmental risk analysis should be conducted to identify impact sensitivities from an acute spill or event, as well as, spills that result from routine operations, including approved discharge of drilling fluids or cuttings. The analysis of each potentially affected environmental resource should clearly distinguish between the risk of oil spills or other accident and impact severity. The risk of contact in an acute spill does not influence the impact severity. Probabilities related to acute oil spills should be estimated or modeled based on geological studies on resource estimates and

distribution, development scenarios, site-specific and regional considerations, exploration and production plans, and historical data. An analysis of response strategies, techniques, and capabilities should be conducted to determine the efficacy and feasibility of oil spill response throughout the year.

The analysis also should identify the need for risk reducing and contingency measures. Requirements stipulated by or in law or regulations, including requirements for risk reducing measures and the operator’s safety objectives, should form the basis for defining an acceptable level of risk.



Flow Chart depicting an environmental risk analysis scheme (Annex F AOOGG, 2009, p. 88) (Note that this report suggests using a Bow-Tie Risk Diagram as a supplement or replacement for this flow diagram)

Planning (AOOGG p27)

The operator should maintain, within its overall work program, plans for achieving environmental objectives and performance criteria. These plans should include:

- a clear description of the objectives;

- designation of responsibility for setting and achieving objectives and performance criteria at each relevant function and level of the organisation;
- the means by which they are to be achieved;
- time scales for implementation;
- programs for motivating and encouraging personnel towards a suitable HSE culture;
- mechanisms to provide feedback to personnel on environmental performance;
- processes to recognise good individual and team environmental performance; and
- mechanisms for evaluation and follow-up.

The operator should develop, document and maintain and review plans and procedures for responding to emergencies. These plans and procedures should reflect site-specific characteristics. In order to assess effectiveness of response plans, the operator should maintain procedures to test emergency plans by scenario drills and other suitable means at appropriate intervals. Plans should be revised and updated as necessary in light of experience gained. Plans should be available to the affected communities and the public at large.

Compliance Monitoring, auditing and verification (AOOGG p28)

Compliance monitoring, which include carrying out audits, inspections and verifications, are key activities for the authorities when it comes to following up the petroleum activities in the Arctic. Compliance monitoring may be carried out within a variety of organizational frameworks. For example, the recommendations of the European Parliament and Council provides for minimum criteria for environmental inspections in the European Union (EU).

The regulatory supervision should cover all stages of design, fabrication, installation, operations and removal of offshore installations. It should address all relevant parts of the operating company's management systems, such as procedures for ensuring compliance with legislation, licences, permits, and approved plans, as well as how the carrying out of activities are documented and reported. The regulatory supervision should also encompass the company's systems for pollution control and environmental monitoring, drilling and well operations techniques, production, and pipeline operations.

Representatives of the regulatory agencies should have the legal base to take appropriate action in case of violations, noncompliance, or if the operator fails to react adequately to dangerous situations. These actions can include issuing warnings, injunctions, shutting down specific operation, a complete shut-down of the installation, withdrawal of environmental licence or permit, or initiating prosecution by the relevant authority.

Authorized and qualified representatives from the regulatory agencies should have the legal base to access the installations and to see all relevant documentation and equipment at any time. The operating company shall provide for, as far as practical, the accommodation and necessary transportation.

Compliance monitoring may be carried out regularly as a part of a programme, or unscheduled in response to complaints, in connection with the issuing, renewal or modification of an authorisation, permit or licence, or in the investigation of accidents, incidents and occurrences of non-compliance. The frequency and extent of such activities should be decided by the regulatory agencies.

The regulatory agencies should establish plans for these supervisory activities. The extent and the issues to be covered should be based on the relevant regulatory requirements, the previous experience with the operators' compliance, environmental and geologic conditions, the type of activity carried out by the operator, the type of technology applied, reported accidents and incidents, and general knowledge regarding the operator and its ongoing activities. The plans should be available to the public.

Procedures should be maintained for compliance monitoring to:

- determine whether environmental management system elements and activities conform to requirements in the legislation, and are implemented effectively;
- examine line management systems and procedures, field operations, internal compliance monitoring practices, and data to see if they fulfill the company's environmental policy, objectives, and performance criteria;
- review incident reporting and remedy schemes in relation to incidents that have occurred;
- find out how identified current and potential environmental problems have been dealt with by the operator and how this is reflected in the environmental management system;
- determine compliance with relevant legislative and regulative requirements;
- identify areas for improvement, leading to progressively better environmental performance; and
- formulate the conclusions in a report, which must be well documented.

Reporting and evaluation of compliance monitoring activities (AOOGG p29)

The reports from compliance monitoring activities should include the following information:

- (a) legal basis for carrying out compliance monitoring;
- (b) background for carrying out the specific monitoring activity;
- (c) issues covered during the inspections or audits;
- (d) non-compliances or deviations found, as well as other observations;
- (e) requirements regarding correcting non-compliances or deviations, including time lines and needs for reporting back to the authorities; and
- (f) listing parties taking part in the inspections or audits.

The reports should be available to the public.

To prevent illegal cross-border environmental practices, the coordination of inspections with regard to installations and activities which might have transboundary impact should be encouraged.

Design and Operations (AOOGG p36)

Offshore oil and gas activities should make use of the best available and safest technologies as appropriate and be conducted in a manner to minimize impact on the environment. Operators should identify technologies and procedures to be employed for each step of the process from prospecting to exploration, development, production, platform decommissioning, and site clearance. Regulators should examine technologies and procedures proposed for use by operators and their adequacy to ensure that they are appropriate for the Arctic.

Of primary importance is the need to ensure that wells remain under control at all times during drilling, well-completion, production, and well-workover operations. This capability must be maintained even while operating under extreme conditions.

When planning an offshore oil and gas operation, a risk analysis may be used as a tool to identify potential hazards and prevent personal injuries, loss of human lives, and pollution of the environment. Criteria used for conducting such an analysis should be based on local regulatory requirements, local environmental conditions in the area of operation, and the planned operational activity.

A risk analyses should:

- address prevention of injuries, loss of human life, and pollution of the environment;
- include risk criteria that has been defined prior to conducting the analysis and document the evaluations forming the basis of the acceptance criteria;
- be used to follow the progress of activities in planning and implementation;
- identify risk that has been assessed with reference to the acceptance criteria, form the basis of systematic selection of technical operational and organizational risk to be implemented;
- be updated on a continuous basis and included as part of the decision making process; and
- systematically follow-up implemented risk reducing measures and assumptions made in the analysis to ensure safety within the defined criteria.

Technology (AOOGG p37)

Offshore platforms and other structures used for oil and gas activities in the Arctic should be designed, built, installed, maintained, and inspected to ensure their structural integrity taking into account the site-specific environmental conditions. Standards exist for the construction of fixed offshore platforms, including those constructed of steel and concrete; mobile offshore drilling units; and floating production, storage and offloading units (FPSOs). (FPSOs should be double hulled). Standards, such as those under the International Organization for Standardization (ISO), are under development for offshore artificial islands including those constructed of sand, gravel and ice. In iceberg-prone areas, provision should be made for the emergency removal of removable installations.

Employment of effective well control technology and practices including incident drills and exercises will lower the risk of blowouts and unintended release of other hazardous substances.

Blowout preventers and related equipment should be suitable for operation in subfreezing conditions. Drilling fluids, well casing programs, cements, emergency well shut-in procedures and well safety programs should also be suited to Arctic conditions including moving ice and possible subsurface permafrost.

Pipelines should be installed, operated, and maintained in a manner that minimizes disturbance of sea floor habitat and does not unreasonably interfere with other uses of the sea floor in the area. Pipelines should be installed only after a thorough survey of the seafloor for hazards or cultural resources. Design of offshore Arctic pipelines should follow recommended practices such as those from Det Norske Veritas or the American Petroleum Institute and take into account factors such as thaw settlement, near shore strudel scouring, and ice keel gouging. Pipe properties, instrumented internal inspection techniques, leak detection systems and techniques, cathodic protection, and preventive maintenance must also be considered in the design of Arctic pipelines.

Procedures (AOOGG p37)

Procedures relevant to the special conditions in arctic areas should be worked out as a part of the operator's management system.

Operators should submit a summary of the proposed project at the outset, followed by more detailed information prior to the initiation of each major activity, such as the drilling of a well. The application should describe all procedures to be employed, including those necessary to prevent harm to life and the marine environment. Special attention should be paid to operations in offshore areas underlain by permafrost.

Safe work procedures should be developed for all phases of the proposed operations, including construction activities, transportation, equipment operation and maintenance, safety tests and drills. For example, well-control exercises should be conducted regularly for each crew to develop an adequate level of response proficiency to conditions threatening a blowout. Exercises should cover a wide range of situations. As appropriate, procedures should also be developed to ensure that hot work, welding, burning, cutting, and other operations with the potential to cause ignition of flammable vapors are conducted safely. Safe work procedures may also be developed for cold work such as use of radioactive material, trenching and excavating, and work on fire suppression, gas detection or emergency shutdown devices. These procedures may include issuance of a work permit.

Procedures should be developed to protect personnel from the toxic effects of hydrogen sulfide, if it is encountered during drilling and production.

Decommissioning, and site clearance are discussed in Section 8 (**Site Clearance and Decommissioning**). Operators shall incorporate into the design of an installation needed measures to ensure that removal of the installation can be accomplished without causing significant impacts on the environment.

Human Health and Safety (AOOGG p38)

Threats to human health and safety including unsafe working conditions are factors contributing to accidents that could lead to environmental pollution. Possible threats or hazards affecting the health and safety of personnel in Arctic offshore oil and gas activities take many forms and comes from multiple sources. Principal sources include, but are not limited to, the harsh Arctic environment, the structural integrity of the installation, blowouts, fire and explosions, equipment failure, the transfer of personnel and supplies, and drilling, production, well completion, and workover operations.

All offshore activities should be conducted in a safe and skillful manner and equipment maintained in a safe condition for the health and safety of all persons and the protection of the associated facilities. All necessary precautions should be taken to control, remove, or otherwise manage any potential health, safety or fire hazards.

Management System and Work Procedures (AOOGG p38)

One way to manage potential risks is through the use of an appropriate management system. A management system or plan should address the identification of potential hazards, the evaluation of risks to the health and safety of personnel and procedures to eliminate or reduce health and safety risks (See 5.1 **Management Systems**). Management plans should:

- identify and recognize significant health and safety risks;
- evaluate significant health and safety risks;
- plan and implement actions/procedures to manage risks;
- review and test preparedness and effectiveness on a regular basis;
- establish clear lines of communication with personnel;
- provide training to personnel;
- identify appropriate personnel protection equipment; and
- communicate contents of the management plan to all personnel.

Operators should ensure that all contractors pursue established safe working environment objectives. Safe working procedures should be established for all persons, including contractors, to ensure safe working conditions for all offshore activities. In addition work permits may be required for specific work activities including hot work, cutting, and welding (see 6.3 **Design and Operations**).

Another useful tool to consider in the management or elimination of risks is through the use of a Health, Safety and Environment (HSE) Committee. HSE Committee meetings could be held to ensure that critical safety and environmental control information is communicated to all parties throughout offshore operations. HSE meetings would coordinate among the operator, contractors, and employees to ensure a mutual understanding of potential hazards in working environment. Meetings would allow employees an opportunity to express safety concerns to be addressed by the operator.

Training (AOOGG p40)

Trained operator and contract personnel are the key to safe and environmentally sound oil and gas activities. Appropriate training plans, programs, and practices addressing offshore Arctic oil and gas activities should be established and implemented for these personnel in accordance with their duties and job responsibilities. (Refer to Section 7, **Emergencies**, for information concerning response training).

All personnel should be provided with training on basic safety and environmental issues and procedures specific to the offshore environment prior to assuming their duties. This training should provide personnel with the necessary skills and knowledge needed to conduct their jobs in a safe manner, provide for health and safety of all persons, and protect the environment.

Training programs should provide instruction on the operation of equipment, offshore operating practices, offshore emergency survival and fire fighting, local or regional regulatory requirements. It should include Arctic cultural, social, and environmental concerns including marine mammal interactions as dictated by an individuals' job responsibilities. Where appropriate, indigenous and traditional knowledge should be used in training programs.

Supervisory personnel should have a thorough knowledge of the operations and the operating procedures for which they are responsible. Individuals responsible for drilling, well completion, or workover operations should be properly trained in well control. Individuals responsible for production operations should be properly trained in production safety system operations.

A person designated by the operator to be in charge of the offshore operation should have a thorough knowledge of the operations and the operating procedures they are responsible for, and training in the following areas as appropriate:

- leadership and command ability;
- communication skills;
- team building;
- crisis management; and
- installation specific emergency training.

Periodic refresher training should be provided to personnel as appropriate. As required, procedures should be developed to monitor the effectiveness of training programs.

Emergencies (AOOGG p43)

Arctic States that are party to the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC 1990) and/or the International Convention for the Prevention of Pollution from Ships (MARPOL 1973/1978, Annex I – regulations for the prevention of

pollution by oil), are required to ensure that operators have oil pollution emergency plans and that these plans are carried on board installations.

Preparedness (AOOGG p43)

Operators should establish and maintain emergency preparedness so that the mitigation of an incident will be carried out without delay in a controlled, organized, and safe manner. Risk analyses should be carried out in order to identify the accidental events that may occur and the consequences of such accidental events. Hazardous situations and accidents should be defined for the operations in question. An analysis should be carried out to design the emergency preparedness requirements so as to meet the specific circumstances of the operation. Such an analysis should include oil spill response strategies, techniques, and capabilities. The emergency preparedness required for the operation should be incorporated in the design and modification of the oil and gas installation, and for the selection of equipment. The performance requirements expected of both standby vessel and ice roads in emergencies should also be defined. This should include design criteria, equipment and manning requirements for standby vessels and design criteria and construction and maintenance requirements for roads. Emergency preparedness should be part of the safety and environmental program to ensure its integration into all phases of the operation in question.

Preparedness relating to oil pollution should ensure that the source of any oil pollution is first secured, and any release is effectively contained and collected near the source of the discharge as quickly as possible. Particular attention should be paid to response contingencies in ice conditions, where oil spill response, including containment, may require a range of techniques depending on the condition of the ice. The preparedness should also address protection of public health, environmental resources including shorelines, ice and water interfaces, and economic and cultural resources. The health and safety of all persons who may be involved in an incident (e.g., local populations and their representatives, responders, volunteers, etc.) should be a predominant consideration, and should be integrated into the overall emergency preparedness regime.

The communication within the emergency preparedness organization should ensure effective administration and control of all response resources when abnormal conditions and emergencies occur. The means of communication and their use should ensure unambiguous and effective transmission of information.

A key factor in preparedness is ensuring that personnel involved in the response are trained and instructed in their roles and duties.

Preparedness planning of the operator should include co-ordination with any relevant municipal, local, state or federal emergency response plan.

Governments are responsible for oversight including national emergency contingency planning. Governments should also make appropriate arrangements that facilitate international coordination and cooperation.

Response

Contingency Planning (AOOGG p44)

The contingency planning process is one of the key best management practices for evaluating the environmental effects of the response operation. Through the planning process, response options (e.g., no response, dispersant use, in situ burning, or mechanical recovery) can be fully evaluated under varying weather and ice conditions to decide ahead of time which options may be most successful in minimizing the effects of a spill and subsequent clean-up operations. By conducting this risk assessment through a multilateral contingency planning process such issues as disturbance to marine mammal migration from response, including ice-breaking activities can be evaluated in the context of each response measure and/or a combination of response measures. Through a multilaterally developed plan, response options would be vetted through the countries in preparation for an incident. The plan should establish training schedules so that response organizations are exercised periodically, and communicate on a regular schedule.

A multilateral Arctic response plan would delineate regional response zones, clearly identify the lead response group for each region and identify response groups to cascade in to help with the response. The plan would identify roles and responsibilities, would be maintained so contacts could be made effectively given an incident, and would identify response capabilities (personnel, equipment, platforms, communication, infrastructure, etc.) for each region.

Emergency Response Plans (AOOGG p44)

Refer to the EPPR Field Guide for Oil Spill Response in Arctic Waters for a practical introduction to oil spill response. Emergency response plans should address abnormal conditions and emergencies that can be anticipated during the oil and gas operation being carried out, including:

- personnel injury or loss of life;
- loss of well control, or release of flammable or toxic gas;
- fire, explosion or other emergencies that may occur;
- damage to the oil and gas installation;
- loss of support craft including aircraft;
- spills of oil or other pollutants; and
- hazards unique to the operation including ice encroachment; uncontrolled flooding of the installation; loss of ballast control or stability; pipeline leaks or ruptures; vessel collision; and heavy weather and difficulties with support facilities such as ice roads, aircraft or shuttle tankers.

Contents of Emergency Response Plans (AOOGG p44)

An emergency response plan should contain at least the following elements:

- a description of the response organization, clearly stating its structure, roles, responsibilities and decision-making authorities;

- policies and procedures for responding, including a summary of equipment to combat the particular condition or emergency situation, clearly stating the make and type of equipment, its capacity, location, type of transport, field of operation and operational procedures and training for operating staff. The procedures should include each key person's duties, when and how the emergency equipment is to be employed, and the action to be carried out. Policies should state measures for limiting or stopping the event in question and conditions for terminating the action. The procedures should be designed so as to be expedient to use for the emergency;
- a description of the alarm and communication systems, including notification criteria, reporting procedures and policies regarding government notification. Primary and secondary communication facilities among operational components should also be identified;
- Alert Criteria, whose procedures should list precautionary measures to secure the well and evacuate personnel in the event of damage from severe weather, sea, ice, erosion or other event;
- On-Site First Aid - List available backup medical support, medevac facilities and other emergency facilities, such as emergency fueling sites. Also describe required survival equipment, including extreme weather survival gear, alternate accommodation facilities, and emergency power sources; and
- Relief Well Arrangements - The operator should outline his immediate response to a well control incident or blowout. Also, the operator should demonstrate the availability of the necessary equipment, and support systems to be utilized.
- Designated response operation center to coordinate response actions; and
- "Emergency response contact list" in order to identify who and how key responders to an emergency are to be contacted.

Oil Spill Response Plan (AOOGG p45)

Operators should be required to have site-specific or operator-specific plans. An oil spill response plan addresses an oil spill volume based on relevant well data, catastrophic loss of a tank ship or barge, or damage to a pipeline. The Plan should be supplemented by resource sensitivity maps arranged sequentially by month for those areas identified by spill trajectories as being potentially exposed to oil pollution. The plan should also describe the process for its development, which should include involvement by response entities, both government and private, health officials, scientists, local populations that may be affected, wildlife experts, trustees of resources, and anyone else who may be affected or who may have a role in the response. Operators should allow the opportunity for public review and comment of the Plan.

The oil spill response plan should include, in addition to the items described above, the following:

- a brief description of the operation;
- a description of remote sensing systems in order to detect and monitor oil spills;
- a description of the site, water depth, seasonal constraints, and logistical support;
- references to all environmental support material that would be relevant to establish cleanup

priorities;

- details of the operator's capability in using real time wind and current data to implement an oil spill trajectory model both for open sea and for ice-infested areas;
- a map depicting sensitive areas to be protected;
- a description of cleanup and containment strategies required for shoreline and ice-covered areas;
- a description of alternative cleanup strategies such as the use of dispersants, in situ burning, and no response;
- a strategy to respond to small spills from the installation, shore base or loading operations;
- provisions for transport, storage, and disposal of recovered oil and oil contaminated materials;
- spill response crew relief & logistics; and
- a list or inventory of spill response equipment and their measured efficiency when used as expected in the plan.

Operators should have access to oil spill countermeasures equipment. The oil spill response plan should itemize equipment on-site for immediate containment purposes. The plan should also provide details of oil spill equipment and resources that are not onsite but will be mobilized in the event of a spill; the details should include type of equipment, required resources, logistics and timing of mobilizing the equipment to the site.

The oil spill response plan should include the qualifications and training of personnel responsible for the management of oil spill responses. It should clearly define their authority to take actions to respond to such emergencies.

A national preparedness and response system should be developed on the basis of protecting the health and safety, the environment, and the socio-economic interests of the nation's citizens. Oil spill response plans must take the existence of ice conditions into account. Broken ice conditions make it difficult to respond to oil spills with conventional mechanical response equipment because oil can be trapped in melting or freezing ice and require the coordinated application of a suite of response strategies. Through ice movement and drift, oil can be carried a long distance from the original site of the spill. Deployment of oil tracking buoys in the ice can aid in maintaining knowledge of the position of the oil. Where ice conditions exist, oil spill response plans must outline the strategies to be used, list the equipment to be deployed, and techniques to be implemented including for tracking oil in ice and for alternative response measures.

Exercises and Drills (AOOGG p46)

To enhance response capabilities, response organizations should conduct regular safety and emergency response drills during which trained workers and emergency responders carry out regular exercises. Drills include desk-top exercises and actual equipment and operational deployment exercises. Such drills should be conducted by operators as well as by relevant government authorities in their areas of responsibility, such as coast guards for marine spills.

Ice Management Plan (AOOGG p47)

Where there may be pack ice, drifting icebergs or ice islands at the operational site, the operator should develop an ice management plan that provides for the protection of the installation.

The Plan should include details regarding ice detection, ice surveillance, data collection, forecasting and reporting of ice encroachment, multiyear ice hazards, ice loading, and structural loading. If required, the Plan should also include details of ice avoidance or ice deflection, including forecasting oil-in-ice drift.

The Plan should include alert criteria and alert procedures to ensure a totally effective mobilization of all relevant emergency preparedness resources, including procedures for moving the installation. Measures for danger limitation should be implemented when a hazardous situation occurs in order to prevent its developing into an accident situation.

Emergency Preparedness Maintenance (AOOGG p47)

All the established technical, operational and organizational measures that make up the emergency preparedness of the individual activity, as well as, the actual equipment should be maintained in order to keep up a state of effective emergency preparedness.

Oil spill response exercises should be carried out on a scheduled basis allowing responders to use actual equipment. In addition, a communication exercise in response to an emergency should be conducted on a scheduled basis. Exercises should be reviewed to ensure compliance with all requirements relating to emergency preparedness. Any deviation should be identified and corrected immediately; the causes of such deviation should be identified. In accordance with the safety and environmental program, emergency preparedness work should be verified and documented.

Measures should be taken to update the established emergency preparedness based on continuous evaluation of experience, technological development and new knowledge.

Definition of Practices and Techniques (AOOGG p79)

Criteria for the Definition of Practices and Techniques mentioned in Paragraph 3(b)(i) of Article 2 of the OSPAR Convention

BEST AVAILABLE TECHNIQUES (BAT)

1. The use of the best available techniques shall emphasise the use of non-waste technology, if available.
2. The term "best available techniques" means the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste. In determining whether a set of processes, facilities and methods of operation constitute the best available techniques in general or individual cases, special consideration shall be

given to:

- (a) comparable processes, facilities or methods of operation which have recently been successfully tried out;
 - (b) technological advances and changes in scientific knowledge and understanding;
 - (c) the economic feasibility of such techniques;
 - (d) time limits for installation in both new and existing plants;
 - (e) the nature and volume of the discharges and emissions concerned.
3. It therefore follows that what is "best available techniques" for a particular process will change with time in the light of technological advances, economic and social factors, as well as changes in scientific knowledge and understanding.
 4. If the reduction of discharges and emissions resulting from the use of best available techniques does not lead to environmentally acceptable results, additional measures have to be applied.
 5. "Techniques" include both the technology used and the way in which the installation is designed, built, maintained, operated and dismantled.

BEST ENVIRONMENTAL PRACTICE (BEP)

6. The term "best environmental practice" means the application of the most appropriate combination of environmental control measures and strategies. In making a selection for individual cases, at least the following graduated range of measures should be considered:
 - (a) the provision of information and education to the public and to users about the environmental consequences of choice of particular activities and choice of products, their use and ultimate disposal;
 - (b) the development and application of codes of good environmental practice which covers all aspect of the activity in the product's life;
 - (c) the mandatory application of labels informing users of environmental risks related to a product, its use and ultimate disposal;
 - (d) saving resources, including energy;
 - (e) making collection and disposal systems available to the public;
 - (f) avoiding the use of hazardous substances or products and the generation of hazardous waste;
 - (g) recycling, recovery and re-use;
 - (h) the application of economic instruments to activities, products or groups of products;
 - (i) establishing a system of licensing, involving a range of restrictions or a ban.
7. In determining what combination of measures constitute best environmental practice, in general or individual cases, particular consideration should be given to:
 - (a) the environmental hazard of the product and its production, use and ultimate

- disposal;
 - (b) the substitution by less polluting activities or substances;
 - (c) the scale of use;
 - (d) the potential environmental benefit or penalty of substitute materials or activities;
 - (e) advances and changes in scientific knowledge and understanding;
 - (f) time limits for implementation;
 - (g) social and economic implications.
8. It therefore follows that best environmental practice for a particular source will change with time in the light of technological advances, economic and social factors, as well as changes in scientific knowledge and understanding.
 9. If the reduction of inputs resulting from the use of best environmental practice does not lead to environmentally acceptable results, additional measures have to be applied and best environmental practice redefined.

Company safety, environmental policies and objectives (AOOGG p89)

Detailed elements that may be incorporated into company safety and environmental policies and objectives

- Competent personnel are used during planning and implementation of the separate phases, including design, fabrication and installation and operation
- The operator's personnel and those of any Contractors are provided with necessary training
- Lines of responsibility, authority and communication are clearly defined and understood;
- Risk evaluation should be a part of the project management strategy in order to establish and maintain an acceptable level of health Safety and Environmental protection for the personnel and the environment;
- No activity should be performed unless an acceptable level of HSE protection can be maintained;
- Management of discharges should be achieved through the application of Best Available [Techniques/Technology]
- Experiences from arctic operations should be integrated into specifications, functional requirements, standards and procedures;
- Safety evaluations should be undertaken both prior to start-up and in subsequent phases of the operation;
- Administrative systems are established for the control of all documentation in all phases of the operation;
- Purchase documents and specifications should contain Quality Assurance requirements;
- Contractor's Quality Assurance systems should be evaluated and assessed and be the subject of regular audits;
- The quality of supplies and materials should be documented;
- Quality Assurance and Quality Control during operations should function effectively and

corrective action should be taken when quality control indications deviation from specification;

- ❑ Operational programmes should be prepared and compiled with relevant regulations and their functional capability should be subject to verification;
- ❑ Specifications for repairs should be established and specifications provide sufficient basis and requirements for their execution;
- ❑ Temporary equipment may be installed and operated in a secure way and in accordance with established specifications;
- ❑ Modifications should not reduce the degree of safety originally specified;
- ❑ An emergency preparedness system should be established and maintained so that necessary measures can be activated effectively and authorities involved notified;
- ❑ Administrative decisions made by the supervisory personnel are communicated effectively to the personnel and contractors;
- ❑ There should be continuous control and monitoring of all aspects of the working environment with regard to health safety and environmental risks and that necessary actions are implemented
- ❑ There should be continuous control and monitoring of the danger of pollution of the external environment and that personnel at all times will perform their tasks in such a way that pollution is avoided ;
- ❑ Both operator and contractor personnel should be made aware of the potential danger of accidents and inherent health and pollution aspects and they are given necessary information, training and exercises.